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September 15, 2015

The Board of Commissioners of Public Utilities Prince Charles Building 120 Torbay Road, P.O. Box 21040 St. John's, Newfoundland & Labrador A1A 5B2

Attention: Ms. Cheryl Blundon

Director Corporate Services & Board Secretary

Dear Ms. Blundon:

Re: Recommendation 2.16: Liberty Consulting Group Supply Issues and Power Outages Review Island Interconnected System addressing Newfoundland and Labrador Hydro

In response to Recommendation #2.16 in the *Report on Island Interconnected System to Interconnection with Muskrat Falls addressing Newfoundland and Labrador Hydro* by Liberty Consulting Group, dated December 17, 2014, enclosed is a copy of the planned demand management analysis completed for Newfoundland and Labrador Hydro and Newfoundland Power (the Utilities).

This Conservation and Demand Management (CDM) Potential Study 2015 (the Study) is the third such study completed by the Utilities. Previous CDM Potential Studies were completed in early 1990's and in 2008, and also filed with the Board. Similar to the previous work, this study was completed by an external consultant, and results are presented by Residential Sector; Commercial Sector; and Industrial Sector. The Study provides an analysis of energy conservation and load management technologies that are cost effective in comparison to the marginal costs of supply. The Study is not a conservation and demand management plan but is used by the Utilities to develop the Five-Year Conservation and Demand Management Plan: 2016-2020.

The Study informs that energy efficiency measures offer the largest potential for demand reduction on the Island Interconnected System, as well as the primary function of energy conservation. The main reason for this is that electric heat is the predominate driver of electric load on the Island Interconnected System. Therefore, measures that contribute to efficiencies with respect to electric heating and reducing heat loss will also contribute to reduced loading. The Study also recognizes that approximately 100 MW of capacity assistance is currently in place through the Utilities existing load curtailment programs and arrangements with their respective large commercial and industrial customers.

The Utilities are presently completing the Five-Year Conservation and Demand Management Plan: 2016-2020 and anticipate filing it with the Board in October. As with previous five-year plans, the 2016-2020 Plan will provide a portfolio of economically viable program offerings, and allow for continued assessment of CDM potential during the planning period.

Enclosed are copies of the *Newfoundland and Labrador Conservation and Demand Management Potential Study: 2015* for each of the Residential Sector; Commercial Sector; and Industrial Sector. Should you require additional information, please contact the undersigned.

Please note that following communications with the Board, they have approved the electronic file of the appendices only due to the volume of material. The original and copies are filed without the appendices. However, it is agreed that hard copies of the appendices can be provided upon request.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

TLP/bs

Legal Counsel

cc: Gerard Hayes – Newfoundland Power
Paul Coxworthy – Stewart McKelvey Stirling Scales
Sheryl Nisenbaum – Praxair Canada Inc.
ecc: Roberta Frampton Benefiel – Grand Riverkeeper Labrador

Thomas Johnson – Consumer Advocate Thomas O' Reilly – Cox & Palmer Danny Dumaresque









Newfoundland and Labrador Conservation and Demand Management Potential Study: 2015

Commercial Sector Final Report

August 2015

Submitted to: Newfoundland Power Inc. and Newfoundland and Labrador Hydro

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Executive Summary

Background and Objectives

Since the initial launch of takeCHARGE, NL's Conservation and Demand Management (CDM) market has changed both naturally and as a result of the Utilities' planned interventions. Since the last CDM Potential Study, energy efficient technologies have evolved and the takeCHARGE programs have impacted the province's awareness and adoption of CDM measures. In addition, new codes & standards have been drafted or come into effect.

Experience throughout many North American jurisdictions has demonstrated that energy efficiency and conservation have a significant potential to reduce energy consumption, energy costs and emissions.

The objective of this CDM Potential Study, referenced as *CDM Potential Study 2015*, is to identify the achievable, cost-effective electric energy efficiency and demand management potential in the province. Similar to the 2007 Study, the information in this report will be critical to developing the next generation of takeCHARGE programs that are equally responsive to customer expectations, support efforts to be responsible stewards of electrical energy resources and is consistent with provision of least cost, reliable electricity service. The *CDM Potential Study 2015*, provides a resource for the Utilities to develop a comprehensive vision of the province's future energy service needs.

Scope

The scope of this study is summarized below:

- Sector Coverage: This study addresses three sectors: residential households (Residential sector), commercial and institutional buildings (Commercial sector), and small, medium, and large industry (Industrial sector).
- Geographical Coverage: The study addresses all regions of NL that are served by the Utilities.
 Customers served by both the hydroelectric grid and the stand-alone diesel grids are included.
 The study results are estimated for three distinct regions: Newfoundland, Labrador, and Isolated Diesel.
- Study Period: This study addresses a 15 year period. The Base Year for the study is the calendar year 2014. The Base Year of 2014 was calibrated to the 2014 actual sales data. The study milestone years will be 2017, 2020, 2023, 2026 and 2029.
 - It is recognized that the weather conditions in 2014 were not typical. The CDM Potential Study 2015 follows the same assumptions as in the Utilities' Load Forecast.
- Technologies: This study addresses a range of electricity conservation and demand management (CDM) measures and includes all electrical efficiency technologies or measures that are expected to be commercially viable by the year 2029 as well as peak load reduction technologies.

CDM Potential Study 2015 has been organized into two analysis areas and the results are presented in three reports, as show in Exhibit ES 1, below.

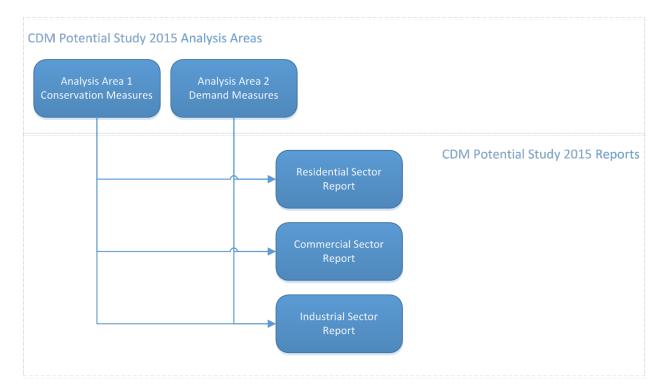


Exhibit ES 1 Overview of CDM POTENTIAL STUDY 2015 Organization – Analysis Areas and Reports

This report presents the results of both Analysis Area 1: Energy-efficiency Technologies and Behaviours and Analysis Area 2: Demand Measures, for Commercial sector customers. This report addresses all commercially available electric energy-efficiency and peak load reduction measures that are applicable to NL's Commercial sector. It includes the potential for electrical efficiency and peak load reduction technologies expected to be commercially viable by the year 2029; residential customer behaviour measures and commercial and industrial operation and maintenance (O&M) practices are also addressed.

Approach

The detailed end-use analysis of electrical efficiency opportunities in the Commercial sector employed two linked modelling platforms: CEEAM (Commercial Electricity and Emissions Analysis Model), an in-house, simulation model developed in conjunction with Natural Resources Canada (NRCan) for modelling electricity use in commercial/institutional building stock and CSEEM (Commercial Sector Energy End-use Model), which is also an ICF in-house spreadsheet-based macro model.

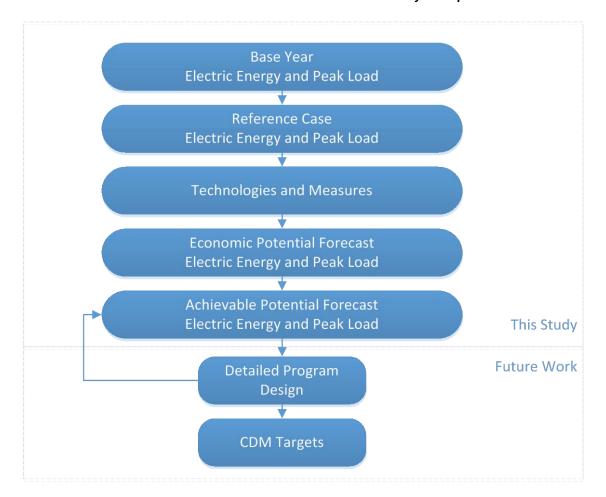


Exhibit ES 2 CDM POTENTIAL STUDY 2015: Main Analytic Steps

The major steps involved in the analysis are shown in Exhibit ES 2 and are discussed in greater detail in Section 2 of this report. As illustrated in Exhibit ES 2, the results of *CDM Potential Study 2015*, and in particular the estimation of Achievable Potential, support on-going conservation and demand management (CDM) work; however, it should be emphasized that the estimation of Achievable Potential is not synonymous with either the setting of specific CDM targets or with program design.

Overall Commercial Study Findings

As in any study of this type, the results presented in this report are based on a number of important assumptions. Assumptions such as those related to the current penetration of efficient technologies and the rate of future growth in the building stock are particularly influential. Wherever possible, the assumptions used in this study are consistent with those used by the NL utilities. However, the reader is referred to a number of caveats throughout the main text of the report. Given these assumptions, the CDM Potential Study 2015 findings confirm the existence of significant potential cost-effective opportunities for electricity consumption and peak load savings in NL's commercial sector.

¹ The proportion of savings identified that could realistically be achieved within the study period.

Efficiency improvements would provide between 209 and 640 GWh/yr. of electricity consumption savings by 2029 in, respectively, the Lower and Upper Achievable Potential scenarios. The most significant Achievable Potential savings opportunities were in actions that addressed the HVAC end uses, specifically space heating. Besides space heating, there are significant savings to be found in lighting and refrigeration, as well as smaller opportunities in many of the other end uses, such as domestic hot water (DHW), food service and plug loads.

The electricity consumption savings would provide associated peak load reductions of approximately 32 to 118 MW during NL's winter peak period by 2029 in, respectively, the Lower and Upper Achievable Potential scenarios. Demand reduction measures would provide further peak load reductions of approximately 1.2 to 4.2 MW by 2029 in, respectively, the Lower and Upper Achievable Potential scenarios. All told, this amounts to peak load reduction potential of between 6% and 20% with respect to the Reference Case commercial peak load. Demand reductions do not include demand curtailment; rather, existing and future demand curtailment is included in the industrial sector report.

Summary of Electric Energy Savings in the Commercial Sector

A summary of the levels of annual electricity consumption contained in each of the forecasts addressed by CDM Potential Study 2015 is presented in Exhibit ES 3 and Exhibit ES 4, by milestone year.

Exhibit ES 3 Electricity Savings by Milestone Year for Three Scenarios (GWh/yr.)

	Economic Potential Scenario		Upper Achievable Potential Scenario		Lower Achievable Potential Scenario	
Year	Potential Savings (GWh/yr.)	% Savings Relative to Reference Case	Potential Savings (GWh/yr.)	% Savings Relative to Reference Case	Potential Savings (GWh/yr.)	% Savings Relative to Reference Case
2017	744	31%	56	2.3%	8	0.3%
2020	789	32%	149	6.0%	32	1.3%
2023	834	32%	280	11%	73	2.8%
2026	892	34%	456	17%	137	5.2%
2029	936	35%	640	24%	209	7.8%

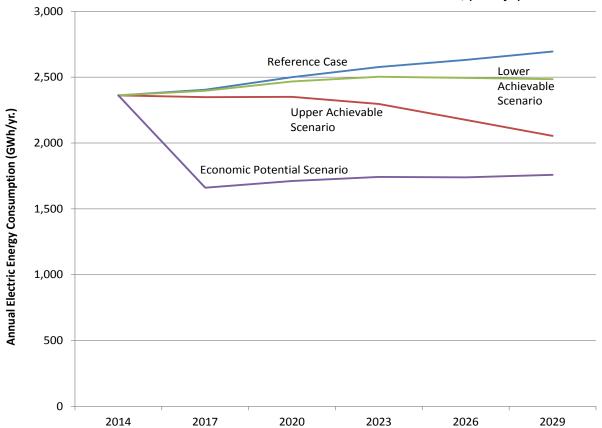


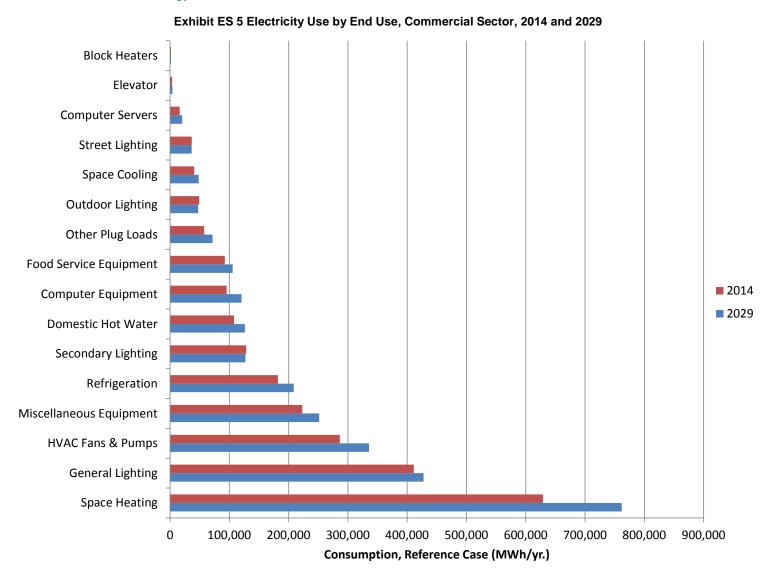
Exhibit ES 4 Annual Electricity Consumption—Energy-efficiency Achievable Potential Relative to Reference Case and Economic Potential Forecast for the Commercial Sector, (GWh/yr.)

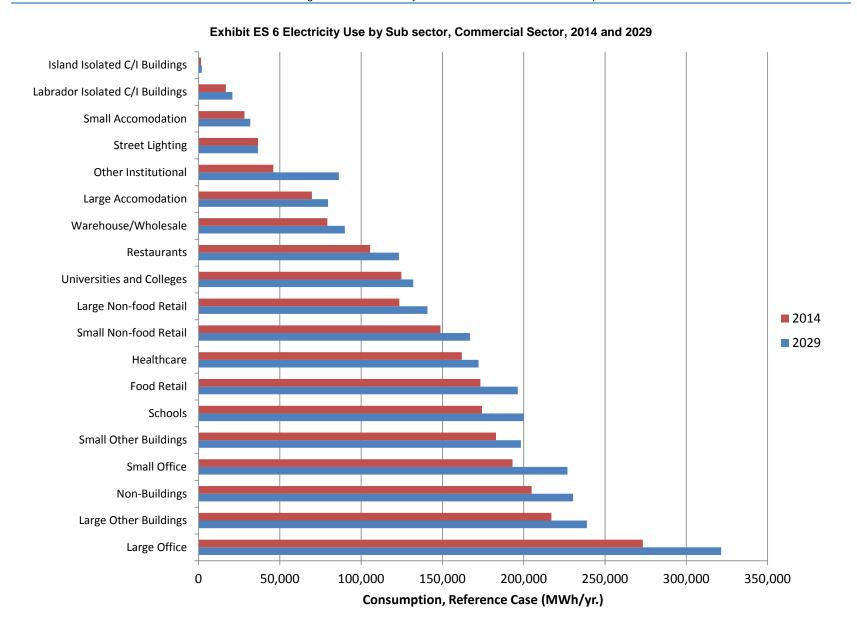
Base Year Electricity Use

In the Base Year of 2014, NL's Commercial sector consumed about 2,360 GWh/yr. Exhibit ES 5 shows that space heating accounts for about 27% of total commercial electricity use. Lighting accounts for the second largest percentage, at 17%. These are followed by HVAC Fans and Pumps at 12%, miscellaneous equipment at 9%, refrigeration at 8%, secondary lighting at 5%, and domestic hot water (DHW) at 5%. Other end uses account for 4% or less of the total. Indeed, some end uses are extremely small. Block heaters are assumed to be used only in Labrador. The same exhibit also presents the Reference Case consumption by end use in 2029, at the end of the study period, for comparison. Overall, NL's Commercial sector is forecast to rise to about 2,700 GWh/yr. by 2029 in the absence of new utility CDM initiatives.

Exhibit ES 6 shows the distribution of Base Year electricity consumption by sub sector. As illustrated, large offices account for the largest share (12%) of Commercial sector Base Year electricity use. The same exhibit also presents the Reference Case consumption by sub sector in 2029, at the end of the study period, for comparison.

Reference Case – Electric Energy





Economic Potential Forecast - Electric Energy

Under the conditions of the Economic Potential scenario, the study estimated that electricity consumption in the commercial sector would decrease to approximately 1,758 GWh/yr. by 2029. Savings relative to the Reference case would be approximately 936 GWh/yr. or about 35%. The Economic Potential savings in the intermediate milestone years are 1,660 GWh/yr. in 2017, 1,711 GWh/yr. in 2020, 1,743 GWh/yr. in 2023, and 1,739 GWh/yr. in 2026. In each case, the savings amount to approximately 31-35% of the Reference case consumption. The Economic Potential savings are dominated by measures that are cost-effective based on their full cost (versus the "donothing" option), and therefore within the definitions of the scenario they would be adopted immediately and provide savings starting in the first milestone period.

Achievable Potential – Electric Energy

The Achievable Potential is the portion of the Economic Potential savings that could realistically be achieved within the study period.³ In the commercial sector, the Achievable Potential for electricity savings was estimated to be 209 and 640 GWh/yr., respectively, in the Lower and Upper Achievable Potential scenarios. The savings in the intervening milestone years show a more realistic ramp-up pattern than that observed in the Economic Potential scenario.

The most significant Achievable Potential savings opportunities were in actions that addressed HVAC. In fact, savings in the HVAC end uses account for 57% of the opportunities in 2029. Of this, the ductless mini-split heating systems and building recommissioning measures offer the largest savings potential in the commercial sector. Besides HVAC, there are significant savings to be found in lighting and refrigeration as well as smaller opportunities in many of the other end uses.⁴

² The Economic Potential Electricity Forecast is the level of electricity consumption that would occur if all equipment and building envelopes were upgraded to the level that is cost effective against the economic threshold value, which has been set at different prices per kWh for the different regions. (One kWh from the Labrador hydroelectric grid is much less expensive than one kWh from an isolated diesel grid.)

³ The Achievable Potential recognizes that it is difficult to induce customers to purchase and install all the electrical efficiency technologies that meet the criteria defined by the Economic Potential Forecast. The results are presented as a range, defined as lower and upper.

⁴ It should be noted that measures are applied separately for each combination of region, sub sector, and milestone year. Some of the parameters that are used to assess measures in each circumstance can vary. For example, the potential savings or cost for a measure in one sub sector or region may be different from the savings or cost in another sub sector or region. In addition, the economic threshold value that is used to assess cost-effectiveness varies for each of the milestones. As such, measures that are marginally cost-effective, such as multi-split heat pumps, are only cost-effective in a subset of the regions, sub sectors, and milestone years being considered.

Summary of Peak Load Reductions

Based on discussions with utility personnel, the following peak period definition was used for this study:

Peak Period – The morning period from 7 am to noon and the evening period from 4 pm to 8 pm on the four coldest days in the December to March period; this is a total of 36 hours per year.⁵

Exhibit ES 7 and Exhibit ES 8 show the peak load reductions from both the energy efficiency measures and from measures targeted specifically at load management. More details on peak load reduction opportunities are provided in the main body of the report. Highlights of the findings include the following:

- Electricity savings offered by the Lower and Upper Achievable Potential scenarios would provide peak load reductions of approximately 32 to 118 MW by 2029, a decrease of between 5% and 20% relative to the reference case.
- Demand reduction measures under the Lower and Upper Achievable Potential scenarios would provide peak load reductions of an additional 1.2 to 4.2 MW by 2029, a decrease of up to a further 1%.
- Demand reduction potential is dominated by the reductions associated with energy efficiency measures in both of the achievable potential scenarios.

Exhibit ES 7 Peak Demand Reductions by Milestone Year for Three Scenarios (MW)

	Economic Potential		Upper Achievable		Lower Achievable	
Year	Potential Reductions (MW)	% Reduction Relative to Reference Case	Potential Reductions (MW)	% Reduction Relative to Reference Case	Potential Reductions (MW)	% Reduction Relative to Reference Case
2017	3.5	0.6%	0.0	0.0%	0.0	0.0%
2020	41.1	7.4%	0.8	0.1%	0.2	0.0%
2023	41.8	7.3%	1.7	0.3%	0.4	0.1%
2026	41.8	7.1%	2.9	0.5%	0.7	0.1%
2029	41.7	6.9%	4.2	0.7%	1.2	0.2%

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⁵ Source: NL (Feb 2014) http://hydroblog.nalcorenergy.com/meeting-peak-demand/

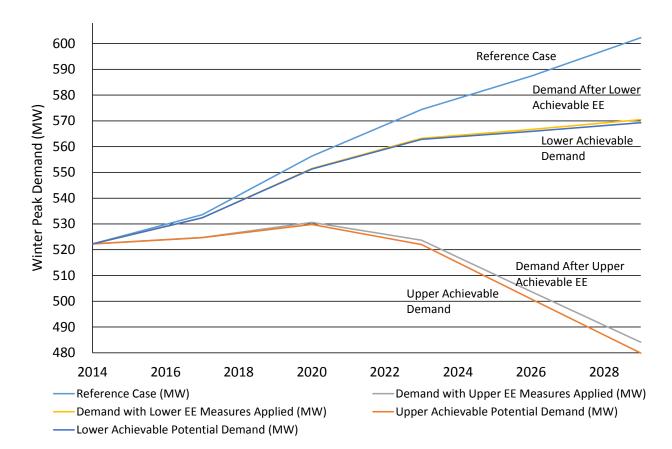


Exhibit ES 8 Peak Demand of Reference Case, Lower Achievable Potential and Upper Achievable Potential in Commercial Sector (MW)

Base Year Demand

In the Base Year of 2014, NL's Commercial sector demand was approximately 522 MW, averaged over the 36-hour peak period. This may be compared against the overall average commercial demand for the year, which is:

2,360 GWh / 8760 hours * 1000 MW/GW = 269 MW

Exhibit ES 9 shows that space heating accounts for nearly 40% of total commercial sector demand. General lighting accounts for the second largest percentage, at 14%. These are followed by HVAC Fans and Pumps and domestic hot water each at 8%, food service equipment and miscellaneous equipment each at 7% and refrigeration and secondary lighting at 4% each. Other end uses account for 3% or less of the total. The same exhibit also presents the Reference Case demand by end use in 2029, at the end of the study period, for comparison. Overall, NL's Commercial sector is forecast to rise to about 602 MW by 2029 in the absence of new utility CDM initiatives, an increase of approximately 13%.

Exhibit ES 10 shows the distribution of Base Year electric peak demand by sub sector. As illustrated, large offices account for the largest share (12%) of Commercial sector Base Year electricity use. The same exhibit also presents the Reference Case consumption by sub sector type in 2029, at the end of the study period, for comparison.

Reference Case - Electric Peak Demand



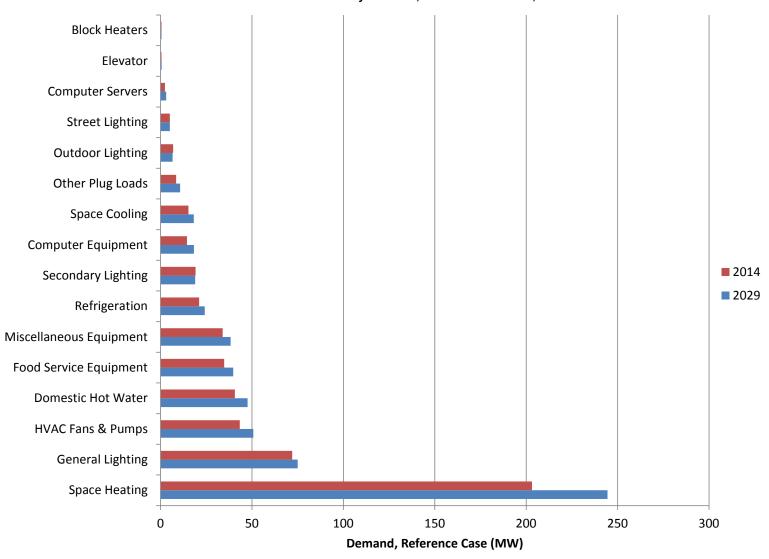


Exhibit ES 10 Electric Peak Demand by Sub Sector, Commercial Sector, 2014 and 2029 Island Isolated C/I Buildings Labrador Isolated C/I Buildings Street Lighting **Small Accomodation** Warehouse/Wholesale Other Institutional Large Accomodation **Universities and Colleges** Large Non-food Retail Non-Buildings **2014** Food Retail **2029** Restaurants Healthcare Small Non-food Retail **Small Other Buildings** Schools Small Office Large Other Buildings

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20

30

40

Demand, Reference Case (MW)

50

60

70

80

10

Large Office

0

Economic Potential Forecast – Electric Peak Demand

Under the conditions of the Economic Potential scenario, ⁶ the study estimated that electric peak demand in the commercial sector would decrease to approximately 449 MW by 2029. Reductions relative to the Reference case would be approximately 153 MW or about 25%. The Economic Potential reductions in the intermediate milestone years are 134 MW in 2017, 137 MW in 2020, 142 MW in 2023, and 148 MW in 2026. In each case, the reductions amount to approximately 25% of the Reference case peak demand. The Economic Potential reductions are dominated by measures that are cost-effective relative to the Utilities' cost of new capacity based on their full cost (versus the "donothing" option), and therefore within the definitions of the scenario they would be adopted immediately and provide reductions starting in the first milestone period.

Achievable Potential – Electric Peak Demand

The Achievable Potential is the portion of the Economic Potential reductions that could realistically be achieved within the study period. In the commercial sector, electricity savings offered by the Lower and Upper Achievable Potential scenarios would provide peak load reductions of approximately 32 to 118 MW by 2029, a decrease of between 5% and 20% relative to the reference case. Demand reduction measures under the Lower and Upper Achievable Potential scenarios would provide peak load reductions of an additional 1.2 to 4.2 MW by 2029, a decrease of up to a further 1%. Thus, demand reduction potential is dominated by the reductions associated with energy efficiency measures in both of the achievable potential scenarios. The savings in the intervening milestone years show a more realistic ramp-up pattern than that observed in the Economic Potential scenario.

Among the demand reduction measures the most significant Achievable Potential savings opportunities were in actions that addressed HVAC measures. In fact, HVAC reductions account for 64-74% of the opportunities in 2029. Of this, the HVAC demand controls measure offers the largest demand reduction potential in the commercial sector, aside from the demand reduction associated with energy efficiency measures. Besides the HVAC savings, there are also potential demand savings from demand measures related to DHW, lighting, and refrigeration.

-

⁶ The Economic Potential Electric Peak Load Forecast is the expected electric peak load that would occur in the defined peak period if demand is reduced by the reductions associated with the energy efficiency measures in the Economic Potential Electricity Efficiency Forecast, and all peak load reduction measures that are cost effective against the future avoided cost of new capacity in NL were also fully implemented.

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1 Introduction

Newfoundland Power Inc. and Newfoundland and Labrador Hydro have been successfully delivering electricity conservation programs to their customers since 2009 under the joint brand, takeCHARGE.

Since the initial launch of takeCHARGE, NL's CDM market has changed both naturally and as a result of the Utilities' planned interventions. Since the last CDM Potential Study, energy efficient technologies have evolved and the takeCHARGE programs have impacted the province's awareness and adoption of CDM measures. In addition, new codes & standards have been drafted or come into effect.

Experience throughout many North American jurisdictions has demonstrated that energy efficiency and conservation have a significant potential to reduce energy consumption, energy costs and emissions.

The objective of this CDM Potential Study, referenced as *CDM Potential Study 2015*, is to identify the achievable, cost-effective electric energy efficiency and demand management potential in province. Similar to the 2008 Study, the information in this report will be critical to developing the next generation of takeCHARGE programs that are equally responsive to customer expectations, support efforts to be responsible stewards of electrical energy resources and is consistent with provision of least cost, reliable electricity service. The *CDM Potential Study 2015*, provides a resource for the Utilities to develop a comprehensive vision of the province's future energy service needs.

1.1 Study Scope

The scope of this study is summarized below:

- Sector Coverage: This study addresses three sectors: residential households (Residential sector), commercial and institutional buildings (Commercial sector), and small, medium, and large industry (Industrial sector).
- Geographical Coverage: The study addresses all regions of NL that are served by the Utilities.
 Customers served by both the hydroelectric grid and the stand-alone diesel grids are included.
 The study results are estimated for three distinct regions: Newfoundland, Labrador, and Isolated Diesel.
- Study Period: This study addresses a 15 year period. The Base Year for the study is the
 calendar year 2014. The Base Year of 2014 was calibrated to the 2014 actual sales data. The
 study milestone years will be 2017, 2020, 2023, 2026 and 2029.
 - It is recognized that the weather conditions in 2014 were not typical. The CDM Potential Study 2015 follows the same assumptions as in the Utilities' Load Forecast.
- Technologies: This study addresses a range of conservation and demand management (CDM)
 measures and includes all electrical efficiency technologies or measures that are expected to be
 commercially viable by the year 2029 as well as peak load reduction technologies.

1.1.1 Data Caveat

As in any study of this type, the results presented in this report are based on a large number of important assumptions. Assumptions such as those related to the current penetration of energy-efficient technologies, the rate of future growth in the stock of commercial buildings and customer willingness to implement new energy-efficiency measures are particularly influential. Wherever possible, the assumptions used in this study are consistent with those used by the Utilities and the Government of Newfoundland and are based on best available information, which in many cases includes the professional judgment of the consultant team, client personnel and local experts. The reader should, therefore, use the results presented in this report as best available estimates; major assumptions, information sources and caveats are noted throughout the report.

1.2 Study Organization

Exhibit 1 presents an overview of the study's organization; as illustrated, the study has been organized into two analysis areas and four individual reports.

A brief description of each analysis area and its report content is provided below.

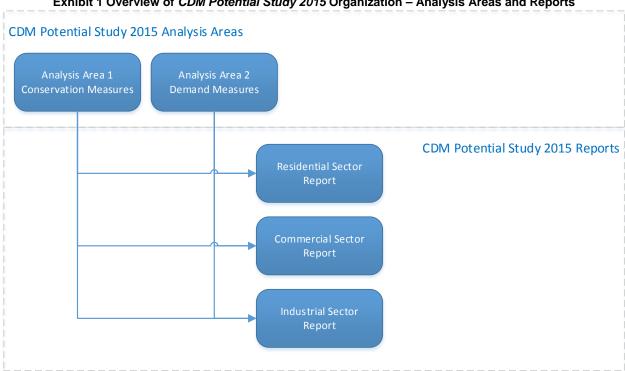


Exhibit 1 Overview of CDM Potential Study 2015 Organization - Analysis Areas and Reports

1.2.1 **Analysis Area 1 – Conservation Measures**

This area of the CDM Potential Study 2015 assesses electric energy reduction opportunities that could be provided by electrical efficiency technologies that are expected to be commercially viable by the year 2029; residential customer behaviour measures and commercial and industrial operation and maintenance (O&M) practices are also addressed. The results of Analysis Area 1 are presented in three individual sector reports.

1.2.2 **Analysis Area 2 – Demand Measures**

This area of the CDM Potential Study 2015 assesses peak load reduction opportunities that could be provided by peak load reduction technologies that are expected to be commercially viable by the year 2029. The results of Analysis Area 2 are presented in three individual sector reports.

1.3 **Report Organization**

This report presents the Commercial sector results. It is organized and presented as follows:

- Section 2 presents an overview of the study methodology, including a definition of key terms and an outline of the major analytic steps involved.
- Section 3 presents a profile of Commercial sector Base Year electricity use in NL.
- Section 4 presents a profile of Commercial sector Base Year electric peak load, including the definition of peak periods that are included in this study.

⁷ The term "electric energy" is used in this report to distinguish electricity consumption (in units of kWh or MWh) from electricity demand during a specific period (in units of MW).

- Section 5 presents the Reference Case, which provides a detailed estimate of electricity use in NL's Commercial sector over the study period 2014 to 2029, in the absence of new utility CDM program initiatives.
- Section 6 presents the Reference Case electric peak loads, which provide a detailed estimate of peak load requirements in NL's Commercial sector over the study period 2014 to 2029, in the absence of new utility CDM program initiatives.
- Section 7 identifies and assesses the economic attractiveness of the selected energy-efficiency technology measures for the Commercial sector.
- Section 8 presents the Commercial sector Economic Potential Electricity Forecast for the study period 2014 to 2029, including the potential for both energy efficiency measures and capacityonly peak load reduction measures.
- Section 9 presents the estimated upper and lower Achievable Potential for electric energy savings for the study period 2014 to 2029, including the potential for both energy efficiency measures and capacity-only peak load reduction measures.
- Section 10 lists sources and references.
- Section 11 is the Glossary.

1.4 Results Presentation

The preparation of CDM Potential Studies involves the compilation and analysis of an enormous amount of market and technology data and a nearly infinite number of ways of organizing and presenting the results. It is recognized that readers will have differing levels of needs with respect to the level of detail provided. Consequently, the results of this CDM Potential Studies are presented at three levels of detail.

- Main report body: The main body of the report provides a relatively high-level reporting of the main steps involved in undertaking each stage of the study together with a concise summary of results, including comments and interpretation of key findings. It is assumed that the content and level of detail in the main report body is suitable for the majority of readers who wish to gain an understanding of the potential contribution of CDM options to NL's long-term electricity requirements.
- Appendices: A separate appendix accompanies each major section of the main report. Each
 appendix provides more detailed information on the methodology employed, including major
 assumptions or sample calculations as applicable, together with additional levels of results. It is
 assumed that this presentation is better suited to CDM analysts and managers wishing a more
 thorough understanding of the study results.
- Software: All of the data generated by the study is provided in two custom-designed Excel models: Data Manager and the measure TRM (technical resource manual) Workbook.
 - Data Manager is a custom-designed Excel workbook with query protocols that enable the user to search and report the study results in a virtually infinite number of combinations. Data Manager is intended to support the most detailed level of CDM activity such as program design, preparation of regulatory submissions, etc.

The Measure TRM Workbook is a custom-designed model that provides comprehensive profiles of the CDM measures assessed within the study. Because the information is provided in software form, any changes to economic, financial or performance data inputs can be easily accommodated and revised results generated automatically.

2 Study Methodology

This section provides an overview of the methodology employed for this study. More specifically, it addresses:

- Definition of terms
- Major analytic steps
- Analytic models

2.1 Definition of Terms

This study uses numerous terms that are unique to analyses such as this one and consequently it is important to ensure that readers have a clear understanding of what each term means when applied to this study.

A brief description of some of the most important terms and their application within this study is included below.

Base Year Electricity Use

The Base Year is the starting point for the analysis. It provides a detailed description of where and how electrical energy is currently used in the existing building stock. Building electricity use simulations were undertaken for the major sub sector types and calibrated to actual utility customer billing data for the Base Year. As noted previously, the Base Year for this study is the calendar year 2014.

Base Year Electric Peak Load Profile Electric peak load profiles refer to one specific time period throughout the year when NL's generation, transmission and distribution system experiences particularly high levels of electricity demand. This period is of particular interest to system planners; improved management of electricity demand during this peak period may enable deferral of costly system expansion. This study addresses one specific peak periods, as outlined in the main text.

Reference Case Electricity Use (includes "natural" conservation) The Reference Case electricity use estimates the expected level of electrical energy consumption that would occur over the study period in the absence of new (post-2014) utility-based CDM initiatives. It provides the point of comparison for the subsequent calculation of Economic and Achievable electricity savings potentials. Creation of the Reference Case required the development of profiles for new buildings in each of the sub sectors, estimation of the expected growth in building stock, and finally an estimation of "natural" changes affecting electricity consumption over the study period. The Reference Case is calibrated to the Utilities most recent load forecast, minus the impacts of new, future CDM initiatives.

Reference Case Electric Peak Load Profile The Reference Case peak load profile estimates the expected electric peak loads in the defined peak period over the study period in the absence of new utility CDM program initiatives. It provides the point of comparison for the subsequent calculation of Economic and Achievable Potentials for peak load reduction.

Conservation and Demand Management (CDM) Measures CDM measures can include energy efficiency (use more efficiently), energy conservation (use less), demand management (use less during peak periods), fuel switching (use a different fuel to provide the energy service) and customer-side generation (displace load off of grid). Customer –side generation and fuel switching are not included in this study.

The Cost of Conserved Energy (CCE) The CCE is calculated for each energy-efficiency technology measure. The CCE is the annualized incremental capital and O&M cost of the upgrade measure divided by the annual energy savings achieved, excluding any administrative or program costs. The CCE represents the cost of conserving one kWh of electricity; it can be compared directly to the cost of supplying one new kWh of electricity.

The Cost of Electric Peak Reduction (CEPR) The CEPR for a peak load reduction measure is defined as the annualized incremental capital and O&M cost of the measure divided by the annual peak reduction achieved, excluding any administrative or program costs. The CEPR represents the cost of reducing one kW of electricity during a peak period; it can be compared to the cost of supplying one new kW of electric capacity during the same period.

Electric Capacity-Only Peak Load Reduction Measures Capacity-only measures are technologies or activities that result in the shifting of certain electrical loads from periods of peak system demand to periods of lower system demand.

Economic Potential Electricity Forecast The Economic Potential Electricity Forecast is the level of electricity consumption that would occur if all equipment and building envelopes were upgraded to the level that is cost effective against the economic threshold value⁸, which has been set at different prices per kWh for the different supply system types. All the energy-efficiency upgrades included in the technology assessment that had a CCE equal to, or less than, the economic threshold value for a given supply system were incorporated into the Economic Potential Forecast.

Economic Potential Electric Peak Load Forecast The Economic Potential Electric Peak Load Forecast is the expected electric peak loads that would occur in each of the three defined peak periods if all peak load reduction measures that are cost effective against the future avoided cost of new capacity in NL were fully implemented.

Achievable Potential

The Achievable Potential is the proportion of the savings identified in the Economic Potential Forecasts that could realistically be achieved within the study period. The Achievable Potential recognizes that it is difficult to induce customers to purchase and install all the electrical efficiency technologies that meet the criteria defined by the Economic Potential Forecast. The results are presented as a range, defined as lower and upper.

⁸ The economic threshold value is related to the cost of new avoided electrical supply. The values for each supply system are generally selected to provide the CDM Potential Study with a reasonably useful time horizon (life) to allow planners to examine options that may become more cost effective over time. Further discussion is provided in Section 7 of this report.

2.2 Major Analytic Steps

The study was conducted within an iterative process that involved a number of well-defined steps, as illustrated in Exhibit 2.



Exhibit 2 Major Analytic Steps

A summary of the steps is presented below.

Step 1: Develop Base Year Electric Energy and Peak Load Calibration Using Actual Utility Billing Data

Build a model of electric energy and demand for the sector, disaggregated to all the building types and end uses, calibrated to sales of electricity in NL. This includes the following sub-steps:

- Compile and analyze available data on NL's existing building stock.
- Develop detailed technical descriptions of the existing building stock.
- Undertake computer simulations of electricity use in each building type and compare these with actual building billing and audit data.
- Compile actual utility billing data.
- Create sector model inputs and generate results.
- Calibrate sector model results using actual utility billing data.
- Use end-use load shape data to convert electric energy use to electric demand in each selected peak period.

 Calibrate the weather-sensitive load shape ratios for all three sectors to produce regional demand results that agree with the actual utility peak demand.

Step 2: Develop Reference Case Electric Energy Use and Peak Load Profile

Extend the base year model to the end of the study period, based on forecast building stock growth and expected natural changes in construction practices, equipment efficiency levels and/or practices. This includes the following sub-steps:

- Compile and analyze building design, equipment and operations data and develop detailed technical descriptions of the new building stock.
- Develop computer simulations of electricity use in each new building type.
- Compile data on forecast levels of building stock growth and "natural" changes in equipment efficiency levels and/or practices.
- Define sector model inputs and create forecasts of electricity use for each of the milestone years.
- Compare sector model results with load forecasting data provided by the Utilities for the study period.
- Use end-use load shape data to convert electric energy use to electric demand in each selected peak period over the study period.

Step 3: Identify and Assess Energy-efficiency and Peak Load Reduction Measures

Compile information on upgrade measures that can save electric energy and/or reduce peak demand, and assess them for technical applicability and economic feasibility. This includes the following sub-steps:

- Develop list of energy-efficiency upgrade and peak load reduction measures.
- Compile detailed cost and performance data for each measure.
- For energy-efficiency measures, identify the baseline technologies employed in the Reference Case, develop energy-efficiency upgrade options and associated electricity savings for each option, and determine the CCE for each upgrade option.
- For each peak load reduction measure, identify the affected end use, the potential load reduction or off-peak shifting and determine the CEPR.
- Based on the above results, prepare summary tables that show the amount of potential peak load reduction provided by each measure and at what cost (\$/kW/yr.).
- Apply each peak load reduction measure to the affected end use, regardless of cost, and determine total peak reduction.
- Summarize the peak load reduction impacts in a supply curve.

Step 4: Estimate Economic Electric Energy Savings Potential

Develop an estimate of the electric energy savings potential that would result from implementing all of the economically feasible measures in all the buildings where they are applicable. This includes the following sub-steps:

- Compile utility economic data on the forecast cost of new electricity generation and set an
 economic threshold value; different economic threshold values were selected for each region
 and milestone year.
- Identify the combinations of energy-efficiency upgrade options and building types where the cost
 of saving one kilowatt of electricity is equal to, or less than, the cost of new electricity generation.
- Apply the economically attractive electrical efficiency measures from Step 3 within the energyuse simulation model developed previously for the Reference Case.

- Determine annual electricity consumption in each building type and end use when the economic efficiency measures are employed.
- Compare the electricity consumption levels when all economic efficiency measures are used with the Reference Case consumption levels and calculate the electricity savings.

Step 5: **Estimate Achievable Potential Electricity Savings**

Develop an estimate for the peak load impacts associated with the measures that save electric energy. This includes the following sub-steps:

- Convert the electricity (electric energy) savings (MWh) calculated in the preceding steps to peak load (electric demand) savings (kW).
- Convert electricity savings to hourly demand, drawing on a library of specific sub sector and enduse electricity load shapes. Using the load shape data, apply the following steps:
 - Disaggregate annual electricity savings for each combination of sub sector and end use by month
 - Further disaggregate monthly electricity savings by day type (weekday, weekend day and peak day)
 - Finally, disaggregate each day type by hour.
- Produce a post-efficiency case for peak demand, by region, building type, end use, and milestone year, to serve as a base case for estimating the impacts of peak load measures.

Step 6: **Estimate Peak Load Impacts of Electricity Savings**

Develop an estimate for the peak load impacts associated with the measures that save electric energy. This includes the following sub-steps:

- Compile utility economic data on the forecast cost of new capacity and set an economic threshold value; different economic threshold values were selected for each region and milestone year.
- Identify the combinations of energy efficiency upgrade options and building types where the cost of reducing one kilowatt of demand is equal to, or less than, the cost of new electric capacity.
- Apply the economically attractive electrical efficiency measures from Step 3 within the demand simulation model developed previously for the Reference Case, using the post-efficiency case as the starting point for the demand measures.
- Determine annual electric demand in each building type and end use when the economic demand reduction measures are employed.
- Compare the electric demand levels when all economic demand reduction measures are used with the post-efficiency demand levels and calculate the total demand reduction.

Step 7: **Estimate Achievable Potential Electricity Savings and Demand Reduction**

Develop an estimated range for the portion of economic potential savings and demand reductions that would likely be achievable within realistic CDM programs. This includes the following sub-steps:

- Bundle the electric energy and peak load reduction opportunities identified in the Economic Potential Forecasts into a set of opportunities.
- For each of the identified opportunities, create an Opportunity Profile that provides a high-level implementation framework, including measure description, cost and savings profile, target sub sectors, potential delivery allies, barriers and possible synergies.

⁹ Peak load savings were modelled using the Cross-Sector Load Shape Library Model (LOADLIB).

- Review historical achievable program results and prepare preliminary Assessment Worksheets.
- Conduct a full day workshop involving the client, the consultant team, trade allies and technical
 experts to reach general agreement on the upper and lower range of Achievable Potential for
 both efficiency and demand reduction.
- Total potential for demand reduction includes both the demand reductions associated with the energy efficiency measures and the demand reductions from demand management measures.

2.3 Analytical Models

The analysis of the Commercial sector employed two linked modelling platforms:

- CEEAM (Commercial Electricity and Emissions Analysis Model), an in-house, simulation model developed in conjunction with Natural Resources Canada (NRCan) for modelling electricity use in commercial/institutional building stock.
- CSEEM (Commercial Sector Electricity End-use Model), an in-house spreadsheet-based macro model.

CEEAM was used to develop commercial electricity end-use intensities (EUIs) for each of the commercial and institutional building archetypes. CEEAM has been successfully employed in numerous domestic and international conservation and demand management projects.

Domestically, this includes assignments for BC Hydro, FortisBC, SaskPower, Manitoba Hydro, the Independent Electricity System Operator (IESO)¹⁰, Enbridge Gas, Union Gas, NB Power, Newfoundland Power, Newfoundland Labrador Hydro and Natural Resources Canada. CEEAM is a robust modelling platform whose results have been verified against actual end-use metered data for commercial buildings in the cities of Ottawa and Toronto and against results from DOE-2, the widely used building simulation software tool developed by the US Department of Energy (DOE).

CEEAM was developed specifically for applications such as this study. One of its particular strengths is the capability to simulate electricity performance not only in a given building but also in an entire stock of similar buildings (e.g., all Large Offices). In particular, it is capable of tracking the penetration of multiple technologies in combinations that are not possible with other simulation software tools, such as DOE-2.

CEEAM simulates the electricity consumption and peak load for all electricity end uses present in a given commercial building segment. CEEAM calculates energy use and emissions by end use and reports them in kWh/ft²/yr. and kg eCO₂/ft². Because CEEAM is a full modelling program, it calculates both building heating and cooling loads (internal and transmission). It therefore accounts for interactive effects such as the increase in heating energy use and decrease in cooling energy use resulting from lighting retrofits. CEEAM also uses equipment part load performance curves to accurately model the seasonal efficiency of heating and cooling plants.

The commercial EUIs derived by CEEAM provide inputs into CSEEM. CSEEM consists of two modules:

- A general parameters module that contains general sector data (e.g., floor space, growth rates, etc.)
- A building profile module that contains the EUI data for each of the selected building sub sectors

¹⁰ Formerly the Ontario Power Authority (OPA). The OPA merged with the IESO on January 1, 2015.

CSEEM combines data from each of these modules and provides total electricity use by service region, building sub sector and end use. CSEEM also enables the analyst to estimate the impacts of the electrical efficiency measures on a utility's on-peak system demand.

3 Base Year (2014) Electric Energy Use

3.1 Introduction

This section provides a profile of Base Year (2014) electricity use in NL's commercial sector. Development of the Commercial sector Base Year electricity profile required the following major steps:

- NL's commercial buildings were segmented into sub sectors containing buildings with similar energy use patterns
- The major energy end uses within commercial buildings were selected
- Data on end-use fuel shares and space cooling saturation were compiled for each sub sector
- Detailed building and equipment specifications were compiled and used to create building energy-use models for each sub sector
- Utility sales data were compiled for each sub sector
- Utility sales data were combined with the model results showing typical sub sector electricity use to generate an estimate of floor area for each sub sector
- CSEEM was used to combine the above data and provide the detailed Base Year profile.

A brief description of each of the above steps is provided below, together with a summary of the results. Additional information is provided in Appendix A.

3.2 Commercial Sector Segmentation

The first major task in developing the Base Year calibration involved the segmentation of the commercial building stock into specific sub sectors. The choice of building sub sectors is driven by both data availability and the need to facilitate the subsequent analysis and modelling of potential electrical efficiency improvements.

Base Year Electric Energy Use



Base Year Electric Peak Load



Reference Case Electric Energy Forecast



Reference Case Electric Peak Load Forecast



Technology Assessment: All Measures



Economic Potential: Energy and Peak Load



Achievable Potential: Energy and Peak Load

For modelling and analysis of energy-efficiency opportunities, the selected building sub sectors must be reasonably similar in terms of major design and operating considerations, such as building size, typical mechanical and electrical systems, and annual operating hours. In order to facilitate energy modelling, this report deals primarily with buildings in which energy use is dominated by space conditioning and the provision of services to occupants (e.g., lighting and water heating). As discussed below, buildings where energy use is primarily process-driven are segregated into a separate category and treated at a less detailed level.

Based on discussions with the Utilities personnel, it was agreed that NL's existing commercial stock would be segmented into the following sub sectors:

- Large Office
- Small Office
- Large Non-food Retail
- Small Non-food Retail

- Food Retail
- Large Accommodations
- Small Accommodations
- Health Care (Hospitals & Nursing Homes)
- Schools (Elementary and Secondary)
- Universities and Colleges
- Warehouse/Wholesale
- Restaurants
- Isolated C/I Buildings
- Large Other Buildings
- Small Other Buildings
- Other Institutional Buildings
- Non-Buildings
- Street Lighting

A brief description of each Commercial sub sector is included in Appendix A. Additional explanation is provided for selected sub sectors:

- Isolated C/I Buildings: This sub sector includes buildings such as restaurants, schools, variety stores, medical clinics and multi-purpose garages and sheds that are located in isolated communities served by local diesel-powered systems.
- Other Buildings: This sub sector represents buildings that do not fit into the other sub sectors, including churches, theatres, community centres, transportation buildings and recreation complexes.
- Other Institutional Buildings: This sub sector includes buildings such as barracks, mess halls, hangers and warehouses located at Canadian Forces Base Goose Bay.
- Non-Buildings: This sub sector includes facilities such as microwave repeater stations and telephone exchanges. Although these facilities are housed within a "building," the majority of their electricity use is consumed by the unique equipment that it houses. This sub sector will be tracked throughout the study but will not be subjected to detailed analysis.

3.3 End Uses

End Use

Miscellaneous Equipment

HVAC Fans & Pumps

Domestic Hot Water

Space Heating
Space Cooling

Street Lighting

Block Heaters

Electricity use within each of the sub sectors noted above is defined on the basis of specific end uses. In this study, an end use is defined as "the final application or final use to which energy is applied. End uses are the services of economic value to the users of energy."

A summary of the major commercial sector end uses used in this study is provided in Exhibit 3, together with a brief description of each.

Lighting in main areas of a building (e.g., classrooms in a General Lighting school) Secondary Lighting Lighting in secondary areas of a building (e.g., corridors/lobbies in a school) Outdoor Lighting Lighting used for parking lots and exterior building illumination Computer Equipment Computers, monitors, printers, fax machines, and copiers Computer Servers Computer servers Other Plug Loads Other plug loads, excluding computer equipment Food Service Equipment Food preparation equipment, including ranges, broilers. ovens, etc. Refrigeration Fridges, freezers, coolers, and display cases Elevator Passenger and freight elevators

Air-conditioning compressors

Electric water heaters

Roadway lighting

Fans, pumps, cooling tower fans, etc.

outlets in commercial building parking lots

Exhibit 3 Commercial Electric End Uses

Description

Air compressors, sump pumps, clothes washers, etc.

Block heaters and other car warming equipment plugged into

Electric boilers, unit heaters, baseboard heaters

3.4 End-use Saturation and Fuel Share Data

The next step in the analysis involved an estimation of the electric fuel share for space heating, domestic hot water (DHW) and food service equipment, and an estimation of saturation for space cooling. Various information sources were used to derive these estimates, including analysis of NL's sales data, the Commercial End Use Survey (CEUS) from NL, previous project team

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¹¹ Space heating fuel share refers to the percentage of the total floor space that is electrically heated; similarly, DHW fuel share refers to the percentage of the total floor space that is served by electrically heated domestic hot water. Food service equipment fuel share refers the electric portion of end-use energy.

¹² Space cooling saturation refers to the percentage of the total floor space that is air conditioned.

experience, comparable data from other Canadian jurisdictions contained in the ICF database, and consultations with local technical advisors.

Exhibit 4 and Exhibit 5 present the estimated fuel shares and space cooling saturations for each sub sector and service region. It should be noted that the electric fuel share and space cooling saturation was not estimated for all sub sectors. Rather, the end use EUIs for the other sub sectors was derived based on a weighted average of the EUIs for specific sub sectors. Section 5.3 includes more details on how this approach was implemented.

Exhibit 4 Electric Fuel Share by Sub sector & Service Region (%)

	Island	Interconr	nected	Labrado	or Interco	nnected		Isolated	
Sub Sector	Space Heating	DHW	Food Service	Space Heating	DHW	Food Service	Space Heating	DHW	Food Service
Large Office	85%	90%	100%	100%	100%	100%	-	-	-
Small Office	90%	95%	100%	100%	100%	100%	-	-	-
Large Non-Food Retail	85%	90%	100%	100%	100%	100%	-	-	-
Small Non-Food Retail	85%	95%	100%	100%	100%	100%	-	-	-
Food Retail	85%	90%	100%	100%	100%	100%	-	-	-
Large Accomodation	90%	90%	98%	100%	100%	100%	-	-	-
Small Accomodation	90%	90%	100%	100%	100%	100%	-	-	-
Healthcare	50%	60%	100%	100%	100%	100%	-	-	-
Schools	75%	80%	100%	100%	100%	100%	-	-	-
Universities and Colleges	20%	25%	100%	90%	100%	100%	-	-	-
Warehouse / Wholesale	75%	80%	100%	80%	100%	100%	-	-	-
Restaurant	90%	95%	98%	100%	100%	100%	-	-	-
Labrador Isolated C/I Buildings	-	-	-	-	-	-	15%	15%	50%
Island Isolated C/I Buildings	-	-	-	-	-	-	15%	15%	50%

Exhibit 5 Space Cooling Saturation by Sub sector and Service Region (%)

Sub Sector	Island Interconnected	Labrador Interconnected	Isolated
Large Office	85%	50%	
Small Office	75%	25%	
Large Non-Food Retail	75%	50%	
Small Non-Food Retail	70%	50%	
Food Retail	65%	25%	
Large Accomodation	75%	25%	
Small Accomodation	50%	25%	
Healthcare	60%	50%	
Schools	2%	50%	
Universities and Colleges	15%	35%	
Warehouse / Wholesale	5%	2%	
Restaurant	70%	25%	
Labrador Isolated C/I Buildings	-	-	10%
Island Isolated C/I Buildings	-	-	0%

3.5 Detailed Building and Equipment Specifications

The next major task involved the development of detailed technical data on building specifications, mechanical and electrical equipment, operating practices and electricity use for each sub sector and end use identified above.

To facilitate the subsequent analysis of the potential impacts of energy-efficiency measures, the detailed data on building, equipment and operating practices were compiled within ICF's Commercial/Institutional Building Energy-use Simulation Model (CEEAM). Detailed building profiles were created that represent the stock of buildings within each sub sector. The detailed technical profiles constitute a bottom-up profile of energy use in the targeted sub sectors.

The building profiles developed for the 2008 CDM Potential Study were used as a starting point for several of the building profiles that were developed for this study. Development and refinement of the detailed building profiles relied on an analysis of data sources, primarily:

- The Commercial End Use Survey (CEUS) provided by the Utilities
- Professional experience of the study team personnel, including building site visits in Newfoundland and other jurisdictions

Separate building profiles were developed for both the Island Interconnected and the Labrador Interconnected service regions. Exhibit 6 presents a sample building profile summary. Detailed profiles for each existing building sub sector are provided in Appendix A.

Exhibit 6 Sample Building Profile Summary – Existing Large Office

Building Type:	Large Offic	е	Location:		Island Interconnected					
Description:										
The building characterisitics used to define the La - Average gross floor area of 40,000 ft ² - Average footprint of 13,333 ft ² (approx. 115 ft x 1 - Average height of 3 stories	rge Office arch	netype are as	follows:							
Building Envelope										
roof construction:	0.48	W/m².°C								
wall construction:		W/m².°C								
windows:	3.97	W/m².°C								
shading coefficient	0.58									
window to wall ratio	0.4									
General Lighting & LPD	550	Lux	14.8	W/m²						
Sustan Tunes	INC	CEL	T10	T8	HID	TELLO	ſ			
System Types	0%	CFL 0%	T12 20%	80%	0%	T5HO 0%				
Architectural Lighting & LPD	350			W/m²						
System Types	INC	CFL			HID	T5HO	1			
Cyston Types	45%	45%			5%	0%				
	1070	7070			070	070	ı			
Overall LPD	16.4	W/m²								
Plug Loads	1.2	W/m²								
Computer Equipment	4.6	W/m²								
Ventilation:		1					•			
System Type	CAV	VAV	DD	IU	100%OA	Other				
	75%	25%	0%	0%	0%					
System air Flow		L/s.m²		CFM/ft²						
Fan Power Cooling Plant:	6.0	W/m²	0.56	W/ft²						
System Type	Centrifugal	Centri HE	Recip Open	DX	LiBr.	Other				
Cystem Type	20%	0%	0%	80%	0%	Otrici				
							•			
Calculated Capacity	84	W/m²	450	ft²/Ton						
Cooling Plant Auxiliaries										
Circulating Pumps		W/m²		W/ft²						
Condenser Pumps		W/m²		W/ft²						
Condenser Fan Size	1.7	W/m²	0.2	W/ft²						
End-Use Summary	Elect	ricity	Fuel Oil /	Propane						
	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr						
GENERAL LIGHTING	202	5.2								
ARCHITECTURAL LIGHTING	60	1.5								
SPECIAL PURPOSE LIGHTING	0	0.0								
OUTDOOR LIGHTING	17	0.4	20 =							
SPACE HEATING	355	9.2	89.5	2.3						
SPACE COOLING HVAC FANS & PUMPS	38 173	1.0 4.5	0.0	0.0						
DOMESTIC HOT WATER	23	0.6	3.0	0.1						
COMPUTER EQUIPMENT	91	2.4	5.0	0.1						
COMPUTER SERVERS	16	0.4								
OTHER PLUG LOADS	28	0.7								
FOOD SERVICE EQUIPMENT	4	0.1	0.0	0.0						
REFRIGERATION	4	0.1								
ELEVATORS	3.9	0.1								
MISCELLANEOUS	10	0.3								
BLOCK HEATERS	0	0.0								
Total	1,025	26.5	92.5	2.4						

3.6 Floor Area Calculations

The addition of floor area is used to drive changes in NL's commercial building stock over the study period, including changes to equipment and electricity use. For the purposes of this study, floor space was derived by dividing the actual sales data for each building sub sector by the applicable fuel share and saturation-weighted whole-building electricity use intensity (EUI). The EUIs used in this calculation were based on the detailed building models for each of the sub sectors and the estimates for fuel share and saturation, as discussed in Sections 3.4 and 0. Exhibit 7 shows the resulting estimates of floor area within each building sub sector and service region.

Exhibit 7 Base Year Floor Area (ft²) by Sub sector and Service Region

Sub Sector	Island Interconnected	Isolated	Labrador Interconnected	Grand Total
Large Office	10,328,000	-	-	10,328,000
Small Office	8,407,000	-	168,000	8,575,000
Large Non-food Retail	3,817,000	-	273,000	4,090,000
Small Non-food Retail	5,531,000	-	525,000	6,056,000
Food Retail	2,823,000	-	159,000	2,982,000
Large Accomodation	2,442,000	-	234,000	2,677,000
Small Accomodation	1,162,000	-	31,000	1,193,000
Healthcare	4,034,000	-	573,000	4,608,000
Schools	13,600,000	-	741,000	14,341,000
Universities and Colleges	7,391,000	-	118,000	7,509,000
Warehouse/Wholesale	5,075,000	-	370,000	5,444,000
Restaurants	994,000	-	89,000	1,083,000
Labrador Isolated C/I Buildings	-	2,179,000	-	2,179,000
Island Isolated C/I Buildings	-	205,000	-	205,000
Large Other Buildings	6,373,000	-	2,228,000	8,601,000
Small Other Buildings	6,214,000	-	1,500,000	7,715,000
Other Institutional	-	-	2,960,000	2,960,000
Non-Buildings	-	-	-	-
Street Lighting	-	-	-	-
Grand Total	78,193,000	2,383,000	9,969,000	90,545,000

Note: Any differences in totals are due to rounding.

For the Island service region, the total floor area of the modelled sub sectors is approximately 78 million square feet. The largest sub sector is Schools, which accounts for 17.4% of the total floor area, followed by Large Office at 13.2%, Small Office at 10.8% and Universities and Colleges at 9.5%.

For the Labrador Interconnected service region, the total floor area of the modelled sub sectors is approximately 10 million square feet. The largest sub sector is Other Institutional, which accounts for 29.7% of the total floor area, followed by Large Other Buildings at 22.3%, Small Other Buildings at 15.1% and Schools at 7.4%.

3.7 Summary of Commercial Base Year Electricity Use

This section presents the results of the analysis of electricity consumption for the Base Year 2014. The results are measured at the customer's point-of-use and do not include line losses; they are presented in five separate exhibits:

- Exhibit 8 presents base year electricity consumption in tabular form by sub sector type and end
 use
- Exhibit 11 through Exhibit 10 present the results by sub sector, by region and by end use respectively.
- Exhibit 12 presents the model results as a series of stacked bars, showing the percentage consumed by end use for each sub sector.

Additional highlights are provided below.

By Sub Sector

Large Office Buildings account for the largest share of electricity use within the sub sectors (11.6%), followed by Large Other Buildings (9.2%), Non-Buildings (8.7%), and Small Office at 8.2%.

By Region

The Island Interconnected region accounts for 88% of commercial electricity consumption, while the Labrador Interconnected region accounts for 11% of commercial electricity consumption. Commercial accounts connected to isolated diesel grids consume the remaining 1% of commercial electricity.

By End Use

Space heating is the largest end use, accounting for about 27% of Commercial sector electricity use followed by general lighting (17%), HVAC fans & pumps (12%), and Miscellaneous Equipment (9%).

By Sub Sector and End Use

The last exhibit in this section highlights the differences among sub sectors. Offices and schools show a higher percentage of consumption for HVAC and lighting than food retail where the electricity use is dominated by refrigeration. Sub sectors such as large and small accommodation and restaurants have a higher amount of electricity consumption in the domestic hot water end use.

Data Manager

As part of this report, an Excel application called Data Manager is provided. This Excel workbook has the ability to produce charts and tables looking at the data filtered and segmented in many ways. For example:

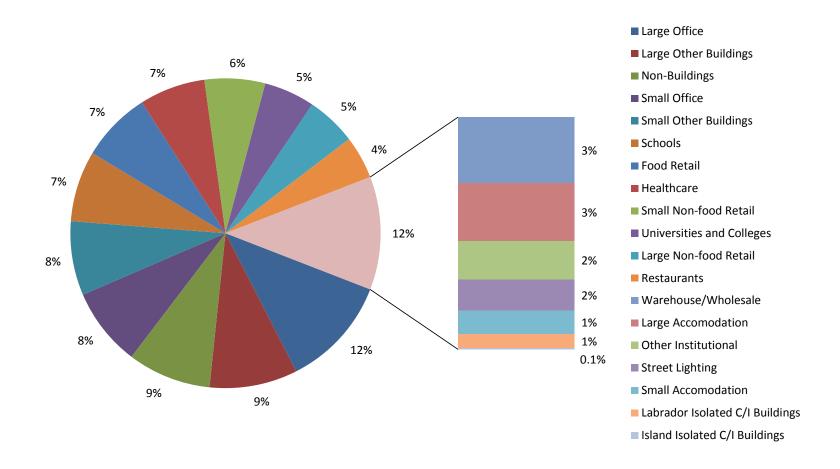
- The user can produce a pie chart of electricity consumption by end use for an individual sub sector of interest, such as large offices.
- The user can produce a column chart showing the electricity consumption for space heating and lighting in each of several sub sector types, with each sub sector type as a separate column and the different end use consumption values shown stacked on top of each other.
- The user can produce a line chart showing consumption for a particular subsector type by year.

Data Manager has a user interface designed for someone with basic knowledge of Excel.

Exhibit 8 Base Year Annual Electricity Consumption by Sub sector and End Use, All of NL (MWh/yr.)

Sub Sector	Space Heating	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Refrigeration	Secondary Lighting	Domestic Hot Water	Computer Equipment	Food Service Equipment	Other Plug Loads	Outdoor Lighting	Space Cooling	Street Lighting	Computer Servers	Elevator	Block Heaters	Grand Total
Large Office	94,614	53,893	46,186	2,666	1,067	15,973	5,999	24,326	1,067	7,386	4,524	10,209	-	4,319	1,033	-	273,262
Small Office	76,520	40,527	20,053	2,192	868	6,020	5,263	20,197	-	6,132	3,756	7,928	-	3,586	-	22	193,065
Large Non-food Retail	30,090	36,209	28,344	1,021	6,135	3,845	1,819	2,021	4,090	2,632	3,583	3,224	-	467	-	35	123,515
Small Non-food Retail	45,979	45,510	29,767	1,496	-	5,322	2,835	2,993	-	3,896	5,305	4,984	-	691	-	68	148,847
Food Retail	23,490	20,697	11,522	749	91,544	3,236	3,484	2,323	9,237	2,502	2,612	1,610	-	327	-	21	173,352
Large Accomodation	20,548	7,426	5,946	661	2,073	7,856	16,327	1,194	3,392	1,321	1,172	1,210	-	254	244	30	69,655
Small Accomodation	9,922	3,788	1,435	304	462	2,102	7,230	537	770	589	523	411	-	113	-	4	28,191
Healthcare	57,863	5,258	30,746	1,116	1,784	24,911	10,048	4,163	9,516	8,004	4,036	2,446	-	963	864	222	161,941
Schools	83,105	45,131	9,356	1,082	1,074	10,063	5,700	7,777	1,481	1,567	6,281	279	-	1,363	-	29	174,289
Universities and Colleges	12,738	40,181	35,767	1,923	3,877	5,076	1,269	10,028	2,908	4,881	3,289	1,341	-	714	739	15	124,745
Warehouse/Wholesale	28,325	20,567	4,753	1,358	8,433	4,089	2,136	1,869	-	4,518	2,385	114	-	621	-	48	79,216
Restaurants	13,061	2,564	3,573	268	18,173	8,146	20,519	447	36,502	598	474	1,007	-	124	-	12	105,467
Labrador Isolated C/I Buildings	580	6,909	1,132	-	3,416	1,608	149	1,051	496	677	739	-	-	-	-	305	17,062
Island Isolated C/I Buildings	-	649	106	-	321	151	-	99	47	64	69	-	-	-	-	-	1,505
Large Other Buildings	65,447	36,027	27,825	1,564	22,200	14,680	13,133	8,017	12,662	5,660	4,741	2,936	-	1,388	406	358	217,045
Small Other Buildings	56,786	33,165	21,646	1,450	18,691	10,949	9,525	7,223	9,684	5,022	4,365	2,711	-	1,240	227	238	182,923
Other Institutional	10,017	12,713	8,247	412	1,763	4,559	2,407	1,212	537	2,075	1,406	219	-	-	-	412	45,979
Non-Buildings	-	-	-	204,856	-	-	-	-	-	-	-	-	-	-	-	-	204,856
Street Lighting	-	-	-	-	-	-	-	-	-	-	-	-	37,127	-	-	-	37,127
Grand Total	629,085	411,214	286,405	223,118	181,881	128,587	107,844	95,476	92,387	57,527	49,260	40,630	37,127	16,170	3,514	1,817	2,362,042

Exhibit 9 Distribution of Electricity Consumption by Sub sector in the Base Year (2014)



Totals may not add to 100% due to rounding.

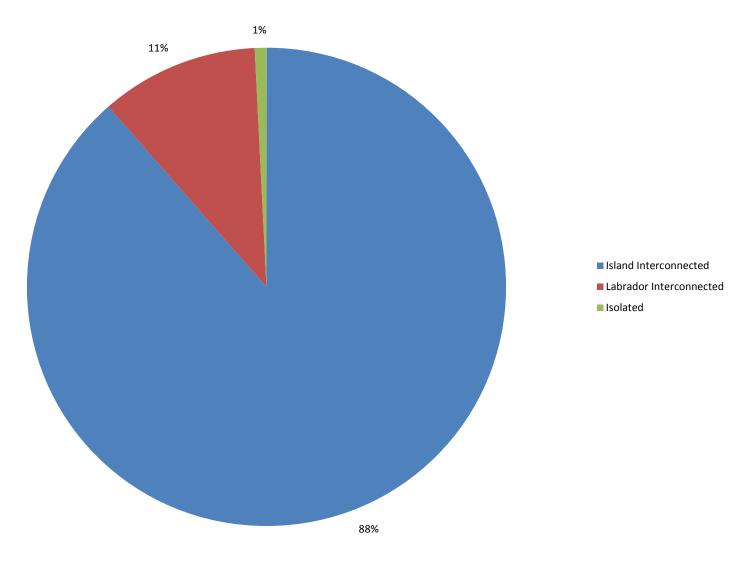
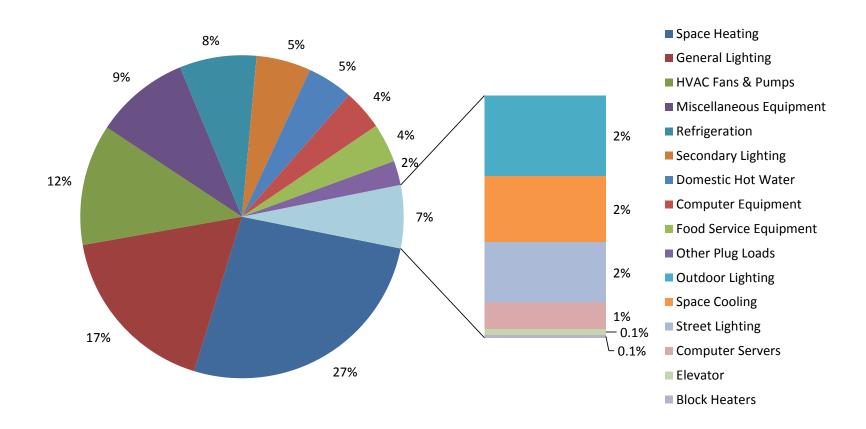


Exhibit 10 Distribution of Electricity Consumption, by Region in the Base Year (2014)

Totals may not add to 100% due to rounding.

Exhibit 11 Distribution of Electricity Consumption, by End Use in the Base Year (2014)



Totals may not add to 100% due to rounding.

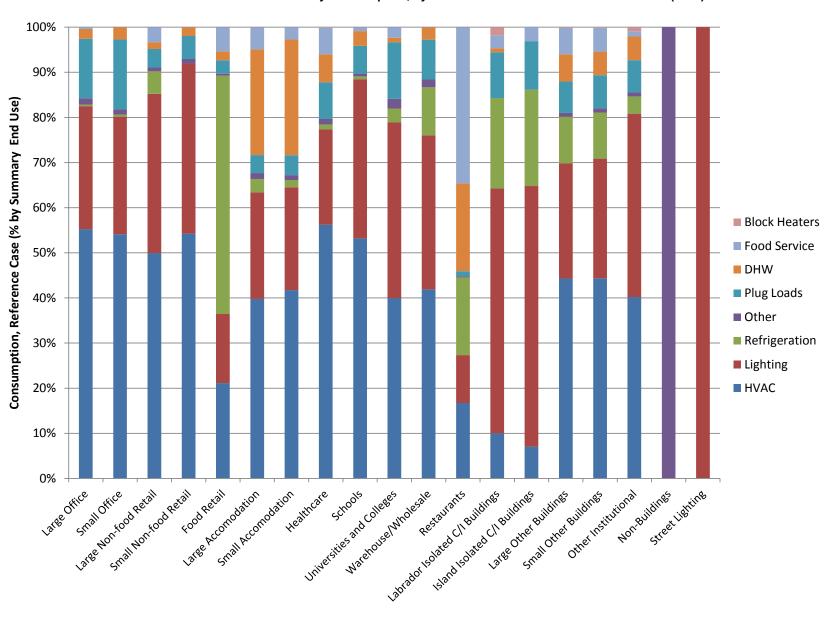


Exhibit 12 Distribution of Electricity Consumption, by Sub Sector and End Use in the Base Year (2014)

4 Base Year (2014) Electric Peak Load

4.1 Introduction

This section provides a profile of the Base Year electric peak load for NL's Commercial sector. The discussion is organized into the following subsections:

- Peak period definitions
- Methodology
- Summary of results

Additional details are provided in Appendix B.

4.2 Peak Period Definitions

Based on discussions with utility personnel, the peak period of interest was the same as in the 2007-2008 study:

Peak Period – The morning period from 7 am to noon and the evening period from 4 pm to 8 pm on the four coldest days in the December to March period; this is a total of 36 hours per year.¹³

The system capacity constraints are very dependent on cold weather. The NL utilities are do not currently experience capacity constraints in the summer. In future, there may be financial advantages to reducing system demand in summer in order to market more power to summer-peaking utilities in the U.S. That possibility was not explored in this study.

4.3 Methodology

The electric peak load profile converts the annual electric energy use (MWh) presented in Section 3 to hourly demand (MW). Development of the electric peak load estimates employs four specific factors, which are described below and shown graphically in **Error! Not a valid bookmark self-reference.**

- Monthly Usage Allocation Factor: This factor represents the percent of annual electric energy usage that is allocated to each month. This set of monthly fractions (percentages) reflects the seasonality of the load shape, whether a facility, process or end use, and is dictated by weather or other seasonal factors. In decreasing order of priority, this allocation factor can be obtained from either:
 - Monthly consumption statistics from end-use load studies
 - Monthly seasonal sales (preferably weather normalized) obtained by subtracting a "base" month from winter and summer heating and cooling months, or
 - Heating or cooling degree days applied to an appropriate base.
- Weekend to Weekday Factor: This factor is a ratio that describes the relationship between weekends and weekdays, reflecting the degree of weekend activity inherent in the facility or end

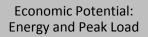
Base Year Electric Energy
Use

Base Year Electric
Peak Load

Reference Case Electric
Energy Forecast

Reference Case Electric
Peak Load Forecast

Technology Assessment:
All Measures





Achievable Potential: Energy and Peak Load

¹³ Source: NL (Feb 2014) http://hydroblog.nalcorenergy.com/meeting-peak-demand/

use. This may vary by month or season. Based on this ratio, the average electric energy per day type can be computed from the corresponding monthly electric energy.

- Peak Day Factor: This factor reflects the degree of daily weather sensitivity associated with the load shape, particularly heating or cooling; it compares a peak (e.g., hottest or coldest) day to a typical weekday in that month.
- Per Unit Hourly Factor: This factor reflects the operating hours of the commercial electric
 equipment or end uses among different hours of the day for each day type (weekday, weekend
 day, peak day) and for each month. For example, for lighting, this would be affected by time of
 day and season (affected by daylight).

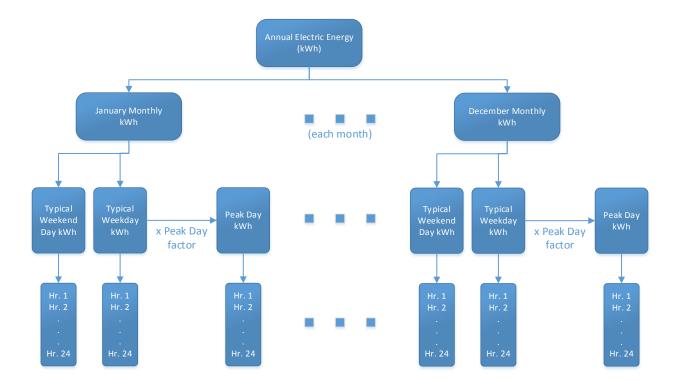


Exhibit 13 Overview of Peak Load Profile Methodology

4.4 Summary of Results

The factors defined above provided the basis for converting the annual commercial electricity use presented in Section 3 to aggregate peak loads in the peak period.

Exhibit 14 presents the results for the Commercial sector Base Year. The results are presented for each of the three regions in NL, by sub sector type. In each case, the results show the contribution of Commercial sector demand that is coincident with the total demand in the peak period.

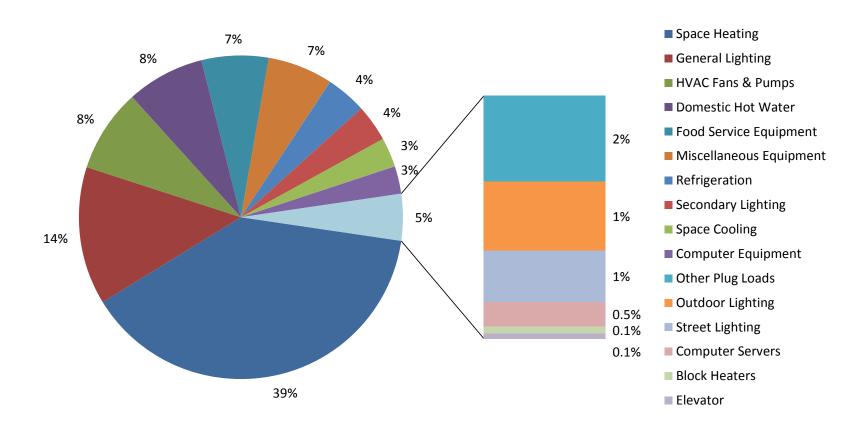
Exhibit 14 Commercial Sector Base Year (2014) Aggregate Peak Demand by Region (MW)

Sub-Sector Type	Island Interconnected	Labrador Interconnected	Isolated	Grand Total
Large Office	62	-	-	62
Small Office	45	1	-	46
Large Non-food Retail	27	2	-	29
Small Non-food Retail	33	4	-	36
Food Retail	29	3	-	32
Large Accomodation	16	2	-	18
Small Accomodation	7	0	-	8
Healthcare	33	3	-	36
Schools	43	3	-	46
Universities and Colleges	22	1	-	23
Warehouse/Wholesale	16	2	-	17
Restaurants	28	2	-	30
Labrador Isolated C/I Buildings	-	-	3	3
Island Isolated C/I Buildings	-	-	0	0
Large Other Buildings	35	15	-	49
Small Other Buildings	32	10	-	41
Other Institutional	-	9	-	9
Non-Buildings	30	1	-	31
Street Lighting	5	0	0	5
Grand Total	463	56	3	522

Exhibit 15 shows the contribution, by end use, to the commercial component of the peak demand. Some key observations may be made:

- Space heating is the largest commercial component of peak demand. As shown in the previous section, space heating is the largest end use in terms of annual electrical consumption. It also tends to be concentrated in the winter when the NL system peaks.
- General lighting is the second largest commercial component of peak demand. As shown in the previous section, lighting is a relatively large end use in terms of annual electrical consumption.
- HVAC Fans & Pumps are the third largest commercial contributor to peak demand. As shown in the previous section, HVAC Fans & Pumps are a relatively large end use in terms of annual electrical consumption.
- Domestic Hot Water is the fourth largest commercial contributor to peak demand. As shown in the previous section, domestic hot water is a relatively large end use in terms of electrical consumption.

Exhibit 15 Contribution by End Use to Commercial Aggregate Peak Demand (%)



Additional detail is provided in Appendix B.

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5 Reference Case Electric Energy Forecast

5.1 Introduction

This section presents the Commercial sector Reference Case for the study period (2014 to 2029). The Reference Case estimates the expected level of electricity consumption that would occur over the study period in the absence of new utility-based CDM initiatives. As such, the Reference Case provides the point of comparison for the calculation of electricity saving opportunities associated with each of the scenarios that are assessed within this study.

The Reference Case discussion is presented within the following subsections:

- Methodology
- New Commercial Buildings
- "Natural Changes" to Electricity Use Intensity
- Commercial Floor Space
- Summary of Model Results
- Selected Highlights

5.2 Methodology

Development of the Reference Case involved the following three steps:

Step 1: Detailed building archetypes were developed for "New" buildings in each of the Commercial sub sectors. For the purposes of this study, any facility built after the Base Year is considered to be a "New" building. Each profile defines building specifications, mechanical equipment, lighting equipment and other electricity-using equipment.

Step 2: Expected "natural" changes in electricity consumption patterns over the study period were estimated. Special consideration was given to three factors:

- Naturally-occurring improvements in equipment efficiency through time.
- Expected stock penetration by more efficient equipment as older, inefficient equipment reaches the end of its service life.
- Changes in equipment density (e.g., computers and plug loads) or loads (e.g., required ventilation rates).

Step 3: The growth in floor space within each building sub sector over the study period was estimated. The growth rates were derived from the load forecast data provided by the Utilities.

Base Year Electric Energy Use Base Year Electric Peak Load Reference Case **Electric Energy Forecast** Reference Case Electric Peak Load Forecast Technology Assessment: All Measures **Economic Potential:** Energy and Peak Load Achievable Potential: **Energy and Peak Load**

5.3 New Commercial Buildings

The first task in building the Reference Case involved the development of detailed technical profiles that define building specifications, mechanical equipment, lighting equipment and electricity use for the new buildings in each of the commercial building sub sectors. In each case, the new building profiles were developed using CEEAM and the same approach as described previously in Section 3.5. Detailed profiles for each building sub sector are provided in Appendix C. Exhibit 16 highlights the resulting whole building electric EUIs for each new commercial building sub sector. For the purposes of comparison, it also shows whole-building electric EUIs for each of the existing building sub sectors.

Other trends include:

- Higher efficiency building envelopes, including improved window U-values and higher levels of wall and roof insulation.
- Improved lighting system efficiency, including higher efficacy lighting sources and lower light levels where appropriate.
- Increased saturation of space cooling in some sub sectors.
- 100% penetration of electric space heating and domestic hot water heating in new construction.

Certain sub sectors were not modelled with CEEAM. The methodology for determining the end use EUIs for these sub sectors is described in more detail below:

- Large Other Buildings: These buildings are assumed to be a composite of the Large Office, Large Non-Food Retail, Food Retail, Large Accommodation, Healthcare, Schools, Universities and Colleges, Warehouse/Wholesale, and Restaurants sub sectors. Their EUIs for each end use are estimated by taking a weighted average of the end use EUIs of each of the aforementioned building types.
- Small Other Buildings: These buildings are assumed to be a composite of the Small Office, Small Non-Food Retail, Food Retail, Small Accommodation, Healthcare, Schools, Universities and Colleges, Warehouse/Wholesale, and Restaurants sub sectors. Their EUIs for each end use are estimated by taking a weighted average of the end use EUIs of each of the aforementioned building types.
- Other Institutional: The military base at Goose Bay is assumed to be a composite of the Small Office, Food Retail, Small Non-Food Retail, Small Accommodation, Healthcare, Warehouse/Wholesale, and Restaurant sub sectors.
- Isolated C/I Buildings: The end use EUIs for these sub sectors, Island and Labrador, are based on energy audit data for buildings in these regions. The buildings in the isolated regions are not further broken down into sub sectors because of a lack of detailed information about specific sub sectors and because building types do not differ as much in the isolated regions as they do in larger urban areas.

Exhibit 16 Comparison of Whole Building Electric EUIs by Sub Sector, (kWh/ft²/yr.)

		and		ador	
Sub Sector	Interco		Interco		Comments
	Existing Buildings	New Buildings	Existing Buildings	New Buildings	
Large Office	28.3	25.7	28.6	35.7	New Office buildings have higher efficiency lighting and envelope systems. This is offset
Small Office	23.8	22.2	22.8	26.9	by a higher space cooling saturation and electric space heating share.
Large Non-food Retail	31.9	24.1	29.4	29.5	New Non-food retail buildings have higher efficiency lighting and envelope systems.
Small Non-food Retail	26.0	23.6	27.9	25.6	This is offset by a higher space cooling saturation and electric space heating share.
Food Retail	59.0	53.2	72.2	53.2	New Food Retail buildings are typically equipped with higher efficiency lighting, HVAC and envelope systems. This is offset by higher a space cooling saturation and electric space heating share.
Large Accommodation	27.3	23.4	30.3	28.6	New Hotels and Motels have higher efficiency lighting and envelope systems. This is offset by a higher electric space
Small Accommodation	25.4	22.2	30.3	30.1	heating share and higher space cooling saturations due primarily to increased instance of in-room heating/cooling units.
Healthcare	51.4	35.0	29.6	31.0	New healthcare buildings have higher efficiency lighting and envelope systems, and higher space cooling saturation. This is offset somew hat by higher ventilation rates, particularly in larger buildings and a higher electric space heating share.
School	14.9	13.3	18.5	15.3	New Schools have higher efficiency lighting and envelope systems. This is offset by a higher electric space heating share.
Universities and Colleges	24.1	19.6	26.3	24.8	New Universities and Colleges have higher efficiency lighting and envelope systems. This is offset by a higher electric space heating share.
Warehouse / Wholesale	16.2	14.0	21.1	16.8	New Warehouse/Wholesale buildings have higher efficiency lighting and envelope systems. This is offset by a higher electric space heating share.
Restaurant	100.9	102.9	97.0	92.9	New Restaurants have higher efficiency lighting, and envelope systems. This is offset by a higher electric space heating share.
Large Other	24.0	23.4	28.8	26.9	Changes to this sub sector are a consequence of changes to its constituent building types (see below).
Small Other	22.7	22.7	28.0	26.3	Changes to this sub sector are a consequence of changes to its constituent building types (see below).
Other Institutional	N/A	N/A	15.5	14.6	No major changes to construction practices are anticipated.
Island Isolated C/I	7.4	7.1	N/A	N/A	Natural changes to equipment efficiency are expected to drive EUI reduction.
Labrador Isolated C/I	N/A	N/A	7.8	7.5	Natural changes to equipment efficiency are expected to drive EUI reduction.

5.4 "Natural Changes" to Electricity Use Intensity

The next task involved estimating changes in electricity consumption patterns that would occur within the existing building stock over the study period in the absence of any CDM programming or influence. This included consideration of three major factors:

- Naturally-occurring improvements in equipment efficiency
- Expected stock penetration by more efficient equipment
- Changes in the saturation/intensity of end-use services (e.g., cooling, plug loads etc.)

These factors strongly influence future electric energy use within the Commercial sector. While the first two factors will have the effect of reducing electricity consumption, the last factor will result in increased electricity demand. Other considerations, such as operating hours and fuel share, may also affect future electricity demand. However, the values assumed in existing and new stock were assumed to remain constant over the study period.

Based on the assessment of current trends, the most significant natural changes are expected to involve the following end uses:

- Reduced lighting EUIs in existing buildings due to efficiency improvements at the time of natural stock turnover
- A trend toward more efficient space cooling equipment in existing buildings
- Increased computer equipment and plug load EUIs due to higher equipment densities

Detailed assumptions regarding natural change are presented in Appendix C.

5.5 Commercial Floor Space

The final task in the construction of the Reference Case involved calibration with NLH and NLP's load forecasts through time. This was accomplished using the following steps:

- Estimate and apply the expected impact of natural changes (see Section 5.4 above) within the
 existing building stock for each sub sector (i.e., an adjusted EUI that includes the effects of
 natural conservation at each milestone year)
- Add new buildings to the stock in order to match forecasted consumption in each combination of sub sector and milestone year.

A summary of the resulting floor space estimates in the Island Interconnected, Labrador Interconnected, and Isolated grids by sub sector and milestone year are provided in the following exhibits.

Exhibit 17 Commercial Sector Floor Space (ft²), by Sub Sector and Milestone Year – Island Interconnected

Sub Sector	2014	2017	2020	2023	2026	2029
Large Office	10,328,000	10,615,000	11,014,000	11,559,000	11,950,000	12,399,000
Small Office	8,407,000	8,588,000	9,043,000	9,439,000	9,722,000	10,047,000
Large Non-food Retail	3,817,000	3,930,000	4,169,000	4,377,000	4,532,000	4,708,000
Small Non-food Retail	5,531,000	5,606,000	5,841,000	6,082,000	6,266,000	6,474,000
Food Retail	2,823,000	2,864,000	2,990,000	3,111,000	3,198,000	3,297,000
Large Accomodation	2,442,000	2,490,000	2,620,000	2,742,000	2,831,000	2,933,000
Small Accomodation	1,162,000	1,174,000	1,221,000	1,271,000	1,308,000	1,349,000
Healthcare	4,034,000	4,059,000	4,176,000	4,303,000	4,397,000	4,502,000
Schools	13,600,000	13,817,000	14,448,000	15,083,000	15,562,000	16,102,000
Universities and Colleges	7,391,000	7,475,000	7,617,000	7,744,000	7,847,000	7,961,000
Warehouse/Wholesale	5,075,000	5,187,000	5,435,000	5,654,000	5,816,000	6,001,000
Restaurants	994,000	1,011,000	1,061,000	1,106,000	1,138,000	1,174,000
Large Other Buildings	6,373,000	6,492,000	6,778,000	7,040,000	7,232,000	7,451,000
Small Other Buildings	6,214,000	6,184,000	6,328,000	6,543,000	6,705,000	6,885,000
Grand Total	78,193,000	79,492,000	82,741,000	86,053,000	88,504,000	91,284,000

Note: Any differences in totals are due to rounding.

Exhibit 18 Commercial Sector Floor Space (ft2), by Sub Sector and Milestone Year – Labrador Interconnected

Sub Sector	2014	2017	2020	2023	2026	2029
Large Office	-	-	-	-	-	-
Small Office	168,000	168,000	172,000	176,000	180,000	184,000
Large Non-food Retail	273,000	275,000	277,000	279,000	281,000	283,000
Small Non-food Retail	525,000	528,000	545,000	560,000	575,000	590,000
Food Retail	159,000	159,000	160,000	161,000	162,000	163,000
Large Accomodation	234,000	235,000	236,000	237,000	238,000	239,000
Small Accomodation	31,000	31,000	32,000	33,000	33,000	34,000
Healthcare	573,000	442,000	444,000	446,000	449,000	451,000
Schools	741,000	744,000	752,000	760,000	768,000	776,000
Universities and Colleges	118,000	118,000	119,000	119,000	120,000	120,000
Warehouse/Wholesale	370,000	371,000	377,000	382,000	388,000	393,000
Restaurants	89,000	90,000	91,000	92,000	93,000	94,000
Large Other Buildings	2,228,000	2,236,000	2,245,000	2,254,000	2,263,000	2,271,000
Small Other Buildings	1,500,000	1,503,000	1,547,000	1,585,000	1,622,000	1,658,000
Other Institutional	2,960,000	2,983,000	3,005,000	3,028,000	3,051,000	3,075,000
Grand Total	9,969,000	9,882,000	10,003,000	10,113,000	10,222,000	10,331,000

Note: Any differences in totals are due to rounding.

Exhibit 19 Commercial Sector Floor Space (ft²), by Sub Sector and Milestone Year – Isolated

Sub Sector	2014	2017	2020	2023	2026	2029
Labrador Isolated C/I Buildings	2,179,000	2,153,000	2,506,000	2,620,000	2,727,000	2,836,000
Island Isolated C/I Buildings	205,000	201,000	240,000	251,000	262,000	273,000
Grand Total	2,383,000	2,354,000	2,746,000	2,870,000	2,989,000	3,109,000

Note: Any differences in totals are due to rounding.

5.6 Summary of Results

This section presents the results of the model runs for the entire study period. The results are measured at the customer's point-of-use and do not include line losses. They are presented in four exhibits:

- Exhibit 20 presents the model results in tabular form, by sub sector type, end use and milestone year
- Exhibit 21 presents the model results for 2029 by subsector type
- Exhibit 22 presents the model results for 2029 by by region

Exhibit 23 presents the model results for 2029 by end use

 Exhibit 24 shows the evolving relative contribution of different summary end uses towards the total consumption in different sub sector types.

As illustrated, the combined Reference Case for all regions indicates that, in the absence of new utility-based CDM initiatives, total Commercial sector electricity consumption is expected to increase from approximately 2.36 million MWh/yr. in the Base Year to approximately 2.70 million MWh/yr. in 2029. This is an increase of approximately 14.1% over the study period.

Selected highlights are provided below.

By Sub Sector

Large and small office buildings contribute the largest portion of electricity consumption increases to the overall growth rate, about 25% of total load growth. The retail sector, including food retail and large and small non-food retail, also accounts for a significant portion of load growth (18%).

By Region

The division of electricity consumption by region is expected to remain stable over the study period, with the Island Interconnected region continuing to account for 88% of commercial electricity consumption, the Labrador Interconnected region accounting for 11%, and accounts connected to isolated diesel grids consuming the remaining 1%.

By End Use

Overall, electricity use grows a total of about 14% over the study period. This growth is driven in large part by increases in space heating electricity consumption, which grows by 21% between 2014 and 2029, due to a large number of new electrically heated buildings being introduced in to the building stock. A knock-on effect of the move toward electric space heating in new buildings is that electricity consumption for water heating also increases dramatically (17% growth), as electrically heated buildings rarely invest in fossil fuel infrastructure for water heating only.

Three additional end uses also experience significant growth from 2014 to 2029: space cooling (19%), HVAC fans and pumps (17%), and computer equipment (26%), servers (27%), and plug loads (24%).

Between 2014 and 2029 space cooling (19%) and HVAC fans and pumps (17%) increase as a consequence of a trend towards higher space cooling saturations. Computer equipment (26%), servers (27%), and plug loads (24%) increase between 2014 and 2029, reflecting increased densities of computer equipment and plug loads which offset efficiency gains in equipment over the period.

End uses which grow at a significantly slower rate than average include general lighting (4%) and secondary lighting, which decreases by 1.2%. Lighting end uses show a slight decline in importance as more efficient new buildings are introduced into the building stock through time, and as a result of naturally occurring lighting retrofits in existing buildings.

In terms of absolute contribution, space heating accounts for the largest portion of overall load growth (133,000 MWh or about 40% of total load growth). This is followed by HVAC fans & pumps (15%), miscellaneous equipment (9%), refrigeration (8%) and computer equipment (8%).

By Sub sector and End Use

The last exhibit in this section shows the trends in consumption by sub sector and end-use groupings. The following key observations can be made:

- Consumption in the HVAC end uses is expected to modestly increase in most commercial sub sectors between now and 2029
- Lighting is expected to account for a slightly diminishing share of commercial electricity consumption between now and 2029, even without new CDM intervention, largely as a result of naturally occurring lighting retrofits in existing buildings.
- The exhibit also permits comparisons of end-use consumption proportions from one sub sector type to another. These patterns are expected to remain relatively consistent through the study period.

Exhibit 20 Reference Case Electricity Consumption, Modelled by End Use, Sub sector and Milestone Year (MWh/yr.)

Sub-Sector	Year	Space Heating	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Refrigeration	Secondary Lighting	Domestic Hot Water	Computer Equipment	Food Service Equipment	Other Plug Loads	Outdoor Lighting	Space Cooling	Street Lighting	Computer Servers	Elevator	Block Heaters	Grand Total
	2014	94,614	53,893	46,186	2,666	1,067	15,973	5,999	24,326	1,067	7,386	4,524	10,209	0	7	1,033	0	273,262
	2017	96,854	54,127	47,938	2,740	1,096	15,870	6,179	25,489	1,096	7,739	4,469	10,463	0	7	1,062	0	279,648
Large Office	2020	99,960	54,868	50,370	2,843	1,137	15,850	6,427	26,914	1,137	8,172	4,462	10,855	0	.,	1,101	0	288,877
	2023	104,216	56,281	53,700	2,984	1,194	15,942	6,768	28,686	1,194	8,710	4,520	11,430	0	-,	1,156	0	301,873
	2026	107,265	56,989	56,085	3,085	1,234	15,916	7,013	30,093	1,234	9,137	4,510	11,813	0	-,	1,195	0	310,912
	2029	110,768	57,962	58,826	3,201	1,280	15,935	7,293	31,637	1,280	9,606	4,526	12,268	0	-7-	1,240	0	321,441
	2014	76,520	40,527 40,464	20,053	2,192 2,239	868 868	6,020 5,953	5,263	20,197 21,027	0	6,132 6,384	3,756 3,685	7,928 8,062	0	-7	0	22 22	193,065 196,495
	2017	77,805 81,110	40,464	20,877 22,953	2,239	868	5,953	5,376 5,663	22,513	0	6,836	3,736	8,520	0	-,	0	22	206,097
Small Office	2023	83,988	42,399	24,762	2,460	868	5,967	5,913	23,860	0	7,244	3,761	8,910	0	-,	0	23	214,387
	2026	86.061	42,399	26.056	2,533	868	5,904	6.092	24,940	0	7,244	3,736	9,166	0	-,	0	23	220,180
	2029	88,432	43,325	27,540	2,618	868	5,903	6,298	26,118	0	7,930	3,730	9,472	0	.,	0	24	226,895
	2014	30,090	36,209	28,344	1,021	6,135	3,845	1,819	2,021	4,090	2,632	3,583	3,224	0	1,001	0	35	123,515
	2017	30,629	36,278	29,006	1,050	6,308	3,823	1,875	2,118	4,205	2,758	3,540	3,293	0		0	36	125,409
	2020	31,748	37,212	30,389	1,112	6,669	3,862	1,993	2,278	4,446	2,966	3,608	3,472	0	526	0	36	130,316
Large Non-food Retail	2023	32,725	37,934	31,596	1,166	6,983	3,886	2,096	2,422	4,656	3,153	3,648	3,624	0	559	0	36	134,485
	2026	33,458	38,292	32,499	1,206	7,219	3,884	2,173	2,540	4,813	3,307	3,642	3,730	0	586	0	36	137,386
	2029	34,291	38,800	33,526	1,252	7,487	3,893	2,261	2,668	4,991	3,474	3,656	3,854	0	616	0	37	140,806
	2014	45,979	45,510	29,767	1,496	0	5,322	2,835	2,993	0	3,896	5,305	4,984	0	691	0	68	148,847
	2017	46,550	45,134	30,163	1,515	0	5,252	2,873	3,091	0	4,025	5,161	5,012	0	713	0	68	149,557
Small Non-food Retail	2020	48,422	45,949	31,431	1,578	0	5,262	2,997	3,275	0	4,265	5,170	5,208	0	756	0	70	154,382
Gillail Holl Tood Hotali	2023	50,318	46,793	32,723	1,642	0	5,274	3,122	3,461	0	4,507	5,182	5,409	0	799	0	72	159,301
	2026	51,805	47,249	33,725	1,692	0	5,259	3,220	3,620	0	4,713	5,144	5,553	0		0	74	162,891
	2029	53,457	47,862	34,845	1,747	0	5,255	3,329	3,790	0	4,934	5,127	5,720	0		0	76	167,017
	2014	23,490	20,697	11,522	749	91,544	3,236	3,484	2,323	9,237	2,502	2,612	1,610	0		0	21	173,352
	2017	23,684	20,545	11,683	760	92,742	3,205	3,538	2,401	9,364	2,587	2,561	1,619	0		0	21	175,048
Food Retail	2020	24,284	20,942	12,182	793	96,442	3,244	3,702	2,544	9,759	2,744	2,622	1,683	0		0	21	181,322
	2023	24,858 25,273	21,302	12,659	824 847	99,978 102,532	3,279 3,286	3,859	2,684 2,798	10,137	2,896 3.020	2,676 2.686	1,743 1,781	0		0	21 21	187,295
	2026	25,273	21,447 21,671	13,003 13,396	847 872	102,532	3,286	3,973 4,103	2,798	10,410 10,720	3,020	2,686	1,781	0		0	21	191,473 196,304
	2029	20,548	7,426	5.946	661	2,073	7,856	16,327	1,194	3,392	1,321	1,172	1,828	0		244	30	69,655
	2014	20,548	7,426	6,051	673	2,073	7,807	16,653	1,194	3,423	1,321	1,172	1,210	0		244	30	70,481
	2020	21,816	7,440	6.330	707	2,143	7,938	17,530	1,316	3,506	1,462	1,157	1,220	0		262	30	73,210
Large Accomodation	2023	22,685	7,440	6,593	738	2,143	8,053	18,355	1,310	3,585	1,549	1,164	1,350	0		274	31	75,762
	2026	23,322	7,512	6,786	762	2,130	8,095	18,959	1,452	3,642	1,620	1,157	1,391	0		283	31	77,550
	2029	24,046	7,542	7,006	788	2,265	8,165	19,647	1,519	3,708	1,697	1,155	1,439	0	-	293	31	79,627
	2014	9,922	3,788	1,435	304	462	2,102	7,230	537	770	589	523	411	0		0	4	28,191
	2017	10,008	3,730	1,450	307	466	2,076	7,305	553	777	606	507	413	0		0	4	28,319
Small Accompdation	2020	10,385	3,728	1,514	319	485	2,107	7,630	584	809	642	507	437	0	124	0	4	29,276
Small Accomodation	2023	10,777	3,731	1,581	332	505	2,141	7,971	615	841	679	508	462	0	131	0	4	30,280
	2026	11,069	3,713	1,631	342	519	2,156	8,222	642	866	709	504	480	0	137	0	4	30,992
	2029	11,397	3,702	1,687	353	536	2,177	8,506	670	893	742	501	500	0	143	0	4	31,812

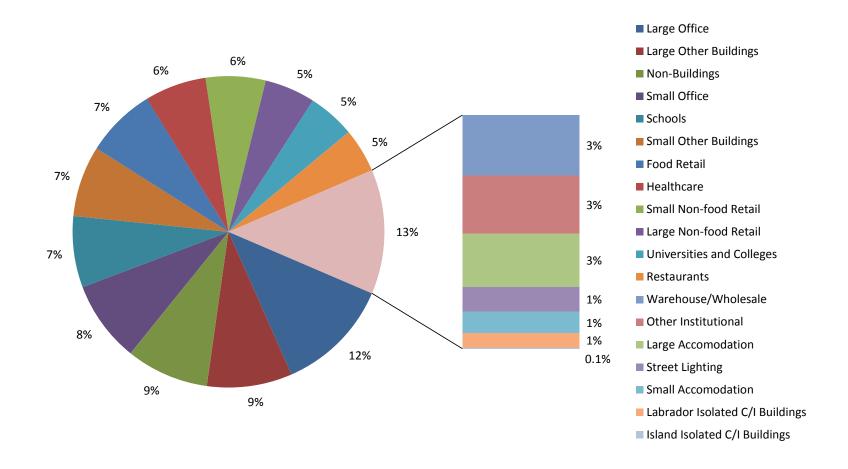
Exhibit 20 Reference Case Electricity Consumption, Modelled by End Use, Sub sector and Milestone Year (MWh/yr.) (cont'd...)

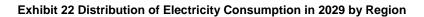
Sub-Sector	Year	Space Heating	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Refrigeration	Secondary Lighting	Domestic Hot Water	Computer Equipment	Food Service Equipment	Other Plug Loads	Outdoor Lighting	Space Cooling	Street Lighting	Computer	Elevator	Block Heaters	Grand Total
	2014	57,863	5,258	30,746	1,116	1,784	24,911	10,048	4,163	9,516	8,004	4,036	2,446	(864	222	161,941
	2017	57,443	5,038	30,085	1,105	1,743	23,821	9,690	4,148	9,296	7,975	3,787	2,414	(856	171	158,532
Healthcare	2020	58,774	5,092	30,958	1,135	1,789	23,841	10,089	4,336	9,542	8,337	3,737	2,472	(880	171	162,156
	2023	60,227	5,160	31,908	1,169	1,839	23,905	10,524	4,534	9,809	8,717	3,697	2,537	(, , , ,	905	172	166,153
	2026	61,299	5,184	32,612	1,193	1,876	23,828	10,846	4,702	10,007	9,039	3,626	2,579	(,	924	172	168,975
	2029	62,507	5,224	33,404	1,221	1,918	23,801	11,208	4,880	10,230	9,382	3,566	2,629	(946	172 29	172,217
	2014	83,105	45,131	9,356	1,082	1,074	10,063	5,700	7,777	1,481	1,567	6,281	279	(-	0	29 29	174,289
	2017	84,471 88.451	44,837 45,707	9,534 10.053	1,099 1,148	1,091 1,141	9,983 10,136	5,808 6.122	8,052 8,555	1,504 1,570	1,623 1,724	6,126 6,155	300 365	(0	29	175,868 182.656
Schools	2023	92,446	46,585	10,575	1,148	1,141	10,130	6,437	9,059	1,636	1,724	6,186	430	(,	0	29	189,475
	2026	95,470	47.029	10,970	1,235	1,228	10,358	6.676	9,478	1,686	1,910	6,148	479	(,	0	30	194,358
	2029	98,878	47,644	11,415	1,277	1,271	10,460	6,945	9,931	1,743	2,001	6,136	535	(, , , ,	0	30	200,006
	2014	12,738	40,181	35,767	1,923	3,877	5,076	1,269	10,028	2,908	4,881	3,289	1,341	(,	739	15	-
	2017	13,160	39,760	36,075	1,945	3,921	5,017	1,323	10,341	2,940	5,033	3,194	1,419	(748	15	
	2020	13,867	39,599	36,592	1,982	3,994	4,987	1,415	10,731	2,995	5,223	3,125	1,557	(762	15	
Universities and Colleges	2023	14,504	39,375	37,058	2,015	4,060	4,950	1,497	11,102	3,045	5,404	3,049	1,681	(790	774	15	129,321
	2026	15,022	39,042	37,437	2,041	4,114	4,901	1,564	11,442	3,085	5,569	2,963	1,779	(814	785	15	130,574
	2029	15,589	38,754	37,852	2,071	4,172	4,857	1,638	11,794	3,129	5,741	2,882	1,887	(839	796	16	132,017
	2014	28,325	20,567	4,753	1,358	8,433	4,089	2,136	1,869	0	4,518	2,385	114	(621	0	48	79,216
	2017	28,899	20,571	4,825	1,387	8,608	4,028	2,195	1,945	0	4,703	2,339	118	(646	0	48	80,312
Warehouse/Wholesale	2020	30,202	21,092	4,988	1,452	9,003	3,992	2,326	2,070	0	5,004	2,355	128	(688	0	49	83,349
Wai ellouse/Wilolesale	2023	31,347	21,500	5,131	1,509	9,349	3,951	2,442	2,184	0	5,280	2,358	137	(726	0	49	85,963
	2026	32,210	21,703	5,239	1,551	9,609	3,899	2,528	2,279	0	5,510	2,336	144	(0	50	87,817
	2029	33,185	21,988	5,361	1,600	9,903	3,852	2,626	2,382	0	5,758	2,323	152	(-	0	51	89,972
	2014	13,061	2,564	3,573	268	18,173	8,146	20,519	447	36,502	598	474	1,007	C		0	12	
	2017	13,396	2,552	3,624	273	18,467	8,065	20,868	463	37,092	620	463	1,016	C	-	0	12	107,038
Restaurants	2020	14,360	2,617	3,769	286	19,321	8,140	21,878	493	38,804	660	466	1,061	C		0	12	
	2023	15,233	2,671	3,900	297	20,093	8,192	22,793	521	40,355	697	468	1,101	(4	0	12	
	2026	15,856	2,694	3,994	306	20,646	8,183	23,447	544	41,465	727	463	1,126	(1	0	12	-
	2029	16,569	2,729	4,101	315	21,278	8,196	24,195	568	42,733	760	461	1,157	(-	0	12	
	2014	580	6,909	1,132	0	3,416	1,608	149	1,051	496	677	739	0	(0	305	17,062
Laborador la aleta d C/I	2017	573 650	6,689	1,118	0	3,375	1,557	148	1,059	490	682	701	0			0	301	16,693
Labrador Isolated C/I Buildings	2020	674	7,498 7.663	1,409 1,501	0	3,931 4,109	1,724 1,756	172 180	1,258 1,335	573 599	810 860	813 830	0			0	351 367	19,187
bullulings	2023	674 698	7,663	1,501	0	4,109 4,279	1,785	180	1,335	599 624	908	830 844	0	(-	0	367	19,874 20,521
	2029	721	7,815	1,679	0	4,279	1,785	194	1,410	650	908	858	0			0	397	21,173
	2029	0	649	1,679	0	321	1,614	194	99	47	64	69	0	(0	0	
	2014	0	626	105	0	316	146	0	99	46	64	66	0	(1	0	0	
	2020	0	716	136	0	377	164	0	120	55	78	78	0	(4	0	0	7
Island Isolated C/I Buildings	2023	0	732	145	0	393	168	0	128	57	82	80	0			0	0	7 - 2
	2026	0	748	154	0	411	171	0	135	60	87	82	0	(-	0	0	,
	2029	0	765	163	0	428	174	0	143	62	92	83	0	(0	0	

Exhibit 20 Reference Case Electricity Consumption, Modelled by End Use, Sub sector and Milestone Year (MWh/yr.) (cont'd...)

Sub-Sector	Year	Space Heating	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Refrigeration	Secondary Lighting	Domestic Hot Water	Computer Equipment	Food Service Equipment	Other Plug Loads	Outdoor Lighting	Space Cooling	Street Lighting	Computer Servers	Elevator	Block Heaters	Grand Total
Large Other Buildings	2014	65,447	36,027	27,825	1,564	22,200	14,680	13,133	8,017	12,662	5,660	4,741	2,936	0	1,388	406	358	217,045
	2017	66,313	35,786	28,269	1,590	22,506	14,521	13,332	8,306	12,823	5,854	4,623	2,986	0	1,437	413	359	219,118
	2020	68,311	36,189	29,295	1,651	23,216	14,534	13,783	8,769	13,190	6,152	4,598	3,146	0	1,516	429	360	225,139
	2023	70,141	36,495	30,234	1,707	23,865	14,520	14,196	9,206	13,525	6,435	4,560	3,290	0	1,591	444	361	230,570
	2026	71,504	36,537	30,933	1,748	24,348	14,437	14,505	9,572	13,777	6,675	4,482	3,389	0	,	455	362	234,377
	2029	73,045	36,680	31,724	1,795	24,895	14,380	14,855	9,964	14,061	6,931	4,420	3,504	0	1,720	467	363	238,804
	2014	56,786	33,165	21,646	1,450	18,691	10,949	9,525	7,223	9,684	5,022	4,365	2,711	0	1,240	227	238	182,923
	2017	56,611	32,383	21,570	1,444	18,624	10,696	9,497	7,339	9,654	5,106	4,176	2,673	0	1,260	226	238	181,497
Small Other Buildings	2020	57,970	32,437	22,175	1,479	19,060	10,671	9,774	7,656	9,895	5,329	4,114	2,754	0	1,315	232	242	185,103
oman other bandings	2023	59,756	32,744	22,979	1,527	19,645	10,698	10,135	8,039	10,204	5,592	4,089	2,879	0	1,381	239	246	190,153
	2026	61,179	32,844	23,617	1,565	20,107	10,679	10,424	8,369	10,453	5,821	4,033	2,969	0	1,438	245	250	193,994
	2029	62,724	33,015	24,311	1,606	20,611	10,675	10,738	8,717	10,722	6,062	3,987	3,071	0	1,498	251	254	198,243
Other Institutional	2014	10,017	12,713	8,247	412	1,763	4,559	2,407	1,212	537	2,075	1,406	219	0	0	0	412	45,979
	2017	33,698	12,550	8,319	415	1,775	4,494	2,423	1,246	542	2,133	1,362	218	0	0	0	415	69,591
	2020	50,460	12,387	8,392	418	1,788	4,428	2,438	1,280	547	2,191	1,318	218	0	0	0	418	86,285
	2023	50,522	12,225	8,466	421	1,801	4,362	2,454	1,314	552	2,250	1,274	218	0	0	0	421	86,281
	2026	50,585	12,063	8,540	425	1,814	4,297	2,470	1,348	558	2,308	1,231	217	0	0	0	425	86,280
	2029	50,648	11,902	8,615	428	1,827	4,232	2,486	1,382	563	2,366	1,187	217	0	0	0	428	86,282
	2014	0	0	0	204,856	0	0	0	0	0	0	0	0	0		0	0	204,856
	2017	0	0	0	207,490	0	0	0	0	0	0	0	0	0	-	0	0	207,490
Non-Buildings	2020	0	0	0	214,805	0	0	0	0	0	0	0	0	0	-	0	0	214,805
	2023	0	0	0	221,041	0	0	0	0	0	0	0	0	0	0	0	0	221,041
	2026	0	0	0	225,350	0	0	0	0	0	0	0	0	0	0	0	0	225,350
	2029	0	0	0	230,330	0	0	0	0	0	0	0	0	0	Ü	0	0	230,330
Street Lighting	2014	0	0	0	0	0	0	0	0	0	0	0	0	37,127	0	0	0	37,127
	2017	0	0	0	0	0	0	0	0	0	0	0	0	36,851	0	0	0	36,851
	2020	0	0	0	0	0	0	0	0	0	0	0	0	36,931	0	0	0	36,931
	2023	0	0	0	0	0	0	0	0	0	0	0	0	36,999	0	0	0	
	2026	0	0	0	0	0	0	0	0	0	0	0	0	37,043	0	0	0	37,043
	2029	0	0	0	0	0	0	0	0	0	0	0	0	37,086	0	0	0	37,086
	2014	629,085	411,214	286,405	223,118	181,881	128,587	107,844	95,476	92,387	57,527	49,260	40,630	37,127	16,170	3,514	1,817	2,362,042
	2017	660,988	408,432	290,691	226,032	183,999	126,314	109,081	98,914	93,254	59,263	47,906	41,233	36,851	16,760	3,553	1,768	2,405,038
Grand Total	2020	700,771	415,029	302,937	234,065	191,362	126,848	113,939	104,692	96,828	62,594	48,023	43,168	36,931	17,744	3,665	1,831	2,500,428
	2023	724,416	421,095	315,512	241,030	198,063	127,332	118,743	110,542	100,196	65,882	48,049	45,201	36,999	18,765	3,793	1,860	2,577,476
	2026	742,075	423,639	324,872	245,880	203,029	127,062	122,301	115,362	102,679	68,634	47,587	46,596	37,043	19,600	3,887	1,887	2,632,135
	2029	762,002	427,532	335,451	251,473	208,630	127,074	126,322	120,570	105,485	71,588	47,311	48,233	37,086	20,505	3,994	1,915	2,695,172

Exhibit 21 Distribution of Electricity Consumption in 2029 by Sub Sector





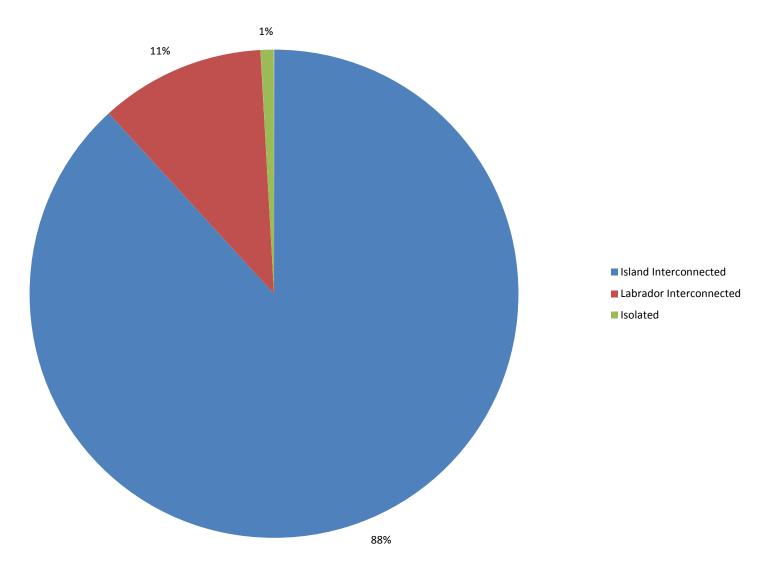
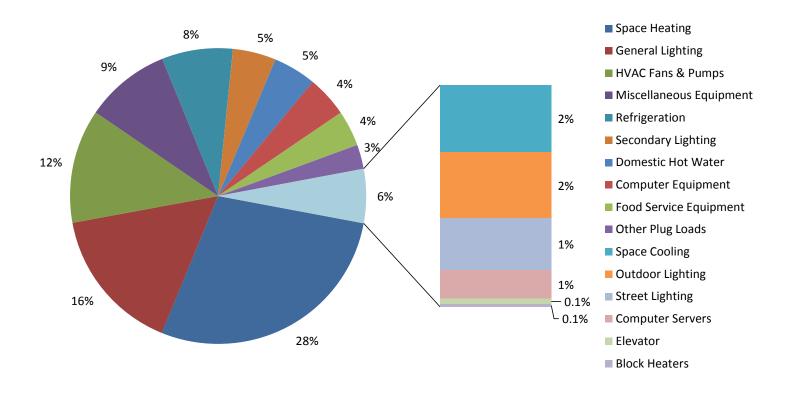
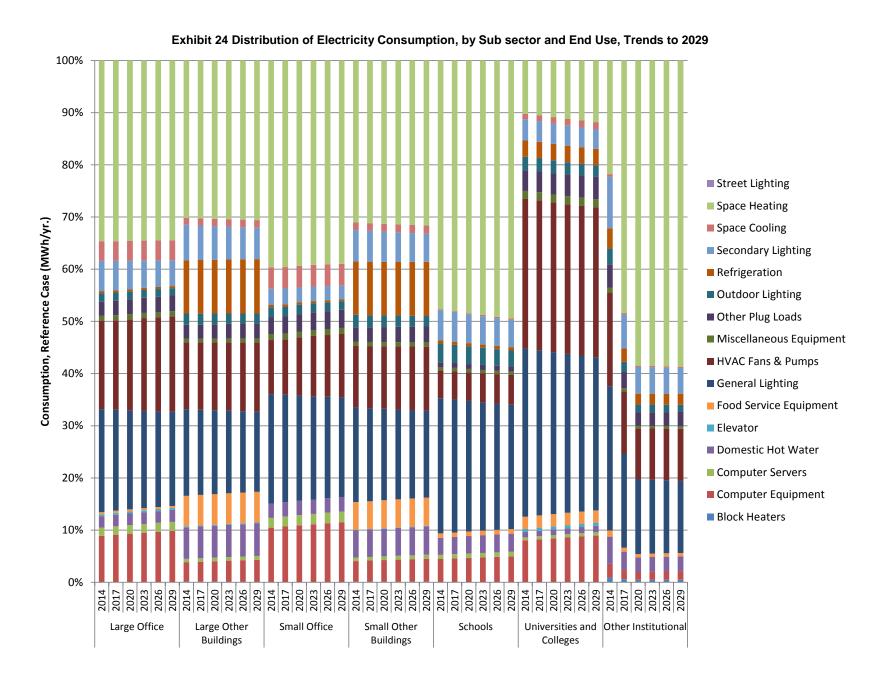
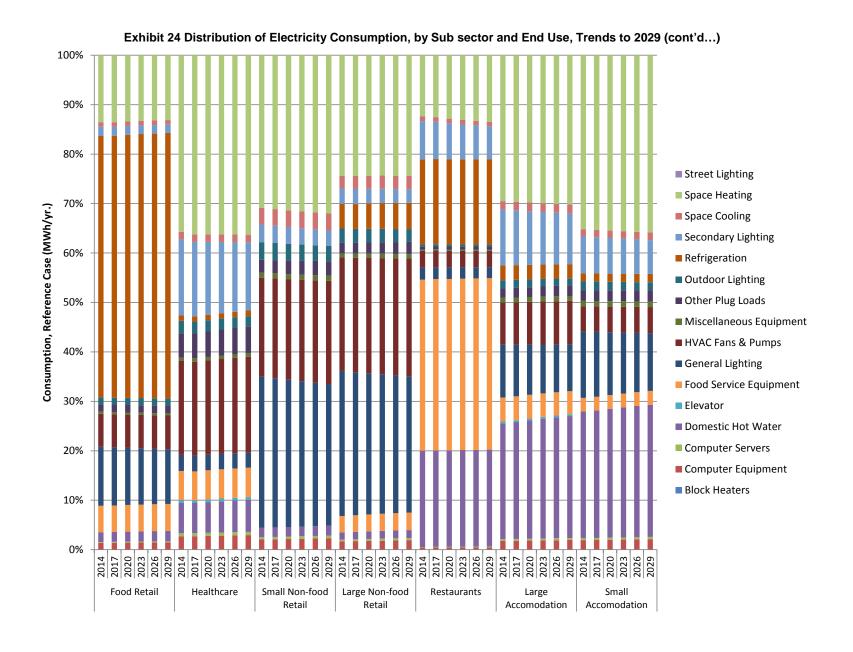
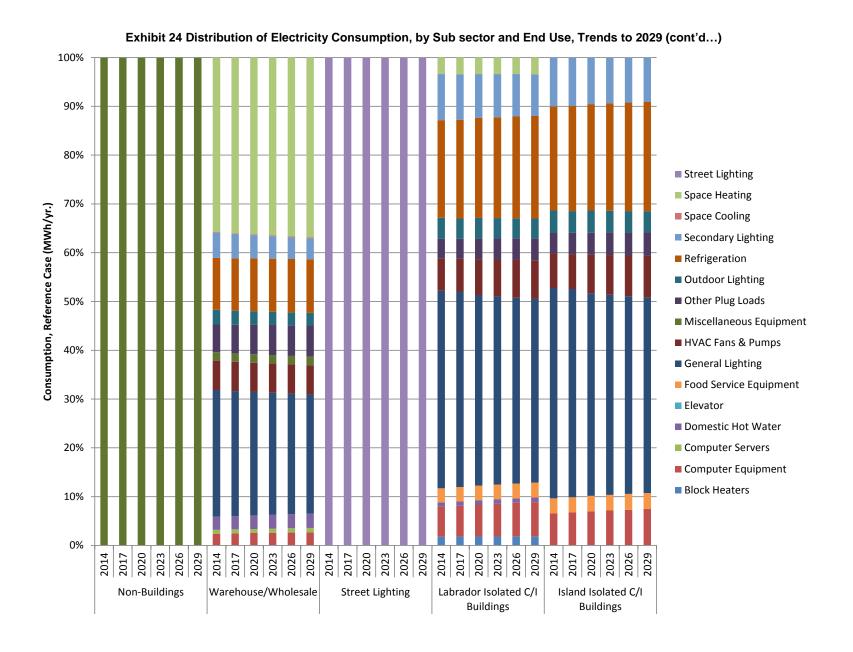


Exhibit 23 Distribution of Electricity Consumption in 2029 by End Use









6 Reference Case Electric Peak Load Forecast

6.1 Introduction

This section provides a profile of the electric peak load for Newfoundland and Labrador's Commercial sector over the Reference Case period of 2014 to 2029. The Reference Case peak load profile estimates the expected level of demand in the peak period that would occur over the study period in the absence of new CDM initiatives or rate changes. As such, the Reference Case provides the point of comparison for the calculation of peak load savings associated with each of the subsequent scenarios that are assessed within this study.

The discussion is organized into the following sub-sections:

- Methodology
- Summary of results

6.2 Methodology

The electric peak loads for each combination of end use, sub sector and milestone year were calculated in exactly the same manner as shown in Section 4, which presented the Base Year peak load profiles.

For this Reference Case, the electric energy consumption (from Section 5) is converted to a demand value for the peak period definition by dividing the applicable electric energy value for each sub sector and end use by the corresponding Commercial sector load shape hours-use factors, as presented in Appendix B.

6.3 Summary of Results

A summary of the Reference Case peak load profiles is presented in Exhibit 25.

Base Year Electric Energy Use



Base Year Electric Peak Load



Reference Case Electric Energy Forecast



Reference Case Electric Peak Load Forecast



Technology Assessment: All Measures



Economic Potential: Energy and Peak Load



Achievable Potential: Energy and Peak Load

Exhibit 25 Electric Peak Loads, by Milestone Year, Sub sector & Region (MW)

Sub-Sector	Year	Island Interconnected	Isolated	Labrador Interconnected	Grand Total
	2014	62	-	-	62
	2017	64	-	-	64
Large Office	2020	66	-	-	66
Large Office	2023	69	-	-	69
	2026	71	-	-	71
	2029	73	-	-	73
	2014	45	-	1	46
	2017	46	-	1	47
Small Office	2020	48	-	1	49
	2023	50	-	1	51
	2026	51	-	1	52
	2029	53	-	1	54
	2014	27	-	2	29
	2017	27	-	2	29
Large Non-food Retail	2020	28	-	2	30
	2023	29	-	2	31
	2026	30	-	2	32
	2029	31	-	2	33
	2014	33	-	4	36
	2017	33	-	4	37
Small Non-food Retail	2020	34	-	4	38
	2023	35	-	4	39
	2026	36	-	4	40
	2029	37	-	4	41
	2014	29	-	3	32
	2017	29	-	3	32
Food Retail	2020	30	-	3	33
	2023	31	-	3	34
	2026	32	-	3	35
	2029	33	-	3	36
	2014	16	-	2	18
	2017 2020	17 17	-	2	18 19
Large Accomodation			-		
	2023 2026	18 19	<u> </u>	2	20
	2029	19	-	2	20 21
	2029	7	-	0	8
	2014	7	-	0	8
	2020	8	-	0	8
Small Accomodation	2023	8	-	0	8
	2026	8	-	0	8
	2029	8	<u> </u>	0	9
	2014	33	-	3	36
	2017	33	<u> </u>	3	36
	2020	34	-	3	37
Healthcare	2023	35	<u> </u>	3	37
	2026	36	-	3	38
	2029	36	-	3	39

Exhibit 25 Electric Peak Loads, by Milestone Year, Sub sector & Region (MW) (cont'd...)

Sub-Sector	Year	Island Interconnected	Isolated	Labrador Interconnected	Grand Total
	2014	43	-	3	46
	2017	44	-	3	46
Schools	2020	45	-	3	48
Julions	2023	47	-	3	50
	2026	49	-	3	52
	2029	50	-	3	53
	2014	22	-	1	23
	2017	22	-	1	23
Universities and	2020	23	-	1	23
Colleges	2023	23	-	1	24
	2026	23	-	1	24
	2029	24	-	1	25
	2014	16	-	2	17
	2017	16	-	2	18
Warehouse/Wholesale	2020	17	-	2	18
Trai onouco, Triiciccaic	2023	17	-	2	19
	2026	18	-	2	19
	2029	18	-	2	20
	2014	28	-	2	30
	2017	28	-	2	31
Restaurants	2020	30	-	3	32
Nootaurunto	2023	31	-	3	34
	2026	32	-	3	35
	2029	33	-	3	36
	2014	-	3	-	3
	2017	-	3	-	3
Labrador Isolated C/I	2020	-	3	-	3
Buildings	2023	-	3	-	3
	2026	-	4	-	4
	2029	-	4	-	4
	2014	-	0	-	0
	2017	-	0	-	0
Island Isolated C/I	2020	-	0	-	0
Buildings	2023	-	0	-	0
	2026	-	0	-	0
	2029	-	0	-	0
	2014	35	-	15	49
	2017	35	-	15	50
Large Other Buildings	2020	36	-	15	51
J J	2023	38	-	15	53
	2026	39	-	15	54
	2029	40	-	15	55
	2014	32	-	10	41
	2017	32	-	10	41
Small Other Buildings	2020	32	-	10	42
J .	2023	33	-	10	43
	2026	34	-	10	44
	2029	35	-	10	45

Exhibit 25 Electric Peak Loads, by Milestone Year, Sub sector & Region (MW) (cont'd...)

Sub-Sector	Year	Island Interconnected	Isolated	Labrador Interconnected	Grand Total
	2014	-	-	9	9
	2017	-	-	15	15
Other Institutional	2020	-	-	20	20
Other institutional	2023	-	-	20	20
	2026	-	-	20	20
	2029	-	-	20	20
	2014	30	-	1	31
	2017	31	-	1	32
Non-Buildings	2020	32	-	1	33
14011-Dullulligs	2023	33	-	1	34
	2026	34	-	1	34
	2029	34	-	1	35
	2014	5	0	0	5
	2017	5	0	0	5
Street Lighting	2020	5	0	0	5
Street Lighting	2023	5	0	0	5
	2026	5	0	0	5
	2029	5	0	0	5
	2014	463	3	56	522
	2017	469	3	62	534
Grand Total	2020	486	4	67	557
Grand Total	2023	503	4	67	575
	2026	516	4	68	588
	2029	530	4	68	603

Selected highlights include:

- Since the hours-use factors applied are not assumed to change during the study period, trends
 in peak demand contributions for specific sub sectors are expected to follow the electricity
 consumption trends for those sub sectors. Large and small offices, for example, will continue to
 make the largest commercial contribution to the peak demand throughout the study period.
- Similarly, peak demand contributions for specific end uses are expected to follow the electricity
 consumption trends for those end uses. Space heating becomes an increasingly important
 contributor to peak demand through time, while indoor lighting, because of natural gains in
 efficiency, will make a gradually declining contribution towards the peak demand.

7 Technology Assessment: All Measures

7.1 Introduction

This section identifies and assesses the economic attractiveness of the selected energy efficiency measures for the Commercial sector. It also identifies and assesses the economic attractiveness of selected Commercial sector electric capacity-only peak load reduction measures, which in this study are defined as those measures that affect electric peak but have minimal or no impact on electric energy use. The discussion is organized and presented as follows:

- Methodology
- Energy efficiency technologies
- Electric peak load reduction measures
- Summary of unbundled results
- Energy efficiency supply curves
- Demand reduction supply curves.

7.2 Methodology

The following steps were employed to assess the measures:

- Select candidate measures
- Establish technical performance for each option
- Establish the capital, installation and operating costs for each option
- Calculate the cost of conserved energy (CCE) for each energy efficiency technology and O&M measure
- Calculate the cost of electric peak load reduction (CEPR) for each option.

A brief description of each step is provided below.

Base Year Electric Energy Use



Base Year Electric Peak Load



Reference Case Electric Energy Forecast



Reference Case Electric
Peak Load Forecast



Technology
Assessment: All
Measures



Economic Potential: Energy and Peak Load



Achievable Potential: Energy and Peak Load

Step 1 Select Candidate Measures

The candidate measures were selected in close collaboration with client personnel based on a combination of a literature review and previous study team experience. The selected measures are all considered to be technically proven and commercially available, even if only at an early stage of market entry. Technology costs, which will be addressed in this section, were not a factor in the initial selection of candidate technologies.

Step 2 Establish Technical Performance

Information on the performance improvements provided by each measure was compiled from available secondary sources, including the experience and on-going research work of study team members. In the case of some of the peak load reduction measures, comfort may be affected and the trade-off between benefits (e.g., cost savings) and costs (including reduction in comfort) were judged based on past experience with similar technologies and customer acceptance.

Step 3 Establish Capital, Installation and Operating Costs for Each Measure

Information on the cost of implementing each measure was also compiled from secondary sources, including the experience and on-going research work of study team members.

In the case of energy efficiency measures, the incremental cost is applicable when a measure is installed in a new facility, or at the end of its useful life in an existing facility; in this case, incremental cost is defined as the cost difference for the energy efficiency measure relative to the baseline technology. The full cost is applicable when an operating piece of equipment is replaced with a more efficient model prior to the end of its useful life. ¹⁴

Unlike energy efficiency measures, in which major equipment, such as heating and water heating systems are typically replaced, or thermal envelope measures such as insulation upgrades affect systems directly, capacity-only measures are typically implemented via add-on control equipment, although some built-in control equipment exists. The incremental cost is thus defined as the control equipment itself or incremental cost for a controllable appliance or device relative to the baseline appliance cost (e.g., remote accessible thermostat vs. standard thermostat), plus any required infrastructure (e.g., automatic meter reading or communications gateways). In cases where a more efficient appliance with peak control functions replaces a standard appliance, both electric energy and electric peak reduction are achieved, with some splitting of incremental costs attributable to each function. Where a new or replacement end use is installed that operates off peak, thus achieving electric peak reduction without significant energy impacts, incremental costs for the electric peak reduction device will be compared with standard equipment without assuming any early replacement and, thus, salvage value.

In all cases the costs and savings are annualized, based on the number of years of equipment life and the discount rate, and the costs incorporate applicable changes in annual O&M costs. All costs are expressed in constant 2014 dollars.

Step 4 Calculate CCE for Each Energy Efficiency Measure

One of the important sets of information provided in this section is the CCE associated with each energy efficiency measure. The CCE for an energy efficiency measure is defined as the annualized incremental cost of the upgrade measure divided by the annual energy savings achieved, excluding any administrative or program costs required to achieve full use of the technology or measure. All cost information presented in this section and in the accompanying TRM Workbook is expressed in constant 2014 dollars.

The CCE provides a basis for the subsequent selection of measures to be included in the Economic Potential Forecast (see Section 8). The CCE is calculated according to the following formula:

$$\frac{C_A + M}{S}$$

It is recognized that some measures can be implemented prior to the end of their useful life, that is, early retirement. This intermediate option between full and incremental cost could increase the rate of adoption for some of the incremental measures, raising the Economic Potential savings modestly. However, in this study early retirement is treated as a program option.

¹⁴ With some exceptions, many measures could conceivably be applied as either a full-cost measure (applicable immediately) or as an incremental cost measure (upon end of service life), depending on how financially attractive it is. Therefore, for all but a few measures, the TRM Workbook is configured to evaluate the measure at full cost and include it on that basis if it passes the screen, then roll to evaluating it on an incremental basis, and only fail it completely if it fails both tests. Where a measure is always full cost (such as the block heater timer, where the baseline technology is the "do nothing" option), the incremental cost option is excluded. Where a measure is always incremental cost (such as high-performance homes, where the baseline technology has to be a standard construction home, not no home at all), the full cost option is excluded.

Where:

 C_A is the annualized installed cost M is the incremental annual cost of operation and maintenance (O&M) S is the annual kWh electricity savings

And A is the annualization factor

$$A = \frac{i(1+i)^n}{(1+i)^n - 1}$$

Where:

i is the discount rate *n* is the life of the measure

The detailed CCE tables (see TRM Workbook) show both incremental and full installed costs for the energy efficiency measures, as applicable. If the measure or technology is installed in a new facility or at the point of natural replacement in an existing facility, then the incremental cost of the measure versus the cost of the baseline technology is used. If, prior to the end of its life, an operating piece of equipment is replaced with a more efficient model, then the full cost of the efficient measure is used.

The annual saving associated with the efficiency measure is the difference in annual electricity consumption with and without the measure.

The CCE calculation is sensitive to the chosen discount rate. In the CCE calculations that accompany this document, a discount rate of 7% (real) is used.

Step 5 Calculate CEPR for Each Peak Load Measure

The CEPR for a peak load reduction measure is defined as the annualized incremental cost of the measure divided by the annual peak reduction achieved, excluding any administrative or program costs required to achieve full use of the technology or measure. All cost information presented in this section and in the TRM Workbook is in constant (2014) dollars.

The CEPR provides a basis for the subsequent selection of measures to be included in the Economic Potential Forecast (see Section 8). The CEPR is calculated according to the following formula:

$$\frac{C_A + M}{S_n}$$

Where:

 C_A is the annualized installed cost M is the incremental annual cost of operation and maintenance (O & M) S_p is the annual kW load reduction associated with peak definition p.

And A is the annualization factor.

Where:
$$A = \frac{i(1+i)^n}{(1+i)^n - 1}$$

i is the discount rate: n is the life of the measure. Note that the annual O&M cost will include, in some cases, amortized costs associated with infrastructure considered a prerequisite for implementation of the measure. This could include automated metering infrastructure (AMI), such as advanced metering, communications gateways and other related system investments. These costs would typically support multiple applications (e.g., communications gateways could enable control of heating, air conditioning, water heating, and HVAC fans and pumps), as well as facilitate time-differentiated rates that would be required for a feasible and cost-effective program implementation (e.g., thermal energy storage). It should also be noted that the measure lifetime is for the control device, function or feature, rather than that of the unit it is controlling. The study does not presume any specific technology or infrastructure, but does assume that a marketplace will develop for such systems, whether or not NL utilities adopt them, or develops access directly or indirectly to customer control equipment.

The CEPR can be compared to benefits, which include the value of reduced peak for the utility (avoided capacity and transmission and distribution (T&D) investment or purchase costs), the customer (e.g., bill savings) and society (e.g., value of environmental benefits) to determine its cost effectiveness from various perspectives (societal, utility, participant and non-participant).

As with the CCE for energy savings, the CEPR calculation is sensitive to the chosen discount rate, which, as for the CCE, used a 7% (real) discount rate. Higher discount rates will tend to reduce savings and decrease cost effectiveness where costs are incurred upfront and benefits accrue over many years.

Step 6 Estimate Approximate Unbundled Electric Energy Savings Potential for Each Energy Efficiency Measure and Demand Reduction for Each Peak Load Measure

The next step in the assessment was to prepare an approximate estimate of the potential unbundled electric energy savings that could theoretically be provided by each energy efficiency measure over the study period, and similarly to prepare an estimate of demand reductions that could be provided by each peak load measure. The term "unbundled" means that the savings for each measure are calculated in isolation from other important factors that ultimately determine the potential for real life savings.

The strength of this approach is that it provides insight into the relative size of the potential electric energy savings or demand reductions associated with individual measures; this perspective is often of particular value to utility CDM program design personnel who may need to consider combinations of measures that differ from those selected for the CDM potential assessment.

However, it should be noted that the savings from individual measures cannot be used directly to calculate total savings potential or demand reduction. This is due primarily to two factors:

- More than one upgrade may affect a given end use: For example, improved insulation reduces space heating electricity use, as does the installation of a heat pump. On its own, each measure will reduce overall space heating electricity use. However, the two savings are not additive. The order in which some upgrades are introduced is also important. In this study, the approach has been to select and model the impact of bundles of measures that reduce the load for a given end use (e.g., wall insulation and window upgrades that reduce the space heating load) and then to introduce measures that meet the remaining load more efficiently (e.g., a heat pump heating system). Similarly, more than one peak load measure may affect a given end use, or peak load measures may be applied to the same end use that one or more energy efficiency measures may also affect.
- There are interactive effects among end uses: For example, the electricity savings from more
 efficient lighting result in reduced waste heat. During the space heating season, lighting waste
 heat contributes to a facility's internal heat gains, which lower the amount of heat that must be

provided by the space heating system. The magnitude of the interactive effects can be significant, both on energy consumption and peak demand. However, it is important to note that assessing the impact of interactive effects in commercial facilities is more complex since heat may be generated in spaces that heat the conditioned space much less effectively (e.g. high bay fixtures or equipment in mechanical rooms). Interactive effects were captured on a measure by measure basis for measures that were more likely to have an impact on space heating requirements and a 30% heating penalty was assumed for this subset of measures. For example, it was assumed that about 30% of the savings from the LED lamps measure would be lost due to increased space heating requirements. Rather than reducing the savings from these measures directly, interactive effects have been taken into consideration with the measure "HVAC Impact from Other Savings".

The above factors are incorporated in later stages of the analysis.

Step 7 Prepare Energy Efficiency and Demand Reduction Supply Curves

The final step in the assessment of the selected energy efficiency measures was the generation of an energy efficiency supply curve and a demand reduction supply curve. Energy efficiency supply curves are built up based on the conserved electricity and the CCE for each measure. Similarly, demand reduction supply curves are built up based on the demand reduction and the CEPR for each measure. The CSEEM model was used to model the application of all technically feasible measures, accumulating the electricity savings or demand reduction and associated implementation costs for each sub sector type.

Measures were applied sequentially to account, at least approximately, for interaction between measures. The impact of building shell measures was modelled using ICF's Commercial/Institutional Building Energy-use Simulation Model (CEEAM), but only individually. The full package of measures was not modelled together, nor was the impact of internal gains on space heating and cooling included. These effects are modelled more thoroughly for the Economic Potential calculation, when all the measures that pass the economic screen are modelled together. Similarly, the demand measures were also applied sequentially, but began with the demand reference case, not the demand that would remain after all the efficiency measures were applied. Thus the interaction between energy efficiency and demand reduction is neglected for this supply curve.

The accumulated savings and costs for each measure were added together to present the overall energy efficiency supply curve for the province. They were sorted in order from lowest cost per kWh saved to highest cost, and presented on a graph showing CCE versus electricity savings.

The accumulated demand reduction and costs for each measure were added together to present the overall demand reduction supply curve for the province. They were sorted in order from lowest cost per kW reduction to highest cost, and presented on a graph showing CEPR versus demand reduction.

7.3 Energy Efficiency Technology Assessment

Exhibit 26 shows the energy efficiency technologies and measures that are included in this study. A description and detailed financial and economic assessment of each measure is provided in the TRM Workbook that accompanies this report.

Exhibit 26 Energy Efficiency Technologies Included in this Study

Block Heaters

Block Heater Controls

Computer Equipment (ENERGY STAR ®)

- ENERGY STAR® Computers
- ENERGY STAR® Office Equipment
- Energy-Efficient Server Technologies
- Activate PC Power Management*

Domestic Hot Water

- On-Demand Water Heaters
- Heat Pump Water Heaters
- Low-Flow Pre-Rinse Spray Valves
- Low-Flow Faucet Aerators
- Low-Flow Showerheads
- Drainwater Heat Recovery
- ENERGY STAR® Dishwashers

Food Service Equipment

High-Efficiency Cooking Equipment

Lighting

- LED Screw-In Lamps**
- LED High Bay fixtures**
- LED Tubular Lamps**
- LED Troffers**
- LED Outdoor Fixtures
- LED Exit Signs
- LED Refrigerated Display Case Lighting
- High Performance T8 Fixtures**
- T5HO Fixtures**
- Occupancy Sensors (Lighting)
- Dimming Control (Daylighting)
- Lighting Controls (Outdoor)
- Make Use of Daylighting*
- Use Task Light Instead of Ambient*

Building Envelope

- Roof Insulation
- Wall Insulation
- High Performance Glazing Systems
- Air Curtains

Refrigeration

- Cooler Night Covers
- Refrigerated Cases with Doors
- ECM Motors and Evaporator Fan Motor Controllers
- Freezer Defrost Controllers
- High Efficiency Compressors
- Automatic Door Closers (Walk-in Coolers)
- Refrigeration Heat Recovery
- Refrigeration Controls
- CEE-Rated Refrigerators and Freezers

HVAC

- High-Efficiency Air Source Heat Pumps
- Ground Source Heat Pumps
- Ductless Mini-Split Heat Pumps
- HVAC Occupancy Sensors
- Demand Control Ventilation (DCV)
- VFDs on HVAC Motors
- Ventilation Heat Recovery
- Radiant Infrared Heaters
- High Efficiency Chillers
- High Efficiency Rooftop Units (RTUs)
- Premium Efficiency Motors
- Advanced Building Automation Systems
- Building Recommissioning
- Programmable Thermostats
- Demand Control Kitchen Ventilation (DCKV)
- Use Natural Ventilation (Summer)*
- Use Shades/Blinds (Summer)*
- Use Shades/Blinds (Winter)*
- Keep Doors Closed (Summer)*
- Keep Doors Closed (Winter)*

Other Plug Loads

- Refrigerated Vending Machine Controllers
- Reduce Number of Fridges*

New Construction

- New Construction (25% more efficient)
- New Construction (40% more efficient)

Street Lighting

LED Street Lighting

^{*} Denotes behavioural measure

^{**} Measures assessed separately for primary (e.g. classrooms in a school) and secondary lighting (e.g. hallways in a school), since hours of operation differ for these scenarios. As such, many of the following exhibits include two line items with the same measure name.

7.3.1 **Technology Screening Results**

A summary of the results is provided in Exhibit 27. For each of the measures reviewed, the exhibit shows:

- The name of the measure
- The cost basis ¹⁵ for the CCE that is shown (e.g. full versus incremental)

 The measure's average CCE for each region ¹⁶ Average CCE refers to a weighted average of the CCE values for the measure in different sub sectors. 1

Measures analyzed on the basis of full cost have been placed towards the top of Exhibit 27 because they are qualitatively different from the measures that pass only on an incremental basis. A measure that passes on a full-cost basis can be applied immediately, even if the piece of equipment it replaces or improves is currently working properly. That means the rate at which the measure can be implemented as a utility CDM measure is limited only by market and program constraints. A measure that passes only on an incremental basis, on the other hand, is limited by the rate of natural replacement (due to failure or obsolescence) or purchase of the piece of equipment it replaces. A measure that passes on a full-cost basis in some sub sector types and on an incremental cost basis in others is shown as "Full/Incr". The exhibit does not include behavior measures as there are no measure-level costs associated with implementing these measures (i.e. CCE of 0 ¢/kWh).

Exhibit 27 Commercial Sector Energy Efficiency Technology Measures, Screening Results 18

Measure Name	Basis	Average CCE (¢/kWh)		
Measure Name	Dasis	Island	Labrador	Isolated
Activate PC Power Management	Full	0.0	0.0	0.0
Make Use of Daylighting	Full	0.0	0.0	0.0
Use Task Light Instead of Ambient	Full	0.0	0.0	0.0
Reduce Number of Fridges	Full	0.0	0.0	0.0
Use Shades/Blinds (Winter)	Full	0.0	0.0	0.0
Keep Doors Closed (Winter)	Full	0.0	0.0	0.0
Use Shades/Blinds (Summer)	Full	0.0	0.0	0.0
Use Natural Ventilation (Summer)	Full	0.0	0.0	0.0
Keep Doors Closed (Summer)	Full	0.0	0.0	0.0
Low-Flow Showerheads	Full	0.1	0.1	0.1
Low-Flow Showerheads	Full	0.1	0.1	0.1
Low-Flow Faucet Aerators	Full	0.1	0.1	0.1
Lighting Controls (Outdoor)	Full	0.4	0.4	0.7
Cooler Night Covers	Full	0.7	0.7	0.7
Low-Flow Pre-Rinse Spray Valves	Full	0.7	0.9	1.1
Automatic Door Closers (Walk-In Coolers & Freezers)	Full	1.2	1.2	N/A
LED Screw-In Lamps (Secondary)	Full	1.7	1.4	1.6
Programmable Thermostats	Full	1.8	2.0	1.4
LED Screw-In Lamps	Full	2.2	1.8	2.1

¹⁵ See Step 4 in Section 7.2 for a fuller description.

¹⁶ The thresholds that were employed for the economic screening of the measures are summarized in Section 8.2 ¹⁷ In the subsequent modeling described in Section 8, measure pass or fail the economic screen on the basis of their CCE in the individual sub sector and region, not on the basis of this weighted average value. ¹⁸ Average CCE does not include program costs.

Exhibit 27 Commercial Sector Energy Efficiency Technology Measures, Screening Results (cont'd...)

Measure Name	Pagia	Average CCE (¢/kWh)		
modera Nume	Basis	Island	Labrador	Isolated
Refrigerated Vending Machine Controllers	Full	2.6	2.6	2.6
High Efficiency Compressors (Refrigeration)	Full	2.7	2.7	N/A
High Performance T8 Fixtures (Secondary)	Full	3.7	2.7	3.3
VFDs on HVAC Motors	Full	3.5	3.2	3.1
Building Recommissioning	Full	3.4	3.6	2.9
Hotel Occupancy Sensors	Full	3.8	2.8	N/A
ENERGY STAR Dishwashers	Full	5.0	5.0	0.0
T5HO Fixtures (Secondary)	Full	3.9	2.9	3.6
LED High Bay Fixtures (Secondary)	Full	4.0	3.2	3.8
LED Exit Signs	Full	3.8	3.8	3.8
High Performance T8 Fixtures	Full	4.7	3.5	4.2
Demand Control Kitchen Ventilation (DCKV)	Full	4.2	4.2	N/A
T5HO Fixtures	Full	4.7	3.7	4.5
Refrigeration Controls	Full	4.5	4.5	N/A
LED High Bay Fixtures	Full	5.0	4.0	4.8
Ventilation Heat Recovery	Full	5.2	4.7	4.1
ECM Motors and Evaporator Fan Motor Controllers	Full	4.7	4.7	4.7
Occupancy Sensors (Lighting)	Full	4.7	4.9	5.3
LED Street Lighting	Full	7.8	7.8	0.0
Radiant Infrared Heaters	Full	5.9	6.1	N/A
LED Tubular Lamps (Secondary)	Full	7.1	5.3	6.8
Ductless Mini-Split Heat Pump	Full	9.0	4.4	6.2
Demand Control Ventilation (DCV)	Full	8.1	5.9	N/A
Refrigeration Heat Recovery	Full	8.2	8.2	N/A
Block Heater Controls	Full	N/A	10.0	10.0
Advanced Building Automation Systems	Full	9.9	11.2	N/A
Refrigerated Cases with Doors	Full	10.9	10.9	N/A
Dimming Control (Daylighting)	Full	18.5	14.2	18.6
Air Curtains	Full	18.8	18.8	N/A
Freezer Defrost Controllers	Full	27.9	27.9	27.9
High-Efficiency Air Source Heat Pumps	Full/Incr.	4.6	0.9	9.4
Heat Pump Water Heaters	Full/Incr.	4.8	3.4	12.2
LED Tubular Lamps	Full/Incr.	8.9	5.3	8.7
Ground Source Heat Pumps	Full/Incr.	12.3	10.0	12.5
Energy-Efficient Server Technologies	Incr.	0.0	0.0	0.0
ENERGY STAR Computers	Incr.	0.0	0.0	0.0
ENERGY STAR Office Equipment	Incr.	0.0	0.0	0.0
New Construction (25% More Efficient)	Incr.	3.3	3.1	3.8
Drainwater Heat Recovery	Incr.	4.5	4.5	4.5

Exhibit 27 Commercial Sector Energy Efficiency Technology Measures, Screening Results (cont'd...)

Measure Name	Decie	Aver	age CCE (¢/	kWh)
Measure Name	Basis	Island	Labrador	Isolated
Premium Efficiency Motors	Incr.	4.9	4.5	4.3
High Performance Glazing Systems	Incr.	5.6	6.1	3.2
LED Outdoor Fixtures	Incr.	3.0	3.0	11.3
New Construction (40% More Efficient)	Incr.	6.1	5.8	7.2
CEE-Rated Refrigerators and Freezers	Incr.	8.4	8.4	8.4
Wall Insulation	Incr.	14.1	13.8	5.8
Roof Insulation	Incr.	15.8	16.4	5.0
LED Refrigerated Display Case Lighting	Incr.	11.5	11.5	16.0
On-Demand Water Heaters	Incr.	13.2	13.2	N/A
LED Troffers (Secondary)	Incr.	15.9	12.7	26.2
High Efficiency Chillers	Incr.	14.9	21.7	N/A
LED Troffers	Incr.	20.1	16.3	19.3
High Efficiency RTUs	Incr.	24.6	34.7	32.1

7.4 Demand Reduction Technology Assessment

Exhibit 28 shows the demand reduction technologies and measures that are included in this study. A description and detailed financial and economic assessment of each measure is provided in the TRM Workbook that accompanies this report.

Exhibit 28 Demand Reduction Technologies Included in this Study¹⁹

Space Heating Thermal Storage Heating Controls HVAC Fans and Pumps HVAC Demand Controls	Domestic Hot Water DHW Controls Refrigeration Refrigeration Demand Controls
Lighting Lighting Demand Controls	

7.4.1 Technology Screening Results

A summary of the results is provided in Exhibit 29. For each of the measures reviewed, the exhibit shows:

- The name of the measure
- The cost basis²⁰ for the CEPR that is shown (e.g. full versus incremental)
- The measure's average CEPR for each region²¹

¹⁹ Please note that all demand curtailment is accounted for in the Industrial sector analysis and reporting

²⁰ See Step 4 in Section 7.2 for a fuller description.

The thresholds that were employed for the economic screening of the measures are summarized in Section 8.2

Measures analyzed on the basis of full cost have been placed towards the top of Exhibit 29 because they are qualitatively different from the measures that pass only on an incremental basis. A measure that passes on a full-cost basis can be applied immediately, even if the piece of equipment it replaces or improves is currently working properly. That means the rate at which the measure can be implemented as a utility CDM measure is limited only by market and program constraints. A measure that passes only on an incremental basis, on the other hand, is limited by the rate of natural replacement (due to failure or obsolescence) or purchase of the piece of equipment it replaces. A measure that passes on a full-cost basis in some sub sector types and on an incremental cost basis in others is shown as "Full/Incr."

Exhibit 29 Commercial Sector Demand Reduction Technology Measures, Screening Results²²

Measure Name	Basis	Average CEPR (\$/kW)		
incasure ivallie	Dasis	Island	Labrador	Isolated
Lighting Demand Controls	Full	37.7	37.7	37.7
Refrigeration Demand Controls	Full	69.2	69.2	N/A
HVAC Demand Controls	Full	72.4	72.4	72.4
Heating Controls	Full	87.1	87.1	87.1
DHW Controls	Full	103.7	92.9	82.7
Thermal Storage	Full	241.0	241.0	241.0

7.5 Energy Efficiency Supply Curve

This sub-section includes energy efficiency supply curves for each of the three regions studied. It is important to present the supply curves for each region separately, because the avoided costs are different. The supply curves presented are for the year 2029, but the Data Manager can be used to generate supply curves for the other years. Each supply curve shows the avoided cost for that region as a horizontal line, with dashed lines showing the upper and lower edge of the range of reasonableness.

The supply curves were constructed based on the approximate Technical Potential savings associated with the measures listed in Exhibit 23. The following approach was used:

- Measures were introduced in sequence
- Where more than one measure affected the same end use, the savings shown for the second measure are incremental to those already shown for the first
- Sequence was determined by listing first the items that reduce the electrical load, then those that
 meet residual load with the most efficient technology. It included consideration of CCE results
 from the preceding exhibit, but not for the purposes of economic screening.
- Items appear in order, starting with the lowest average CCE, but do not stop at the avoided cost threshold. Hence, the supply curve presents a type of Technical Potential scenario.

The results are presented in six exhibits:

- Exhibit 30 presents the potential by measure for the Island Interconnected region. The columns
 provide the savings for the measure, cumulative savings, and CCE, with measures sorted and
 numbered in order of increasing CCE.
- Exhibit 31 presents the supply curve for the Island Interconnected region. A few of the larger measures are numbered as landmarks. The numbers match those in Exhibit 30.

²² Average CEPR does not include program costs.

- Exhibit 32 presents the potential by measure for the Labrador Interconnected region. The
 columns provide the savings for the measure, cumulative savings, and CCE, with measures
 sorted and numbered in order of increasing CCE.
- Exhibit 33 presents the supply curve for the Island Interconnected region. A few of the larger measures are numbered as landmarks. The numbers match those in Exhibit 32.
- Exhibit 34 presents the potential by measure for the Labrador Interconnected region. The
 columns provide the savings for the measure, cumulative savings, and CCE, with measures
 sorted and numbered in order of increasing CCE.
- Exhibit 35 presents the supply curve for the Island Interconnected region. A few of the larger measures are numbered as landmarks. The numbers match those in Exhibit 34.

Exhibit 30 Island Interconnected Measure Potential and CCE

Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
1	ENERGY STAR Computers	26,019	26,019	\$0.00
2	Activate PC Power Management	8,476	34,495	\$0.00
3	Energy-Efficient Server Technologies	2,510	37,005	\$0.00
4	ENERGY STAR Office Equipment	1,834	38,839	\$0.00
5	Make Use of Daylighting	1,055	39,894	\$0.00
6	Reduce Number of Fridges	587	40,481	\$0.00
7	Use Task Light Instead of Ambient	456	40,938	\$0.00
8	Use Shades/Blinds (Winter)	239	41,177	\$0.00
9	Keep Doors Closed (Winter)	114	41,291	\$0.00
10	Use Shades/Blinds (Summer)	41	41,332	\$0.00
11	Use Natural Ventilation (Summer)	20	41,351	\$0.00
12	Keep Doors Closed (Summer)	11	41,362	\$0.00
13	Low-Flow Showerheads	4,628	45,990	\$0.00
14	Low-Flow Faucet Aerators	15,350	61,340	\$0.00
15	Lighting Controls (Outdoor)	3,873	65,213	\$0.00
16	Low-Flow Pre-Rinse Spray Valves	1,004	66,217	\$0.00
17	Cooler Night Covers	3,660	69,877	\$0.01
18	Automatic Door Closers (Walk-In Coolers & Freezers)	561	70,438	\$0.01
19	LED Screw-In Lamps	14,213	84,652	\$0.02
20	Programmable Thermostats	31,416	116,068	\$0.02
21	High-Efficiency Air Source Heat Pumps	109,737	225,804	\$0.02
22	LED Screw-In Lamps	10,497	236,301	\$0.02
23	Refrigerated Vending Machine Controllers	6,819	243,121	\$0.03
24	High Efficiency Compressors (Refrigeration)	8,537	251,658	\$0.03
25	High Performance T8 Fixtures	2,832	254,490	\$0.03
26	LED Outdoor Fixtures	21,223	275,714	\$0.03
27	New Construction (25% More Efficient)	45,360	321,074	\$0.03
28	VFDs on HVAC Motors	22,300	343,374	\$0.03
29	Building Recommissioning	96,103	439,477	\$0.03
30	Heat Pump Water Heaters	6,015	445,492	\$0.03
31	Advanced Building Automation Systems	49,883	495,376	\$0.04
32	Hotel Occupancy Sensors	2,434	497,810	\$0.04
33	LED Exit Signs	169	497,979	\$0.04

Exhibit 30 Island Interconnected Measure Potential and CCE (cont'd...)

Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
34	Demand Control Kitchen Ventilation (DCKV)	1,569	499,548	\$0.04
35	Premium Efficiency Motors	3,516	503,064	\$0.04
36	High Performance Glazing Systems	27,639	530,703	\$0.04
37	Occupancy Sensors (Lighting)	33,225	563,928	\$0.04
38	T5HO Fixtures	3,345	567,273	\$0.04
39	Refrigeration Controls	3,318	570,591	\$0.04
40	Drainwater Heat Recovery	4,108	574,699	\$0.05
41	ECM Motors and Evaporator Fan Motor Controllers	5,901	580,600	\$0.05
42	LED High Bay Fixtures	4,486	585,086	\$0.05
43	High Performance T8 Fixtures	19,273	604,359	\$0.05
44	T5HO Fixtures	804	605,162	\$0.05
45	ENERGY STAR Dishwashers	2,856	608,018	\$0.05
46	Ventilation Heat Recovery	19,399	627,417	\$0.05
47	LED High Bay Fixtures	1,095	628,512	\$0.05
48	New Construction (40% More Efficient)	26,877	655,388	\$0.06
49	Radiant Infrared Heaters	3,270	658,658	\$0.06
50	LED Tubular Lamps	4,989	663,648	\$0.06
51	High-Efficiency Cooking Equipment	3,658	667,306	\$0.06
52	LED Tubular Lamps	33,184	700,490	\$0.07
53	LED Street Lighting	14,638	715,127	\$0.08
54	Refrigeration Heat Recovery	896	716,023	\$0.08
55	CEE-Rated Refrigerators and Freezers	5,714	721,738	\$0.08
56	Ductless Mini-Split Heat Pump	62,016	783,754	\$0.09
57	Demand Control Ventilation (DCV)	23,996	807,750	\$0.09
58	Ground Source Heat Pumps	24,316	832,067	\$0.11
59	Refrigerated Cases with Doors	13,416	845,482	\$0.11
60	LED Refrigerated Display Case Lighting	3,310	848,793	\$0.11
61	Wall Insulation	29,480	878,272	\$0.13
62	On-Demand Water Heaters	843	879,115	\$0.13
63	LED Troffers	915	880,030	\$0.14
64	Roof Insulation	20,435	900,466	\$0.14
65	High Efficiency Chillers	1,193	901,659	\$0.15
66	Air Curtains	299	901,957	\$0.19
67	Dimming Control (Daylighting)	9,011	910,968	\$0.19
68	LED Troffers	5,826	916,794	\$0.19
69	High Efficiency RTUs	5,442	922,236	\$0.26
70	Freezer Defrost Controllers	291	922,527	\$0.28

0.25 Weighted Average CCE (\$/kWh) 0.20 0.15 61 0.10 3637 0.05 27 29 20 21 0.00 100 200 300 400 500 600 700 800 900 Cumulative Savings (GWh/yr.) ■ Weighted Average CCE (\$/kWh) - 2027-2029 Island Avoided Cost ■ 2027-2029 Island Lower Reasonable ■ 2027-2029 Island Upper Reasonable

Exhibit 31 Island Interconnected Energy Efficiency Supply Curve

Exhibit 32 Labrador Interconnected Measure Potential and CCE

Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
1	ENERGY STAR Computers	1,784	1,784	\$0.00
2	Activate PC Power Management	387	2,171	\$0.00
3	ENERGY STAR Office Equipment	99	2,270	\$0.00
4	Energy-Efficient Server Technologies	48	2,318	\$0.00
5	Make Use of Daylighting	40	2,358	\$0.00
6	Keep Doors Closed (Winter)	16	2,374	\$0.00
7	Reduce Number of Fridges	5	2,379	\$0.00
8	Use Task Light Instead of Ambient	5	2,384	\$0.00
9	Use Shades/Blinds (Winter)	3	2,387	\$0.00
10	Keep Doors Closed (Summer)	0	2,387	\$0.00
11	Use Shades/Blinds (Summer)	0	2,387	\$0.00
12	Use Natural Ventilation (Summer)	0	2,387	\$0.00
13	Low-Flow Showerheads	605	2,992	\$0.00
14	Low-Flow Faucet Aerators	3,117	6,109	\$0.00
15	Lighting Controls (Outdoor)	518	6,626	\$0.00
16	Low-Flow Pre-Rinse Spray Valves	129	6,755	\$0.00
17	Cooler Night Covers	175	6,929	\$0.01

Exhibit 32 Labrador Interconnected Measure Potential and CCE (cont'd...)

Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
18	High-Efficiency Air Source Heat Pumps	21,261	28,190	\$0.01
19	Automatic Door Closers (Walk-In Coolers & Freezers)	68	28,259	\$0.01
20	LED Screw-In Lamps	1,458	29,716	\$0.02
21	Programmable Thermostats	6,414	36,130	\$0.02
22	LED Screw-In Lamps	1,293	37,423	\$0.02
23	Refrigerated Vending Machine Controllers	736	38,159	\$0.03
24	High Efficiency Compressors (Refrigeration)	415	38,574	\$0.03
25	Hotel Occupancy Sensors	262	38,836	\$0.03
26	LED Outdoor Fixtures	2,881	41,717	\$0.03
27	New Construction (25% More Efficient)	1,753	43,470	\$0.03
28	High Performance T8 Fixtures	461	43,931	\$0.03
29	VFDs on HVAC Motors	1,886	45,817	\$0.03
30	Ductless Mini-Split Heat Pump	14,318	60,135	\$0.03
31	LED Exit Signs	39	60,174	\$0.04
32	Building Recommissioning	14,030	74,204	\$0.04
33	Heat Pump Water Heaters	1,114	75,317	\$0.04
34	High-Efficiency Cooking Equipment	314	75,631	\$0.04
35	High Performance T8 Fixtures	1,323	76,953	\$0.04
36	Demand Control Kitchen Ventilation (DCKV)	160	77,114	\$0.04
37	T5HO Fixtures	78	77,192	\$0.04
38	LED High Bay Fixtures	345	77,537	\$0.04
39	Premium Efficiency Motors	367	77,904	\$0.04
40	LED High Bay Fixtures	105	78,009	\$0.04
41	Refrigeration Controls	157	78,167	\$0.04
42	Ventilation Heat Recovery	4,624	82,791	\$0.04
43	T5HO Fixtures	270	83,061	\$0.04
44	Drainwater Heat Recovery	324	83,384	\$0.05
45	LED Tubular Lamps	830	84,214	\$0.05
46	ECM Motors and Evaporator Fan Motor Controllers	411	84,625	\$0.05
47	Occupancy Sensors (Lighting)	3,056	87,681	\$0.05
48	Advanced Building Automation Systems	7,460	95,141	\$0.05
49	ENERGY STAR Dishwashers	277	95,418	\$0.05
50	New Construction (40% More Efficient)	1,031	96,449	\$0.06
51	Demand Control Ventilation (DCV)	6,440	102,889	\$0.06
52	High Performance Glazing Systems	5,351	108,240	\$0.06
53	Radiant Infrared Heaters	554	108,794	\$0.06
54	LED Tubular Lamps	2,332	111,126	\$0.06
55	LED Street Lighting	883	112,010	\$0.08
56	Refrigeration Heat Recovery	637	112,647	\$0.08
57	CEE-Rated Refrigerators and Freezers	1,169	113,815	\$0.08
58	Ground Source Heat Pumps	5,383	119,198	\$0.09
59	Block Heater Controls	407	119,605	\$0.10
60	Refrigerated Cases with Doors	650	120,255	\$0.11

Exhibit 32 Labrador Interconnected Measure Potential and CCE (cont'd...)

Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
61	LED Refrigerated Display Case Lighting	167	120,422	\$0.11
62	Roof Insulation	6,822	127,244	\$0.13
63	On-Demand Water Heaters	68	127,312	\$0.13
64	Wall Insulation	7,924	135,236	\$0.14
65	LED Troffers	153	135,389	\$0.14
66	Dimming Control (Daylighting)	172	135,561	\$0.17
67	Air Curtains	54	135,615	\$0.19
68	LED Troffers	417	136,032	\$0.19
69	High Efficiency Chillers	41	136,073	\$0.21
70	Freezer Defrost Controllers	69	136,142	\$0.28
71	High Efficiency RTUs	146	136,288	\$0.36

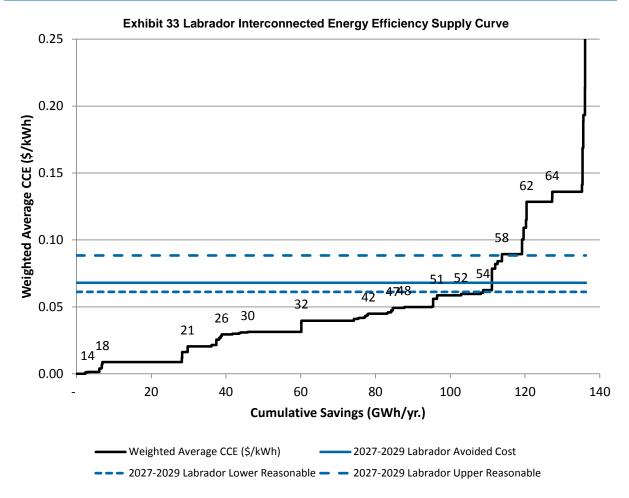


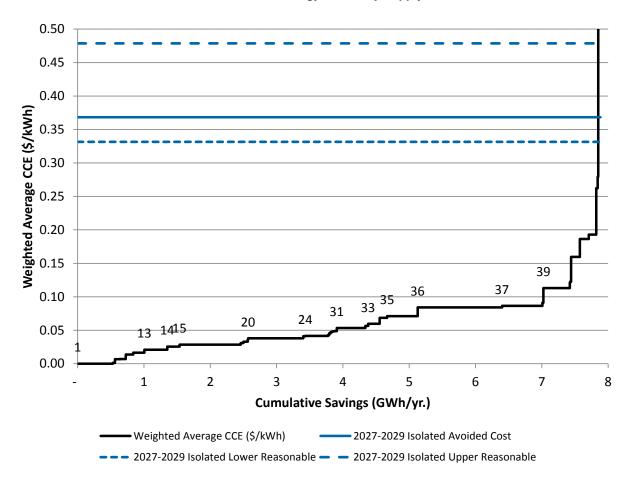
Exhibit 34 Isolated Measure Potential and CCE

Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
1	ENERGY STAR Computers	334	334	\$0.00
2	Activate PC Power Management	127	462	\$0.00
3	Make Use of Daylighting	44	506	\$0.00
4	ENERGY STAR Office Equipment	24	529	\$0.00
5	Use Shades/Blinds (Winter)	1	530	\$0.00
6	Low-Flow Faucet Aerators	30	559	\$0.00
7	Low-Flow Showerheads	3	562	\$0.00
8	Lighting Controls (Outdoor)	73	635	\$0.01
9	Cooler Night Covers	91	725	\$0.01
10	Low-Flow Pre-Rinse Spray Valves	2	727	\$0.01
11	Programmable Thermostats	110	837	\$0.01
12	LED Screw-In Lamps	169	1,006	\$0.02
13	LED Screw-In Lamps	345	1,351	\$0.02
14	Refrigerated Vending Machine Controllers	186	1,536	\$0.03
15	Building Recommissioning	921	2,457	\$0.03
16	VFDs on HVAC Motors	18	2,476	\$0.03
17	High Performance Glazing Systems	25	2,501	\$0.03
18	High Performance T8 Fixtures	64	2,565	\$0.03
19	T5HO Fixtures	6	2,571	\$0.04
20	New Construction (25% More Efficient)	821	3,392	\$0.04
21	LED High Bay Fixtures	9	3,401	\$0.04
22	LED Exit Signs	3	3,404	\$0.04
23	Ventilation Heat Recovery	30	3,434	\$0.04
24	High Performance T8 Fixtures	343	3,777	\$0.04
25	Premium Efficiency Motors	17	3,794	\$0.04
26	Drainwater Heat Recovery	3	3,796	\$0.05
27	T5HO Fixtures	18	3,814	\$0.05
28	ECM Motors and Evaporator Fan Motor Controllers	28	3,842	\$0.05
29	LED High Bay Fixtures	27	3,869	\$0.05
30	Roof Insulation	39	3,908	\$0.05
31	Occupancy Sensors (Lighting)	430	4,338	\$0.05
32	Wall Insulation	42	4,381	\$0.06
33	Ductless Mini-Split Heat Pump	173	4,554	\$0.06
34	LED Tubular Lamps	115	4,668	\$0.07
35	New Construction (40% More Efficient)	460	5,128	\$0.07
36	CEE-Rated Refrigerators and Freezers	1,272	6,400	\$0.08
37	LED Tubular Lamps	609	7,008	\$0.09
38	High-Efficiency Air Source Heat Pumps	16	7,024	\$0.09
39	LED Outdoor Fixtures	397	7,422	\$0.11
40	Ground Source Heat Pumps	7	7,428	\$0.12
41	Heat Pump Water Heaters	14	7,442	\$0.12
42	LED Refrigerated Display Case Lighting	131	7,574	\$0.16
43	Dimming Control (Daylighting)	135	7,709	\$0.19

Exhibit 34 Isolated Measure Potential and CCE (cont'd...)

Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
44	LED Troffers	112	7,820	\$0.19
45	LED Troffers	22	7,842	\$0.26
46	Freezer Defrost Controllers	9	7,851	\$0.28
47	High-Efficiency Cooking Equipment	33	7,884	\$1.11

Exhibit 35 Isolated Energy Efficiency Supply Curve



7.6 Demand Reduction Supply Curve

This sub-section includes demand reduction supply curves for each of the three regions studied. It is important to present the supply curves for each region separately, because the avoided costs are different. The supply curves presented are for the year 2029, but the Data Manager can be used to generate supply curves for the other years. Each supply curve shows the avoided cost for that region as a horizontal line, with dashed lines showing the upper and lower edge of the range of reasonableness.

The supply curves were constructed based on the approximate Technical Potential savings associated with the measures listed in Exhibit 28. The following approach was used:

- Measures were introduced in sequence
- Where more than one measure affected the same end use, the reduction shown for the second measure are incremental to those already shown for the first
- Sequence was determined by listing first the items that reduce the electrical load, then those that
 meet residual load with the most efficient technology. It included consideration of CEPR results
 from the preceding exhibit, but not for the purposes of economic screening.
- Items appear in order, starting with the lowest average CEPR, but do not stop at the avoided cost threshold. Hence, the supply curve presents a type of Technical Potential scenario.

The results are presented in six exhibits:

- Exhibit 36 presents the potential by measure for the Island Interconnected region. The columns
 provide the reduction for the measure, cumulative reduction, and CEPR, with measures sorted
 and numbered in order of increasing CEPR.
- Exhibit 37 presents the supply curve for the Island Interconnected region. A few of the larger measures are numbered as landmarks. The numbers match those in Exhibit 36.
- Exhibit 38 presents the potential by measure for the Labrador Interconnected region. The
 columns provide the savings for the measure, cumulative savings, and CCE, with measures
 sorted and numbered in order of increasing CCE.
- Exhibit 39 presents the supply curve for the Labrador Interconnected region. A few of the larger measures are numbered as landmarks. The numbers match those in Exhibit 38.
- Exhibit 40 presents the potential by measure for the Isolated region. The columns provide the savings for the measure, cumulative savings, and CCE, with measures sorted and numbered in order of increasing CCE.
- Exhibit 41 presents the supply curve for the Isolated region. A few of the larger measures are numbered as landmarks. The numbers match those in Exhibit 40.

Exhibit 36 Island Interconnected Measure Potential and CEPR	

F	Ref #	Measure Name	Demand Reduction (MW)	Cumulative Reduction (MW)	CEPR (\$/kW)
	1	Lighting Demand Controls	3	3	\$37.65
	2	Refrigeration Demand Controls	1	4	\$69.24
	3	HVAC Demand Controls	10	14	\$72.41
	4	Heating Controls	2	16	\$87.13
	5	DHW Controls	13	29	\$89.31
	6	Thermal Storage	75	104	\$240.96

250

6

200

150

100

20 40

Cumulative Reduction (MW)

Weighted Average CEPR (\$/kW)

2027-2029 Island Avoided Cost

--- 2027-2029 Island Lower Reasonable

--- 2027-2029 Island Upper Reasonable

Exhibit 37 Island Interconnected Demand Reduction Supply Curve

Exhibit 38 Labrador Interconnected Measure Potential and CEPR

Ref	Measure Name	Demand Reduction (MW)	Cumulative Reduction (MW)	CEPR (\$/kW)
1	Lighting Demand Controls	1	1	\$37.65
2	Refrigeration Demand Controls	0	1	\$69.24
3	HVAC Demand Controls	1	2	\$72.41
4	DHW Controls	2	4	\$85.31
5	Heating Controls	1	5	\$87.13
6	Thermal Storage	8	12	\$240.96

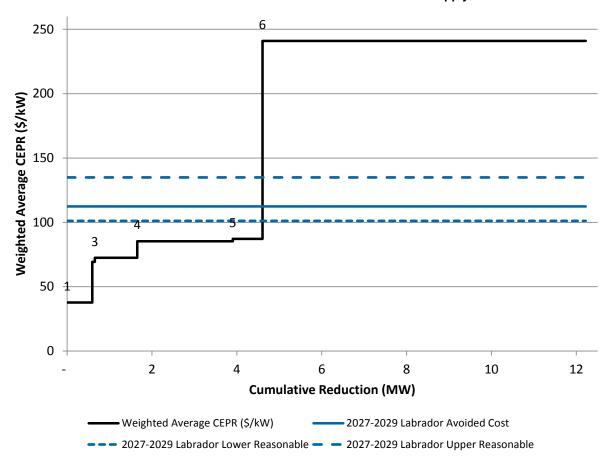
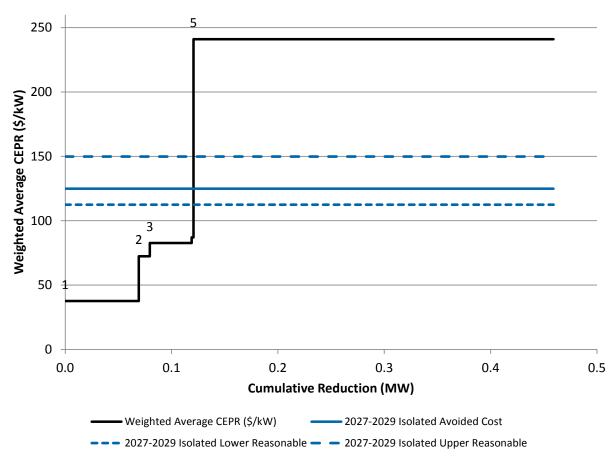


Exhibit 39 Labrador Interconnected Demand Reduction Supply Curve

Exhibit 40 Isolated Measure Potential and CEPR

Ref #	Measure Name	Demand Reduction (MW)	Cumulative Reduction (MW)	CEPR (\$/kW)
1	Lighting Demand Controls	0.07	0.07	\$37.65
2	HVAC Demand Controls	0.01	0.08	\$72.41
3	DHW Controls	0.04	0.12	\$82.74
4	Heating Controls	0.00	0.12	\$87.13
5	Thermal Storage	0.34	0.46	\$240.96





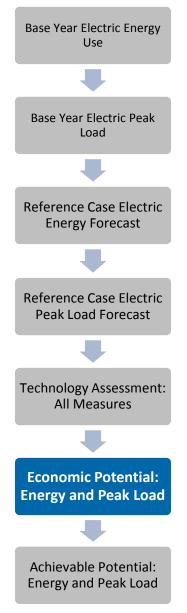
8 Economic Potential: Electric Energy Forecast

8.1 Introduction

This section presents the Commercial sector Economic Potential Forecast for electric energy and demand for the study period 2014 to 2029. The Economic Potential Electric Energy Forecast estimates the level of electricity consumption that would occur if all equipment and building envelopes were upgraded to the level that is cost effective against the economic threshold values for electricity in the three regions in NL. The model also estimates the peak demand implications of applying all the cost-effective efficiency measures. Starting from that point, the Economic Potential Peak Demand Forecast estimates the level of peak demand that would occur if all cost-effective demand reduction measures were also applied. In this study, "cost effective" means that the technology upgrade cost, referred to as the cost of conserved energy (CCE) or the cost of electricity peak reduction (CEPR) in the preceding section, is equal to or less than the economic threshold value for a given region.

The discussion in this section covers the following:

- Avoided costs used for screening
- Major modelling tasks
- Technologies included in Economic Potential Forecast
- Presentation of energy efficiency results
- Interpretation of energy efficiency results
- Summary of peak load reductions from energy efficiency
- Presentation of load reduction results
- Interpretation of load reduction results
- Range of reasonableness.



8.2 Avoided Costs Used For Screening

The Utilities agreed on a set of economic threshold values for electricity supply to be used in this study. The values vary by region and milestone year as shown in Exhibit 42. Each of the values for the years after 2014 represents the average of the three years in the milestone period.

Exhibit 42 Avoided Costs of New Electricity Supply

	Avoided Cost per kWh		
Year	Island Interconnected	Labrador Interconnected	Isolated
2014	\$0.108	\$0.037	\$0.21
2017	\$0.125	\$0.039	\$0.23
2020	\$0.050	\$0.045	\$0.26
2023	\$0.059	\$0.053	\$0.29
2026	\$0.068	\$0.061	\$0.34
2029	\$0.076	\$0.068	\$0.37

The Economic Potential Electric Energy Forecast then incorporates all the electric energy-efficient upgrades that the technology assessment found to have a CCE equal to or less than these thresholds.

The Utilities also agreed on a set of economic threshold values for new generation capacity to be used in this study. These values also vary by region and milestone year as shown in Exhibit 43. Again, each value for the years after 2014 represents an average of the three years in the milestone period. The cost of new capacity for the Isolated region was not available. For the purposes of the study, the higher of the two values for the other two regions was used in each milestone year.

Exhibit 43 Avoided Costs of New Electric Generation Capacity

	Avoided Cost per kW		
Year	Island Interconnected	Labrador Interconnected	Isolated
2014	\$50.911	\$72.059	
2017	\$65.116	\$82.527	
2020	\$101.821	\$91.601	
2023	\$115.126	\$103.571	
2026	\$124.930	\$112.390	
2029	\$124.907	\$112.370	

The Economic Potential Peak Demand Forecast then incorporates all the demand reduction upgrades that the technology assessment found to have a CEPR equal to or less than these thresholds.

The Utilities also provided a range of reasonableness for all of these avoided costs. The lower range for new electricity supply is considered to be 10% below the costs per kWh shown in Exhibit 42 while the upper range is considered to be 30% above those values. The upper range for new electric generation capacity supply is considered to be 10% below the costs per kW shown in Exhibit 43 while the upper range is considered to be 20% above those values. The purpose for establishing the range of reasonableness is to show the sensitivity of the results to varying avoided cost scenarios and to improve the ability of planners to examine options that may become more cost effective over time.

Emerging end-use technology measures are becoming cheaper over time as these markets become more cost effective. This is apparent by examining a range of measures whose costs have reduced significantly in the last several years (e.g., the cost of LED lamps has reduced by a factor of 5-10x since their introduction). Including these apparently more costly measures in this study allows the review of these measures in the near future, as programs are effective in introducing more competitiveness within these markets. At the same time, new sources of supply are expected to come online during the study period, so it is important to explore the implications of lower avoided costs.

8.3 Major Modelling Tasks

By comparing the results of the Commercial sector Economic Potential Electric Energy and Peak Demand Forecasts with the Reference Case, it is possible to determine the aggregate level of potential electricity savings and demand reductions within the Commercial sector, as well as identify which specific building sub sectors and end uses provide the most significant opportunities for savings.

To develop the Commercial sector Economic Potential Electric Energy Forecast, the following tasks were completed:

- The CCE for each of the energy-efficient upgrades presented in Exhibit 27 were reviewed, using the 7% (real) discount rate.
- Technology upgrades that had a CCE equal to, or less than, the threshold values for each region and milestone year were selected for inclusion in the Economic Potential scenario, either on a full-cost or incremental basis. It is assumed that technical upgrades having a full-cost CCE that met the cost threshold were implemented in the first forecast year. It is assumed that those upgrades that only met the cost threshold on an incremental basis are being introduced more slowly as the existing stock reaches the end of its useful life.
- Electricity use within each of the building sub sectors was modelled with the same energy
 models that were used to generate the Reference Case. However, for this forecast, the
 remaining baseline technologies included in the Reference Case forecast were replaced with the
 most efficient technology upgrade option and associated performance efficiency that met the
 cost thresholds for each region and milestone period.
- When more than one upgrade option was applied to a given end use, the first measure selected
 was the one that reduced the electrical load. For example, measures to reduce the overall space
 heating load (e.g., roof insulation and more efficient glazing) were applied before a heat pump.

To develop the Commercial sector Economic Potential Peak Demand Forecast, the following tasks were completed:

- The Economic Potential Electric Energy Forecast was used to generate the reductions in peak demand associated with efficiency improvements. These reductions were applied to the demand Reference Case to generate a Post-Efficiency Case to serve as the starting point for the demand reduction model. This was intended to avoid any double counting of demand reductions.
- The CEPR for each of the load reduction upgrades presented in Exhibit 28 were reviewed, using the 7% (real) discount rate.
- Technology upgrades that had a CEPR equal to, or less than, the threshold values for each region and milestone year were selected for inclusion in the Economic Potential scenario, either on a full-cost or incremental basis. It is assumed that technical upgrades having a full-cost CEPR that met the cost threshold were implemented in the first forecast year. It is assumed that those upgrades that only met the cost threshold on an incremental basis are being introduced more slowly as the existing stock reaches the end of its useful life.
- Peak demand within each of the building sub sectors was modelled with the same demand models that were used to generate the Reference Case. However, for this forecast, the remaining baseline technologies included in the Reference Case forecast were replaced with the most efficient technology upgrade option and associated performance efficiency that met the cost thresholds for each region and milestone period.

8.4 Technologies Included in Economic Potential Forecast

Exhibit 44 provides a listing of the efficiency technologies included in this forecast. Exhibit 45 provides a listing of the demand reduction technologies included in this forecast. In each case, the exhibits show the following:

- End use affected
- Upgrade option(s) selected
- Building type to which the upgrade options were applied
- Rate at which the upgrade options were introduced into the stock.

Some of the technologies listed in the exhibits below are the subject of current utility programs in the province of NL. The load forecast provided by the Utilities assumed a modest level of continued program activity and continued savings from efficiency improvements made under past programs, but no new program activity. The reference case for this project was constructed to be consistent with that forecast, in that the penetrations of the energy technologies below were not all assumed to remain static at their current levels. Reference case penetrations were assumed to increase, to account for natural adoption and the modest level of program activity assumed in the reference case.

In most cases, current programs are unlikely to capture all the economic potential for the technologies over the next 15 years. Therefore, none of the technologies have actually been removed from consideration in the study. Nonetheless, there are cases where the reference case penetration "catches up" to the economic penetration, and the economic potential diminishes, as can be seen later in this section in Exhibit 48.

Exhibit 44 Efficiency Technologies Included in Economic Potential Forecast

End Use Category	Upgrade Option	Applicability	Rate of Introduction
	ENERGY STAR Computers	All existing facilities	At natural rate of replacement
	ENERGY STAR Office Equipment	All existing facilities	At natural rate of replacement
_qa.po	Energy-Efficient Server Technologies	All existing facilities	At natural rate of replacement
	LED Screw-In Lamps	All existing facilities	Immediate
Lighting	LED Tubular Lamps	All existing facilities	At natural rate of replacement/Immediate in some facility types
	LED Troffers	All existing facilities	At natural rate of replacement
	High Performance T8 Fixtures	All existing facilities	Immediate
	LED Exit Signs	All existing facilities	Immediate
	LED High Bay Fixtures	Facilities with high bay fixtures (e.g. warehouses)	Immediate
Lighting	T5HO Fixtures	Facilities with high bay fixtures (e.g. warehouses)	Immediate
	Occupancy Sensors (Lighting)	All existing facilities	Immediate
	Dimming Control (Daylighting)	Facilities with a significant proportion of windows	Immediate
	LED Outdoor Fixtures	All existing facilities	At natural rate of replacement/Immediate in some cases
	Lighting Controls (Outdoor)	All existing facilities	Immediate
	LED Street Lighting	All street lighting	At natural rate of replacement/Immediate in some cases
Lighting	Low-Flow Faucet Aerators	All existing facilities	Immediate
	On-Demand Water Heaters	Accommodation facilities	Immediate (at time of major renovation)
	Drainwater Heat Recovery	Accommodation facilities	Immediate (at time of major renovation)
DUIM	Heat Pump Water Heaters	Facilities with waste heat in their mechanical rooms (excludes retail and warehouses)	At natural rate of replacement/Immediate in some facility types
DHVV	Low-Flow Pre-Rinse Spray Valves	Facilities with larger commercial kitchens (excludes Offices)	Immediate
	ENERGY STAR Dishwashers	Facilities with larger commercial kitchens (excludes Offices)	At natural rate of replacement/Immediate in some facility types
	Low-Flow Showerheads	Facilities with significant shower use	Immediate
	Refrigeration Heat Recovery	Large Other facilities (focus on arenas)	Immediate
Refrigeration	LED Refrigerated Display Case Lighting	Food Retail and Large Non-Food Retail	At natural rate of replacement
Kenigeration	Cooler Night Covers	Food Retail and Large Non-Food Retail	Immediate

Exhibit 44 Efficiency Technologies Included in Economic Potential Forecast (cont'd...)

End Use Category	Upgrade Option	Applicability	Rate of Introduction		
	Refrigerated Cases with Doors	Food Retail and Large Non-Food Retail	Immediate		
	ECM Motors and Evaporator Fan Motor Controllers	All facilities with significant commercial refrigeration loads	Immediate		
	Freezer Defrost Controllers	All facilities with significant commercial refrigeration loads	Immediate		
Refrigeration	High Efficiency Compressors (Refrigeration)	Food Retail and Large Non-Food Retail	Immediate		
	Automatic Door Closers (Walk-In Coolers & Freezers)	Food Retail and Restaurants	Immediate		
	Refrigeration Controls	Food Retail and Large Non-Food Retail	Immediate		
	CEE-Rated Refrigerators and Freezers	All facilities with stand-alone refrigerators	At natural rate of replacement		
	High-Efficiency Air Source Heat Pumps	All commercial facilities with rooftop units (RTUs)	At natural rate of replacement/Immediate in some facility types		
	Ground Source Heat Pumps	All existing facilities	At natural rate of replacement/Immediate in some facility types		
	Ductless Mini-Split Heat Pump	All small commercial facilities	Immediate		
	Ventilation Heat Recovery	Facilities where exhaust air ducting is located close to supply air ducting	Immediate		
	Radiant Infrared Heaters	Warehouses	Immediate		
HVAC	High Efficiency Chillers	All commercial facilities with chillers	At natural rate of replacement		
Equipment and	High Efficiency RTUs	All commercial facilities with rooftop units (RTUs)	At natural rate of replacement		
Controls	Hotel Occupancy Sensors	Accommodation facilities	Immediate		
	Demand Control Ventilation (DCV)	Facilities with large variances in occupancy, excluding restaurants	Immediate		
	Programmable Thermostats	All existing facilities	Immediate		
	Demand Control Kitchen Ventilation (DCKV)	Restaurants	Immediate		
	VFDs on HVAC Motors	All facilities with variable air volume (VAV) HVAC systems	Immediate		
	Premium Efficiency Motors	All existing facilities	At natural rate of replacement		
	Roof Insulation	All existing facilities	Immediate (at time of major renovation)		
Building	Wall Insulation	All existing facilities	Immediate (at time of major renovation)		
Envelope	High Performance Glazing Systems	All existing facilities	At natural rate of replacement		
	Air Curtains	Food Retail and Large Non-Food Retail	Immediate		

Exhibit 44 Efficiency Technologies Included in Economic Potential Forecast (cont'd...)

End Use Category	Upgrade Option	Applicability	Rate of Introduction		
Whole Building New Construction Other	Advanced Building Automation Systems	Larger commercial facilities	Immediate		
whole building	Building Recommissioning	All existing facilities	Immediate		
	New Construction (25% More Efficient)	All new facilities	At time of new construction		
	New Construction (40% More Efficient)	All new facilities	At time of new construction		
	Refrigerated Vending Machine Controllers	All facilities with vending machines	Immediate		
Other	High-Efficiency Cooking Equipment	All facilities with commercial kitchens	At natural rate of replacement		
	Block Heater Controls	Labrador and Isolated only	Immediate		
	Activate PC Power Management	All existing facilities	Immediate		
	Make Use of Daylighting	Facilities with a significant proportion of windows	Immediate		
	Use Task Light Instead of Ambient	Offices	Immediate		
	Reduce Number of Fridges	Offices	Immediate		
Behaviour	Use Shades/Blinds (Winter)	Offices	Immediate		
	Use Shades/Blinds (Summer)	Offices	Immediate		
	Use Natural Ventilation (Summer)	Offices	Immediate		
	Keep Doors Closed (Winter)	Retail facilities and Warehouses	Immediate		
	Keep Doors Closed (Summer)	Retail facilities and Warehouses	Immediate		

Exhibit 45 Load Reduction Technologies Included in Economic Potential Forecast

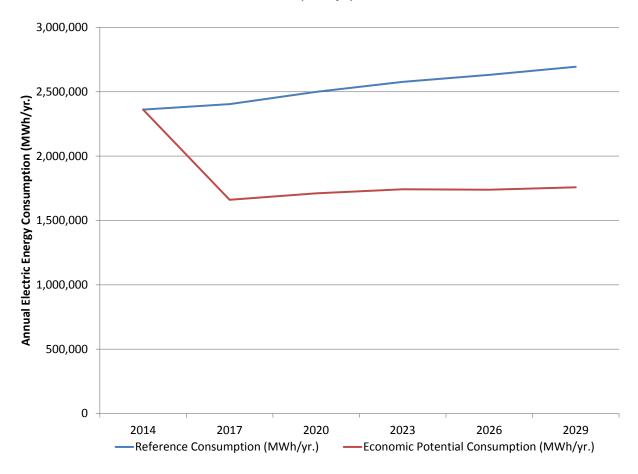
End Use Category	Upgrade Option	Applicability	Rate of Introduction		
	Space Heating Controls	Accommodation facilities	Immediate		
HVAC	Electric Thermal Storage Systems	All facilities, excluding large retail, Universities and Warehouses	Immediate		
	HVAC Fans & Pumps Controls	Larger facilities with central HVAC controls	Immediate		
Lighting	Lighting Controls	All facilities	Immediate		
DHW Domestic Hot Water (DHW) Controls F		Facilities with DHW loads during peak periods	Immediate		
Refrigeration	Refrigeration Controls	All facilities with significant refrigeration loads	Immediate		

8.5 Summary of Electric Energy Savings

Exhibit 46 compares the commercial electricity consumption forecasts for the Reference Case and the Economic Potential Electric Energy scenarios. ²³ Under the Reference Case, commercial electricity consumption would grow from the Base Year level of about 2,360 GWh/yr. to approximately 2,700 GWh/yr. by 2029. This contrasts with the Economic Potential Forecast in which electricity use would decrease to approximately 1,760 GWh/yr. for the same period. This represents a difference of approximately 940 GWh/yr., or about 35%.

The exhibit shows a large fraction of the economic potential savings occurring in the first milestone period. There are several reasons for this, including a large number of measures that pass on a full-cost basis, and avoided costs in the Island Interconnected region that are forecast to drop sharply after 2018. These factors are discussed in more detail in Section 8.5.2.

Exhibit 46 Reference Case versus Economic Potential Electric Energy Consumption in Commercial Sector (MWh/yr.)



²³ All results are reported at the customer's point-of-use and do not include line losses.

8.5.1 Electric Energy Savings

Further detail on the total potential electric energy savings provided by the Economic Potential Forecast is provided in the following exhibits:²⁴

- Exhibit 47 presents the results by end use, sub sector and milestone year
- Exhibit 48 provides a further disaggregation of the savings by measure and milestone year
- Exhibit 49 presents savings by major end use, milestone year and region
- Exhibit 50 presents savings by major end use, milestone year and sub sector
- Exhibit 51 presents savings by major end use, milestone year and vintage

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²⁴ MWh/yr. savings shown in the following exhibits are not incremental. For example, the space heating savings in 2029 are not in addition to the space heating savings from the previous milestone years. Rather, they are the difference between the Reference Case space heating consumption in 2029 and the space heating consumption if all the measures included in the Economic Potential scenario are implemented.

Exhibit 47 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year (MWh/yr.)

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Refrigeration	Domestic Hot Water	Computer Equipment	Secondary Lighting	Outdoor Lighting	Street Lighting	Space Cooling	Other Plug Loads	Food Service Equipment	Computer Servers	TOTAL
	2017	35,396	21,111	14,702	112	2,009	7,233	4,890	1,856	-	2,385	2,000	-	643	92,337
	2020	40,728	20,671	15,130	118	2,047	9,231	4,640	2,251	-	2,430	2,048	-	1,093	100,389
Large Office	2023	47,060	20,538	15,984	132	2,129	9,532	4,441	2,669	-	2,563	2,101	-	1,114	108,262
	2026	51,318	25,502	16,999	148	2,227	9,797	4,260	2,988	-	2,728	2,149	-	1,135	119,251
	2029	58,110	25,654	18,382	170	2,363	10,076	4,119	2,902	-	2,967	2,199	-	1,156	128,099
	2017	44,075	15,639	6,969	-	1,515	5,995	1,842	1,540	-	2,384	215	-	534	80,708
	2020	44,508	15,394	7,186	-	1,648	7,685	1,745	1,867	-	2,407	231	-	908	83,577
Small Office	2023	45,850	15,353	7,715	-	1,830	7,923	1,667	2,218	-	2,511	245	-	925	86,236
	2026	45,843	18,520	8,269	-	2,012	8,134	1,591	2,479	-	2,621	256	-	943	90,666
	2029	48,379	19,236	9,021	-	2,186	8,355	1,526	2,402	-	2,782	268	-	960	95,116
	2017	9,704	17,204	9,596	2,257	489	602	1,411	1,471	-	948	829	-	-	44,511
	2020	11,305	16,818	9,720	2,300	502	772	1,344	1,786	-	955	846	-	-	46,347
Large Non-food Retail	2023	13,142	16,653	10,057	2,405	533	797	1,294	2,126	-	994	862	-	-	48,864
	2026	15,226	16,513	10,418	2,492	565	819	1,247	2,382	-	1,037	878	-	-	51,577
	2029	17,206	16,521	10,914	2,614	610	843	1,211	2,318	-	1,100	895	-	-	54,231
	2017	18,270	16,073	7,408	-	760	887	1,936	2,174	-	1,105	-	-	-	48,613
	2020	20,230	15,879	7,578	-	776	1,135	1,842	2,634	-	1,118	-	-	-	51,191
Small Non-food Retail	2023	21,848	15,704	7,891	-	805	1,169	1,761	3,112	-	1,159	-	-	-	53,449
	2026	23,084	18,549	8,283	-	842	1,200	1,688	3,473	-	1,215	-	-	-	58,333
	2029	26,040	18,600	8,817	-	893	1,232	1,628	3,354	-	1,299	-	-	-	61,863
	2017	8,169	10,190	3,909	33,502	909	688	951	1,071	-	472	789	163	-	60,813
	2020	9,536	10,028	3,979	33,872	926	880	924	1,301	-	474	804	345	-	63,068
Food Retail	2023	10,849	9,914	4,099	34,930	969	906	914	1,552	-	487	820	517	-	65,958
	2026	12,165	9,812	4,230	35,784	1,016	929	899	1,743	-	501	835	574	-	68,489
	2029	13,559	9,786	4,413	37,022	1,079	954	894	1,702	-	524	850	574	-	71,357
	2017	9,754	4,933	2,051	360	6,988	354	2,396	481	-	355	390	58	-	28,119
	2020	10,151	4,787	2,075	363	7,455	453	2,281	582	-	356	398	58	-	28,960
Large Accomodation	2023	10,722	4,692	2,146	389	8,039	467	2,210	691	-	370	405	58	-	30,189
	2026	11,309	4,581	2,221	401	8,632	479	2,145	772	-	386	413	58	-	31,396
	2029	12,525	4,491	2,325	418	9,316	492	2,108	748	-	409	421	58	-	33,308
	2017	4,724	2,389	340	0	3,337	159	643	214	-	91	174	-	-	12,069
	2020	4,840	2,309	347	2	3,545	203	611	259	-	92	177	-	-	12,384
Small Accomodation	2023	5,032	2,244	365	7	3,804	209	591	306	-	98	181	-	-	12,836
	2026	5,332	2,177	384	13	4,072	214	573	342	-	105	184	-	-	13,396
	2029	5,579	2,118	411	21	4,378	220	563	330	-	115	187	-	-	13,922

Exhibit 47 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year (MWh/yr.) (cont'd...)

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Refrigeration	Domestic Hot Water	Computer Equipment	Secondary Lighting	Outdoor Lighting	Street Lighting	Space Cooling	Other Plug Loads	Food Service Equipment	Computer Servers	TOTAL
	2017	36,691	1,670	14,522	162	2,587	1,197	3,849	1,606	-	692	151	173	140	63,438
	2020	37,767	1,723	14,946	168	2,858	1,525	3,707	1,938	-	701	154	345	237	66,070
Healthcare	2023	38,734	1,702	15,160	179	3,157	1,566	3,629	2,280	-	709	157	518	242	68,033
	2026	39,687	1,903	15,425	193	3,472	1,604	3,580	2,531	-	723	160	576	246	70,099
	2029	40,867	1,986	15,793	213	3,770	1,642	3,586	2,424	-	746	163	576	251	72,016
	2017	44,326	16,758	2,417	110	2,231	2,306	2,926	2,574	-	63	307	-	-	74,016
	2020	45,341	16,530	2,454	115	2,263	2,951	2,790	3,115	-	69	313	-	-	75,940
Schools	2023	47,323	16,488	2,526	123	2,322	3,041	2,730	3,668	-	79	319	-	-	78,619
	2026	48,896	16,862	2,637	134	2,385	3,123	2,633	4,078	-	92	325	-	-	81,164
	2029	50,672	16,994	2,762	147	2,471	3,208	2,710	3,913	-	109	331	-	-	83,318
	2017	2,922	19,998	17,143	774	489	2,966	1,392	1,347	-	396	956	-	106	48,488
Universities and	2020	3,408	19,576	17,190	777	500	3,771	1,329	1,622	-	406	974	-	181	49,734
Colleges	2023	4,224	19,173	17,267	790	516	3,860	1,271	1,897	-	425	993	-	184	50,599
Colleges	2026	5,118	18,909	17,469	815	554	3,946	1,231	2,106	-	480	1,012	-	188	51,826
	2029	6,190	18,643	17,669	839	591	4,032	1,191	2,003	-	536	1,030	-	191	52,915
	2017	9,491	11,239	727	852	574	555	442	978	-	17	-	-	-	24,877
	2020	11,448	11,412	746	862	582	711	411	1,179	-	18	-	-	-	27,368
Warehouse/Wholesale	2023	13,713	11,260	793	986	609	732	394	1,394	-	20	-	-	-	29,901
	2026	16,359	11,294	835	1,046	634	751	370	1,548	-	22	-	-	-	32,859
	2029	18,576	11,180	886	1,130	666	771	511	1,485	-	25	-	-	-	35,230
	2017	6,393	1,013	848	1,710	6,693	133	3,930	194	-	222	-	681	-	21,817
	2020	7,071	1,012	868	1,807	6,826	170	3,765	236	-	226	-	1,363	-	23,343
Restaurants	2023	7,647	1,006	902	2,072	7,295	175	3,619	279	-	234	-	2,044	-	25,274
	2026	8,437	1,004	943	2,288	7,570	180	3,480	311	-	246	-	2,272	-	26,729
	2029	9,260	1,013	997	2,588	7,944	184	3,359	301	-	262	-	2,272	-	28,181
	2017	- 330	2,812	277	647	49	306	431	542	-	-	157	-	-	4,893
Labrador Isolated C/I	2020	- 310	2,864	310	1,034	53	405	428	529	-	-	160	-	-	5,473
Buildings	2023	- 266	2,895	343	1,427	56	418	423	516	-	-	164	-	-	5,975
Dununiya	2026	- 221	2,951	384	1,610	59	431	425	507	-	-	167	-	-	6,312
	2029	- 174	3,013	436	1,702	64	443	434	502	-	-	170	-	-	6,589
	2017	- 64	263	26	61	-	29	42	51	-	-	15	-	-	422
Island Isolated C/I	2020	- 64	270	30	98	-	38	42	50	-	-	15	-	-	479
Buildings	2023	- 61	274	33	135	-	39	42	49	-	-	15	-	-	525
Dandings	2026	- 59	280	37	153	-	41	42	48	-	-	16	-	-	558
	2029	- 56	287	42	162	-	42	43	48	-	-	16	-	-	584

Exhibit 47 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year (MWh/yr.) (cont'd...)

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Refrigeration	Domestic Hot Water	Computer Equipment	Secondary Lighting	Outdoor Lighting	Street Lighting	Space Cooling	Other Plug Loads	Food Service Equipment	Computer Servers	TOTAL
Large Other Buildings	2017	23,286	14,207	9,809	339	4,562	2,385	3,787	1,947	-	845	1,672	-	-	62,840
	2020	27,260	14,223	9,936	413	5,124	3,047	3,600	2,352	-	853	1,705	-	-	68,514
	2023	32,510	14,408	10,110	529	5,193	3,132	3,436	2,761	-	871	1,738	-	-	74,687
	2026	36,861	14,340	10,502	796	5,356	3,210	3,331	3,085	-	931	1,771	-	-	80,183
	2029	41,277	14,276	10,898	1,066	5,521	3,290	3,232	2,962	-	990	1,804	-	-	85,316
Small Other Buildings	2017	21,487	10,048	5,347	0	2,273	2,127	2,871	1,781	-	593	-	-	-	46,529
	2020	22,765	9,988	5,414	38	2,297	2,711	2,721	2,146	-	592	-	-	-	48,672
	2023	25,953	10,125	5,540	125	2,351	2,787	2,594	2,518	-	605	-	-	-	52,597
	2026	29,908	11,656	5,800	310	2,891	2,857	2,505	2,807	-	644	-	-	-	59,377
	2029	32,411	11,573	6,094	520	3,386	2,929	2,428	2,691	-	689	-	-	-	62,719
Other Institutional	2017	9,842	-	1,179	-	546	258	22	547	-	19	-	-	-	12,412
	2020	17,828	-	1,208	-	546	350	19	631	-	18	-	-	-	20,600
	2023	23,123	29	1,239	4	550	357	24	716	-	18	-	-	-	26,061
	2026	28,089	2,627	2,411	7	554	364	27	798	-	47	-	-	-	34,924
	2029	30,009	2,600	2,439	11	559	371	32	847	-	47	-	-	-	36,916
Street Lighting	2017	-	-	-	-	-	-	-	-	17,083	-	-	-	-	17,083
	2020	-	-	-	-	-	-	-	-	16,530	-	-	-	-	16,530
	2023	-	-	-	-	-	-	-	-	15,941	-	-	-	-	15,941
	2026	-	-	-	-	-	-	-	-	15,311	-	-	-	-	15,311
	2029	-	-	-	-	-	-	-	-	14,638	-	-	-	-	14,638
Grand Total	2017	284,135	165,544	97,271	40,886	36,012	28,181	33,762	20,374	17,083	10,585	7,655	1,074	1,423	743,986
	2020	313,812	163,484	99,116	41,968	37,946	36,040	32,199	24,477	16,530	10,714	7,826	2,110	2,418	788,639
	2023	347,403	162,458	102,169	44,234	40,157	37,109	31,040	28,751	15,941	11,143	7,998	3,137	2,465	834,005
	2026	377,351	177,479	107,245	46,188	42,841	38,078	30,028	31,999	15,311	11,775	8,165	3,479	2,511	892,450
	2029	410,430	177,969	112,300	48,622	45,797	39,084	29,576	30,931	14,638	12,600	8,333	3,479	2,558	936,317

Notes:

- 1) Results are measured at the customer's point-of-use and do not include line losses.
- 2) Any differences in totals are due to rounding.
- 3) In the above exhibit a value displays as 0 if it is between 0 and 0.5. Totals are calculated using the actual numerical value.
- 4) MWh/yr. savings are not incremental. The space heating savings in 2029 are not in addition to the savings from the previous milestone years. Rather, they are the difference between the Reference Case space heating consumption in 2029 and the space heating consumption if all the measures included in the Economic Potential scenario are implemented.

Exhibit 48 Economic Potential Electricity Savings by Measure and Milestone Year (MWh/yr.)

Measure	Annual Savings, 2017,	Annual Savings, 2020,	Annual Savings, 2023,	Annual Savings, 2026,	Annual Savings, 2029,
	(MWh/yr.)	(MWh/yr.)	(MWh/yr.)	(MWh/yr.)	(MWh/yr.)
Building Recommissioning	137,102	133,362	128,738	128,412	123,507
High-Efficiency Air Source Heat Pumps	45,572	71,317	96,559	120,842	144,057
Ductless Mini-Split Heat Pump	79,528	81,486	80,623	82,501	82,190
Advanced Building Automation Systems	54,053	52,542	50,623	47,612	45,501
Programmable Thermostats	53,150	51,176	48,444	45,286	42,110
Occupancy Sensors (Lighting)	39,154	38,926	39,384	38,737	38,093
Demand Control Ventilation (DCV)	38,334	36,498	42,422	38,946	35,175
ENERGY STAR Computers	19,568	26,603	27,114	27,626	28,137
VFDs on HVAC Motors	24,176	24,176	24,176	24,205	24,205
LED Tubular Lamps	20,749	18,649	16,599	32,973	31,915
Ventilation Heat Recovery	19,429	23,712	23,712	23,712	23,712
High Performance T8 Fixtures	21,584	22,254	21,869	21,403	20,938
New Construction (25% More Efficient)	925	6,523	17,289	30,239	47,934
Low-Flow Faucet Aerators	19,005	18,906	18,814	18,722	18,629
LED Outdoor Fixtures	7,605	14,484	21,161	26,078	24,502
LED Screw-In Lamps	20,760	19,513	18,277	17,053	15,840
LED Street Lighting	17,083	16,530	15,941	15,311	14,638
High Performance Glazing Systems	5,575	8,854	12,601	19,915	31,999
LED Screw-In Lamps	16,135	15,110	14,101	13,109	12,134
Refrigerated Cases with Doors	13,416	13,416	13,416	13,416	13,416
New Construction (40% More Efficient)	561	2,674	8,009	15,513	24,134
High Efficiency Compressors (Refrigeration)	9,347	9,368	9,389	9,410	9,431
Ground Source Heat Pumps	9,586	9,046	8,511	7,951	7,420
Activate PC Power Management	7,706	7,588	8,110	8,531	8,990
Lighting Controls (Outdoor)	12,729	9,731	6,882	4,659	4,463
Refrigerated Vending Machine Controllers	7,178	7,319	7,460	7,601	7,741
ECM Motors and Evaporator Fan Motor Controllers	6,672	6,574	6,973	6,870	6,768
Heat Pump Water Heaters	5,085	5,852	6,062	6,713	7,204
Low-Flow Showerheads	6,036	5,831	5,640	5,450	5,259
LED Tubular Lamps	6,232	5,870	5,515	5,162	5,122
LED High Bay Fixtures	5,218	5,059	4,900	4,739	4,567
Wall Insulation	2,671	3,437	4,204	5,504	6,443
T5HO Fixtures	4,545	4,503	4,251	3,938	3,633
Cooler Night Covers	4,153	4,138	4,116	4,124	4,138
Radiant Infrared Heaters	3,798	3,799	3,779	4,425	4,415
Refrigeration Controls	3,421	3,642	3,636	3,648	3,660
High Performance T8 Fixtures	3,642	3,568	3,506	3,432	3,357
Hotel Occupancy Sensors	3,293	3,234	3,174	3,097	2,942
ENERGY STAR Dishwashers	2,868	2,865	3,140	3,136	3,133
Roof Insulation	2,047	2,441	2,836	3,231	3,625
CEE-Rated Refrigerators and Freezers	2,096	2,478	2,859	2,986	2,986
High-Efficiency Cooking Equipment	1,074	2,110	3,137	3,479	3,479
Drainwater Heat Recovery	822	1,774	2,661	3,548	4,435

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Exhibit 48 Economic Potential Electricity Savings by Measure and Milestone Year (MWh/yr.) (cont'd)

Measure	Annual Savings, 2017, (MWh/yr.)	Annual Savings, 2020, (MWh/yr.)	Annual Savings, 2023, (MWh/yr.)	Annual Savings, 2026, (MWh/yr.)	Annual Savings, 2029, (MWh/yr.)
Energy-Efficient Server Technologies	1,423	2,418	2,465	2,511	2,558
Premium Efficiency Motors	714	1,526	2,286	3,041	3,795
Demand Control Kitchen Ventilation (DCKV)	2,390	2,547	2,360	2,088	1,854
ENERGY STAR Office Equipment	907	1,849	1,885	1,921	1,956
Make Use of Daylighting	1,227	1,278	1,320	1,246	1,263
LED High Bay Fixtures	1,345	1,299	1,253	1,208	1,163
Low-Flow Pre-Rinse Spray Valves	1,171	1,160	1,152	1,143	1,135
T5HO Fixtures	1,153	1,075	1,040	963	888
Refrigeration Heat Recovery	931	922	913	905	896
Automatic Door Closers (Walk-In Coolers & Freezers)	669	670	665	666	667
Use Task Light Instead of Ambient	660	651	643	539	524
LED Refrigerated Display Case Lighting	985	792	598	403	207
Reduce Number of Fridges	477	507	538	564	592
LED Exit Signs	572	477	385	296	211
Use Shades/Blinds (Winter)	295	295	294	286	274
Keep Doors Closed (Winter)	189	184	179	167	157
Dimming Control (Daylighting)	112	129	131	133	135
LED Troffers	31	60	89	116	112
Use Shades/Blinds (Summer)	41	44	46	47	48
Use Natural Ventilation (Summer)	20	21	22	23	23
Keep Doors Closed (Summer)	11	12	12	13	13
Freezer Defrost Controllers	-	-	10	9	9
High Efficiency Chillers	5	4	4	3	3
HVAC Impact from Other Savings	- 35,027	- 36,221	- 34,898	- 39,084	- 38,142
Grand Total	743,986	788,639	834,005	892,450	936,317

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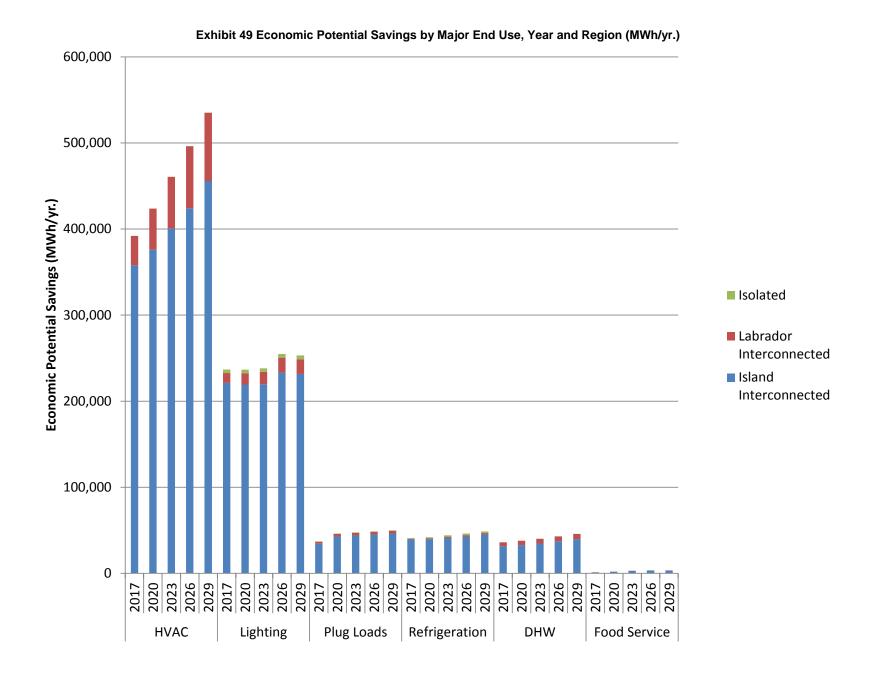
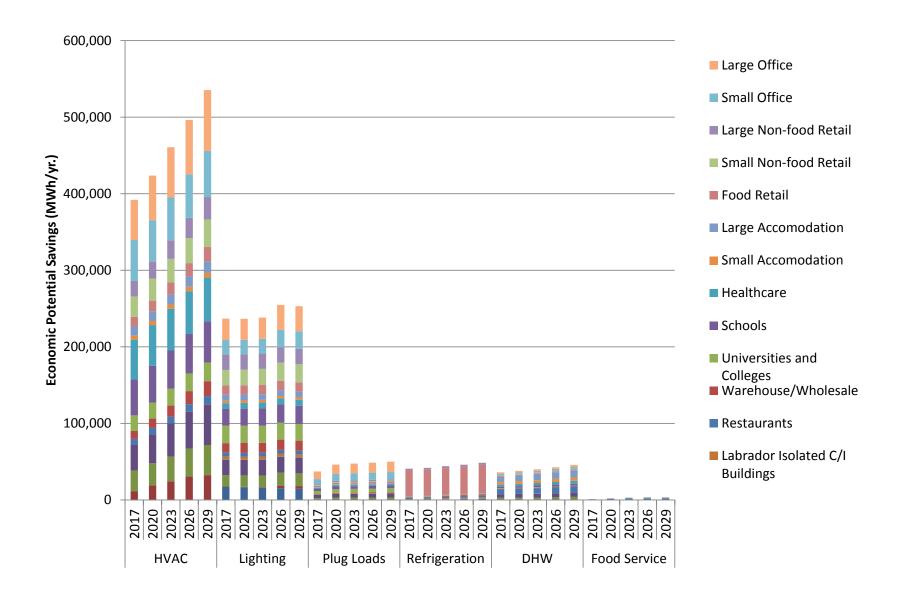
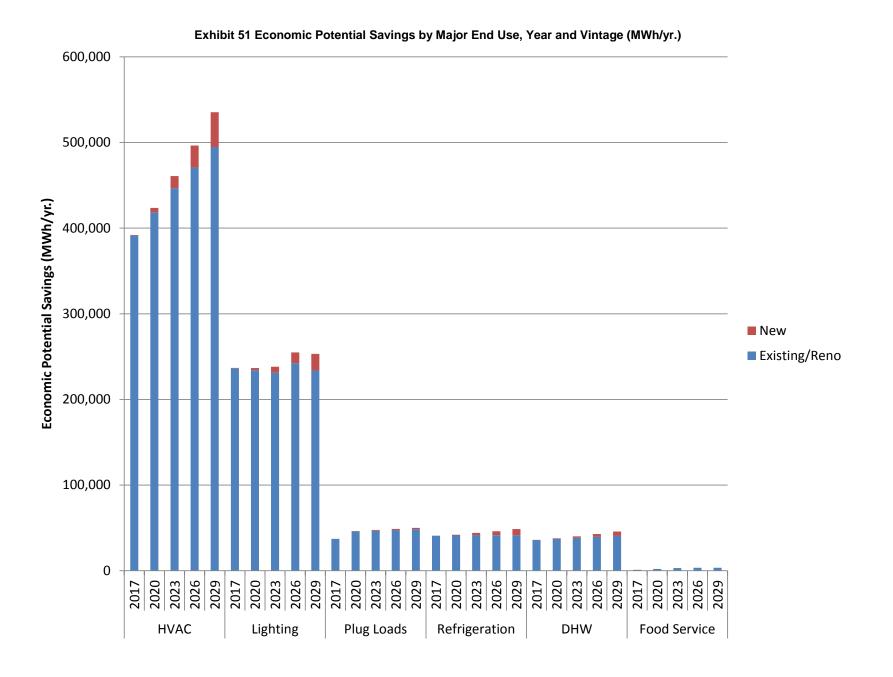


Exhibit 50 Economic Potential Savings by Major End Use, Year and Sub sector Type (MWh/yr.)





8.5.2 Interpretation of Results

Highlights of the results presented in the preceding exhibits are summarized below:

Savings by Milestone Year

The Economic Potential savings increase modestly from about 740 GWh/yr. in 2017 to approximately 940 GWh/yr. in 2029. As such, almost 80% of the savings possible at the end of the study period are already economically viable within the first milestone period. This occurs because it is economically attractive to implement the majority of the efficiency upgrades immediately, before the existing equipment reaches the end of its useful life. Many of the measures pass the economic screen on the basis of their full cost, meaning that under the definition of economic potential they would be implemented in the first year.

Savings by Sub sector

Office Buildings account for about 24% of the potential savings in 2029, with over 10% of the potential savings in Small Offices and 14% of the savings occurring in Large Offices. This reflects their large share of the commercial floor area and energy use. Retail facilities, including Small Non-Food Retail, Large Non-Food Retail, and Food Retail, also account for a significant portion of the overall 2029 savings, at about 20%. Other notable sub sectors include Educational facilities at about 15% and Hospitality and Healthcare facilities each at about 8% of the 2029 economic potential savings.

Savings by Region

The Island Interconnected region accounts for the overwhelming majority of the potential savings in 2029, at about 88%. The Labrador Interconnected region accounts for about 11% of the 2029 potential savings, and the Isolated region accounts for the remaining 1% of the potential savings. This distribution reflects the overall breakdown in the consumption for the three regions but the 2029 potential savings versus the reference case are highest in the Labrador region (36%) and lowest in the Isolated region (32%). The economic potential savings in the Island region in 2029 represent 35% of the reference case consumption in that milestone year.

Savings By Existing Buildings versus New Construction

Savings in existing buildings account for almost all of the savings potential at the beginning of the study period but, as buildings are constructed, the savings potential associated with them occupies a progressively larger portion of the total. By 2029, savings from new buildings account for about 8% of the total economic potential.

Savings by End Use

Savings in the HVAC major end use (which includes space heating, space cooling, and HVAC Fans and Pumps) accounts for 57% of the total electrical savings in the Economic Potential Forecast. Nearly 77% of this savings, or 44% of the overall savings, is from space heating measures, including air source heat pumps (15% of overall savings), ductless minisplit heat pumps (9% of overall savings), recommissioning (5% of overall savings). Other

Space heating measures dominate the results, including both efficient equipment and building envelope improvements.

space heating measures account for 3% or less of the overall savings. In addition, the "HVAC Impact from Other Savings" measure, which represents increased heating requirements due to less heat being generated in the buildings envelope, accounts for -4% of the overall economic potential savings (i.e. a penalty on the savings).

²⁵ As noted below, the recommissioning measure applies to multiple end uses. As such, it accounts for a larger portion of the economic potential savings. Only the savings that apply to the space heating end use are noted here.

Measures related to HVAC Fans and Pumps account for 12% of the total Economic Potential savings. Recommissioning represents 4% of the overall savings²⁶, while 3% of the overall savings are from VFDs, 2% are from advanced BAS, and another 2% are from programmable thermostats. Space cooling measures account for only 1% of the overall economic potential savings, reflecting the relatively small space cooling load in Newfoundland and Labrador.

The Lighting major end use (which is made up of General Lighting, Secondary Lighting, Outdoor Lighting, and Street Lighting) accounts for 27% of the total electricity savings in the Economic Potential Forecast. General lighting measures account for about 70% lighting savings, followed by outdoor lighting measures (12%), secondary lighting measures (12%), and street lighting measures (6%). LED lighting measures account for about 13% of the total electricity savings at the beginning of the Economic Potential Forecast but fall to 12% by 2029. This is due to the expected natural adoption of LED lighting products or other products of similar efficiency by the end of the study period.

DHW measures account for 5% of the total electricity savings in the Economic Potential Forecast. This is made up of 3% of the overall savings from low flow fixtures, such as showerheads, faucets, and faucet aerators, and 1% of the overall savings from heat pump water heaters. Other DHW measures account for less than 1% of the potential savings.

Measures that pertain to Plug Loads (made up of the Computer Equipment, Computer Servers and Plug Loads end uses) account for 5% of the total electricity savings in the Economic Potential Forecast. Of this, 3% is from ENERGY STAR® Computers, 1% is from the behavior measure related to implementing PC power management features and 1% is from vending machine controllers.

Refrigeration measures also account for about 5% of the total electricity savings in the Economic Potential Forecast. Refrigerated display cases, high efficiency compressors and evaporator fan upgrades each account for approximately 1% of these overall economic potential savings. Other refrigeration measures account for less than 1% of total electricity savings.

Some measures are applied across multiple end uses. The energy saving measures applied across multiple end uses include recommissioning, advanced BAS and the high performance new construction (HPNC) measures. Recommissioning accounts for a total of 13% of the electricity savings in the Economic Potential Forecast, while the HPNC measures account for about 8% of the economic savings (i.e. 5% savings from HPNC (25% better) and 3% savings from HPNC (40% better)). The Advanced BAS measure accounts for approximately 5% of the overall economic potential savings.

8.5.3 Caveats on Interpretation of Results

A systems approach was used to model the energy impacts of the efficiency upgrades presented in the preceding section. In the absence of a systems approach, there would be double counting of savings and an accurate assessment of the total contribution of the energy-efficient upgrades would not be possible. More specifically, there are two particularly important considerations:

 More than one upgrade may affect a given end use: For example, improved insulation reduces space heating electricity use, as does the installation of a heat pump. On its own, each measure will reduce overall space heating electricity use. However, the two savings are not additive. The order in which some upgrades are introduced is also important. In this study, the

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²⁶ As noted below, the recommissioning measure applies to multiple end uses. As such, it accounts for a larger portion of the economic potential savings. Only the savings that apply to the HVAC fans and pumps end use are noted here.

approach has been to select and model the impact of "bundles of measures" that reduce the load for a given end use (e.g., wall insulation and window upgrades that reduce the space heating load) and then to introduce measures that meet the remaining load more efficiently (e.g., a high-efficiency space heating system).

• There are interactive effects among end uses: For example, the electricity savings from more efficient lighting result in reduced waste heat. During the space heating season, this waste heat contributes to the building's internal heat gains, which lower the amount of heat that must be provided by the space heating system. Interactive effects have been taken into consideration with the measure "HVAC Impact from Other Savings". The magnitude of the interactive effects can be significant. For example, for low bay lighting measures, it was estimated that a 100 kWh savings in lighting electricity use results, on average, in an increased space heating load of up to 30 kWh (a 60% rate of interaction).

However, it is important to note that assessing the impact of interactive effects in commercial facilities is more complex since heat may be generated in spaces that heat the main conditioned space much less effectively (e.g. high bay fixtures or equipment in mechanical rooms). Interactive effects were captured on a measure by measure basis for measures that were more likely to have an impact on space heating requirements and a 30% heating penalty was assumed for this subset of measures. The subset of measures included low bay lighting measures (i.e. LED screw-in lamps, LED tubular lamps, and high performance T8 fixtures), ENERGY STAR computers and office equipment, and refrigerated vending machine controllers.

The model implements this interaction by multiplying the savings for any relevant measures with significant interactive effects by the 30% factor. This becomes the additional heating load for the building. This is, in turn, multiplied by the space heating electric share for the type of building, because the non-electric heating sources are assumed to provide their share of the additional heating load. Exhibit 48 shows the total heating penalty caused by internal end use savings as a separate line item, just before the grand total. In other words, the heating penalty is not subtracted from the savings of individual measures, but is instead shown as a separate item in the exhibit.

8.6 Electric Peak Load Reductions from Energy Efficiency

Exhibit 52 presents a summary of the peak load reductions that would occur as a result of the electric energy savings contained in the Economic Potential Forecast. The reductions are shown by milestone year and region. In each case, the reductions are an average value over the peak period and are defined relative to the Reference Case presented previously in Sections 4 and 6. Exhibit 53 shows the same information graphically for the winter peak period.

Exhibit 52 and Exhibit 53 only approximate the potential demand impacts associated with the energy-efficiency measures because they are based on the assumption that the measures do not change the load shape of the end uses they affect. This is not always correct. For example, most of the heat pump measures will not produce any peak demand savings, because during the winter peak period heat pumps (i.e. air source and ductless mini-splits heat pump measures) will revert to back-up electric resistance heating. As such, there will be no net reduction in space heating peak demand for these measures. Accordingly, the demand reductions for the heat pump measures have been manually filtered out of the results presented in these exhibits.

Exhibit 54 shows the demand reductions associated with each electric energy savings measure contained in the Economic Potential Forecast for the milestone year 2029. The heat pump measures are omitted from the exhibit, as with the previous two exhibits.

One notable line item in the exhibit is "HVAC Impact from Other Savings" - the impact on peak space heating load resulting from the savings for other end uses within the facilities. This is to capture the fact that in an electrically-heated facility, savings of energy consuming devices within the facility will not reduce the winter peak demand. On the coldest winter days, reducing the energy used by a lamp will simply make the electric baseboard beside it work harder. However, heat from lamps and other equipment is often generated in areas where the heat is not useful (e.g. near the ceiling of a warehouse). The non-heating end uses also produce some peak load reductions in other cases, such as facilities that are heated by non-electric fuels, in outside light fixtures, or in heated water that drains out of the facility while still warm. The impact of demand reductions for other end uses on the space heating demand can be seen graphically. As the demand impacts for many of the other end uses rise with time, the demand impacts for space heating actually decreases over time.

Electric peak load reductions related to capacity-only measures are presented separately in Section 8.7.

Exhibit 52 Electric Peak Load Reductions from Economic Energy Savings Measures, by Milestone Year, Peak Period and Sub sector (MW)

Sub Sector	Milestone Year	Island Interconnected	Labrador Interconnected	Isolated	Grand Total
	2017	19	0	0	19
	2020	19	0	0	19
Large Office	2023	20	0	0	20
· ·	2026	20	0	0	20
	2029	21	0	0	21
	2017	13	0	0	13
	2020	13	0	0	14
Small Office	2023	14	0	0	14
	2026	14	0	0	15
	2029	16	0	0	16
	2017	8	0	0	9
	2020	8	0	0	9
Large Non-food Retail	2023	8	0	0	9
· ·	2026	8	0	0	9
	2029	8	0	0	8
	2017	8	1	0	9
	2020	8	1	0	9
Small Non-food Retail	2023	8	1	0	9
	2026	9	1	0	10
	2029	9	1	0	10
	2017	9	1	0	9
	2020	9	1	0	9
Food Retail	2023	9	1	0	10
	2026	9	1	0	10
	2029	9	1	0	10
	2017	5	1	0	6
	2020	5	1	0	6
Large Accomodation	2023	6	1	0	6
	2026	6	1	0	7
	2029	6	1	0	7
	2017	2	0	0	2
	2020	2	0	0	2
Small Accomodation	2023	2	0	0	3
	2026	3	0	0	3
	2029	3	0	0	3
	2017	9	0	0	9
	2020	10	1	0	10
Healthcare	2023	10	1	0	11
	2026	11	1	0	12
	2029	12	1	0	12
	2017	12	1	0	13
	2020	12	1	0	13
Schools	2023	13	1	0	13
	2026	13		0	14
	2029	14	1	0	15
	2017	8	0	0	8
Distriction 1	2020	8	0	0	8
Universities and	2023	8	0	0	
Colleges	2026	8	0	0	
	2029	8	0	0	

Exhibit 52 Electric Peak Load Reductions from Economic Energy Savings Measures, by Milestone Year, Peak Period and Sub sector (MW) (cont'd)

Sub Sector	Milestone Year	Island	Labrador	Isolated	Grand Total
	2017	Interconnected 5	Interconnected 0	0	5
	2020	5	0	0	
Warehouse/Wholesale	2023	5	0	0	
	2026	5	0	0	
	2029	5	0	0	
	2017	5	0	0	5
	2020	5	0	0	6
Restaurants	2023	6	0	0	6
	2026	6	1	0	6
	2029	6	0	0	7
	2017	0	0	1	1
	2020	0	0	1	1
Labrador Isolated C/I	2023	0	0	1	1
Buildings	2026	0	0	1	1
	2029	0	0	1	1
	2017	0	0	0	0
laland la alatad C/I	2020	0	0	0	0
Island Isolated C/I Buildings	2023	0	0	0	0
bullulings	2026	0	0	0	0
	2029	0	0	0	0
	2017	11	3	0	13
	2020	10	3	0	13
Large Other Buildings	2023	10	3	0	14
	2026	10	3	0	14
	2029	11	3	0	14
	2017	7	2	0	8
	2020	6	2	0	8
Small Other Buildings	2023	6	2	0	9
	2026	7	2	0	9
	2029	7	2	0	9
	2017	0	1	0	1
	2020	0		0	
Other Institutional	2023	0		0	_
	2026	0	5	0	5
	2029	0	5	0	
	2017	2	0	0	
Ctroot Lighting	2020	2	0	0	
Street Lighting	2023	2	0	0	
	2026	2	0	0	
	2029	2	0	0	
	2017	123	10	1	134
Grand Total	2020	124		1	137
Grand Total	2023	127	14	1	142
	2026	131	16	1	148
	2029	136 s 0 if it is between 0		1	153

Notes: 1) In the above exhibit a value displays as 0 if it is between 0 and 0.5. Totals are calculated using the actual numerical value.

Exhibit 53 Electric Peak Load Reductions from Economic Energy Savings Measures, by Milestone Year End Use and Subsector, Winter Peak Period (MW)

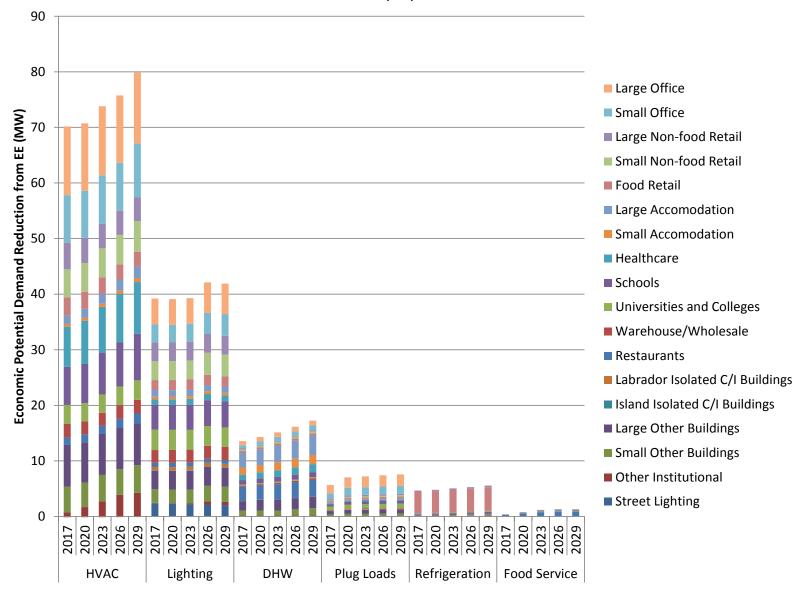


Exhibit 54 Electric Peak Load Reductions from Economic Energy Savings Measures, 2029 (MW)

Measure	Island Interconnected	Labrador Interconnected	Isolated	Grand Total
Building Recommissioning	24	4	0	28
Demand Control Ventilation (DCV)	9	2	0	11
New Construction (25% More Efficient)	11	0	0	11
Programmable Thermostats	9	2	0	11
Advanced Building Automation Systems	10	0	0	10
High Performance Glazing Systems	9	1	0	10
Ventilation Heat Recovery	6	1	0	7
Low-Flow Faucet Aerators	6	1	0	7
Occupancy Sensors (Lighting)	6	1	0	7
New Construction (40% More Efficient)	6	0	0	6
LED Tubular Lamps	5	0	0	5
ENERGY STAR Computers	4	0	0	4
High Performance T8 Fixtures	3	0	0	4
VFDs on HVAC Motors LED Outdoor Fixtures	3	0	0	4
	3	0	0	3
Heat Pump Water Heaters	2	0	0	3
LED Screw-In Lamps Ground Source Heat Pumps	2	0	0	2
LED Street Lighting	2	0	0	2
LED Screw-In Lamps	2	0	0	2
Low-Flow Showerheads	2	0	0	2
Wall Insulation	2	0	0	2
Drainwater Heat Recovery	2	0	0	2
Refrigerated Cases with Doors	2	0	0	2
Radiant Infrared Heaters	1	0	0	1
Activate PC Power Management	1	0	0	1
High-Efficiency Cooking Equipment	1	0	0	1
Refrigerated Vending Machine Controllers	1	0	0	1
ENERGY STAR Dishwashers	1	0	0	1
Roof Insulation	1	0	0	<u>.</u> 1
High Efficiency Compressors (Refrigeration)	1	0	0	1
LED High Bay Fixtures	1	0	0	1
ECM Motors and Evaporator Fan Motor Controllers	1	0	0	1
Hotel Occupancy Sensors	1	0	0	1
LED Tubular Lamps	1	0	0	1
T5HO Fixtures	1	0	0	1
Lighting Controls (Outdoor)	1	0	0	1
Premium Efficiency Motors	1	0	0	1
Demand Control Kitchen Ventilation (DCKV)	1	0	0	1
High Performance T8 Fixtures	0	0	0	0
Cooler Night Covers	0	0	0	0
Low-Flow Pre-Rinse Spray Valves	0	0	0	0
Refrigeration Controls	0	0	0	0
Energy-Efficient Server Technologies	0	0	0	0

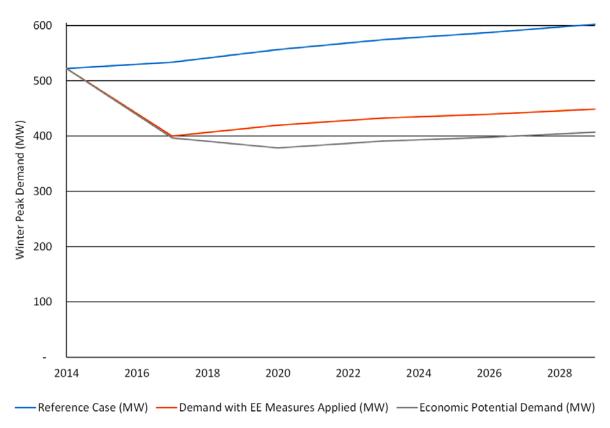
Exhibit 54 Electric Peak Load Reductions from Economic Energy Savings Measures, 2029 (MW) (cont'd...)

Measure	Island Interconnected	Labrador Interconnected	Isolated	Grand Total
CEE-Rated Refrigerators and Freezers	0	0	0	0
Refrigeration Heat Recovery	0	0	0	0
ENERGY STAR Office Equipment	0	0	0	0
Make Use of Daylighting	0	0	0	0
LED High Bay Fixtures	0	0	0	0
T5HO Fixtures	0	0	0	0
Use Task Light Instead of Ambient	0	0	0	0
Reduce Number of Fridges	0	0	0	0
Use Shades/Blinds (Winter)	0	0	0	0
Automatic Door Closers (Walk-In Coolers & Freezers)	0	0	0	0
Keep Doors Closed (Winter)	0	0	0	0
LED Exit Signs	0	0	0	0
LED Refrigerated Display Case Lighting	0	0	0	0
Dimming Control (Daylighting)	0	0	0	0
LED Troffers	0	0	0	0
Use Shades/Blinds (Summer)	0	0	0	0
Use Natural Ventilation (Summer)	0	0	0	0
Keep Doors Closed (Summer)	0	0	0	0
High Efficiency Chillers	0	0	0	0
Freezer Defrost Controllers	0	0	0	0
HVAC Impact from Other Savings	-12	-1	0	-13
Grand Total	136	16	1	153

8.7 Summary of Peak Load Reduction

Exhibit 55 compares the Reference Case and Economic Potential Peak Demand Forecast levels of winter peak demand. ²⁷ Under the Reference Case, commercial peak demand would grow from the Base Year level of about 520 MW to approximately 600 MW by 2029. This contrasts with the Economic Potential Forecast in which peak demand would decrease to approximately 400 MW for the same period, a difference of approximately 200 MW or about 32%. As illustrated in the exhibit, nearly 80% of this reduction comes from the impact of energy efficiency measures.

Exhibit 55 Reference Case Peak Demand versus Economic Potential Peak Demand in Commercial Sector (MW)²⁸



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²⁷ All results are reported at the customer's point-of-use and do not include line losses.

²⁸ Please note that all demand curtailment is accounted for in the Industrial sector analysis and reporting

8.7.1 Peak Demand Reduction

Further detail on the total potential peak demand reduction provided by the Economic Potential Forecast is provided in the following exhibits:²⁹

- Exhibit 56 presents the results by end use, sub sector and milestone year
- Exhibit 57 provides a further disaggregation of the savings by end use, technology, and milestone year
- Exhibit 58 presents peak demand reduction by major end use, milestone year and supply system
- Exhibit 59 presents peak demand reduction by major end use, milestone year and sub sector
- Exhibit 60 presents peak demand reduction by major end use, milestone year and vintage

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²⁹ MW reductions shown in the following exhibits are not incremental. For example, the space heating reductions in 2029 are not in addition to the space heating reductions from the previous milestone years. Rather, they are the difference between the Reference Case space heating peak demand in 2029 and the space heating peak demand if all the measures included in the Economic Potential scenario are implemented.

Exhibit 56 Total Economic Potential Peak Demand Reduction by End Use, Sub sector and Milestone Year (MW)

Cult anatan	Milestone	Domestic Hot	HVAC Fans &	Defiinemetien	Secondary	Space	One of Tatal
Sub sector	Year	Water	Pumps	Refrigeration	Lighting	Heating	Grand Total
	2017	0	0	0	1	0	1
	2020	0	3	0	1	2	5
Large Office	2023	0	3	0	1	2	5
	2026	0	3	0	1	2	5
	2029	0	3	0	1	2	5
	2017	0	0	0	0	0	0
	2020	0	0	0	0	1	1
Small Office	2023	0	0	0	0	1	1
	2026	0	0	0	0	1	1
	2029	0	0	0	0	1	1
	2017	0	0	0	0	0	0
	2020	0	2	0	0	1	3
Large Non-food Retail	2023	0	2	0	0	1	3
	2026	0	2	0	0	1	3
	2029	0	2	0	0	1	3
	2017	0	0	0	0	0	0
	2020	0	0	0	0	1	1
Small Non-food Retail	2023	0	0	0	0	1	1
	2026	0	0	0	0	1	1
	2029	0	0	0	0	1	1
	2017	0	0	0	0	0	0
	2020	0	1	1	0	1	2
Food Retail	2023	0	1	1	0	1	2
	2026	0	1	1	0	1	2
	2029	0	1	1	0	0	2
	2017	0	0	0	0	0	0
	2020	2	0	0	0	1	4
Large Accomodation	2023	2	0	0	0	1	4
	2026	2	0	0	0	1	4
	2029	2	0	0	0	1	4
	2017	0	0	0	0	0	0
	2020	1	0	0	0	0	1
Small Accomodation	2023	1	0	0	0	1	2
	2026	1	0	0	0	1	2
	2029	1	0	0	0	1	2
	2017	0	0	0	1	0	1
	2020	2	1	0	1	1	4
Healthcare	2023	2	1	0	1	1	4
	2026	2	1	0	1	1	4
	2029	2	1	0	1	1	4
	2017	0	0	0	0	0	0
	2020	0	1	0	0	1	2
Schools	2023	0	1	0	0	1	2
	2026	0	1	0	0	2	3
	2029	0	1	0	0	2	3
	2017	0	0	0	0	0	0
Universities and	2020	0	1	0	0	0	2
Colleges	2023	0	2	0	0	0	2
Coneges	2026	0	2	0	0	0	2
	2029	0	2	0	0	0	2

Exhibit 56 Total Economic Potential Peak Demand Reduction by End Use, Sub sector and Milestone Year (MW) (cont'd...)

Sub sector	Milestone Year	Domestic Hot Water	HVAC Fans & Pumps	Refrigeration	Secondary Lighting	Space Heating	Grand Total
	2017	0	0	0	0	0	0
	2020	0	0	0	0	1	1
Warehouse/Wholesale	2023	0	0	0	0	1	1
	2026	0	0	0	0	0	1
	2029	0	0	0	0	0	1
	2020	4	0	0	0	0	4
Restaurants	2023	4	0	0	0	0	4
Restaurants	2026	4	0	0	0	0	4
	2029	4	0	0	0	0	4
	2017	0	0	0	0	0	0
Labordon la elected Off	2020	0	0	0	0	0	0
Labrador Isolated C/I	2023	0	0	0	0	0	0
Buildings	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
latan dia atau di Oli	2020	0	0	0	0	0	0
Island Isolated C/I	2023	0	0	0	0	0	0
Buildings	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	2	1	0	1	1	5
Large Other Buildings	2023	2	2	0	1	1	5
	2026	2	2	0	1	1	5
	2029	2	2	0	1	1	5
	2017	0	0	0	0	0	0
	2020	2	0	0	0	1	3
Small Other Buildings	2023	2	0	0	0	1	3
	2026	2	0	0	0	1	3
	2029	2	0	0	0	1	3
	2017	0	0	0	0	0	0
	2020	0	1	0	0	1	2
Other Institutional	2023	0	1	0	0	1	1
	2026	0	0	0	0	1	1
	2029	0	0	0	0	1	1
	2017	0	0	0	3	0	3
	2020	13	10	1	4	13	41
Grand Total	2023	13	11	1	4	13	42
	2026	13	11	1	4	13	42
	2029	13	11	1	4	12	42

Notes:

- 1) Results are measured at the customer's point-of-use and do not include line losses.
- 2) Any differences in totals are due to rounding.
- 3) In the above exhibit a value displays as 0 if it is between 0 and 0.5. Totals are calculated using the actual numerical value.

⁴⁾ MW reductions are not incremental. The space heating reductions in 2029 are not in addition to the reductions from the previous milestone years. Rather, they are the difference between the Reference Case space heating peak demand in 2029 and the space heating peak demand if all the measures included in the Economic Potential scenario are implemented.

⁵⁾ The values in this exhibit do not include peak demand reductions from energy efficiency measures.

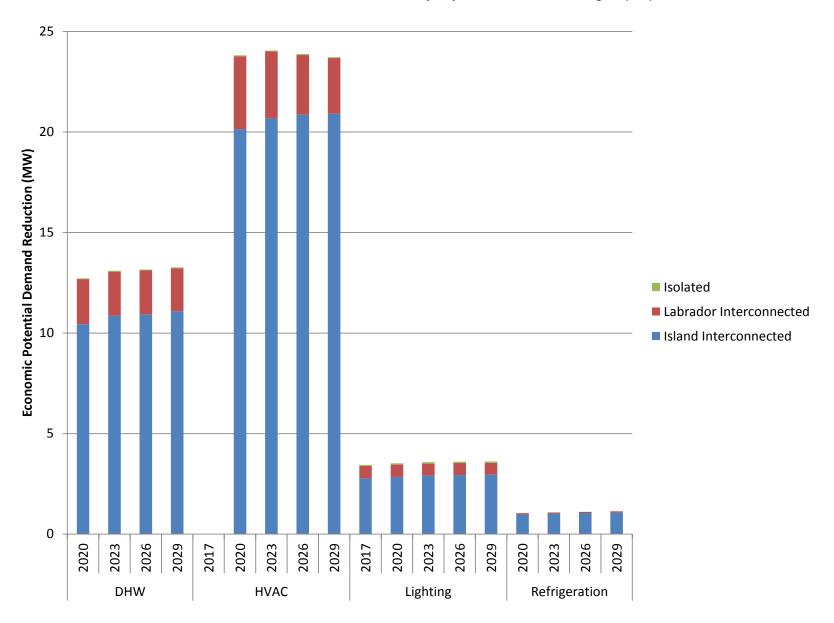
Exhibit 57 Economic Potential Peak Demand Reduction by Measure and Milestone Year (MW)

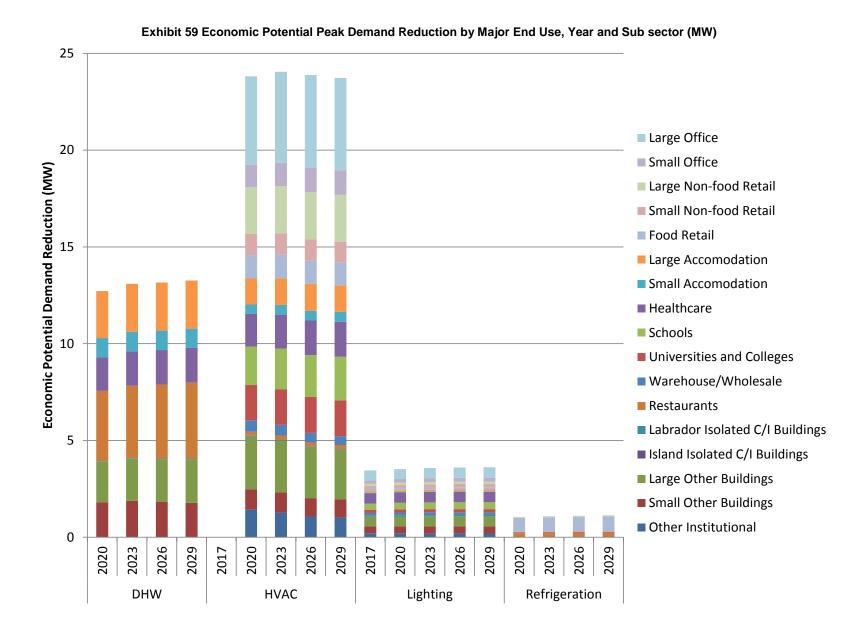
Measure	Peak Demand Reduction, 2017 (MW)	Peak Demand Reduction, 2020 (MW)	Peak Demand Reduction, 2023 (MW)	Peak Demand Reduction, 2026 (MW)	Peak Demand Reduction, 2029 (MW)
DHW Controls	0	13	13	13	13
Heating Controls	0	13	13	13	12
Lighting Demand Controls	3	4	4	4	4
Refrigeration Demand Controls	0	1	1	1	1
HVAC Demand Controls	0	10	11	11	11
Grand Total	3	41	42	42	42

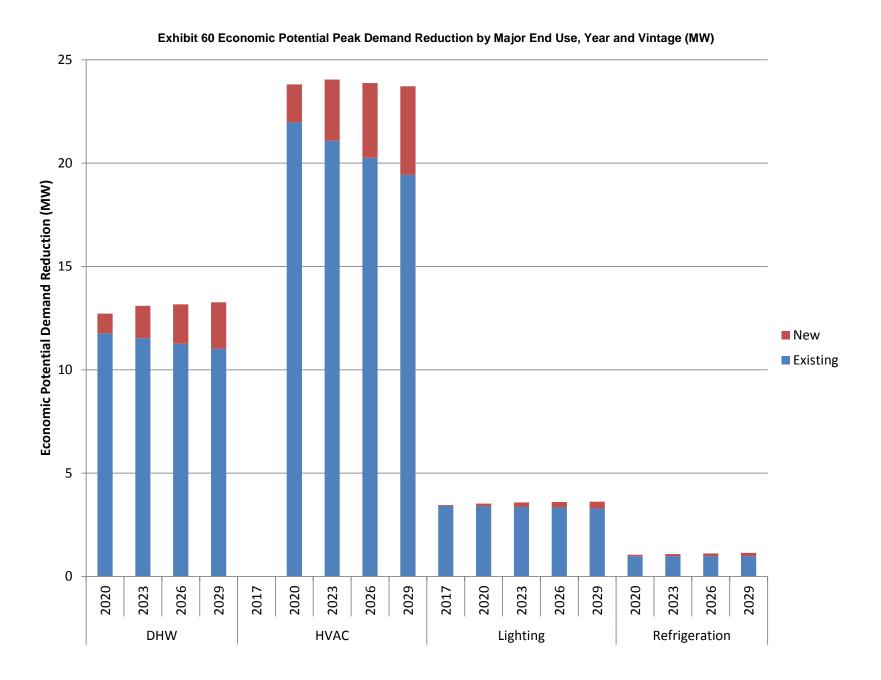
Notes

- 1) Results are measured at the customer's point-of-use and do not include line losses.
- 2) Any differences in totals are due to rounding.
- 3) In the above exhibit a value displays as 0 if it is between 0 and 0.5. Totals are calculated using the actual numerical value.
- 4) MW reductions are not incremental. The space heating reductions in 2029 are not in addition to the reductions from the previous milestone years. Rather, they are the difference between the Reference Case space heating peak demand in 2029 and the space heating peak demand if all the measures included in the Economic Potential scenario are implemented.
- 5) The values in this exhibit do not include peak demand reductions from energy efficiency measures.
- 6) Demand-specific measure savings are impacted by the demand savings from conservation measures. The demand reference case to which demand-specific measures are applied already factors in the corresponding Economic Potential demand savings from conservation measures. So the more peak demand reductions are generated through conservation measures, the less peak demand remains for demand-specific measures to reduce.









8.7.2 Interpretation of Results

Highlights of the results presented in the preceding exhibits are summarized below:

Peak Demand Reduction by Milestone Year

The Economic Potential peak load reductions increase from about 3 MW in 2017 to 42 MW in 2029. From 2020 onwards, space heating controls, domestic hot water controls, and HVAC fans and pumps controls are cost effective. The CEPR for electric thermal storage systems does not fall below the avoided cost of demand throughout the study period. As such, this measure does not contribute to the economic potential savings.

Peak Demand Reduction by Sub Sector

Offices account for the largest portion of the potential peak load reductions, at 16%. Peak load reductions in the retail sub sectors also account for a significant portion of the overall peak load reductions in 2029 (14%). Other sub sectors with significant contributions to the peak load reductions include hotels (13%), education (11%), restaurants (10%), and healthcare (10%). Peak load reductions in hotels are mostly due to potential DHW and HVAC savings in this sector, while the potential peak reductions in the healthcare and restaurant sub sectors are largely driven by the relatively high domestic hot water consumption in these sub sectors for cooking, sterilization and bathing.

Peak Demand Reduction by Region

The Island Interconnected region accounts for 86% of the 2029 potential peak load reductions, while the Labrador Interconnected region accounts for about 13% of the potential peak load reductions, and the Isolated region contributes less than 1% to the potential peak load reductions in 2029.

Peak Demand Reduction by Existing Buildings versus New Construction

Peak load reductions in existing buildings account for almost all of the reduction potential at the beginning of the study period, but as buildings are constructed, the savings potential associated with them occupies a progressively larger portion of the total reduction potential. By 2029, peak load reductions from new buildings account for about 17% of the total potential peak load reductions.

Peak Demand Reduction by End Use

DHW controls account for 32% of the 2029 load reductions in the Economic Potential Forecast, not including load reductions from energy efficiency measures. Space heating controls and HVAC fans and pumps controls are also significant opportunities, accounting for 30% and 27% of the overall peak demand potential reductions in 2029, respectively (not including load reductions from energy efficiency measures).

8.8 Sensitivity of the Results to Changes in Avoided Cost

The avoided costs used in the Economic Potential model are varied by region and by milestone year. As with any forecast, the projected avoided costs are subject to uncertainty. Accordingly, the model has been re-run with avoided costs varied within a reasonable range. The lower end of this range is considered to be 10% below the current projection, for both energy cost and demand cost. The upper end of the range is considered to be 30% above the current projections for energy cost and 20% above the current projections for demand cost.

Exhibit 61 shows that the results are sensitive to this range of avoided costs. By 2029, the exhibit shows the following changes in potential:

- The lower range of reasonableness produces energy savings that are about 1% lower in the Island Interconnected and Isolated regions and 3% lower in the Labrador Interconnected region.
- The lower range of reasonableness produces peak demand reductions that are 1% lower in the Island Interconnected region and Isolated regions and less than 1% lower in the Labrador Interconnected region.
- The upper range of reasonableness produces energy savings that are 3% higher in the Island Interconnected region, 6% higher in the Labrador Interconnected region, and almost unchanged in the Isolated region.
- The upper range of reasonableness produces peak demand reductions that are 4% higher in the Island Interconnected and Labrador Interconnected regions, and almost unchanged in the Isolated region.
- The small changes in energy savings and peak demand reductions for the different scenarios
 reflect the fact that a large number of measures comfortably fall below the economic screen, as
 shown in the supply curves in Sections 7.5 and 7.6.

Exhibit 61 Sensitivity of the Energy Savings and Peak Demand Reduction to Avoided Cost

			lange of a bleness	Base Scenario		Upper Range of Reasonableness	
Region	Year	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)
	2017	680,044	125	685,417	126	697,977	139
loland	2020	706,717	157	712,673	159	728,517	163
Island Interconnected	2023	737,037	161	743,138	162	763,376	167
mior comicorca	2026	770,962	165	785,647	167	803,522	173
	2029	816,944	171	821,902	172	842,106	180
	2017	51,603	10	53,255	10	67,620	15
1.1	2020	64,137	17	70,014	18	89,763	23
Labrador Interconnected	2023	82,534	20	84,367	20	99,758	22
inter connected	2026	95,570	21	99,933	21	107,854	22
	2029	104,065	21	107,242	22	113,548	22
	2017	5,291	1	5,315	1	5,344	1
	2020	5,906	1	5,952	1	5,979	1
Isolated	2023	6,423	1	6,500	1	6,516	1
	2026	6,782	1	6,870	1	6,886	1
	2029	7,089	1	7,173	1	7,189	1

9 Achievable Potential: Electric Energy Forecast

9.1 Introduction

This section presents the Commercial sector Achievable Potential for the study period (2014 to 2029). The Achievable Potential is defined as the proportion of the energy-efficiency opportunities identified in the Economic Potential Forecast that could realistically be achieved within the study period.

The remainder of this discussion is organized into the following subsections:

- Description of Achievable Potential
- Approach to the estimation of Achievable Potential
- Achievable Potential Workshop results
- Summary of potential electric energy savings
- Electric peak load reductions for energy efficiency measures
- Summary of peak load reductions
- Sensitivity of the results to changes in avoided cost
- Description of the application of net-to-gross ratios

9.2 Description of Achievable Potential

Achievable Potential recognizes that, in many instances, it is difficult to induce all customers to purchase and install all the energy-efficiency technologies that meet the criteria defined by the Economic Potential Forecast. For example, customer decisions to implement energy-efficient measures can be constrained by important factors such as:

- Higher first cost of efficient product(s)
- Need to recover investment costs in a short period (payback)
- Lack of product performance information
- Lack of product availability
- Lack of available financial resources
- Lack of available human resources to implement the project
- Competing priorities for financial and human resources

The rate at which customers accept and purchase energy-efficiency products will be influenced by the level of financial incentives, information and other measures put in place by the Utilities and the Government of Newfoundland, other levels of government, and the private sector to remove barriers such as those noted above.

Exhibit 62 presents the levels of electricity consumption that are estimated in the Achievable Potential scenario. As illustrated, the Achievable Potential scenarios are banded by the two forecasts presented in previous sections: the Economic Potential Forecast and the Reference Case.

Base Year Electric Energy Use Base Year Electric Peak Load Reference Case Electric **Energy Forecast** Reference Case Electric Peak Load Forecast Technology Assessment: All Measures **Economic Potential: Energy and Peak Load Achievable Potential:**

Energy and Peak Load

As illustrated in Exhibit 62 electric energy savings under the Achievable Potential scenario are less than in the Economic Potential Forecast. In this CDM study, the primary factor that contributes to the outcome shown in Exhibit 62 is the rate of market penetration. In the Economic Potential Forecast, efficient new technologies are theoretically assumed to fully penetrate the market as soon as it is economically attractive to do so. However, the Achievable Potential recognizes that it is unrealistic to expect customers to purchase and install all the electrical energy efficiency technologies that meet the criteria defined by the Economic Potential Forecast.

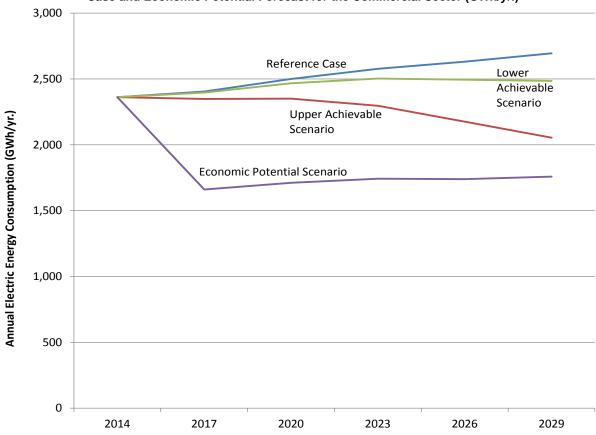


Exhibit 62 Annual Electricity Consumption—Energy-efficiency Achievable Potential Relative to Reference Case and Economic Potential Forecast for the Commercial Sector (GWh/yr.)

As also illustrated in Exhibit 62 the Achievable Potential results are presented as a band of possibilities, rather than a single line. This is because any estimate of Achievable Potential over a 20-year period is necessarily subject to uncertainty. Consequently, the results are presented as a range, defined as Lower Achievable and Upper Achievable.

The Lower Achievable Potential assumes Newfoundland market conditions that are similar to those contained in the Reference Case. That is, the customers' awareness of energy-efficiency options and their motivation levels remain similar to those in the recent past, technology improvements continue at historical levels, and new energy performance standards continue as per current known schedules. It also assumes that the ability of the Newfoundland utilities and government to influence customers' decisions towards increased investments in energy-efficiency options remains roughly in line with previous company CDM experience.

The Upper Achievable Potential assumes Newfoundland market conditions that aggressively support investment in energy efficiency. For example, this scenario assumes that real electricity prices increase over the study period. It also assumes that federal and territorial government actions to

mitigate climate change result in increased levels of complementary energy-efficiency initiatives. The upper Achievable Potential typically does not reach economic potential levels; this recognizes that some portion of the market is typically constrained by barriers that cannot realistically be affected by CDM programs within the study period.

9.2.1 Achievable Potential versus Detailed Program Design

It should also be emphasized that the estimation of Achievable Potential is not synonymous with either the setting of specific program targets or with program design. While both are closely linked to the discussion of Achievable Potential, they involve more detailed analysis that is beyond the scope of this study.

Exhibit 63 illustrates the relationship between Achievable Potential and the more detailed program design.

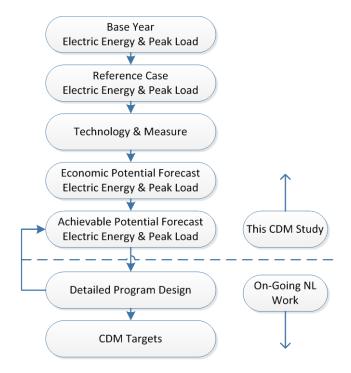


Exhibit 63 Achievable Potential versus Detailed Program Design

This study examined about 80 technologies applicable to commercial electric end uses. Although considerable effort has been made to obtain up-to-date information on each technology and to tailor it to the local market in Newfoundland, this is not a substitute for the type of detailed groundwork needed to prepare a utility program. For each of the technologies selected for further investigation, it will be important to obtain further information on the technical viability and durability of the products in the Newfoundland climate, on the costs in the Newfoundland marketplace, and on real savings under local conditions. If the viability of the technology is confirmed, an assessment of the market barriers is required, leading to the development of program strategies to overcome these barriers.

9.3 Approach to the Estimation of Achievable Potential

Achievable Potential was estimated in a five-step approach.

- Priority opportunities were selected
- Opportunity profiles were created
- Opportunity worksheets were prepared
- A full-day workshop was held
- Workshop results were aggregated and applied to the remaining opportunities.

Further discussion is provided below.

Step 1 Select Priority Opportunities

The first step in developing the Achievable Potential estimates required selection of the energy-saving opportunities identified in the Economic Potential Forecasts to be discussed during the Achievable workshop. Several criteria determined selection, including:

- The priority measures should represent a substantial fraction of the overall economic potential
- The priority measures should represent several different energy end uses
- The priority measures should have a variety of different likely patterns of market adoption, so the discussions will be widely varied.

A summary of the selected energy-efficiency actions, along with the approximate percentage that it represents in the Economic Potential Forecast, is provided in Exhibit 64.

Exhibit 64 Commercial Sector Actions - Energy Efficiency

			Percentage Economic P	
Measure #	Measure	End Use	Consumption Savings	Demand Savings from EE Measures
C1	LED Tubular Lamps	General Lighting	3%	2%
C2	High-Efficiency Air Source Heat Pumps	Space Heating	15%	21%
C3	ECM Motors and Evaporator Fan Motor Controllers	Refrigeration	1%	0%
C4	VFDs on HVAC Motors	HVAC Fans and Pumps	3%	2%
C 5	Advanced Building Automation Systems	Multiple	5%	4%
C6	High Performance New Construction (25% Better)	Multiple	5%	5%
C 7	PC Power Management	Computer Equipment	1%	1%
C8	High Performance Glazing Systems	Multiple	3%	4%
	Grand Total		36%	39%

Step 2 Create Opportunity Assessment Profiles

The next step involved the development of brief profiles for each of the opportunities noted above in Exhibit 64, in the form of PowerPoint slides. The slides are presented in Appendix G.

The purpose of the opportunity profiles was to provide a high-level logic framework that would serve as a guide for participant discussions in the Achievable workshop (see Step 4 below). The intent was to define a broad rationale and direction without getting into the much greater detail required of program design, which, as noted previously, is beyond the scope of this project. As illustrated in Appendix G, each opportunity profile addresses the following areas:

- Technology Description: Provides a summary statement of the broad goal and rationale for the action.
- Target Sub sector and Typical Application: Highlights the sub sectors and applications
 offering the most significant opportunities, and which provide a good starting point for discussion
 of the technology.
- Financial and Economic Indicators: Provides estimates of average simple payback, cost of conserved electricity (CCE) and basis of assessment (full-cost versus incremental).
- **Eligible Participants:** Provides an estimate of the sub sectors that could be affected during the study period if the entire Economic Potential were to be captured.
- Economic Potential versus Time: Shows the pattern of the changing size of the opportunity over the study period, for existing and new buildings. Some opportunities grow steadily through the study period, as more and more equipment reach the age when they would be replaced. Other opportunities are economical to capture immediately, and after that the growth over time is limited to opportunities in new buildings being built. Still other opportunities decline with time as they are eroded by natural conservation activities.

Step 3 Prepare Opportunity Worksheets

A draft assessment worksheet was also prepared for each opportunity profile in advance of the Achievable workshop. The assessment worksheets complemented the information contained in the opportunity profiles by providing quantitative data on the potential electric energy savings for each opportunity as well as providing information on the size and composition of the eligible population of potential participants. Energy impacts and population data were taken from the detailed modelling results contained in the Economic Potential Forecast.

The worksheets, including the results recorded during the workshop discussions, are provided in Appendix H. As illustrated in Appendix H, each opportunity assessment worksheet addresses the following areas:

- Approximate Cost of Conserved Electricity: Shows the approximate levelized cost of saving each kWh of electricity saved by the measure. For the purposes of the workshop, this information provided participants with an indication of the cost-effectiveness of measures in certain scenarios.
- Customer Payback: Shows the simple payback from the customer's perspective for the
 package of energy-efficiency measures included in the opportunity. This information provided an
 indication of the level of attractiveness that the opportunity would present to customers. This

provided an important reference point for the workshop participants when considering potential participation rates. When combined with the preceding CCE information, participants were able to roughly estimate the level of financial incentives that could be employed to increase the opportunity's attractiveness to customers without making it economically unattractive to the Newfoundland utilities.

- Economic Potential in Terms of Applicable Participants (e.g., number of sites): Shows the
 total number of potential participants in terms of either sites or equipment (as appropriate) that
 could theoretically take part in the opportunity. Numbers shown are from the eligible populations
 used in the Economic Potential Forecasts.
- Participation Rates (%): These fields were filled in during the workshops (described below in the following step), based on input from the participants. They show the percentage of economic savings that workshop participants concluded could be achievable in the last milestone period (usually 2029, but may be earlier for measures that peak earlier).
- Achievable Potential in Terms of Applicable Participants (e.g., number of sites): These
 fields were calculated by the spreadsheet based on the participation rates provided by the
 participants.
- Participation Rates Relative to the Discussion Scenario: These fields were filled in during the
 workshops to provide guidance to the consulting team on how participation might differ in other
 regions or sub sectors, or for related or similar technologies.
- Other Parameters: These fields were filled in during the workshop to capture highlights of the discussion.

Step 4 Conduct Achievable Workshop

The most critical step in developing the estimates of Achievable Potential was a one-day Achievable Potential workshop that was held on April 22, 2015. Workshop participants consisted of core members of the consultant team, CDM program and technical personnel from the Utilities, industry representatives, and representatives of other stakeholders. Together, the participating personnel brought many years of experience to the workshop related to the technologies and markets.

The purpose of this workshop was to:

- Promote discussion regarding the technical and market constraints confronting the identified energy-efficiency opportunities
- Identify potential strategies for addressing the identified constraints, including potential partners and delivery channels
- Compile participant views related to how much of the identified economic savings could realistically be achieved over the study period.

Following a brief consultant presentation that summarized the Commercial sector study results to date, the workshop provided a structured assessment of each of the selected opportunities. Opportunity assessment consisted of a facilitated discussion of the key elements affecting successful promotion and implementation of the CDM opportunity. More specifically:

- What are the major constraints/challenges constraining customer adoption of the identified energy-efficiency opportunities?
 - How big is the "won't" portion of the market for this opportunity?
- Preferred strategies and potential partners for addressing identified constraints (high level only)

- Key criteria that determine customers' willingness to proceed
- Key potential channel partners
- Optimum intervention strategies e.g., push, pull, combination
- How sensitive is this opportunity to incentive levels?

Following discussion of market constraints and potential intervention strategies, the participants' views on potential participation rates were recorded. The process involved the following steps:

- The participation rate for the upper Achievable scenario in 2029 was estimated.
- The shape of the adoption curve was selected for the upper Achievable scenario. Rather than seek consensus on the specific values to be employed in each of the intervening years, workshop participants selected one of four curve shapes that best matched their view of the appropriate "ramp-up" rate for each opportunity (see Exhibit 65 below).
- The process was then repeated for the lower Achievable scenario.
- Once participation rates had been established for the specific technology, sub sector and service region selected for the opportunity discussion, workshop participants provided the consultants with guidelines for extrapolating the discussion results to the other sub sectors and service regions included in the opportunity, but not discussed in detail during the workshop. Where time permitted, participants also discussed how the adoption of similar, related technologies might differ from the technology being discussed.

Curve A Curve B Curve C Curve D

Exhibit 65 Participation Rate "Ramp Up" Curves

Curve A represents a steady increase in the expected participation rate over the study period.

Curve B represents a relatively slow participation rate during the first half of the study period followed by a rapid growth in participation during the second half of the 20-year study period.

Curve C represents a rapid initial participation rate followed by a relatively slow growth in participation during the remainder of the study period.

Curve D represents a very rapid initial participation rate that results in virtual full saturation of the applicable market during the first half of the study period.

Step 5 Aggregate and Extend Opportunity Results

The final step involved aggregating the results of the individual opportunities to provide a view of the potential Achievable in both the Residential and Commercial sectors.

9.4 Achievable Workshop Results

The following sub-sections present a summary of the workshop discussions for each of the commercial opportunities listed in Exhibit 64 above. The adoption rates and curves selected by the participant are summarized in Section 0. Included for each opportunity are:

- Participation estimates (for 2029) made by workshop participants, with comments, where needed, about values assumed in the calculations (presented in Section 0).
- Where needed, additional participation estimates made after the workshop for the purposes of the calculations (presented in Section 0).
- Selected highlights that attempt to capture key discussion themes related to the opportunity.

Appendix H provides copies of the assessment worksheets used during the workshop.

9.4.1 **LED Tubular Lamps**

For this technology, achievable workshop participants provided 2029 participation rate estimates of 80% for the upper Achievable Potential scenario and 70% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve would be C in the upper Potential scenario and B in the lower potential scenario.

Barriers that tend to lower adoption included the high cost of implementation, the lack of proper incentives, limited customer awareness of LED replacements for fluorescent tubes and public tendering act limitations. Uptake of this technology is limited due to the current economic crunch and in a lot of cases the lowest cost technology must be selected in some facilities where the public tendering act limits the technology that will be implemented. Since LED tubular lamp replacements for fluorescent tubes have not been around for very long, there is limited customer awareness of this particular option while others are still waiting for the LED technology to mature. In addition, workshop participants indicated that it is difficult for utilities to get in touch with the right contacts at the commercial facilities and while the Government in the province may tend to adopt such technologies quickly, the private sector is lagging behind.

Participants suggested that financial barriers could be addressed by using non-energy benefits to help sell the technology and spreading the word through implementers and lighting distributors. With no incentives in place, there are currently a limited number of individuals going to the marketplace to make the case for LED tubular lamps. As such, incentives are key to the overall strategy and there is a high sensitivity to this. Participants believed some facilities may be overlit already, which allows for a deeper savings opportunity. Government agencies are also much more developed than they were 20 years ago and they can be an important partner in spreading the word. Participants believed that this technology is changing very rapidly and the cost is coming down quite quickly.

The initial discussion focused on large offices on the Island grid. Participants believed that participation would be somewhat lower in the Labrador and Isolated regions because of the difficulty of finding materials and qualified installers in these communities. Participants also believed that participation would be similar for the retail sector, higher for the healthcare and education sectors and lower for warehouses and restaurants. Participants also discussed some of the other lighting measures. The adoption of LED Lamps, LED High Bay Fixtures and LED outdoor fixtures were expected to occur at a higher rate while reduced wattage T8 fixtures were expected to have a lower adoption rate. LED low bay fixtures were thought to be adopted at a similar rate.

9.4.2 High-Efficiency Air Source Heat Pumps

For this technology, achievable workshop participants provided 2029 participation rate estimates of 60% for the upper Achievable Potential scenario and 20% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve in both the upper scenario and lower scenarios would be Curve B.

Participants believed that this technology is fairly mature but that the existing infrastructure is fairly old. They also indicated that rooftop units (RTUs) are not very prevalent in large offices and the savings may not be as significant in some retail applications since lighting and internal loads create quite a bit of heat. As such, the heating systems don't need to work as hard as one might expect. Participants indicated that variable refrigerant technology may make more sense in certain applications and that there is about 15% penetration of air source heat pumps (ASHPs) currently, although this may be limited to smaller RTUs. In particular, participants indicated that restaurants are starting to adopt this technology.

Barriers that tend to lower adoption included infrastructure limitations in offices, high maintenance costs, lack of awareness and lack of a push for this technology from HVAC contractors. ASHP's are not practical for many offices since RTUs aren't too common and zoning would be required. In addition, due to most office buildings being leased it is likely that landlords would implement low cost equipment instead. Participants also believed that chains from other jurisdictions have natural gas space heating and may not be aware that there is an opportunity in electric space heating. Finally, participants indicated that many schools in the province are not allowed to be air conditioned. As such, air conditioning capabilities would need to be disabled in these applications.

The initial discussion focused on food retail facilities on the Island grid. Participants believed that participation would be somewhat lower in the Labrador and Isolated regions because of the difficulty of finding materials and qualified installers in these communities. Participants also believed that participation would be similar for the non-food retail and school sectors, higher for the small office, large accommodations, and restaurant sectors and lower for large offices, small accommodations, healthcare, universities, and warehouses. Participants also discussed some of the other heating measures. The adoption of ductless mini-split heat pumps were expected to occur at a higher rate, while ground source heat pumps, high efficiency RTUs and high efficiency chillers were expected to have a lower adoption rate.

9.4.3 ECM Motors and Evaporator Fan Motor Controllers

For this technology, achievable workshop participants provided 2029 participation rate estimates of 80% for the upper Achievable Potential scenario and 25% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve in both the upper and lower Achievable Potential scenarios would be B.

Participants noted that many larger facilities will already possess sophisticated equipment and have the support of qualified maintenance personnel. Smaller communities in Isolated regions have a lot of residential style equipment rather than centralised systems. Older equipment is also much less likely to be retrofitted.

Barriers that tend to lower adoption included implementation cost, especially in smaller facilities, long payback periods, and a lack of awareness of the technology. In addition, many smaller retailers lease space and landlords are unwilling to make the investments in improvements when tenants pay the energy bills. Existing service contracts for refrigeration systems can also restrict retrofits, and participants believe that the technology may not be as widely available as necessary. There may

also be a perception among retailers that modifications to refrigeration systems can increase the risk of food spoiling.

Participants identified the need for two different strategies, one tailored to large facilities and another for smaller businesses.

The initial discussion focused on the food retail sector on the Island grid. Participants believed that participation would be somewhat lower in Labrador and much lower in the Isolated regions because of the difficulty of finding materials and qualified installers in these communities. Participants also believed that participation would be somewhat the same for large accommodations and universities, higher for warehouses, and lower for non-food retail and restaurants. Participants also discussed some of the related refrigeration measures. The adoption of LED refrigeration lighting and CEE rated fridges and freezers were expected to occur at a higher rate, while refrigerated display cases with doors, floating head pressure controls, defrost controllers, automatic door closers, and night covers were expected to be adopted more slowly. High efficiency compressors were expected to have a similar adoption rate to ECM Motors and Evaporator Fan Motor Controllers.

9.4.4 VFDs on HVAC Motors

For this technology, achievable workshop participants provided 2029 participation rate estimates of 70% for the upper Achievable Potential scenario and 5% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve would be B for both scenarios.

Participants report that awareness of this measure is quite high, and it is commonly implemented on both fan and pump systems. Implementation is straightforward in many facilities, but significant additional retrofits are required in some cases.

Barriers that tend to lower adoption include high implementation costs in certain situations, and landlords are less likely to make energy efficiency improvements in leased properties. Currently VFDs are only incented under the takeCHARGE Custom Program, which some contractors may not be aware of, and this may be slowing the adoption of VFDs.

Participants suggest that prescriptive incentives may make funding more accessible, but there are potential concerns with the variability of the savings. Other strategies for increasing adoption include working with contractors to drum up sales and awareness, bundling with other retrofit measures, and an increased number of energy audits in order to identify retrofit opportunities.

The initial discussion focused on the large office sector on the Island grid. Participants believed that participation would be somewhat lower in the Labrador and Isolated regions because of the difficulty of finding materials and qualified installers in these communities. Participants also believed that participation would be similar for the retail sectors, lower for small offices, and higher for large accommodations, healthcare, schools, and universities. Participants also discussed some of the related HVAC measures. The adoption of high efficiency motors is expected to occur at a higher rate, while lower adoption rates are expected for demand controlled ventilation (DCV) and kitchen fume hood DCV.

9.4.5 Advanced Building Automation Systems

For this technology, achievable workshop participants provided 2029 participation rate estimates of 70% for the upper Achievable Potential scenario and 20% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve would be B for both scenarios.

Barriers that tend to lower adoption include a lack of familiarity and trust of the technology among building operators, a lack of training for operators in the use of sophisticated control systems, a negative perception of the technology due to improperly installed and operated systems, and a reluctance among building owners to sign up for service contracts with controls suppliers. Equipment can also be relatively easily overridden which both erodes savings from installed systems and discourages the adoption of the technology.

Strategies to mitigate these barriers include ensuring that equipment is being well maintained and that there is a service contract in place, increased education for both building operators and contractors, and improved commissioning and continuous optimisation. Participants suggested that advanced BAS controls can be bundled with a recommissioning program.

The initial discussion focused on the large office sector on the Island grid. Participants believed that participation would be similar in Labrador and lower in the Isolated regions because of the difficulty of finding materials and qualified installers in these communities. Participants also believed that participation would be similar for the retail, large accommodation and school sectors, higher for healthcare, lower for small offices and universities, and much lower for warehouses. Participants also discussed some of the related controls measures. The adoption of hotel occupancy controls is expected to occur at a lower rate, daylighting controls at the same rate, and higher adoption rates are expected for programmable thermostats, and indoor and outdoor lighting controls.

9.4.6 High Performance New Construction

For this measure, achievable workshop participants provided 2029 participation rate estimates of 80% for the upper Achievable Potential scenario and 50% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve would be C for the upper achievable scenario and A for the lower achievable scenario.

The primary barrier to implementation is the incremental cost of high performance new construction. Additionally, high performance building rating systems like LEED include many measures that don't improve energy efficiency. Participants also noted that if energy efficiency improvements are missed at the time of new construction, it represents a major lost opportunity.

Participants indicated that much of the recent new construction in the province has been for government buildings, and many of these are being built to high energy efficiency standards which is pushing the local industry to adopt better building standards overall. Strategies to encourage further adoption include presenting the non-energy benefits as part of the business case, including the ability to rent high performance buildings at a premium. Expert engineering consultants are considered key to successfully delivering projects, and increased training for building owners and the design community would help, particularly workshops on how to deal with the administrative burden of certification or strategies to implement energy efficiency outside of established rating systems.

The initial discussion focused on large offices on the Island grid. Participants believed participation would be similar in Labrador and lower in Isolated regions. Participants also believed that participation would be higher for schools and universities, but lower in all other sub sectors. The adoption of high performance new construction practices that result in energy efficiency that is 40%

better than code are expected to be adopted at a much lower rate than practices that are 25% better than code.

9.4.7 PC Power Management

For this measure, achievable workshop participants provided 2029 participation rate estimates of 50% for the upper Achievable Potential scenario and 10% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve would be B for both scenarios.

Barriers that tend to lower adoption included the potential for IT departments needing to make updates during off hours, individuals overriding power management settings, and the increased use of remote work computers limiting the proportion of computer equipment that can be shut down.

Strategies to encourage adoption include driving implementation through the IT department and educating users in order to ensure the persistence of savings. Holding competitions among users, for example between different floors of an office building, can encourage participation.

The initial discussion focused on the large office sector on the Island grid. Participants believed that participation would be somewhat lower in the Labrador and Isolated regions. Participants also believed that participation would be similar for small offices, schools, and universities while participation is expected to be lower for all other sub sectors. Participants also discussed some of the related behavioural measures. The adoption of ENERGY STAR® certified computers, office equipment, and servers is expected to be similar, while the use of task lighting, natural ventilation, and keeping doors closed is expected to be lower.

9.4.8 High Performance Glazing Systems

For this measure, achievable workshop participants provided 2029 participation rate estimates of 80% for the upper Achievable Potential scenario and 10% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve would be C for the upper achievable scenario and B for the lower achievable scenario.

Barriers that tend to lower adoption include some presence of low quality products in the market, a lack of awareness about competitively priced high efficiency options, and a higher first cost. Landlords are also less likely to implement energy efficiency measures in leased buildings. Currently high performance glazing systems are only incented under the takeCHARGE Custom Program, which has seen a very low uptake to date.

Strategies to improve adoption include engaging architects and contractors as partners to promote high efficiency glazing options, ensuring that high efficiency glazing is specified during design, and promoting the non-energy benefits such as improved occupant comfort.

The initial discussion focused on the large office sector on the Island grid. Participants believed that participation would be higher in the Labrador and Isolated regions. Participants also believed that participation would be similar for large accommodations, higher for healthcare, schools, and universities, and lower for small offices, retail, small accommodations, warehouses, and restaurants. Participants also discussed some of the related whole building measures. The adoption of wall insulation and roof insulation is expected to be similar, while the penetration of recommissioning is expected to be higher.

9.4.9 Aggregate Results

Exhibit 66 summarizes the participant rate and "ramp up" curve assumptions discussed above.

Exhibit 66 Summary of Achievable Potential Participation Rates and Curves

	Lower Potentia	l Scenario	Upper Potentia	al Scenario
Technology	2029 Participation Factor	Adoption Curve	2029 Participation Factor	Adoption Curve
C1: LED Tubular Lamps	70%	Curve B	80%	Curve C
C2: High-Efficiency Air Source Heat Pumps	20%	Curve B	60%	Curve B
C3: ECM Motors and Evaporator Fan Motor Controllers	25%	Curve B	80%	Curve B
C4: VFDs on HVAC Motors	5%	Curve B	70%	Curve B
C5: Advanced Building Automation Systems	20%	Curve B	70%	Curve B
C6: High Performance New Construction	50%	Curve A	80%	Curve C
C7: PC Power Management	10%	Curve B	50%	Curve B
C8: High Performance Glazing Systems	10%	Curve B	80%	Curve C

As noted earlier, it was not possible to fully address all opportunities in the one-day workshop. Consequently, the workshop focused on opportunities selected based on the criteria described in Step 1. Estimated participation rates for the remaining opportunities were extrapolated from the workshop results shown above and an aggregate set of results was prepared that included all of the eligible technologies.

The results shown in the attached appendices and in the following summary section incorporate the results of all these inputs.

9.5 Summary of Potential Electric Energy Savings

This section presents a summary of the electric energy savings for the upper and lower achievable potential scenarios. The summary is organized and presented in the following sub-sections:

- Overview and selected highlights
- Electric energy savings Upper Achievable scenario
- Electric energy savings Lower Achievable scenario.

It should be noted that measures are applied separately for each combination of region, sub sector, and milestone year. Some of the parameters that are used to assess measures in each circumstance can vary. For example, the potential savings or cost for a measure in one sub sector or region may be different from the savings or cost in another sub sector or region. In addition, the economic threshold value that is used to assess cost-effectiveness varies for each of the milestones. As such, measures that are marginally cost-effective, such as multi-split heat pumps, are only cost-effective in a subset of the regions, sub sectors, and milestone years being considered.

9.5.1 Overview and Selected Highlights

Exhibit 67 presents an overview of the results for the total Newfoundland service territory by milestone year, for three scenarios: Economic Potential, upper Achievable Potential and lower Achievable Potential.

	Economic Potential Scenario			chievable I Scenario	Lower Achievable Potential Scenario		
Year	Potential Savings (GWh/yr.)	% Savings Relative to Reference Case	Potential Savings (GWh/yr.)	Savings Relative to		% Savings Relative to Reference Case	
2017	744	31%	56	2.3%	8	0.3%	
2020	789	32%	149	6.0%	32	1.3%	
2023	834	32%	280	11%	73	2.8%	
2026	892	34%	456	17%	137	5.2%	
2029	936	35%	640	24%	209	7.8%	

Exhibit 67 Electricity Savings by Milestone Year for Three Scenarios (GWh/yr.)

Selected Highlights – Potential Electric Energy Savings

Selected highlights of the potential electric energy savings for the upper and lower achievable potential scenarios shown in Exhibit 67 are summarized below. Further detail is provided in the following sub-sections and in the accompanying appendices.

Savings by Milestone Year

Savings in both Achievable scenarios are achieved somewhat more steadily throughout the period than in the Economic Potential scenario. In the upper Achievable Potential scenario, 23% of the 2029 savings would be achieved by 2020, rising to 44% in 2023 and 71% by 2026. In the lower Achievable Potential scenario, 15% of the 2029 savings would be achieved by 2020, rising to 35% in 2023 and 66% by 2026. Although there are some measures in both scenarios that can be implemented early in the study period, the majority are expected to follow an adoption curve that starts slowly and builds up towards 2029.

Savings by Sub Sector

Offices account for the largest portion of achievable savings with 21-23% of the achievable potential savings coming from this sector. Of this, large offices account for approximately 13% and 11% of the upper and lower Achievable Potential savings, respectively, and small offices account for 10% each of the upper and lower achievable potential savings. This reflects the larger market share of offices and their generally higher level of energy intensity. The retail sector accounts for 19-21% of the achievable potential savings with 6% of savings in large non-food retail for both scenarios, 7% savings in small non-food retail for both scenarios and 7% and 8% savings in food retail for the upper and lower scenarios respectively. Educational facilities also provide for a total of 16 -17% of achievable potential savings with schools accounting for approximately 11% and 10% of the upper and lower Achievable Potential savings, respectively, and Universities and colleges accounting for 6% each of the upper and lower achievable potential savings.

Savings by Region

The Island Interconnected region accounts are expected to comprise 88% of potential savings in 2029. The Labrador Interconnected region accounts provides 11% of the savings, and the Isolated region provides 1% of the potential savings in 2029.

Savings by End Use

Savings in the HVAC major end use (which includes space heating, space cooling, and HVAC Fans and Pumps) account for 57% of the upper achievable savings and 38% of the lower achievable savings in 2029. Space heating is the biggest contributor, at 42% of the overall upper achievable savings and 29% of the overall lower Achievable Potential savings. HVAC Fans and Pumps savings account for 13% of the overall 2029 upper Achievable Potential savings and 8% of the overall lower Achievable Potential savings. The most significant measures that save HVAC include ductless minisplit heat pumps, building recommissioning, air source heat pumps, demand control ventilation, and programmable thermostats.

Although HVAC accounts for a very large percentage of the potential, the space heating savings potential is also a very large percentage of the reference case space heating consumption. Between 7% and 32% of HVAC consumption could potentially be saved, respectively, in the lower and upper Achievable Potential scenarios.

Lighting savings accounts for 32% of the upper achievable savings and 53% of the lower achievable savings. Of this, the General Lighting savings accounts for 22% of the upper Achievable Potential savings in 2029 and 32% of the lower Achievable Potential savings. The most significant lighting savings come from LED lighting measures, building recommissioning, lighting occupancy sensors, and T8 Fixtures. Secondary Lighting accounts for 4% of the upper Achievable Potential savings and 10% of the lower Achievable Potential savings in 2029. The most significant savings for secondary lighting come from LED lighting measures. Street Lighting accounts for 2% of the upper Achievable Potential savings and 6% of the lower Achievable Potential savings. The potential reduction for street lighting comes solely from the LED Street Lighting measure.

Refrigeration accounts for 5% of each of the 2029 upper Achievable Potential savings and lower Achievable Potential savings. The most significant refrigeration measures are the refrigerated display cases, high efficiency compressors and the evaporator fan upgrades measure (ECM Motors and Evaporator Fan Motor Controllers).

The remaining major end uses are all under 5% in both scenarios. There are savings available in three other major end uses, including Domestic Hot Water, Food Service, and Plug Loads. Together they account for 7% of upper Achievable Potential savings in 2029 and 4% of lower Achievable Potential savings in 2029.

Savings by Measure

The most significant savings in the Achievable Potential come from the following measures:

- **Building recommissioning**, which accounts for 20% of the upper Achievable Potential savings in 2029 and 9% of the lower Achievable Potential savings in 2029
- Ductless mini-split heat pumps, which account for 10% of the upper Achievable Potential savings in 2029 and 11% of the lower Achievable Potential savings in 2029
- Programmable Thermostats, which accounts for 6% of each of the upper Achievable Potential savings and lower Achievable Potential savings in 2029
- **Air Source Heat Pumps**, which accounts for 6% of the upper Achievable Potential savings in 2029 and 7% of the lower Achievable Potential savings in 2029
- Advanced BAS, which accounts for 6% of each of the upper Achievable Potential savings and lower Achievable Potential savings in 2029
- Lighting Occupancy sensors, which accounts for 5% of the upper Achievable Potential savings in 2029 and 4% of the lower Achievable Potential savings in 2029
- **High performance new construction (25% better)**, which accounts for 5% of the upper Achievable Potential savings in 2029 and 8% of the lower Achievable Potential savings in 2029
- **LED tubes** (applied to general and secondary lighting), which accounts for 5% of the upper Achievable Potential savings in 2029 and 10% of the lower Achievable Potential savings in 2029
- **LED lamps** (applied to general and secondary lighting), which accounts for 4% of the upper Achievable Potential savings in 2029 and 11% of the lower Achievable Potential savings in 2029

There are numerous other smaller measures that contribute to the overall Achievable Potential results.

9.5.2 Electric Energy Savings – Upper Achievable Scenario

The following exhibits present the potential electricity savings³⁰ under the upper Achievable Potential scenario. The results shown are relative to the Reference Case. The results are broken down as follows:

- Exhibit 68 presents the results by region and by milestone year
- Exhibit 69 presents the results for the total NL service territory by sub sector and milestone year
- Exhibit 70 presents the results for the total NL service territory by end use and milestone year
- Exhibit 71 presents the results for the total NL service territory by technology and milestone year.

Exhibit 68 Upper Achievable Electricity Savings by Region (MWh/yr.)

Region	2017	2020	2023	2026	2029	2029 Savings Relative to Ref Case	Percentage of Total 2029 Savings
Island Interconnected	52,821	137,859	255,655	407,167	566,388	24%	88%
Labrador Interconnected	2,763	10,142	22,594	45,474	70,163	24%	11%
Isolated	634	1,384	2,185	3,027	3,890	17%	1%
Grand Total	56,218	149,386	280,435	455,668	640,441	24%	100%

³⁰ Note: A value of "0" in the following exhibits means a relatively small number, not an absolute value of zero.

Exhibit 69 Upper Achievable Electricity Savings by Sub sector and Milestone Year (MWh/yr.)

Sub Sector	2017	2020	2023	2026	2029	2029 Savings Relative to Ref Case	% of Total 2029 Savings
Large Office	5,972	16,935	33,303	56,863	80,714	25%	13%
Small Office	4,344	13,029	26,310	44,485	64,337	28%	10%
Large Non-food Retail	3,909	9,491	16,928	25,828	35,879	25%	6%
Small Non-food Retail	3,866	9,947	18,305	30,723	42,647	26%	7%
Food Retail	3,481	10,040	19,787	31,915	45,989	23%	7%
Large Accomodation	2,626	6,740	12,238	18,636	26,101	33%	4%
Small Accomodation	703	1,559	2,650	3,948	5,393	17%	1%
Healthcare	4,110	12,952	25,506	40,432	56,049	33%	9%
Schools	4,772	15,172	30,587	49,433	70,032	35%	11%
Universities and Colleges	3,683	9,793	18,078	28,355	39,881	30%	6%
Warehouse/Wholesale	2,324	5,191	8,925	13,422	18,393	20%	3%
Restaurants	1,473	3,655	6,850	10,856	15,287	12%	2%
Labrador Isolated C/I Buildings	581	1,270	2,008	2,783	3,579	17%	1%
Island Isolated C/I Buildings	53	114	178	244	311	16%	0%
Large Other Buildings	4,573	12,327	23,578	38,402	55,173	23%	9%
Small Other Buildings	3,294	8,581	16,430	28,921	41,187	21%	6%
Other Institutional	365	2,115	5,516	15,870	24,997	29%	4%
Street Lighting	6,088	10,474	13,256	14,552	14,491	40%	2%
Grand Total	56,218	149,386	280,435	455,668	640,441	26%	100%

Note: Any difference in totals is due to rounding.

Exhibit 70 Upper Achievable Electricity Savings by End Use and Milestone Year (MWh/yr.)

End Use	2017	2020	2023	2026	2029	2029 Savings Relative to Ref Case	% of Total 2029 Savings
Space Heating	5,847	37,190	94,421	173,631	269,770	35%	42%
Space Cooling	353	1,455	3,340	5,909	9,053	19%	1%
Secondary Lighting	10,833	18,230	22,812	24,915	25,251	20%	4%
Refrigeration	1,310	5,087	11,544	20,102	30,448	15%	5%
Outdoor Lighting	3,029	8,494	15,338	21,245	23,345	49%	4%
Other Plug Loads	237	968	2,222	4,028	6,416	9%	1%
HVAC Fans & Pumps	3,337	13,675	31,083	55,554	85,286	25%	13%
General Lighting	23,528	47,516	73,094	112,552	140,673	33%	22%
Food Service Equipment	21	102	282	389	389	0%	0%
Domestic Hot Water	1,026	4,297	9,967	17,954	28,026	22%	4%
Computer Servers	28	107	115	130	153	1%	0%
Computer Equipment	581	1,791	2,959	4,709	7,139	6%	1%
Street Lighting	6,088	10,474	13,256	14,552	14,491	40%	2%
Grand Total	56,218	149,386	280,435	455,668	640,441	26%	100%

Note: Any difference in totals is due to rounding.

Exhibit 71 Upper Achievable Electricity Savings by Technology and Milestone Year (MWh/yr.)

Manager			Year			Adoption	Weigh	nted Averag	e CCE
Measure	2017	2020	2023	2026	2029	Curve	Island	Labrador	Isolated
Energy-Efficient Server Technologies	28	107	115	130	153	В	0.0	0.0	N/A
Use Natural Ventilation (Summer)	0	2	4	7	10	В	0.0	0.0	N/A
Activate PC Power Management	185	780	1,852	3,433	5,598	В	0.0	0.0	0.0
Use Task Light Instead of Ambient	16	62	128	185	254	В	0.0	0.0	N/A
Use Shades/Blinds (Summer)	1	3	7	12	19	В	0.0	0.0	N/A
Use Shades/Blinds (Winter)	8	32	68	108	145	В	0.0	0.0	0.0
Make Use of Daylighting	30	117	250	393	561	В	0.0	0.0	0.0
Keep Doors Closed (Summer)	0	1	2	3	5	В	0.0	0.0	N/A
Keep Doors Closed (Winter)	4	16	35	58	80	В	0.0	0.0	N/A
ENERGY STAR Computers	378	921	1,010	1,168	1,415	В	0.0	0.0	0.0
ENERGY STAR Office Equipment	18	90	97	108	125	В	0.0	0.0	0.0
Reduce Number of Fridges	7	28	68	126	207	В	0.0	0.0	N/A
Low-Flow Showerheads	170	678	1,516	2,663	4,088	В	0.1	0.1	0.1
Low-Flow Faucet Aerators	588	2,348	5,273	9,347	14,544	В	0.2	0.1	0.1
Lighting Controls (Outdoor)	458	1,551	2,769	3,819	5,378	В	0.4	0.4	0.7
Low-Flow Pre-Rinse Spray Valves	37	149	335	594	923	В	0.4	0.5	1.1
Cooler Night Covers	149	578	1,236	2,041	2,894	В	0.7	0.7	0.7
Automatic Door Closers (Walk-In Coolers & Freezers)	18	70	154	264	393	В	1.2	1.2	N/A
LED Screw-In Lamps	6,843	11,430	14,044	14,968	14,474	С	1.7	1.6	1.6
Programmable Thermostats	2,091	8,157	17,286	28,318	39,705	В	1.7	2.0	1.4
High-Efficiency Air Source Heat Pumps	978	4,514	11,628	23,109	39,600	В	2.0	0.9	9.1
LED Screw-In Lamps	5,507	9,166	11,224	11,922	11,491	С	2.2	2.2	2.1
Refrigerated Vending Machine Controllers	230	939	2,154	3,901	6,209	В	2.6	2.6	2.6
High Efficiency Compressors (Refrigeration)	342	1,352	2,988	5,176	7,817	В	2.7	2.7	N/A
Heat Pump Water Heaters	125	523	1,139	2,042	2,979	В	2.7	3.9	12.2
High-Efficiency Cooking Equipment	21	102	282	389	389	В	2.8	2.7	N/A
High Performance T8 Fixtures	908	1,581	2,038	2,279	2,323	С	3.0	3.0	3.3
LED Outdoor Fixtures	2,562	6,843	12,228	16,737	16,806	С	3.0	2.9	11.3
VFDs on HVAC Motors	772	3,087	6,946	12,361	19,315	В	3.0	3.1	3.1
New Construction (25% More Efficient)	232	2,664	8,851	17,383	29,530	С	3.1	3.0	3.8
Building Recommissioning	6,339	24,394	51,663	89,675	126,323	В	3.2	4.0	2.8
Wall Insulation	731	1,216	1,853	2,918	3,790	С	3.2	3.6	5.6
Roof Insulation	545	795	1,123	1,498	1,888	С	3.5	2.5	4.9
LED Exit Signs	170	251	266	233	173	С	3.8	3.8	3.8
Hotel Occupancy Sensors	72	267	550	885	1,188	В	3.9	2.9	N/A
Premium Efficiency Motors	25	132	360	765	1,397	В	4.0	4.2	4.3

Exhibit 71 Upper Achievable Electricity Savings by Technology and Milestone Year (MWh/yr.) (cont'd...)

Marana			Year			Adoption	Weigh	nted Averag	e CCE
Measure	2017	2020	2023	2026	2029	Curve	Island	Labrador	
High Performance Glazing Systems	1,620	3,544	6,313	11,969	22,110	С	4.2	5.8	3.1
Demand Control Kitchen Ventilation (DCKV)	60	252	531	843	1,145	В	4.2	4.2	N/A
T5HO Fixtures	946	1,642	2,030	2,148	2,063	С	4.5	4.5	4.5
Refrigeration Controls	121	492	1,058	1,764	2,531	В	4.5	4.5	N/A
Occupancy Sensors (Lighting)	1,419	5,417	11,949	20,758	31,654	В	4.5	4.8	5.3
Drainwater Heat Recovery	13	73	199	423	773	В	4.5	4.5	4.5
ECM Motors and Evaporator Fan Motor Controllers	237	927	2,140	3,682	5,538	В	4.7	4.7	4.7
LED High Bay Fixtures	1,782	3,016	3,784	4,144	4,143	С	4.8	2.1	4.8
High Performance T8 Fixtures	4,967	9,019	11,633	13,012	13,259	С	4.8	4.2	4.2
T5HO Fixtures	317	525	662	701	673	С	5.0	4.3	3.6
ENERGY STAR Dishwashers	54	214	520	924	1,442	В	5.0	5.0	N/A
Ventilation Heat Recovery	570	2,636	5,932	10,545	16,477	В	5.2	4.2	4.1
LED High Bay Fixtures	504	848	1,058	1,156	1,156	С	5.2	3.6	3.8
New Construction (40% More Efficient)	106	807	3,037	6,827	11,360	С	5.3	2.6	7.1
Radiant Infrared Heaters	74	296	663	1,338	2,088	В	5.9	6.1	N/A
Demand Control Ventilation (DCV)	1,149	4,503	11,254	18,613	26,045	В	5.9	4.5	N/A
LED Tubular Lamps	2,078	3,435	4,205	4,482	4,598	С	6.0	3.5	6.8
Ground Source Heat Pumps	223	652	1,291	2,056	2,861	В	6.4	N/A	12.1
LED Tubular Lamps	6,452	9,659	11,469	25,145	25,694	С	7.1	N/A	8.7
LED Street Lighting	6,088	10,474	13,256	14,552	14,491	С	7.8	N/A	N/A
Advanced Building Automation Systems	1,960	7,531	15,931	25,891	36,727	В	8.1	4.3	N/A
Refrigeration Heat Recovery	18	71	158	277	429	В	8.2	N/A	N/A
CEE-Rated Refrigerators and Freezers	52	75	127	157	157	В	8.4	N/A	8.4
Ductless Mini-Split Heat Pump	2,651	10,777	23,888	42,741	66,022	В	8.9	2.4	6.0
High Efficiency Chillers	0	0	0	0	0	В	10.5	N/A	N/A
Refrigerated Cases with Doors	339	1,357	3,053	5,427	8,480	В	10.9	N/A	N/A
LED Refrigerated Display Case Lighting	35	42	52	66	82	В	11.5	N/A	16.0
Dimming Control (Daylighting)	2	10	22	39	62	В	N/A	N/A	18.6
Freezer Defrost Controllers	-	-	1	2	3	В	N/A	N/A	27.9
LED Troffers	8	22	41	62	66	С	N/A	N/A	19.3
HVAC Impact from Other Savings	(8,214)	(13,872)	(17,362)	(23,095)	(23,877)	N/A	N⁄A	N/A	N/A
Grand Total	56,218	149,386	280,435	455,668	640,441				

Note: Curves A and B in this exhibit are as presented in Exhibit 65. In the exhibit, a zero indicates a value that rounds off to zero (i.e., less than 0.5). A dash indicates a value that is actually zero.

9.5.3 Electric Energy Savings – Lower Achievable Scenario

The following exhibits present the potential electricity savings³¹ under the lower Achievable Potential scenario. The results shown are relative to the Reference Case. The results are broken down as follows:

- Exhibit 72 presents the results by supply system, by region and milestone year
- Exhibit 73 presents the results for the total NL by sub sector and milestone year
- Exhibit 74 presents the results for the total NL by end use and milestone year
- Exhibit 75 presents the results for the total NL by technology and milestone year.

Exhibit 72 Lower Achievable Electricity Savings by Region (MWh/yr.)

Region	2017	2020	2023	2026	2029	2029 Savings Relative to Ref Case	% of Total 2029 Savings
Island Interconnected	7,528	29,913	68,110	126,145	191,279	8%	91%
Labrador Interconnected	433	2,109	5,117	10,676	17,359	6%	8.3%
Isolated	14	77	172	311	498	2%	0.2%
Grand Total	7,974	32,099	73,399	137,132	209,136	8%	100%

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³¹ A value of "0" in the following exhibits means a relatively small number, not an absolute value of zero.

Exhibit 73 Lower Achievable Electricity Savings by Sub sector and Milestone Year (MWh/yr.)

Sub Sector	2017	2020	2023	2026	2029	2029 Savings Relative to Ref Case	% of Total 2029 Savings
Large Office	790	3,113	7,361	15,622	23,795	7%	11%
Small Office	769	3,053	7,010	13,560	20,838	9%	10%
Large Non-food Retail	530	2,126	4,851	8,507	12,901	9%	6%
Small Non-food Retail	534	2,133	4,874	9,821	14,585	9%	7%
Food Retail	656	2,596	5,889	10,313	15,696	8%	8%
Large Accomodation	389	1,536	3,447	5,974	9,225	12%	4%
Small Accomodation	90	360	825	1,468	2,252	7%	1%
Healthcare	638	2,611	5,934	10,561	16,027	9%	8%
Schools	829	3,385	7,779	13,863	21,251	11%	10%
Universities and Colleges	513	2,018	4,471	7,906	11,862	9%	6%
Warehouse/Wholesale	295	1,181	2,728	4,895	7,432	8%	4%
Restaurants	176	733	1,721	3,082	4,870	4%	2%
Labrador Isolated C/I Buildings	12	70	157	284	455	2%	0%
Island Isolated C/I Buildings	1	7	15	27	43	2%	0%
Large Other Buildings	625	2,555	5,895	10,792	16,736	7%	8%
Small Other Buildings	432	1,732	4,027	8,414	12,723	6%	6%
Other Institutional	97	576	1,393	3,470	5,637	7%	3%
Street Lighting	598	2,314	5,021	8,574	12,808	35%	6%
Grand Total	7,974	32,099	73,399	137,132	209,136	8%	100%

Note: Any difference in totals is due to rounding.

Exhibit 74 Lower Achievable Electricity Savings by End Use and Milestone Year (MWh/yr.)

End Use	2017	2020	2023	2026	2029	2029 Savings Relative to Ref Case	% of Total 2029 Savings
Space Heating	1,763	7,874	19,308	35,251	60,300	8%	29%
Space Cooling	72	315	773	1,448	2,374	5%	1%
Secondary Lighting	1,079	4,102	8,770	14,713	21,848	17%	10%
Refrigeration	408	1,604	3,730	6,707	10,573	5%	5%
Outdoor Lighting	388	1,756	4,477	7,963	9,032	19%	4%
Other Plug Loads	66	271	621	1,126	1,793	3%	1%
HVAC Fans & Pumps	576	2,459	5,884	10,951	17,737	5%	8%
General Lighting	2,780	10,455	22,741	46,640	66,590	16%	32%
Food Service Equipment	7	34	94	130	130	0%	0%
Domestic Hot Water	115	536	1,363	2,658	4,486	4%	2%
Computer Servers	6	21	23	26	31	0%	0%
Computer Equipment	115	357	592	945	1,435	1%	1%
Street Lighting	598	2,314	5,021	8,574	12,808	35%	6%
Grand Total	7,974	32,099	73,399	137,132	209,136	9%	100%

Note: Any difference in totals is due to rounding.

Exhibit 75 Lower Achievable Electricity Savings by Technology and Milestone Year (MWh/yr.)

Massaura			Year			Adoption	Weighted	d Average CC	E (¢/kWh)
Measure	2017	2020	2023	2026	2029	Curve	Island	Labrador	Isolated
Energy-Efficient Server Technologies	6	21	23	26	31	В	0.0	0.0	N/A
Make Use of Daylighting	6	25	55	93	139	В	0.0	0.0	N/A
Keep Doors Closed (Summer)	0	0	0	1	1	В	0.0	0.0	N/A
Keep Doors Closed (Winter)	1	3	8	14	22	В	0.0	0.0	N/A
ENERGY STAR Computers	75	182	200	231	280	В	0.0	0.0	N/A
ENERGY STAR Office Equipment	3	18	19	21	25	В	0.0	0.0	N/A
Reduce Number of Fridges	1	6	14	25	41	В	0.0	0.0	N/A
Use Natural Ventilation (Summer)	0	0	1	2	2	В	0.0	0.0	N/A
Activate PC Power Management	37	157	373	692	1,130	В	0.0	0.0	0.0
Use Task Light Instead of Ambient	3	13	29	45	66	В	0.0	0.0	N/A
Use Shades/Blinds (Summer)	0	1	2	3	4	В	0.0	0.0	N/A
Use Shades/Blinds (Winter)	2	7	16	28	42	В	0.0	0.0	N/A
Low-Flow Showerheads	13	53	118	210	328	В	0.1	0.1	N/A
Low-Flow Faucet Aerators	43	173	390	693	1,083	В	0.2	0.1	N/A
Lighting Controls (Outdoor)	138	508	1,019	1,567	2,267	В	0.4	0.4	N/A
Low-Flow Pre-Rinse Spray Valves	3	11	25	44	69	В	0.4	0.5	N/A
Cooler Night Covers	46	184	408	709	1,076	В	0.7	0.7	N/A
Automatic Door Closers (Walk-In Coolers & Freezers)	6	22	50	87	134	В	1.2	1.2	N/A
Programmable Thermostats	610	2,418	5,269	9,022	13,483	В	1.6	2.0	N/A
LED Screw-In Lamps	682	2,564	5,401	8,953	12,985	В	1.7	1.6	N/A
Roof Insulation	8	15	33	64	113	В	2.0	2.5	N/A
High-Efficiency Air Source Heat Pumps	329	1,534	4,016	8,183	14,538	В	2.0	0.9	9.1
LED Screw-In Lamps	546	2,046	4,298	7,105	10,279	В	2.2	2.2	N/A
Refrigerated Vending Machine Controllers	65	265	608	1,101	1,751	В	2.6	2.6	N/A
Wall Insulation	10	26	60	149	259	В	2.6	3.6	N/A
High Efficiency Compressors (Refrigeration)	107	427	955	1,684	2,605	В	2.7	2.7	N/A
Heat Pump Water Heaters	42	180	412	793	1,287	В	2.7	3.8	N/A
High-Efficiency Cooking Equipment	7	34	94	130	130	В	2.8	2.7	N/A
High Performance T8 Fixtures	87	341	753	1,311	2,004	В	3.0	3.0	N/A
LED Outdoor Fixtures	247	1,210	3,313	6,067	6,135	В	3.0	2.9	N/A
VFDs on HVAC Motors	55	221	496	883	1,380	В	3.0	3.1	3.1
New Construction (25% More Efficient)	81	1,033	3,800	8,253	15,860	Α	3.1	3.0	3.8
Building Recommissioning	821	3,253	7,153	13,099	19,702	В	3.2	4.0	N/A
LED Exit Signs	16	55	99	135	150	В	3.8	3.8	N/A

Exhibit 75 Lower Achievable Electricity Savings by Technology and Milestone Year (MWh/yr.) (cont'd...)

Measure			Year			Adoption	Weighted	l Average CC	E (¢/kWh)
wiedsure	2017	2020	2023	2026	2029	Curve	Island	Labrador	Isolated
Hotel Occupancy Sensors	22	84	181	304	436	В	3.9	2.9	N/A
Premium Efficiency Motors	2	10	26	56	102	В	4.0	4.2	N/A
Demand Control Kitchen Ventilation (DCKV)	4	19	41	70	105	В	4.2	4.2	N/A
High Performance Glazing Systems	23	83	233	707	1,980	В	4.4	5.9	3.1
T5HO Fixtures	91	358	758	1,247	1,797	В	4.5	4.5	N/A
Refrigeration Controls	38	157	349	609	929	В	4.5	4.5	N/A
Occupancy Sensors (Lighting)	420	1,635	3,614	6,243	9,234	В	4.5	4.8	N/A
Drainwater Heat Recovery	1	5	14	30	55	В	4.5	4.5	N/A
ECM Motors and Evaporator Fan Motor Controllers	74	292	680	1,183	1,807	В	4.7	4.7	4.7
LED High Bay Fixtures	179	685	1,472	2,489	3,686	В	4.8	2.1	N/A
High Performance T8 Fixtures	476	1,947	4,305	7,490	11,449	В	4.8	4.2	N/A
T5HO Fixtures	31	114	247	407	586	В	5.0	4.3	N/A
ENERGY STAR Dishwashers	4	15	37	66	103	В	5.0	5.0	N/A
Ventilation Heat Recovery	41	188	423	753	1,176	В	5.2	4.2	N/A
LED High Bay Fixtures	56	213	455	767	1,132	В	5.3	3.6	N/A
New Construction (40% More Efficient)	37	301	1,291	3,273	6,140	Α	5.3	2.6	N/A
Demand Control Ventilation (DCV)	83	331	852	1,485	2,245	В	5.9	4.5	N/A
Radiant Infrared Heaters	25	99	223	449	702	В	5.9	6.1	N/A
LED Tubular Lamps	202	754	1,584	2,615	3,983	В	6.0	3.5	N/A
Ground Source Heat Pumps	75	229	480	829	1,281	В	6.4	N/A	N/A
LED Tubular Lamps	637	1,941	3,896	14,090	17,506	В	7.3	N/A	8.7
LED Street Lighting	598	2,314	5,021	8,574	12,808	В	7.8	N/A	N/A
Advanced Building Automation Systems	573	2,258	4,938	8,421	12,606	В	8.0	4.3	N/A
Refrigeration Heat Recovery	1	5	11	20	31	В	8.2	N/A	N/A
CEE-Rated Refrigerators and Freezers	14	14	14	14	14	В	8.4	N/A	N/A
Ductless Mini-Split Heat Pump	887	3,624	8,099	14,683	23,256	В	8.9	2.3	N/A
High Efficiency Chillers	0	0	0	0	0	В	10.5	N/A	N/A
Refrigerated Cases with Doors	106	424	954	1,696	2,650	В	10.9	N/A	N/A
LED Refrigerated Display Case Lighting	10	10	10	10	10	В	11.5	N/A	N/A
HVAC Impact from Other Savings	(832)	(3,017)	(6,319)	(12,875)	(18,078)	N/A	0.0	0.0	0.0
Grand Total	7,974	32,099	73,399	137,132	209,136				

Note: Curves A, B, and C in this exhibit are as presented in Exhibit 65.

9.6 Electric Peak Load Reductions from Energy Efficiency

Exhibit 76 presents a summary of the peak load reductions that would occur as a result of the electric energy savings contained in the Achievable Potential Forecast. The reductions are shown by milestone year, region and sub sector for both lower and upper achievable potential savings. In each case, the reductions are an average value over the peak period and are defined relative to the Reference Case presented previously in Sections 4 and 6. Exhibit 77 and Exhibit 78 show the lower and upper Achievable Potential savings by region, sub sector and principal end use for each milestone year.

Exhibit 76, Exhibit 77 and Exhibit 78 only approximate the potential demand impacts associated with the energy-efficiency measures because they are based on the assumption that the measures do not change the load shape of the end uses they affect. This is not always correct. For example, most of the heat pump measures will not produce any peak demand savings, because during the winter peak period the heat pumps and mini-splits will revert to back-up electric resistance heating. Therefore, there will be no net reduction in space heating peak demand for these measures. Accordingly, the demand reductions for the heat pump measures have been manually filtered out of the results presented in these exhibits.

Exhibit 79 shows the demand reductions associated with each electric energy savings measure contained in the Achievable Potential Forecast for the milestone year 2029. The heat pump measures are omitted from the exhibit, as with the previous two exhibits. One notable line item in the exhibit is "HVAC Impact from Other Savings" - the impact on peak space heating load resulting from the savings for other end uses within the sub sector. This is to capture the fact that in an electrically-heated building, savings of energy consuming equipment within the building will not reduce the winter peak demand. The impact of demand reductions for other end uses on the space heating demand can be seen graphically in Exhibit 77. As the demand impacts for many of the other end uses rise with time, the demand impacts for space heating actually decreases over time.

Electric peak load reductions related to capacity-only measures are presented separately in Section 9.7.

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³² In fact, this is a conservative assumption for the Island Interconnected region. Although the demand peak occurs on the coldest winter days, in a climate such as that of St. John's the temperature is typically not very extreme on those peak days. Therefore, many heat pumps will continue to work in heat pump mode and not revert to electric resistance. In this study, we have retained the conservative assumption that they do not provide demand relief.

Exhibit 76 Electric Peak Load Reductions from Lower and Upper Achievable Potential Energy Savings Measures by Milestone Year, Region and Subsector (MW)

Sub Caster	Milestone	Isla		Labr		Isola	ated	Grand Total		
Sub Sector	Year	Intercon		Intercor		Lauran	Haner	Lower	Hanes	
	2017	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	
	2017	0.1 0.6	1.1 3.4	0.0	0.0	0.0	0.0	0.1 0.6	1.1	
Large Office	2023	1.3	7.0	0.0	0.0	0.0	0.0	1.3	3.4 7.0	
Large Office	2026	2.6	11.7	0.0	0.0	0.0	0.0	2.6	11.7	
	2029	4.1	16.8	0.0	0.0	0.0	0.0	4.1	16.8	
	2017	0.1	0.7	0.0	0.0	0.0	0.0	0.1	0.7	
	2020	0.1	2.1	0.0	0.0	0.0	0.0	0.1	2.1	
Small Office	2023	0.4	4.2	0.0	0.0	0.0	0.0	0.4	4.2	
Sinaii Sinos	2026	1.7	6.7	0.0	0.1	0.0	0.0	1.7	6.8	
	2029	2.7	9.7	0.0	0.1	0.0	0.0	2.7	9.9	
	2017	0.1	0.5	0.0	0.0	0.0	0.0	0.1	0.5	
	2020	0.3	1.5	0.0	0.1	0.0	0.0	0.3	1.6	
Large Non-food Retail	2023	0.7	2.9	0.0	0.1	0.0	0.0	0.8	3.0	
J	2026	1.3	4.6	0.1	0.2	0.0	0.0	1.3	4.9	
	2029	1.9	6.5	0.1	0.4	0.0	0.0	2.0	6.9	
	2017	0.1	0.5	0.0	0.0	0.0	0.0	0.1	0.6	
	2020	0.3	1.5	0.0	0.2	0.0	0.0	0.3	1.6	
Small Non-food Retail	2023	0.7	2.9	0.1	0.3	0.0	0.0	0.7	3.3	
	2026	1.3	5.0	0.1	0.6	0.0	0.0	1.4	5.6	
	2029	1.9	6.9	0.2	0.8	0.0	0.0	2.1	7.7	
	2017	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.4	
	2020	0.3	1.3	0.0	0.1	0.0	0.0	0.3	1.4	
Food Retail	2023	0.7	2.7	0.1	0.2	0.0	0.0	0.8	3.0	
	2026	1.2	4.5	0.1	0.4	0.0	0.0	1.3	4.9	
	2029	1.9	6.4	0.1	0.6	0.0	0.0	2.0	7.0	
	2017	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.4	
	2020	0.2	1.1	0.0	0.1	0.0	0.0	0.2	1.2	
Large Accomodation	2023	0.5	2.1	0.0	0.2	0.0	0.0	0.5	2.4	
	2026	0.8	3.4	0.1	0.4	0.0	0.0	0.9	3.8	
	2029	1.3	4.8	0.1	0.5	0.0	0.0	1.4	5.3	
	2017	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	
	2020	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	
Small Accomodation	2023	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.3	
	2026	0.2	0.5	0.0	0.0	0.0	0.0	0.2	0.5	
	2029	0.3	0.7	0.0	0.0	0.0	0.0	0.3	0.7	
	2017	0.1	0.7	0.0	0.0	0.0	0.0	0.1	0.7	
Haakhaa	2020	0.4	2.3	0.0	0.1	0.0	0.0	0.4	2.4	
Healthcare	2023	0.9	4.7	0.0	0.2	0.0	0.0	1.0	4.9	
	2026	1.7	7.5	0.1	0.4	0.0	0.0	1.7	7.8	
	2029 2017	2.5	10.3	0.1	0.5	0.0	0.0	2.6	10.8	
		0.1	0.9	0.0	0.0	0.0	0.0		0.9	
Schools	2020 2023	0.5 1.2	2.9 5.8	0.0	0.1 0.3	0.0	0.0 0.0	0.5 1.3	3.0 6.1	
JUNUUS	2023	1.2 2.1	9.3	0.1	0.3	0.0	0.0		9.8	
	2026	3.3	9.3 12.9	0.1	0.6	0.0	0.0		9.8	
	2029	0.1	0.5	0.2	0.0	0.0	0.0		0.5	
	2020	0.1	1.5	0.0	0.0	0.0	0.0		1.5	
Universities and	2020	0.3	2.8	0.0	0.0	0.0	0.0		2.9	
Colleges	2026	1.2	4.6	0.0	0.1	0.0	0.0	1.2	4.7	
	2029	1.8	6.6	0.0	0.1	0.0	0.0		6.8	
	2017	0.1	0.4	0.0	0.2	0.0	0.0		0.4	
	2020	0.1	0.4	0.0	0.0	0.0	0.0		1.0	
Warehouse/Wholesale	2023	0.2	1.6	0.0	0.0	0.0	0.0		1.7	
onouco, minorcoule	2026	0.8	2.4	0.0	0.1	0.0	0.0		2.6	
	2029	1.3	3.2	0.0	0.2				3.5	
	2029	1.3	3.2	0.1	0.3	0.0	0.0	1.3	3.5	

Exhibit 76 Electric Peak Load Reductions from Lower and Upper Achievable Potential Energy Savings Measures by Milestone Year, Region and Subsector (MW) (cont'd...)

Sub Sector	Milestone	Isla Intercon		Labra Intercor		Isola	ated	Grand	Total
	Year	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
	2017	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
	2020	0.1	0.6	0.0	0.0	0.0	0.0	0.1	0.7
Restaurants	2023	0.2	1.3	0.0	0.1	0.0	0.0	0.3	1.4
Restaurants Labrador Isolated C/I Buildings Island Isolated C/I Buildings Large Other Buildings Small Other Buildings	2026	0.5	2.2	0.0	0.2	0.0	0.0	0.5	2.4
	2029	0.7	3.2	0.0	0.2	0.0	0.0	0.8	3.4
	2017	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Laborador la aleta d C/I	2020	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2
	2023	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3
buildings	2026	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.4
	2029	0.0	0.0	0.0	0.0	0.1	0.5	0.1	0.5
	2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Internal Income	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
buildings	2026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2029	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2017	0.1	0.6	0.0	0.1	0.0	0.0	0.1	0.8
	2020	0.3	1.8	0.1	0.5	0.0	0.0	0.4	2.3
Large Other Buildings	2023	0.8	3.5	0.2	1.1	0.0	0.0	1.0	4.7
	2026	1.5	6.0	0.4	1.8	0.0	0.0	1.8	7.9
	2029	2.3	8.6	0.6	2.9	0.0	0.0	2.8	11.4
	2017	0.0	0.4	0.0	0.1	0.0	0.0	0.1	0.5
	2020	0.2	1.2	0.0	0.3	0.0	0.0	0.2	1.4
Small Other Buildings	2023	0.4	2.2	0.1	0.7	0.0	0.0	0.6	2.9
Ū	2026	0.9	4.0	0.2	1.1	0.0	0.0	1.2	5.0
	2029	1.4	5.5	0.4	1.7	0.0	0.0	1.8	7.2
	2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2020	0.0	0.0	0.1	0.2	0.0	0.0	0.1	0.2
Other Institutional	2023	0.0	0.0	0.1	0.8	0.0	0.0	0.1	0.8
	2026	0.0	0.0	0.5	2.7	0.0	0.0	0.5	2.7
	2029	0.0	0.0	0.8	4.5	0.0	0.0	0.8	4.5
	2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Buildings	2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2029	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2017	0.1	0.9	0.0	0.0	0.0	0.0	0.1	0.9
	2020	0.3	1.5	0.0	0.0	0.0	0.0	0.3	1.5
Street Lighting	2023	0.7	1.9	0.0	0.0	0.0	0.0	0.7	1.9
	2026	1.2	2.0	0.0	0.0	0.0	0.0	1.2	2.0
	2029	1.8	2.0	0.0	0.0	0.0	0.0	1.8	2.0
	2017	1.1	8.3	0.1	0.5	0.0	0.1	1.2	8.8
	2020	4.5	23.7	0.3	1.8	0.0	0.2	4.8	25.7
Grand Total	2023	10.3	46.1	0.8	4.3	0.0	0.3	11.1	50.7
	2026	19.0	74.4	1.7	8.8	0.0	0.4	20.7	83.6
	2029	29.1	104.2	2.7	13.4	0.1	0.6	31.8	118.2

Exhibit 77 Electric Peak Load Reductions from Upper Achievable Potential Energy Savings Measures, by Milestone Year End Use and Sub sector, Winter Peak Period (MW)

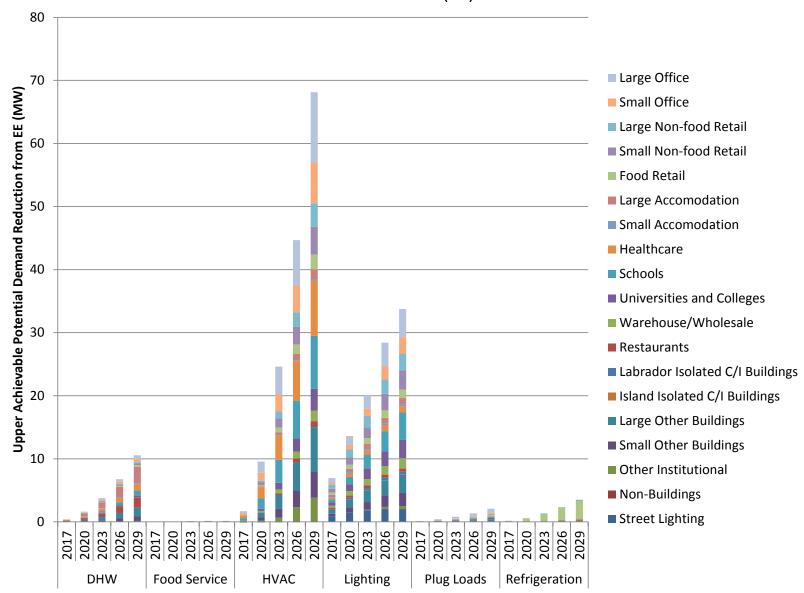


Exhibit 78 Electric Peak Load Reductions from Lower Achievable Potential Energy Savings Measures, by Milestone Year End Use and Sub sector, Winter Peak Period (MW)

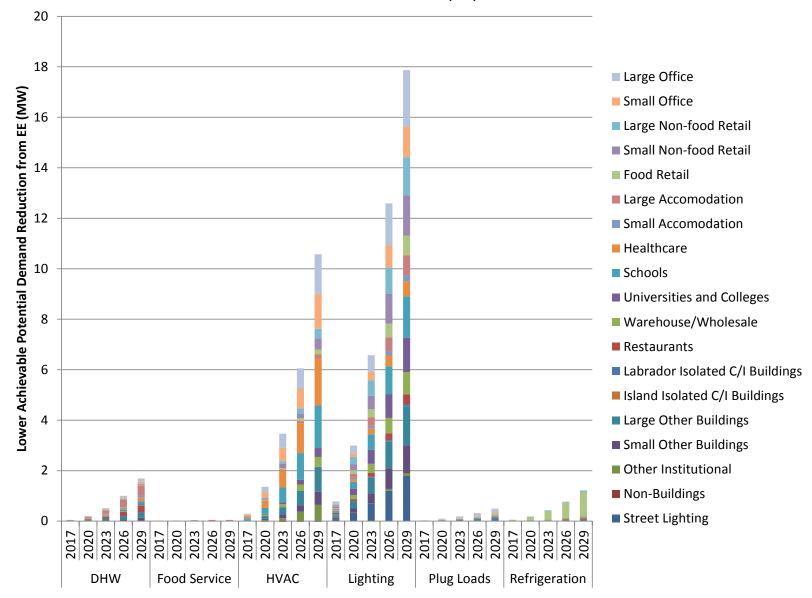


Exhibit 79 Electric Peak Load Reductions from Achievable Potential Energy Savings Measures, 2029 (MW)

Managema	Isla	and	Labr	ador	Isola	ated	Grand	Total
Measure	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
Building Recommissioning	4.0	24.9	0.8	5.1	0.0	0.2	4.8	30.1
New Construction (25% More Efficient)	3.7	6.9	0.1	0.3	0.0	0.1	3.9	7.2
Programmable Thermostats	3.1	8.8	0.6	1.9	0.0	0.0	3.7	10.7
Advanced Building Automation Systems	3.0	8.6	0.0	0.1	0.0	0.0	3.1	8.7
LED Tubular Lamps	2.9	4.3	0.0	0.0	0.1	0.1	2.9	4.3
High Performance T8 Fixtures	1.9	2.1	0.1	0.1	0.0	0.0	2.0	2.3
LED Screw-In Lamps	1.8	2.0	0.2	0.2	0.0	0.0	2.0	2.2
LED Street Lighting	1.8	2.0	0.0	0.0	0.0	0.0	1.8	2.0
Occupancy Sensors (Lighting)	1.6	5.3	0.1	0.5	0.0	0.0	1.7	5.8
LED Screw-In Lamps	1.5	1.7	0.2	0.2	0.0	0.0	1.7	1.9
New Construction (40% More Efficient)	1.4	2.6	0.0	0.0	0.0	0.0	1.4	2.7
LED Outdoor Fixtures	0.8	2.1	0.1	0.2	0.0	0.0	0.9	2.4
LED High Bay Fixtures	0.6	0.7	0.0	0.0	0.0	0.0	0.7	0.7
Demand Control Ventilation (DCV)	0.6	7.3	0.1	1.3	0.0	0.0	0.7	8.6
LED Tubular Lamps	0.6	0.7	0.0	0.0	0.0	0.0	0.6	0.7
High Performance Glazing Systems	0.5	5.6	0.2	1.3	0.0	0.0	0.6	6.9
Heat Pump Water Heaters	0.4	1.0	0.1	0.2	0.0	0.0	0.5	1.1
Ground Source Heat Pumps	0.4	0.9	0.0	0.0	0.0	0.0	0.4	0.9
Low-Flow Faucet Aerators	0.3	4.7	0.1	0.8	0.0	0.0	0.4	5.5
Ventilation Heat Recovery	0.3	4.5	0.0	0.6	0.0	0.0	0.4	5.1
Refrigerated Cases with Doors	0.3	1.0	0.0	0.0	0.0	0.0	0.3	1.0
T5HO Fixtures	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.4
High Efficiency Compressors (Refrigeration)	0.3	0.9	0.0	0.0	0.0	0.0	0.3	0.9
Lighting Controls (Outdoor)	0.3	0.7	0.0	0.1	0.0	0.0	0.3	0.8
High Performance T8 Fixtures	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3
Refrigerated Vending Machine Controllers	0.2	0.8	0.0	0.1	0.0	0.0	0.3	1.0
Radiant Infrared Heaters	0.2	0.6	0.0	0.1	0.0	0.0	0.2	0.7
ECM Motors and Evaporator Fan Motor Controllers	0.2	0.6	0.0	0.0	0.0	0.0	0.2	0.6
VFDs on HVAC Motors	0.2	2.7	0.0	0.2	0.0	0.0	0.2	2.8
LED High Bay Fixtures	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.2
Activate PC Power Management	0.2	0.8	0.0	0.0	0.0	0.0	0.2	0.9
Cooler Night Covers	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.3
Low-Flow Showerheads	0.1	1.4	0.0	0.2	0.0	0.0	0.1	1.5
Hotel Occupancy Sensors	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.3
Refrigeration Controls	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.3
T5HO Fixtures	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1
Wall Insulation	0.1	1.1	0.0	0.0	0.0	0.0	0.1	1.1
High-Efficiency Cooking Equipment	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
ENERGY STAR Computers	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
ENERGY STAR Dishwashers	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5
Roof Insulation	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.6
Demand Control Kitchen Ventilation (DCKV)	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3
Make Use of Daylighting	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1

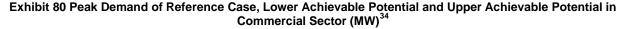
Exhibit 79 Electric Peak Load Reductions from Achievable Potential Energy Savings Measures, 2029 (MW) (cont'd...)

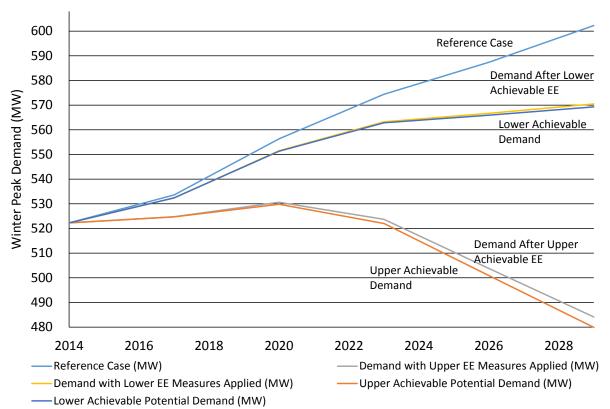
Мерецие	Isla	ınd	Labr	ador	Isol	ated	Grand	Total
Measure	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
Low-Flow Pre-Rinse Spray Valves	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3
Drainwater Heat Recovery	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3
LED Exit Signs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Premium Efficiency Motors	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
Automatic Door Closers (Walk-In Coolers & Freezers)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Use Shades/Blinds (Winter)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refrigeration Heat Recovery	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
Use Task Light Instead of Ambient	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Keep Doors Closed (Winter)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reduce Number of Fridges	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Energy-Efficient Server Technologies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENERGY STAR Office Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Use Shades/Blinds (Summer)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CEE-Rated Refrigerators and Freezers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LED Refrigerated Display Case Lighting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Use Natural Ventilation (Summer)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Keep Doors Closed (Summer)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
High Efficiency Chillers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Freezer Defrost Controllers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LED Troffers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dimming Control (Daylighting)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HVAC Impact from Other Savings	-5.8	-7.5	-0.3	-0.3	0.0	-0.1	-6.0	-8.0
Grand Total	29.1	104.2	2.7	13.4	0.1	0.6	31.8	118.2

9.7 Summary of Peak Load Reductions

This section presents a summary of the electric peak load reductions that would result from the application of peak demand measures. Exhibit 80 compares the Reference Case, Lower Achievable Potential and Upper Achievable Potential Peak Demand Forecast levels of winter peak demand.³³

As illustrated, under the Reference Case commercial peak demand would grow from the Base Year level of 520 MW to approximately 600 MW by 2029. This contrasts with the Lower Achievable Potential Forecast in which peak demand would decrease to approximately 570 MW for the same period, a difference of approximately 35 MW or about 6%. The Upper Achievable Potential forecasts peak demand at 480 MW, a difference of approximately 120 MW or 20%. The other two lines on the chart show the peak demand that would result if all the energy efficiency measures were applied but none of the demand reduction measures in each of the Lower and Upper Achievable Potential scenarios. As illustrated in the exhibit, approximately 97% of the reduction comes from the impact of energy efficiency measures in both the Upper Achievable Potential scenario and the Lower Achievable Potential scenario.





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³³ All results are reported at the customer's point-of-use and do not include line losses.

³⁴ Please note that all demand curtailment is accounted for in the Industrial sector analysis and reporting

9.7.1 Peak Demand Reduction

Further detail on the total potential peak demand reduction provided by the Upper and Lower Achievable Potential Forecast is provided in the following exhibits:³⁵

- Exhibit 81 presents the results by end use, sub sector and milestone year
- Exhibit 82 provides a further disaggregation of the peak demand reduction by technology and milestone year
- Exhibits 83 and 84 present peak demand reduction by major end use, milestone year and region
- Exhibits 85 and 86 present peak demand reduction by major end use, milestone year and sub sector
- Exhibit 87 and Exhibit 88 present 2029 peak demand reduction by major end use and vintage.

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³⁵ MW reductions shown in the following exhibits are not incremental. For example, the space heating reductions in 2029 are not in addition to the space heating reductions from the previous milestone years. Rather, they are the difference between the Reference Case space heating peak demand in 2029 and the space heating peak demand if all the measures included in the Lower or Upper Achievable Potential scenario are implemented.

Exhibit 81 Total Lower and Upper Achievable Potential Peak Demand Reduction by End Use, Sub sector and Milestone Year (MW)

Sub sector	Milestone Year	Domes Wa		HVAC F Pun		Refrige	eration	Seco Ligh		Space I	Heating	Grand	l Total
	Tour	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
	2020	0.00	0.00	0.03	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.12
Large Office	2023	0.00	0.00	0.07	0.27	0.00	0.00	0.00	0.00	0.00	0.01	0.07	0.28
	2026	0.00	0.00	0.13	0.46	0.00	0.00	0.00	0.01	0.00	0.01	0.14	0.48
	2029	0.00	0.00	0.21	0.69	0.00	0.00	0.00	0.01	0.00	0.02	0.22	0.72
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Small Office	2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.01	0.04
	2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.02	0.06
	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.08	0.03	0.08
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Large Non-food	2020	0.00	0.00	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.06
Retail	2023	0.00	0.00	0.03	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.13
retaii	2026	0.00	0.00	0.06	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.23
	2029	0.00	0.00	0.10	0.32	0.00	0.00	0.00	0.00	0.00	0.01	0.10	0.34
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Small Non-food	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Retail	2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
retaii	2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2020	0.00	0.00	0.01	0.02	0.01	0.03	0.00	0.00	0.00	0.01	0.02	0.07
Food Retail	2023	0.00	0.00	0.01	0.05	0.02	0.07	0.00	0.01	0.00	0.01	0.04	0.15
	2026	0.00	0.00	0.03	0.09	0.03	0.12	0.00	0.02	0.01	0.02	0.07	0.25
	2029	0.00	0.00	0.04	0.13	0.05	0.18	0.01	0.03	0.01	0.03	0.11	0.36
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Largo	2020	0.01	0.10	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.11
Large Accomodation	2023	0.03	0.21	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.25
Accomodation	2026	0.06	0.34	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.08	0.40
	2029	0.09	0.46	0.03	0.08	0.00	0.00	0.00	0.00	0.00	0.01	0.12	0.57
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Small	2020	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04
Small Accomodation	2023	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.10
Accomodation	2026	0.03	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.19
	2029	0.04	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.30

Exhibit 81 Total Lower and Upper Achievable Potential Peak Demand Reduction by End Use, Sub sector and Milestone Year (MW) (cont'd...)

Sub sector	Milestone Year	Domes Wa		HVAC I Pun		Refrige	eration	Secor Ligh		Space I	Heating	Grand	Total
	Tour	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2020	0.00	0.00	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.08
Healthcare	2023	0.00	0.01	0.04	0.13	0.00	0.00	0.00	0.00	0.01	0.02	0.05	0.17
	2026	0.00	0.02	0.07	0.20	0.00	0.00	0.00	0.00	0.01	0.04	0.08	0.27
	2029	0.01	0.05	0.10	0.26	0.00	0.00	0.00	0.01	0.02	0.05	0.13	0.36
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2020	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.03
Schools	2023	0.00	0.00	0.01	0.04	0.00	0.00	0.01	0.03	0.00	0.01	0.02	0.07
	2026	0.00	0.00	0.02	0.07	0.00	0.00	0.01	0.05	0.00	0.01	0.03	0.12
	2029	0.00	0.00	0.03	0.10	0.00	0.00	0.02	0.07	0.00	0.02	0.05	0.19
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Universities and	2020	0.00	0.00	0.02	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.09
Colleges	2023	0.00	0.00	0.05	0.17	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.18
Coneges	2026	0.00	0.00	0.09	0.27	0.00	0.00	0.00	0.00	0.00	0.01	0.09	0.29
	2029	0.00	0.00	0.13	0.35	0.00	0.01	0.00	0.00	0.00	0.02	0.14	0.38
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Warehouse/	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Wholesale	2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Wilolesale	2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.03
	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.01	0.04
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2020	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Restaurants	2023	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.04
	2026	0.01	0.04	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.07
	2029	0.01	0.08	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.01	0.02	0.12
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labrador Isolated	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C/I Buildings	2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
On Buildings	2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Island Isolated C/I	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Buildings	2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Duildings	2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Exhibit 81 Total Lower and Upper Achievable Potential Peak Demand Reduction by End Use, Sub sector and Milestone Year (MW) (cont'd...)

Sub sector	Milestone Year	Domes Wa		HVAC I Pun		Refrige	eration	Secor Ligh		Space I	Heating	Grand Total	
	, oui	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Large Other	2020	0.00	0.00	0.02	0.06	0.00	0.00	0.01	0.02	0.00	0.00	0.02	0.09
Buildings	2023	0.00	0.01	0.04	0.14	0.00	0.00	0.01	0.04	0.00	0.00	0.05	0.19
Dullulligs	2026	0.00	0.03	0.07	0.23	0.00	0.00	0.02	0.07	0.00	0.01	0.09	0.33
	2029	0.01	0.05	0.11	0.34	0.00	0.00	0.03	0.10	0.00	0.01	0.14	0.50
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Small Other	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
Buildings	2023	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.01	0.04
bullulings	2026	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.05	0.00	0.00	0.02	0.07
	2029	0.01	0.04	0.00	0.00	0.00	0.00	0.02	0.08	0.00	0.01	0.03	0.12
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other	2020	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Institutional	2023	0.00	0.00	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04
monan	2026	0.00	0.00	0.02	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.07
	2029	0.00	0.00	0.03	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.09
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.01	0.03
	2020	0.02	0.15	0.12	0.46	0.01	0.04	0.01	0.05	0.01	0.06	0.18	0.76
Grand Total	2023	0.05	0.36	0.28	1.00	0.02	0.09	0.03	0.12	0.03	0.13	0.41	1.69
	2026	0.10	0.63	0.50	1.66	0.04	0.15	0.06	0.21	0.05	0.22	0.75	2.87
	2029	0.16	0.97	0.78	2.36	0.07	0.23	0.09	0.33	0.09	0.32	1.18	4.21

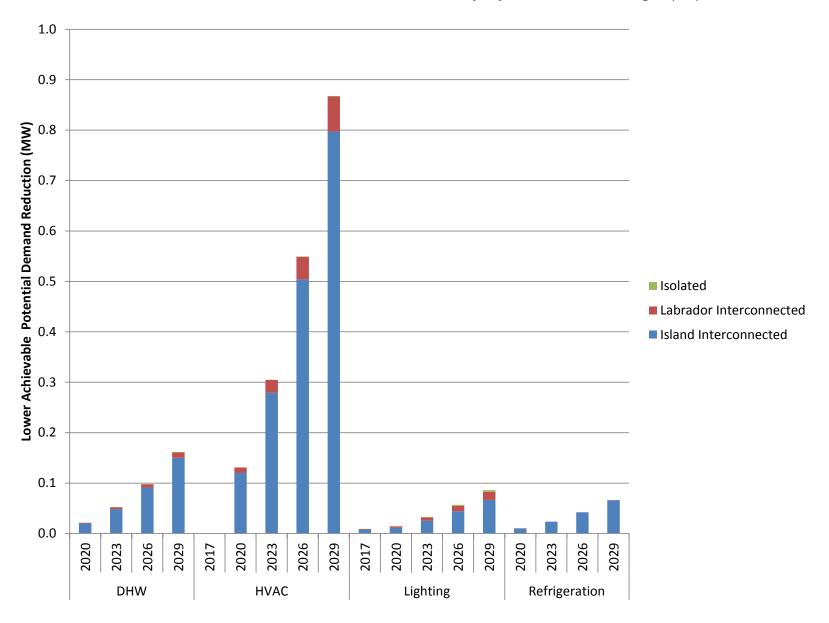
Notes:

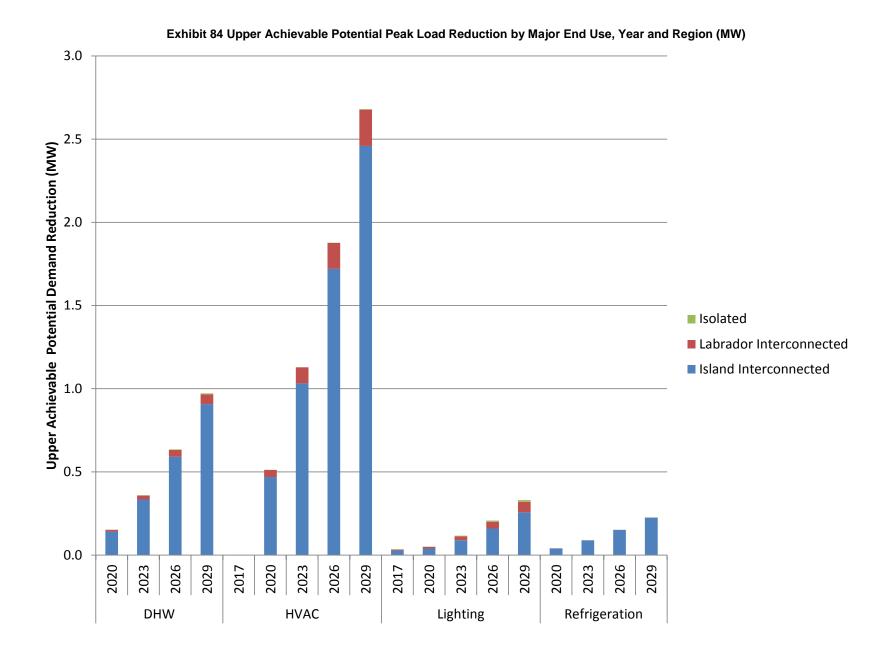
- 1) Results are measured at the customer's point-of-use and do not include line losses.
- 2) Any differences in totals are due to rounding.
- 3) In the above exhibit a value displays as 0 if it is between 0 and 0.5. Totals are calculated using the actual numerical value. 4) MW reductions are not incremental. The space heating reductions in 2029 are not in addition to the reductions from the previous milestone years. Rather, they are the difference between the Reference Case space heating peak demand in 2029 and the space heating peak demand if all the measures included in the Economic Potential scenario are implemented.
- 5) The values in this exhibit do not include peak demand reductions from energy efficiency measures.
- 6) Demand-specific measure savings will fluctuate based on the demand savings from conservation measures. The demand reference case to which demand-specific measures are applied already factors in the corresponding Upper or Lower Achievable demand savings from conservation measures. So the more peak demand reductions are generated through conservation measures, the less peak demand remains for demand-specific measures to reduce.

Exhibit 82 Lower and Upper Achievable Potential Peak Demand Reduction by Measure and Milestone Year (MW)

Measure	Lower A		e Potenti luction (M		Demand	Upper Achievable Potential Peak Demand Reduction (MW)					
	2017	2020	2023	2026	2029	2017	2020	2023	2026	2029	
DHW Controls	0.00	0.02	0.05	0.10	0.16	0.00	0.15	0.36	0.63	0.97	
Heating Controls	0.00	0.01	0.03	0.05	0.09	0.00	0.06	0.13	0.22	0.32	
Lighting Demand Controls	0.01	0.01	0.03	0.06	0.09	0.03	0.05	0.12	0.21	0.33	
Refrigeration Demand Controls	0.00	0.01	0.02	0.04	0.07	0.00	0.04	0.09	0.15	0.23	
HVAC Demand Controls	0.00	0.12	0.28	0.50	0.78	0.00	0.46	1.00	1.66	2.36	
Grand Total	0.01	0.18	0.41	0.75	1.18	0.03	0.76	1.69	2.87	4.21	









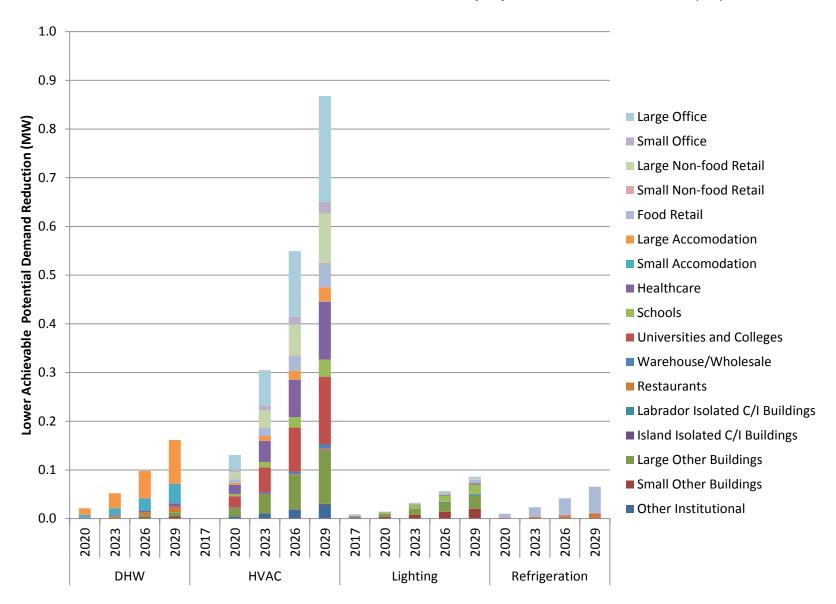
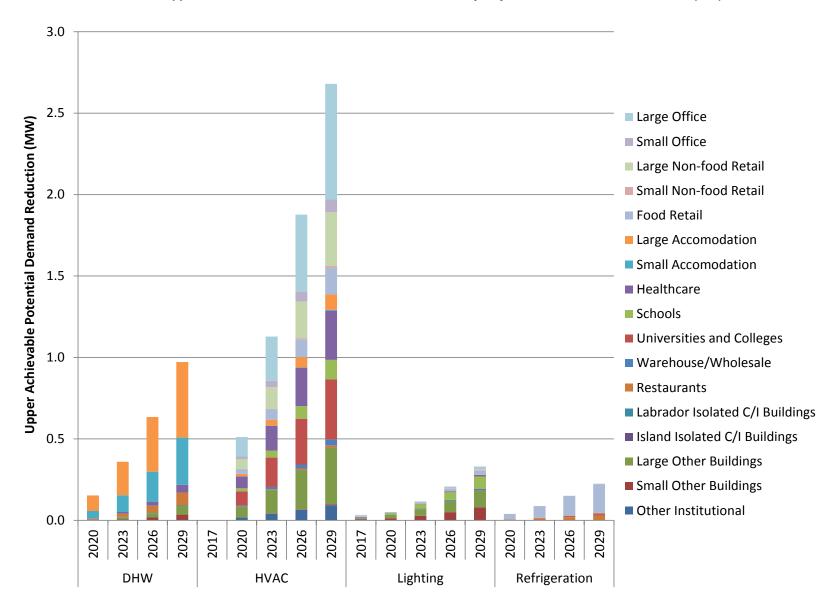


Exhibit 86 Upper Achievable Potential Peak Demand Reduction by Major End Use, Year and Sub sector (MW)





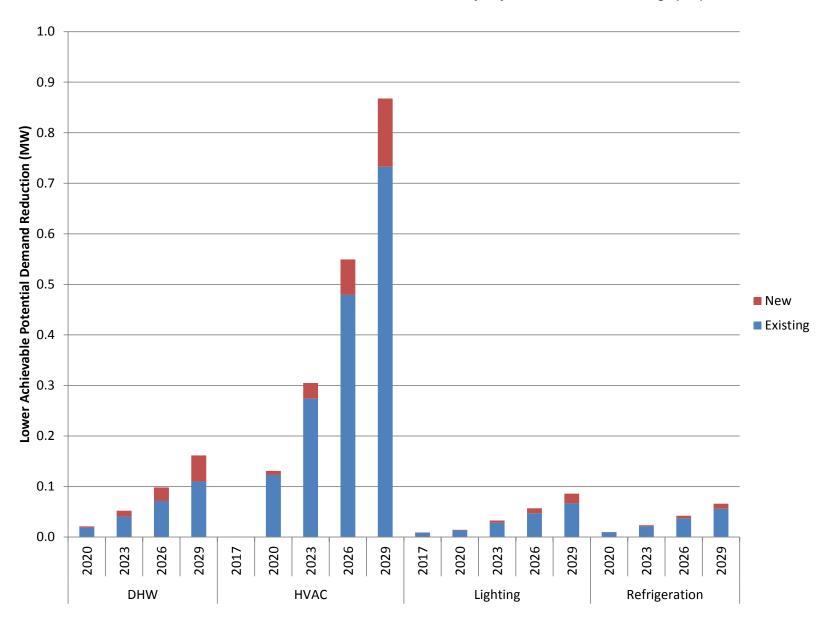
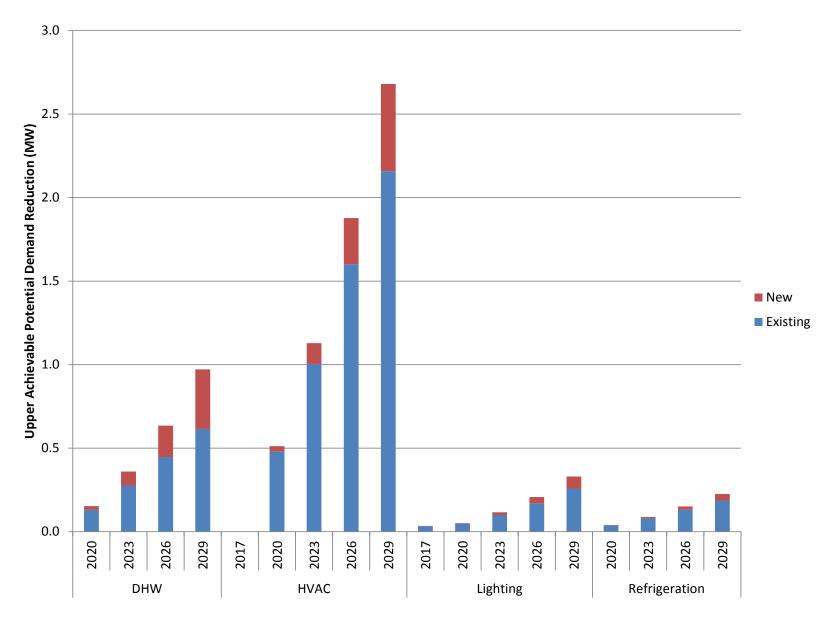


Exhibit 88 Upper Achievable Potential Peak Load Reduction by Major End Use, Year and Vintage (MW)



9.7.2 Interpretation of Results

Highlights of the results presented in the preceding exhibits are summarized below:

Peak Demand Reduction by Milestone Year

The Lower Achievable Potential peak load reductions increase from 0.01 MW in 2017 to 1.18 MW in 2029. The Upper Achievable Potential peak load reductions increase from 0.03 MW in 2017 to 4.21 MW in 2029.

Peak Demand Reduction by Sub sector

The hospitality sector accounts for the largest peak load reduction potential with 23% of the peak load reduction from this sector. Of this, 13% of the achievable peak load reduction savings are from the large accommodations sub sector as a result of the higher achievable savings for DHW and HVAC in these facilities. Office buildings account for 19% of the potential peak load reductions; this reflects their large market share and their generally high level of electrical intensity. Peak load reductions in the retail facilities and other buildings each account for 17% of the potential savings; and educational facilities account for 14% of the potential savings. Healthcare facilities account for 9% of the peak load reductions. The other sub sectors each account for less than 1% of the potential peak load reductions.

Peak Demand Reduction by Region

The Island Interconnected region accounts for 91% of the potential peak load reductions. The Labrador Interconnected region accounts for 8% of the potential peak load reductions, and the Isolated region accounts for less than 1% of the potential peak load reductions.

Peak Demand Reduction by Existing Buildings versus New Construction

Peak load reductions in existing buildings account for almost all of the reduction potential at the beginning of the study period; as new homes are constructed, the load reduction potential associated with them occupies a progressively larger portion of the total. By 2029, peak load reductions from new construction accounts for 24% of the total potential.

Peak Demand Reduction by End Use

HVAC measures account for 68% of the total load reductions in the Upper Achievable Potential Forecast in 2020, not including load reductions from energy efficiency measures; this decreases by to 64% by 2029. HVAC measures account for just over 74% of the total load reductions in the Lower Achievable Potential Forecast in 2020, not including load reductions from energy efficiency measures. With less than 1% of a decrease, the load reduction from HVAC remains at almost 74% by 2029. Of the 64% of 2029 reductions that come from HVAC in the Upper Achievable Potential scenario, approximately 56% of it is from the HVAC Demand Controls measure and almost 8% is from the Heating Controls measure.

DHW measures account for approximately 20% of the total load reductions in the Upper Achievable Potential Forecast in 2020, not including load reductions from energy efficiency measures; this rises to 23% of the total by 2029. DHW measures account for approximately 12% of the total load reductions in the Lower Achievable Potential Forecast in 2020, not including load reductions from energy efficiency measures; this rises to 14% of the total by 2029. All of the potential savings come from the DHW controls measure.

Lighting and Refrigeration makes up a smaller portion of the total load reduction opportunity with Lighting demand controls accounting for 8% of the total 2029 upper achievable potential savings and refrigeration demand controls accounting for 5% of the 2029 upper achievable potential savings.

9.8 Sensitivity of the Results to Changes in Avoided Cost

The avoided costs used in the Achievable Potential model are varied by region and by milestone year. As with any forecast, the projected avoided costs are subject to uncertainty. Accordingly, the model has been re-run with avoided costs varied within a reasonable range. The lower end of this range is considered to be 10% below the current projection, for both energy cost and demand cost. The upper end of the range is considered to be 30% above the current projections for energy cost and 20% above the current projections for demand cost.

Exhibit 89 shows that the lower Achievable Potential results are sensitive to this range of avoided costs. By 2029, the exhibits show the following changes in achievable potential:

- The lower range of reasonableness produces lower Achievable Potential energy savings that are 1% higher in the Island Interconnected region, 5% lower in the Labrador region, and almost unchanged in the Isolated region.
- The lower range of reasonableness produces lower Achievable Potential peak demand reductions that are almost unchanged in the Island Interconnected and Isolated regions and 4% lower in the Labrador region.
- The upper range of reasonableness produces lower Achievable Potential energy savings that are 2% higher in both the Island Interconnected region and Labrador region and almost unchanged in the Isolated region.
- The upper range of reasonableness produces lower Achievable Potential peak demand reductions that are 4% higher in the Island Interconnected region, 2% higher in the Labrador region and almost unchanged in the Isolated region.

Exhibit 89 Sensitivity of the Lower Achievable Potential Energy Savings and Peak Demand Reduction to Avoided Cost

			Range of ableness	Base So	cenario	Upper R Reasona	ange of obleness
Region	Year	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)
	2017	7,466	1	7,528	1	7,665	1
laland	2020	29,627	5	29,913	5	30,932	5
Island Interconnected	2023	67,673	11	68,110	11	71,079	11
	2026	120,163	19	126,145	20	127,373	20
	2029	193,198	30	191,279	30	194,392	31
	2017	416	0	433	0	507	0
Laborator	2020	1,979	0	2,109	0	2,580	0
Labrador Interconnected	2023	4,967	1	5,117	1	6,418	1
micordonnicoted	2026	9,969	2	10,676	2	11,532	2
	2029	16,462	3	17,359	3	17,740	3
	2017	14	0	14	0	14	0
	2020	77	0	77	0	77	0
Isolated	2023	172	0	172	0	172	0
	2026	311	0	311	0	311	0
	2029	498	0	498	0	498	0

Exhibit 90 shows that the upper Achievable Potential results are sensitive to this range of avoided costs. By 2029, the exhibits show the following changes in achievable potential:

- The lower range of reasonableness produces lower Achievable Potential energy savings that are almost unchanged in the Island Interconnected region, 4% lower in the Labrador region, and 1% lower in the Isolated region.
- The lower range of reasonableness produces lower Achievable Potential peak demand reductions that are almost 1% lower in the Island Interconnected region, 4% lower in the Labrador region and 2% lower in the Isolated region.
- The upper range of reasonableness produces lower Achievable Potential energy savings that are 2% higher in the Island Interconnected region, 1% higher in the Labrador region and almost unchanged in the Isolated region.
- The upper range of reasonableness produces lower Achievable Potential peak demand reductions that are 3% higher in the Island Interconnected region, 1% higher in the Labrador region and almost unchanged in the Isolated region.

Exhibit 90 Sensitivity of the Upper Achievable Potential Energy Savings and Peak Demand Reduction to Avoided Cost

		Lower R Reasona	lange of libleness	Base So	cenario	Upper R Reasona	ange of obleness
Region	Year	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)
	2017	52,454	8	52,821	8	53,297	9
laland	2020	136,874	24	137,859	24	141,796	25
Island Interconnected	2023	254,170	47	255,655	48	265,788	50
	2026	396,303	75	407,167	77	415,059	79
	2029	563,888	107	566,388	108	577,793	112
	2017	2,616	0	2,763	0	3,438	1
1 -1 1	2020	9,342	2	10,142	2	13,357	3
Labrador Interconnected	2023	22,055	4	22,594	4	30,071	6
inter connected	2026	43,418	9	45,474	9	49,237	10
	2029	67,045	13	70,163	14	70,976	14
	2017	626	0	634	0	639	0
	2020	1,362	0	1,384	0	1,392	0
Isolated	2023	2,146	0	2,185	0	2,195	0
	2026	2,973	0	3,027	0	3,037	0
	2029	3,837	1	3,890	1	3,901	1

9.9 Net-to-Gross

Net-to-gross ratios are used to estimate the free-ridership occurring in CDM programs. Free riders are program participants who would have undertaken an efficiency or demand management measure naturally, even without the influence of the utility's program. A net-to-gross ratio is a factor that represents the net program impact divided by the gross program impact. The net impact can be found by multiplying the gross impact by the net-to-gross ratio.

Net-to-gross ratios have been estimated for many of the utility programs conducted in NL over the past several years. Though net-to-gross ratios are dependent on many factors, the estimates from previous programs were assumed to provide a reasonable approximation for the ratios in the near future. Where measures in the present study were not included in past programs, the net-to-gross ratio for the most similar program was used.

Sources

The following sources were used to estimate the measure net-to-gross ratios shown in the following exhibits:

- Net-to-gross ratios provided by Newfoundland Power, from evaluations of the CDM programs that have been run in the province.
- Ontario Energy Board TRC Guide recommendations.³⁶
- Performance Plus Impact and Process Evaluation, 2012, from the Efficiency Nova Scotia Corporation.³⁷
- Emera Maine Heat Pump Pilot Program Final Report, 2014.³⁸

Caveat

The estimates produced by the models in this study are not purely gross achievable potential estimates, because the reference case includes some naturally occurring savings. In order to calibrate the model's reference case to the Utilities' load forecast, it was essential to make reasonable assumptions about what efficiency improvements customers would make during the study period, in the absence of new utility programs. The economic, upper achievable, and lower achievable potentials were all calculated from this reference baseline that includes some naturally occurring savings. If the results are then adjusted for net-to-gross ratios, the following adjustments are both being made in the model:

- Naturally occurring savings, from customers who would adopt the efficiency measures in the absence of new utility programs, are being accounted for in the reference case
- Free-ridership, from customers who participate in a program but would have adopted the efficiency measures without its influence, are being accounted for in the net-to-gross ratio

It appears likely that there is some double-counting between naturally occurring savings and freeridership: some of the customers who would have adopted the measures naturally and some of the customers who would be free-riders in a program are actually the same people. Therefore, the exhibits shown below with net upper and lower achievable potential, are likely underestimates of the true net potential.

³⁸ Emera Maine, *Heat Pump Pilot Program Final Report*. November, 2014.

³⁶ Ontario Energy Board, *Total Resource Cost Guide*. October, 2006.

³⁷ Efficiency Nova Scotia Corporation, *Performance Plus Impact and Process Evaluation, 2012.* March, 2013.

Results

The net and gross achievable potential results are presented in the following four exhibits:

- Exhibit 91 shows the gross and net upper achievable potential for energy efficiency, by measure and region for the year 2029, along with the net-to-gross ratios used
- Exhibit 92 shows the gross and net lower achievable potential for energy efficiency, by measure and region for the year 2029, along with the net-to-gross ratios used
- Exhibit 93 shows the gross and net upper achievable potential for demand reduction, by measure and region for the year 2029, along with the net-to-gross ratios used
- Exhibit 94 shows the gross and net lower achievable potential for demand reduction, by measure and region for the year 2029, along with the net-to-gross ratios used

At this time, net-to-gross ratios were not available for demand reduction programs in NL. Because these measures offer no financial advantages to the customer where time of use rates are not in use, free-ridership is assumed to be zero for these measures. The net-to-gross ratios are therefore assumed to be 1.0, and the net potential is equal to the gross potential.

Exhibit 91 Gross Versus Net Upper Achievable EE Potential by Measure and Region, 2029

	Assumed	Island Inter	connected	Labr Intercor		Isola	ated
Measure	Net-to- Gross Ratio	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)
Building Recommissioning	0.70	103,530	72,471	21,748	15,223	1,046	732
Ductless Mini-Split Heat Pump	0.88	57,531	50,628	8,381	7,376	109	96
Advanced Building Automation Systems	0.85	36,414	30,952	313	266	0	0
High-Efficiency Air Source Heat Pumps	0.88	34,680	30,518	4,913	4,323	8	7
Programmable Thermostats	0.85	32,186	27,358	7,457	6,338	63	53
Occupancy Sensors (Lighting)	0.80	28,764	23,011	2,646	2,117	244	195
New Construction (25% More Efficient)	0.76	27,945	21,238	1,158	880	427	325
LED Tubular Lamps	0.95	25,296	24,032	0	0	398	378
Demand Control Ventilation (DCV)	0.85	21,370	18,165	4,675	3,974	0	0
VFDs on HVAC Motors	0.75	18,170	13,628	1,136	852	8	6
High Performance Glazing Systems	0.50	17,405	8,703	4,686	2,343	18	9
LED Outdoor Fixtures	0.90	14,742	13,268	1,747	1,572	316	285
LED Street Lighting	0.90	14,491	13,042	0	0	0	0
Ventilation Heat Recovery	0.85	14,225	12,091	2,238	1,902	14	12
LED Screw-In Lamps	0.90	13,152	11,837	1,188	1,070	134	121
High Performance T8 Fixtures	0.80	12,391	9,912	694	555	175	140
Low-Flow Faucet Aerators	0.70	12,338	8,637	2,188	1,532	17	12
New Construction (40% More Efficient)	0.76	11,165	8,485	11	8	184	140
LED Screw-In Lamps	0.90	10,124	9,112	1,093	984	274	247
Refrigerated Cases with Doors	0.70	8,480	5,936	0	0	0	0
High Efficiency Compressors (Refrigeration)	0.90	7,497	6,747	320	288	0	0
Refrigerated Vending Machine Controllers	0.85	5,533	4,703	580	493	96	82
Activate PC Power Management	0.70	5,294	3,706	234	164	70	49
ECM Motors and Evaporator Fan Motor Controllers	0.75	5,221	3,916	304	228	13	10
Lighting Controls (Outdoor)	0.80	4,674	3,739	654	523	50	40
LED Tubular Lamps	0.95	4,515	4,289	9	9	74	71
LED High Bay Fixtures	0.70	4,091	2,864	30	21	22	15

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Exhibit 91 Gross Versus Net Upper Achievable EE Potential by Measure and Region, 2029 (cont'd...)

	Assumed	Island Inter	connected	Labr Intercor		Isola	ated
Measure	Net-to- Gross Ratio	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)
Low-Flow Showerheads	0.70	3,596	2,517	490	343	2	1
Wall Insulation	0.80	3,583	2,866	176	141	30	24
Ground Source Heat Pumps	0.88	2,859	2,516	0	0	3	2
Cooler Night Covers	0.70	2,739	1,917	121	85	34	24
Heat Pump Water Heaters	0.88	2,558	2,251	416	366	5	5
Refrigeration Controls	0.85	2,426	2,062	105	89	0	0
High Performance T8 Fixtures	0.80	2,034	1,627	256	205	33	26
T5HO Fixtures	0.60	1,930	1,158	123	74	9	5
Radiant Infrared Heaters	0.70	1,837	1,286	252	176	0	0
Roof Insulation	0.80	1,800	1,440	60	48	28	22
ENERGY STAR Dishwashers	0.70	1,338	937	104	73	0	0
ENERGY STAR Computers	0.70	1,316	921	84	58	15	11
Premium Efficiency Motors	0.75	1,283	963	109	82	4	3
LED High Bay Fixtures	0.70	1,099	770	50	35	7	5
Demand Control Kitchen Ventilation (DCKV)	0.85	1,059	900	85	73	0	0
Hotel Occupancy Sensors	0.80	1,030	824	158	126	0	0
Low-Flow Pre-Rinse Spray Valves	0.70	823	576	99	69	1	1
Drainwater Heat Recovery	0.85	709	602	64	54	0	0
T5HO Fixtures	0.60	624	374	45	27	3	2
Make Use of Daylighting	0.70	523	366	20	14	18	13
Refrigeration Heat Recovery	0.85	429	365	0	0	0	0
High-Efficiency Cooking Equipment	0.70	362	253	27	19	0	0
Automatic Door Closers (Walk-In Coolers & Freezers)	0.70	354	248	39	28	0	0
Use Task Light Instead of Ambient	0.70	251	176	3	2	0	0
Reduce Number of Fridges	0.70	205	144	2	1	0	0
Energy-Efficient Server Technologies	0.70	150	105	3	2	0	0

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Exhibit 91 Gross Versus Net Upper Achievable EE Potential by Measure and Region, 2029 (cont'd...)

	Accumed	Island Inter	connected	Labr Intercor		Isolated	
Measure	Assumed Net-to- Gross Ratio	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)
LED Exit Signs	0.75	144	108	27	20	2	1
Use Shades/Blinds (Winter)	0.70	143	100	2	1	0	0
ENERGY STAR Office Equipment	0.70	118	82	6	4	1	1
Keep Doors Closed (Winter)	0.70	70	49	11	7	0	0
CEE-Rated Refrigerators and Freezers	0.70	46	32	0	0	111	78
LED Refrigerated Display Case Lighting	0.95	32	31	0	0	49	47
Use Shades/Blinds (Summer)	0.70	19	13	0	0	0	0
Use Natural Ventilation (Summer)	0.70	10	7	0	0	0	0
Keep Doors Closed (Summer)	0.70	4	3	0	0	0	0
High Efficiency Chillers	0.90	0	0	0	0	0	0
LED Troffers	1.00	0	0	0	0	66	59
Dimming Control (Daylighting)	1.00	0	0	0	0	62	50
Freezer Defrost Controllers	1.00	0	0	0	0	3	3
Grand Total	0.80	588,731	471,578	71,336	55,262	4,251	3,408

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Exhibit 92 Gross Versus Net Lower Achievable EE Potential by Measure and Region, 2029

		Island Inte	connected	Labr Intercor		Isola	ated
Measure	Assumed Net-to- Gross Ratio	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)
Ductless Mini-Split Heat Pump	0.88	20,295	17,860	2,961	2,605	0	0
LED Tubular Lamps	0.95	17,149	16,291	0	0	357	339
Building Recommissioning	0.70	16,308	11,416	3,393	2,375	0	0
New Construction (25% More Efficient)	0.76	15,011	11,409	624	475	225	171
LED Street Lighting	0.90	12,808	11,527	0	0	0	0
High-Efficiency Air Source Heat Pumps	0.88	12,785	11,251	1,750	1,540	3	3
Advanced Building Automation Systems	0.85	12,503	10,627	103	88	0	0
LED Screw-In Lamps	0.90	11,943	10,749	1,042	938	0	0
Programmable Thermostats	0.85	11,075	9,413	2,409	2,048	0	0
High Performance T8 Fixtures	0.80	10,842	8,673	608	486	0	0
LED Screw-In Lamps	0.90	9,321	8,389	958	862	0	0
Occupancy Sensors (Lighting)	0.80	8,472	6,777	762	610	0	0
New Construction (40% More Efficient)	0.76	6,134	4,662	6	4	0	0
LED Outdoor Fixtures	0.90	5,475	4,928	660	594	0	0
LED Tubular Lamps	0.95	3,980	3,781	3	2	0	0
LED High Bay Fixtures	0.70	3,676	2,573	10	7	0	0
Refrigerated Cases with Doors	0.70	2,650	1,855	0	0	0	0
High Efficiency Compressors (Refrigeration)	0.90	2,505	2,255	100	90	0	0
Lighting Controls (Outdoor)	0.80	2,005	1,604	263	210	0	0
Demand Control Ventilation (DCV)	0.85	1,863	1,584	382	324	0	0
High Performance T8 Fixtures	0.80	1,780	1,424	224	179	0	0
ECM Motors and Evaporator Fan Motor Controllers	0.75	1,708	1,281	95	71	4	3
T5HO Fixtures	0.60	1,689	1,013	108	65	0	0
Refrigerated Vending Machine Controllers	0.85	1,585	1,347	166	141	0	0
High Performance Glazing Systems	0.50	1,422	711	557	278	1	1
VFDs on HVAC Motors	0.75	1,298	973	81	61	1	0

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Exhibit 92 Gross Versus Net Lower Achievable EE Potential by Measure and Region, 2029 (cont'd...)

		Island Inter	rconnected	Labr Intercor		Isol	ated
Measure	Assumed Net-to- Gross Ratio	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)
Ground Source Heat Pumps	0.88	1,281	1,127	0	0	0	0
Heat Pump Water Heaters	0.88	1,117	983	170	149	0	0
LED High Bay Fixtures	0.70	1,089	762	44	30	0	0
Activate PC Power Management	0.70	1,069	748	47	33	14	10
Cooler Night Covers	0.70	1,034	724	42	30	0	0
Ventilation Heat Recovery	0.85	1,016	864	160	136	0	0
Low-Flow Faucet Aerators	0.70	927	649	157	110	0	0
Refrigeration Controls	0.85	893	759	36	30	0	0
Radiant Infrared Heaters	0.70	618	433	84	59	0	0
T5HO Fixtures	0.60	546	328	40	24	0	0
Hotel Occupancy Sensors	0.80	379	303	57	46	0	0
Low-Flow Showerheads	0.70	293	205	36	25	0	0
ENERGY STAR Computers	0.70	263	184	17	12	0	0
Wall Insulation	0.80	243	194	16	13	0	0
Make Use of Daylighting	0.70	134	94	5	3	0	0
LED Exit Signs	0.75	127	95	23	18	0	0
Automatic Door Closers (Walk-In Coolers & Freezers)	0.70	121	85	13	9	0	0
High-Efficiency Cooking Equipment	0.70	121	84	9	6	0	0
Roof Insulation	0.80	108	86	5	4	0	0
Demand Control Kitchen Ventilation (DCKV)	0.85	98	83	8	6	0	0
ENERGY STAR Dishwashers	0.70	96	67	7	5	0	0
Premium Efficiency Motors	0.75	95	71	8	6	0	0
Use Task Light Instead of Ambient	0.70	66	46	1	0	0	0
Low-Flow Pre-Rinse Spray Valves	0.70	62	43	7	5	0	0
Drainwater Heat Recovery	0.85	51	43	5	4	0	0

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Exhibit 92 Gross Versus Net Lower Achievable EE Potential by Measure and Region, 2029 (cont'd...)

		Island Inter	rconnected	Labr Intercor		Isolated		
Measure	Assumed Net-to- Gross Ratio	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	
Use Shades/Blinds (Winter)	0.70	42	29	0	0	0	0	
Reduce Number of Fridges	0.70	41	29	0	0	0	0	
Refrigeration Heat Recovery	0.85	31	26	0	0	0	0	
Energy-Efficient Server Technologies	0.70	30	21	1	0	0	0	
ENERGY STAR Office Equipment	0.70	24	16	1	1	0	0	
Keep Doors Closed (Winter)	0.70	19	13	3	2	0	0	
CEE-Rated Refrigerators and Freezers	0.70	14	10	0	0	0	0	
LED Refrigerated Display Case Lighting	0.95	10	10	0	0	0	0	
Use Shades/Blinds (Summer)	0.70	4	3	0	0	0	0	
Use Natural Ventilation (Summer)	0.70	2	2	0	0	0	0	
Keep Doors Closed (Summer)	0.70	1	1	0	0	0	0	
High Efficiency Chillers	0.90	0	0	0	0	0	0	
Grand Total	0.83	208,345	173,595	18,264	14,821	605	527	

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Exhibit 93 Gross Versus Net Upper Achievable Demand Reduction Potential by Measure and Region, 2029

		Island Inter	connected	Labrador Int	erconnected	Isolated		
Measure	Assumed Net-to- Gross Ratio	Gross Upper Achievable Potential (MW)	Net Upper Achievable Potential (MW)	Gross Upper Achievable Potential (MW)	Net Upper Achievable Potential (MW)	Gross Upper Achievable Potential (MW)	Net Upper Achievable Potential (MW)	
DHW Controls	1.00	0.9	0.9	0.1	0.1	0.0	0.0	
Heating Controls	1.00	0.3	0.3	0.0	0.0	0.0	0.0	
HVAC Demand Controls	1.00	2.1	2.1	0.2	0.2	0.0	0.0	
Lighting Demand Controls	1.00	0.3	0.3	0.1	0.1	0.0	0.0	
Refrigeration Demand Controls	1.00	0.2	0.2	0.0	0.0	0.0	0.0	
Grand Total	1.00	3.8	3.8	0.3	0.3	0.0	0.0	

Exhibit 94 Gross Versus Net Lower Achievable Demand Reduction Potential by Measure and Region, 2029

		Island Inter	connected	Labrador Int	erconnected	Isolated		
Measure	Assumed Net-to- Gross Ratio	Gross Lower Achievable Potential (MW)	Net Lower Achievable Potential (MW)	Gross Lower Achievable Potential (MW)	Net Lower Achievable Potential (MW)	Gross Lower Achievable Potential (MW)	Net Lower Achievable Potential (MW)	
DHW Controls	1.00	0.2	0.2	0.0	0.0	0.0	0.0	
Heating Controls	1.00	0.1	0.1	0.0	0.0	0.0	0.0	
HVAC Demand Controls	1.00	0.7	0.7	0.1	0.1	0.0	0.0	
Lighting Demand Controls	1.00	0.1	0.1	0.0	0.0	0.0	0.0	
Refrigeration Demand Controls	1.00	0.1	0.1	0.0	0.0	0.0	0.0	
Grand Total	1.00	1.1	1.1	0.1	0.1	0.0	0.0	

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10 References

The sources listed below include references used in preparation of this report and additional resources likely to be helpful for research on energy consumption patterns and efficient technologies. Additional references on specific technologies may be found in the TRC Analysis Workbooks, supplied as an accompanying deliverable with this report.

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11 Glossary

Achievable Potential:

The portion of the economic conservation potential that is achievable through utility interventions and programs given institutional, economic and market barriers.

Avoided Cost:

By reducing electricity consumption and capacity requirements through the implementation of conservation and demand management programs, the NL utilities avoid the cost of having to buy electricity on the open market, contract for long term supply, and/or build and run new generation facilities. This avoided cost is used to develop a benchmark against which the cost of energy efficiency measures can be compared.

Base Year:

The base year for the 2015 CDM potential assessment is the 2014 sales for the two utilities. This number is derived from 2014 sales and forecast 2014 electric energy and capacity requirements as is explained in each report.

Benchmark for Economic Analysis:

The study established benchmarks for the economic cut-off for new avoided electrical supply on each of the different supply systems in NL. These values were selected to provide the CDM potential assessment with a reasonably useful time horizon (life) to allow planners to examine options that may become more cost-effective over time. The following values were used:

	Avoid	ed Cost per kWh			
Year	Island Interconnected	Labrador Interconnected	Isolated		
2014	\$0.11	\$0.04	\$0.21		
2017	\$0.13	\$0.04	\$0.23		
2020	\$0.05	\$0.05	\$0.26		
2023	\$0.06	\$0.05	\$0.29		
2026	\$0.07	\$0.06	\$0.34		
2029	\$0.08	\$0.07	\$0.37		

Cost of Conserved Energy (CCE):

The CCE is calculated for each energy-efficiency measure. The CCE is the annualized incremental capital and operating and maintenance (O&M) cost of the upgrade measure divided by the annual energy savings achieved, excluding any administrative or program costs. The CCE represents the cost of conserving one kWh of electricity; it can be compared directly to the cost of supplying one new kWh of electricity.

Cost of Electric Peak Reduction (CEPR):

The CEPR for a peak load reduction measure is defined as the annualized incremental capital and O&M cost of the measure divided by the annual peak reduction achieved, excluding any administrative or program costs. The CEPR represents the cost of reducing one kW of electricity during a peak period; it can be compared to the cost of supplying one new kW of electric capacity during the same period.

Conservation and Demand Management (CDM):

CDM is the influencing of customers' electricity use to obtain desirable and quantifiable changes in that use. For example, CDM comprises such cooperative joint customer and utility initiatives as peak

clipping, valley filling, load shifting, strategic conservation, strategic load growth, flexible load shape, customer on-site generation and other similar activities.

Economic Potential:

The Economic Potential is the savings in electricity consumption due to energy efficient measures whose Cost of Conserved Energy (CCE) is less than or equal to the Benchmark for Economic Analysis.

Effective Measure Life (EML):

The estimated median number of years that the measures installed under a program are still in place and operable. EML incorporates: field conditions, obsolescence, building remodelling, renovation, demolition, and occupancy changes.

Electricity Audit:

An on-site inspection and cataloguing of electricity-using equipment/buildings, electricity consumption and the related end uses. The purpose is to provide information to the customer and the utility. Audits are useful for load research, for CDM program design, and identifying specific energy savings projects.

Electric Capacity:

The maximum electric power that a device or network is capable of producing or transferring.

Electricity Conservation:

Activities by utilities or electricity users that result in a reduction of electric energy use without adversely affecting the level or quality of energy service provided. Electricity conservation measures include substitution of high-efficiency motors for standard efficiency ones, occupancy sensors in office buildings, insulation in residences, etc.

Electricity Efficiency:

The ratio of the useful energy delivered by a dynamic system to the amount of electric energy supplied to it.

Electric Energy:

Energy in the form of electricity. Energy is the ability to perform work. Electric energy is different from electric power. Electric energy is measured in kilowatt-hours, megawatt-hours or gigawatt-hours.

Electricity Intensity:

Electric energy use measured per application or end use. Examples would include kilowatt-hours per square meter of lit office space per day, kilowatt-hours per tonne of pulp produced, and kilowatt-hours per year per residential refrigerator. Electricity intensity increases as electricity efficiency decreases.

Electric Power:

The rate at which electric energy is produced or transferred, usually measured in watts, kilowatts and megawatts.

End use:

The services of economic value to the users of energy. For example, office lighting is an end use, whereas electricity sold to the office tenant is of no value without the equipment (light fixtures, wiring, etc.) necessary to convert the electricity into visible light. End use is often used interchangeably with energy service.

Energy Service:

An amenity or service supplied jointly by energy and other components such as buildings, motors and lights. Examples of energy services include residential space heating, commercial refrigeration, paper production, and lighting. The same energy service can frequently be supplied with different mixes of equipment and energy.

Financial Incentive:

Certain financial features in the utility's conservation and demand management programs designed to motivate customer participation. These may include features designed to reduce a customer's net cash outlay, pay-back period or cost of finance to participate in a specific conservation and demand management measure or technology.

Flexible Load Shape:

This is utility action to present customers with variations in service quality in exchange for incentives. Programs involved may be variations of interruptible or curtailable load, concepts of pooled, integrated energy management systems, or individual customer load control devices offering service constraints.

Gigawatt-hour (GWh):

One gigawatt-hour is one million kilowatt-hours.

Integrated Planning or Integrated Resource Planning (IRP):

See Supply Planning.

Integrated Electricity Planning (IEP):

See Supply Planning.

Kilowatt (kW):

One thousand watts; the basic unit of measurement of electric energy. One kilowatt-hour represents the power of one thousand watts (one kilowatt) for a period of one hour. A typical non-electrically heated detached home in NL uses about 10,700 kWh per year. A four foot fluorescent lamp in an office might use about 100-200 kWh per year and a large coal-fired plant might produce about three billion kWh per year.

Levelized Cost of Conservation (LCC):

The LCC is calculated for each energy efficiency measure. The LCC is the annualized incremental capital and O&M cost of the measure divided by the annual energy conserved, excluding any administrative or program costs. The LCC represents the cost of generating or conserving one kWh of electricity; it can be compared directly to the cost of supplying one new kWh of electricity. In the context of commercial energy efficiency measures, it is essentially the same as the cost of conserved energy (CCE), which is the term used in this report.

Load Forecast:

This is a forecast of electricity demand over a specified time period. Long-term load forecasts usually pertain to a 10 to 20-year period. In the case of NL, the load forecast assumes a specific set of rates or prices for electricity and competing energy forms, as well as many other economic variables. In addition, forecasts of electricity conserved through CDM programs are incorporated into the Supply Planning process.

Load Research:

Research to disaggregate and analyze patterns of electricity consumption by various sub sectors and end uses is defined as load research. Load research supports the development of the load forecast and the design of conservation and demand management programs.

Load Shape:

The time pattern and magnitude of a utility's electrical demand.

Load Shifting:

Utility program activity to shift demand from peak to off-peak periods is defined as load shifting.

Measure Total Resource Cost (TRC):

The measure TRC calculates the net present value of energy savings that result from an investment in an energy-efficiency measure. The measure TRC is equal to its full or incremental capital cost (depending on application) plus any change (positive or negative) in the combined annual energy and O&M costs. This calculation includes, among others, the following inputs: the avoided electricity supply costs, the life of the technology, and the selected discount rate, which in this analysis has been set at 7%.

A measure with a positive measure TRC value is included in subsequent stages of the analysis, which consists of the Economic and Achievable Potential scenarios. A measure with a negative TRC value is not economically attractive and is therefore not included in subsequent stages of the analysis.

Megawatt (MW):

One thousand kilowatts.

Natural Change in Electricity Intensity:

The future change in electricity intensity in a given end use that is expected to occur in the absence of conservation and demand management programs. In developing an estimate of natural change in electricity intensity it is necessary to make an explicit assumption about the future prices of electricity and competing fuels.

Peak Clipping:

Utility program activity to reduce peak demand without reducing demand at other times of the day or year.

Peak Demand:

Peak demand is the maximum electric power required by a customer or electric system during a short time period, typically one hour. The peak is the time (usually of day or year) at which peak demand occurs. The peak period of interest in NL is from 7 a.m. to noon and 4 p.m. to 8 p.m. on the four coldest days of the winter, for a total of 36 hours.

Rate Structure:

The formulas used to calculate charges for the use of electricity. For example, the present rate structures for both NL utilities for most commercial customers consists of a fixed monthly charge and charges for both electric energy usage and monthly peak demand usage.

Reference Case:

Provides a forecast of electricity sales that includes natural conservation (that which would occur in the absence of CDM programs) but no impacts of utility CDM programs. The reference case for the study is based on the 2014 base year and the Utilities' Load Forecast.

Sector:

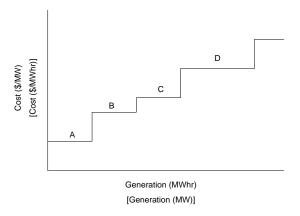
A group of customers having a common type of economic activity. This CDM potential assessment includes the Residential, Commercial, and Industrial sectors.

Sub sectors:

A classification of customers within a sector by common features. Residential sub sectors are by type of home (single-family dwelling or apartment). Commercial sub sectors are generally by type of commercial service (retail and wholesale trade).

Supply Curves:

A graph that depicts the volume of energy at the appropriate screened price in ascending order of cost. Steps A through D below represent programs options, or technologies arranged as a supply curve.



Supply Planning:

The process of long-term planning of electricity generation and associated transmission facilities, in combination with supply reductions made possible through conservation and demand management, in order to meet forecast demands. Supply Planning in NL is done in a framework that recognizes economic, financial, environmental and social costs, risks, and impacts.

Technical Efficiency:

Efficiency of a system, process, or device in achieving a certain purpose, measured in terms of the physical inputs required to produce a given output. In the context of electricity conservation the relevant input is electric energy.

Technology-Based Potential:

Energy and or capacity/demand savings realized through the implementation of energy-efficiency technologies.

Watt:

The basic unit of measurement of electric power.

Appendix A Background-Section 3: Base Year Electricity Use

Introduction

This appendix provides additional detailed information related to the generation of the Commercial sector Base Year profile. The appendix discusses the following:

- Sub sector descriptions
- Sales data analysis
- Detailed Results
- CEEAM archetype summaries existing buildings

A.1 Sub Sector Descriptions

Exhibit 95 presents brief descriptions of the Commercial sub sectors. Detailed building archetype profiles for each sub sector are provided in Sections A.4 (Existing buildings) and C.4 (New buildings) of Appendices A and C, respectively.

Exhibit 95 Sub sector Descriptions

Sub Sector	Definition	Examples of Building Types
Large Office	Buildings used for office or public administration, demand greater than 100 kW	Municipal office, government office building, private office buildings
Small Office	Buildings used for office or public administration, demand less than 100 kW	Municipal office, government office building, private office buildings
Food Retail	Retail store that primarily sells food items and has a significant refrigeration load	Supermarket
Large Non-Food Retail	Retail store which primarily sells non-food items, demand greater than 100 kW	"Big box" store, strip mall, enclosed mall unit
Small Non-Food Retail	Retail store which primarily sells non-food items, demand less than 100 kW	Convenience store, independent retailer
Large Accomodation	Large accomodations with common areas, food preparation, and amenities, demand greater than 100 kW	Hotel
Small Accomodation	Small accommodations with very few amenities, demand less than 100 kW	Motel, bed and breakfast
Healthcare	Buildings used for providing multiple accommodations for short- or long-term care residents	Hospital, nursing home, nursing station
Schools	Buildings whose primary function is education. Typically characterized by seasonably variable occupancy.	Elementary or secondary schools
Universities and Colleges	Buildings that make up a campus related to post-secondary education	University campus
Warehouse / Wholesale	Typically metal-clad building with high ceilings and predominantly high-bay lighting	
Restaurant	Full service or quick service restaurant	Family restaurant, franchise restaurant, diner
Large Other Building	Commercial, institutional, manufacturing or light industrial buildings which do not fit the above categories, demand greater than 100 kW	Municipal workshop, prisons, light manufacturing

Exhibit 95 Sub sector Descriptions (cont'd...)

Sub Sector	Definition	Examples of Building Types
Small Other Building	Commercial, institutional, manufacturing or light industrial buildings which do not fit the above categories, demand less than 100 kW	Service garages, religious buildings, theaters, light manufacturing
Other Institutional	Buildings that form Canadian Forces Base Goose Bay	Barracks, mess halls, hangers, warehouses
Non-Building	Structures for which electricity is primarily used by unique equipment	Telephone exchange, microwave repeater station
Street Lighting	Street lighting	N/A
Island Isolated C/I Buildings	Buildings located in isolated regions on the Island of Newfoundland	Restaurants, schools, variety stores, medical clinics, multi-purpose garages and sheds
Labrador Isolated C/I Buildings	Buildings located in isolated regions in Labrador, including Lanse-Aux-Loup	Restaurants, schools, variety stores, medical clinics, multi-purpose garages and sheds

A.2 Sales Data Analysis

This section outlines the methodology for the allocation of the sales data provided by NLH and NLP to the Commercial sub sectors identified above.

Both NLH and NLP provided sales data to ICF. This data included monthly consumption for accounts grouped by sector, sub sector, and rate class. The sales data was aggregated into the sub sector categories defined by ICF, with the distinction between small and large sub sector building types being made at the 100 kW demand level. Because the three diesel regions of Island Isolated, Labrador Isolated, and Lanse-Aux-Loup have relatively few commercial accounts, it was agreed that instead of reporting at the sub sector level, data and results would be reported in the following aggregate categories: Island Isolated C/I Buildings, Labrador Isolated C/I Buildings, and Street Lighting.

Exhibit 96 Sales Data Subsector Assignments

Sub Sector	Description	CDM Potential Subsector Assignment
Accommodations	Other	Small/Large Accommodation
Accommodations	Restaurants	Restaurants
Education	Colleges and Universities	Universities and Colleges
Education	Other	Schools
Health Care	Hospitals	Health Care
Health Care	Other	Health Care
Non-Buildings		Non-Buildings
Office		Small/Large Office
Other Buildings		Small/Large Other Buildings
Other Buildings	DND	Other Institutional
Retail Trade	Food Stores	Food Retail
Retail Trade	Other	Small/Large Non-Food Retail
Wholesalers & Warehouse		Warehouse/Wholesale

Exhibit 96, above, describes how utility sub sectors were mapped to the sub sector definitions given above.

A.3 Detailed Results

This section of the appendix presents the base year electricity consumption for all three regions.

Exhibit 97 Commercial Sector Base Year (2014) Consumption, Island Interconnected, by Sub Sector and End Use (MWh/yr.)*

Sub Sector	Space Heating	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Refrigeration	Secondary Lighting	Domestic Hot Water	Computer Equipment	Food Service Equipment	Other Plug Loads	Outdoor Lighting	Space Cooling	Street Lighting	Computer Servers	Elevator	Block Heaters	Grand Total
Large Office	94,614	53,893	46,186	2,666	1,067	15,973	5,999	24,326	1,067	7,386	4,524	10,209	-	4,319	1,033	-	273,262
Small Office	74,726	39,734	19,864	2,170	868	5,902	5,155	19,802	-	6,012	3,682	7,866	-	3,516	-	-	189,299
Large Non-food Retail	27,391	33,975	27,191	985	5,725	3,596	1,685	1,886	3,817	2,456	3,344	3,168	-	435	-	-	115,655
Small Non-food Retail	39,263	41,215	28,604	1,428	-	4,845	2,577	2,733	-	3,559	4,845	4,863	-	631	-	-	134,563
Food Retail	18,821	19,666	11,213	729	87,439	3,103	3,279	2,199	8,744	2,369	2,473	1,584	-	322	-	-	161,939
Large Accomodation	17,745	6,841	5,480	631	1,892	7,169	14,755	1,104	3,090	1,205	1,070	1,153	-	232	244	-	62,610
Small Accomodation	9,485	3,690	1,397	300	450	2,047	7,022	525	750	574	509	402	-	110	-	-	27,262
Healthcare	54,806	4,604	27,075	1,042	1,562	21,812	8,124	3,645	8,332	7,008	3,534	2,338	-	844	807	-	145,533
Schools	76,730	42,801	8,422	1,053	1,053	9,582	5,337	7,376	1,404	1,486	5,957	267	-	1,293	-	-	162,762
Universities and Colleges	11,328	39,550	35,395	1,908	3,816	4,996	1,193	9,870	2,862	4,804	3,237	1,316	-	702	739	-	121,717
Warehouse/Wholesale	24,251	19,171	4,292	1,310	7,861	3,812	1,958	1,742	-	4,212	2,223	108	-	579	-	-	71,518
Restaurants	11,925	2,352	3,434	256	16,672	7,540	18,743	410	33,431	545	435	989	-	113	-	-	96,846
Labrador Isolated C/I Buildings	-	-	-	-	-		-	-	-		-	-	-	-	-	-	-
Island Isolated C/I Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large Other Buildings	42,605	28,123	21,288	1,335	16,038	9,791	7,707	6,633	7,918	3,972	3,382	2,667	-	1,116	356	-	152,930
Small Other Buildings	40,739	26,977	17,711	1,293	15,178	8,068	6,768	6,124	7,039	3,876	3,410	2,502	-	1,028	196	-	140,908
Other Institutional	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Buildings	-	-	-	199,788	-	-	-	-	-	-	-	-	-	-	-	-	199,788
Street Lighting	-	-	-	-	-	-	-	-	-	-	-	-	34,828	-	-	-	34,828
Grand Total	544,430	362,591	257,551	216,895	159,621	108,235	90,302	88,376	78,454	49,463	42,624	39,433	34,828	15,241	3,375	-	2,091,418

^{*}Results are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.

Exhibit 98 Commercial Sector Base Year (2014) Consumption, Labrador Interconnected, by Sub Sector and End Use (MW)*

Sub Sector	Space Heating	General Lighting	HVAC Fans & Pumps	Secondary Lighting	Refrigeration	Domestic Hot Water	Food Service Equipment	Other Plug Loads	Miscellaneous Equipment	Computer Equipment	Outdoor Lighting	Street Lighting	Block Heaters	Space Cooling	Computer Servers	Elevator	Grand Total
Large Office	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small Office	1,793	793	189	118	-	108	-	120	22	395	74	-	22	62	70	-	3,766
Large Non-food Retail	2,699	2,234	1,154	248	410	134	273	176	35	135	239	-	35	56	31	-	7,860
Small Non-food Retail	6,716	4,295	1,163	478	-	258	-	338	68	260	460	-	68	121	60	-	14,283
Food Retail	4,669	1,031	309	133	4,105	205	493	133	21	124	139	-	21	25	5	-	11,414
Large Accomodation	2,803	585	466	687	181	1,572	302	116	30	90	103	-	30	57	22	-	7,044
Small Accomodation	438	98	38	55	12	208	20	15	4	12	14	-	4	9	3	-	929
Healthcare	3,057	654	3,671	3,099	222	1,924	1,184	996	74	518	502	-	222	108	120	57	16,408
Schools	6,374	2,331	933	481	21	363	76	81	29	402	324	-	29	12	70	-	11,527
Universities and Colleges	1,410	631	372	80	61	76	46	77	15	157	52	-	15	25	11	-	3,028
Warehouse/Wholesale	4,074	1,396	461	278	572	178	-	307	48	127	162	-	48	6	42	-	7,698
Restaurants	1,136	212	140	606	1,501	1,776	3,071	54	12	37	39	-	12	18	10	-	8,622
Labrador Isolated C/I Buildings	_	_	_	_	-		_	_	_	_		_	_		-	-	_
Island Isolated C/I																	
Buildings	-		-	-	-	-	-	-	-		-	-	-	-	-	-	-
Large Other Buildings	22,842	7,904	6,537	4,889	6,162	5,426	4,743	1,689	229	1,384	1,359	-	358	269	272	50	64,115
Small Other Buildings	16,047	6,188	3,936	2,881	3,513	2,757	2,645	1,147	157	1,099	955	-	238	209	212	31	42,015
Other Institutional	10,017	12,713	8,247	4,559	1,763	2,407	537	2,075	412	1,212	1,406	-	412	219	-	-	45,979
Non-Buildings	-	-	-	-	-	-	-	-	5,068	-	-	-	-	-	-	-	5,068
Street Lighting	-	-	-	-	-	-	-	-	-	-	-	1,756	-	-	-	-	1,756
Grand Total	84,075	41,065	27,616	18,592	18,523	17,392	13,390	7,323	6,224	5,951	5,828	1,756	1,512	1,197	929	138	251,513

^{*}Results are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.

Exhibit 99 Commercial Sector Base Year (2014) Consumption, Isolated, by Sub Sector and End Use (MW)*

Sub Sector	General Lighting	Refrigeration	Secondary Lighting	HVAC Fans & Pumps	Computer Equipment	Outdoor Lighting	Other Plug Loads	Space Heating	Street Lighting	Food Service Equipment	Block Heaters	Domestic Hot Water	Miscellaneous Equipment	Elevator	Space Cooling	Computer Servers	Grand Total
Labrador Isolated C/I																	
Buildings	6,909	3,416	1,608	1,132	1,051	739	677	580	-	496	305	149	-	-	-	-	17,062
Island Isolated C/I																	
Buildings	649	321	151	106	99	69	64	-	-	47	-	-	-	-	-	-	1,505
Street Lighting	-	-	-	-	-	-	-	-	544	-	-	-	-	-	-	-	544
Grand Total	7,558	3,737	1,759	1,238	1,150	808	740	580	544	542	305	149	-	-	-	-	19,112

^{*}Results are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.

A.4 CEEAM Archetype Summaries – Existing Buildings

This section includes summary profiles of the twenty four existing building archetypes constructed for this study. Exhibit 100 presents a table of contents for the CEEAM building profiles that follow. A glossary of terms and acronyms used in the building profiles is included at the end of this appendix.

Exhibit 100 Table of Contents - Existing CEEAM Building Profiles

Region	Sub Sector	Page #
Island Interconnected	Large Office	A – 8
Island Interconnected	Small Office	A – 13
Island Interconnected	Food Retail	A – 18
Island Interconnected	Small Non-food Retail	A – 23
Island Interconnected	Small Non-food Retail	A – 28
Island Interconnected	Large Accommodation	A – 33
Island Interconnected	Small Accommodation	A – 38
Island Interconnected	Healthcare	A – 43
Island Interconnected	Schools	A – 48
Island Interconnected	Universities and Colleges	A – 53
Island Interconnected	Warehouse / Wholesale	A – 58
Island Interconnected	Restaurant	A – 63
Labrador Interconnected	Large Office	A – 68
Labrador Interconnected	Small Office	A – 73
Labrador Interconnected	Food Retail	A – 78
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Labrador Interconnected	Large Accommodation	A – 93
Labrador Interconnected	Small Accommodation	A – 98
Labrador Interconnected	Healthcare	A – 103
Labrador Interconnected	Schools	A – 108
Labrador Interconnected	Universities and Colleges	A – 113
Labrador Interconnected	Warehouse / Wholesale	A – 118
Labrador Interconnected	Restaurant	A – 123
N/A	Terms Used in Building Profiles	A – 128

COMMERCIAL SECTOR BUILDING PROFILE EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Large Office > 100 kW Baseline CONSTRUCTION 0.71 W/m².°C 0.12 Btu/hr.ft² .°F 40,000 ft² Wall U value (W/m².°C) Typical Building Size 3,717 m² Roof U value (W/m².°C) 0.48 W/m².°C 0.09 Btu/hr.ft² .°F Typical Footprint (m²) 1,239 13,333 ft² Glazing U value (W/m².°C) 3.97 W/m².°C 0.70 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.40 Defined as Exterior Zone Typical # Stories 0.58 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A TOTAL Ventilation System Type CAV VAV VAVR System Present (%) 75% 100% Min. Air Flow (%) (Minimum Throttled Ai 60% Occupancy or People Density 274 ft²/person %OA 22.09% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air 42 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: CFM/ft² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation I /s m² operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.70 CFM/ft² 3.55 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² 50% Infiltration Rate Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 1.067.682 Switchover Point KJ/kg. 18 Peak Design Cooling Load Peak Zone Sensible Load 462,384 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipment 13.2 ft³/lbm All Pneumatic 21,510 DDC/Pneumatic Total air circulation or Design air 3.55 l/s.m² All DDC Total (should add-up to 100%) PI / PID Proportional Control mode Control Mode Fixed Discharge Rese Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 14 °C 57.2 °F 24 °C Summer Humidity (%) 50% Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 Winter Unocc. Humidity Enthalpy 50 KJ/ko 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance

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Annual Maintenance Tasks

(Dampers, VAV Boxes)

Inspection/Calibration of Room Thermostat

Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves,

Incidence

(%)

Annual Maintenance Tasks

Calibration of Transmitters

Calibration of Panel Gauges Inspection of Auxiliary Devices

Inspection of Control Devices

Incidence

(%)

EXISTING BUILDINGS: SIZE:
Large Office > 100 kW
Baseline

NTAGE: REGION:
Island Interconnected

LIGHTING														
GENERAL LIGHTING	FF0 1	54	1 tt condice											
Light Level Floor Fraction (GLFF)	550 Lux 0.90	51.	1 ft-candles											
Connected Load	14.8 W/m²	1.4	4 W/ft²											
One Berind/Her ton)	2000		Links I amal (Link)		450	550	050	1				T-1-1	1	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	3300 5460		Light Level (Lux) % Distribution		450 10%	550 80%	650 10%					Total 100%		
Usage During Occupied Period	95%		Weighted Average		1070	0070	1070	-				550		
Usage During Unoccupied Period	20%													
					INC	CFL	T12	T8	HID	T5HO	LED	TOTAL		
Fixture Cleaning:			System Present (%) CU		0.7	0.7	20.0%	80.0%	0.6	0.6	0.6	100.0%		
Incidence of Practice Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.80	0.80			
			Efficacy (L/W)		15	50	72	88	65	95	90			
Relamping Strategy & Incidence	Group Spot		, , ,										1	
of Practice												EUI	kWh/ft².yr	5.2
ARCHITECTURAL LIGHTING													MJ/m².yr	202
Light Level	350 Lux	32.	5 ft-candles											
Floor Fraction (ALFF)	0.10		_											
Connected Load	31.0 W/m ²	2.9	9 W/ft²											
Occ. Period(Hrs./yr.)	3400		Light Level (Lux)		200	300	400	500				Total]	
Unocc. Period(Hrs./yr.)	5360		% Distribution		10%	40%	40%	10%				100%		
Usage During Occupied Period	95%		Weighted Average									350		
Usage During Unoccupied Period	40%													
Fixture Cleaning:			System Bresent (9/)		INC 45%	CFL 45%	T12	T8	HID 5%	T5HO	LED 5%	TOTAL 100.0%		
Fixture Cleaning: Incidence of Practice			System Present (%) CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6			
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.80	0.80			
		_	Efficacy (L/W)		15	50	72	84	65	95	90			
Relamping Strategy & Incidence	Group Spot	_										FIII	1388-762	4.5
of Practice		_				-111 – 1 020	d X Hrs. X S	SE X GLEE				EUI	kWh/ft².yr MJ/m².yr	1.5 60
SPECIAL PURPOSE LIGHTING						LOT LOU	27/1110.7/	JI A OLIT					IVIO/III .yi	00
Light Level	Lux		ft-candles			i	loor fractio	n check: s	should = 1.0	00	1.00			
Floor Fraction (HBLFF)			7144/60											
Connected Load	W/m²		W/ft²											
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)		300	500	700	1000				Total]	
Unocc. Period(Hrs./yr.)	4760		% Distribution											
Usage During Occupied Period	0%		Weighted Average											
Usage During Unoccupied Period	100%				INO	OFI	T40	Tol			LIDO	TOTAL		
Fixture Cleaning:			System Present (%)		INC	CFL	T12	T8		MH	HPS	TOTAL		
Incidence of Practice			CU CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6			
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.55	0.55			
		_	Efficacy (L/W)		15	50	72	84	88	65	90			
Relamping Strategy & Incidence of Practice	Group Spot	_										EUI	kWh/ft².yr	
of Fractice		_1										LOI	MJ/m².yr	
TOTAL LIGHTING								(Overall LP	16.38	W/m²	EUI TOTAL		7
													MJ/m².yr	262
OFFICE EQUIPMENT & PLUG LOA	DS													
			-									-		
Equipment Type	Compu	iters	Monitors	Pri	nters	Copi	ers	Serve	ers	Plug	Loads			
Measured Power (W/device)	5		51	100		200		217						
Density (device/occupant)	0.		0.9	0.15		0.1		0.06	.,, .					
Connected Load		9 W/m² 2 W/ft²	1.8 W/m² 0.2 W/ft²		W/m² W/ft²	0.8 \	N/m² N/f+2	0.5 V 0.05 V			W/m² W/ft²			
Diversity Occupied Period	809		80%	80%		80%		100%	*//10	80%	**/10			
Diversity Unoccupied Period	50%	%	50%	50%		50%		100%		50%				
Operation Occ. Period (hrs./year)	200		2000	2000		2000		2000		2500				
Operation Unocc. Period (hrs./year)	676	60	6760	6760	1	6760		6760		6260				
Total end-use load (occupied period)	5.	.8 W/m²	0.5 W/ft ²							Com	puter Servers	EUI	kWh/ft².yr	0.42
Total end-use load (unocc. period)		8 W/m²	0.4 W/ft²								,		MJ/m².yr	16.20
										Compu	ter Equipmen	EUI	kWh/ft².yr	2.36
Usage during occupied period	1009										D		MJ/m².yr	91.24
Usage during unoccupied period	66%	%									Plug Loads		kWh/ft².yr MJ/m².yr	0.72 27.70
													IVIO/III .yi	21.10
FOOD SERVICE EQUIPMENT														
Provide description below:	Fuel Oil /	Propane Fuel S	Sh	Electricity	Fuel Share:	100.0%			I / Propane				Electric EUI	
Lunch room/cafeteria/restaurant							E		Wh/ft².yr	0.2		EUI	kWh/ft².yr	0.1
								, n	/J/m².yr	6.0		I	MJ/m².yr	4.0
REFRIGERATION														
Provide description below:				_										
Lunch room/cafeteria/restaurant													kWh/ft².yr	0.1
													MJ/m².yr	4.0
BLOCK HEATERS & MISCELLANE	ous													
											Block Heaters		kWh/ft².yr	
											Viscellaneous	EUI	MJ/m².yr kWh/ft².yr	0.3
													MJ/m².yr	10

EXISTING BUILDINGS: SIZE:
Large Office > 100 kW
Baseline

REGION: Island Interconnected

SPACE HEATING													
Heating Plant Type				E.	el Oil / Propa	200	1	Elo	ctric			1	
rieating riant Type				Bo	ilers	Packaged	A/A HP			Resistance	Total		
		System Present (%)		Stan. 15%		Unit				85%	100%		
		Eff./COP Performance (1 / Eff.)		70% 1.43		70% 1.43	1.70 0.59	3.00	4.50 0.22	1.00 1.00			
		(kW/kW)										l	
	W/m² MJ/m².yr		Btwhr.ft² kWh/ft².yr									All Electric EUI	
Electric Fuel Share 85.0%	6	Fuel Oil / Propane Fuel St	15.0%	I	Oil Fuel Sha	re]				kWh/ft².yr MJ/m².yr	10.8 417
Boiler Maintenance	Fire Side Water Sid Inspection	intenance Tasks Inspection e Inspection for Scale Built of Controls & Safeties of Burner Analysis & Burner Set-up	dup	Incidence (%) 75% 100% 100% 90%								Fuel Oil / Propane EU kWh/tt².yr MJ/m².yr Market Composite E! kWh/tt².yr MJ/m².yr	UI 15.4 596
SPACE COOLING													
A/C Plant Type													
TO THE THE		System Present (%) COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifugal Standard 20.0% 4.7 0.21	HE 5.4	3.5	Reciproca Open 3.5 0.29	DX 80.0% 2.6	0.9	CW	Total 100.0%			
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Setpoint	Reset									
Setpoint		Chilled Water Condenser Water Supply Air		°C °C	44.6 86 57.2	°F							
	4 W/m² MJ/m².yr	27 Btu/hr.ft² 2.8 kWh/ft².yr	450	ft²/Ton									
Sizing Factor 1.00	1		Operation (oc	c. period)	3000	hrs/year	Note value	e cannot be	less than 2	,900 hrs/ye	ar)		
A/C Saturation (Incidence of A/C)	6												
Electric Fuel Share 100.0%	6	Fuel Oil / Propane Fuel Sh	1	I									
Chiller Maintenance	Inspect Co Inspect Co Megger M Condense Vibration a Eddy Curr	r Tube Cleaning		Incidence (%)	Frequency (years)							All Electric EUI kWh/ft².yr	1.2
Cooling Tower/Air Cooled Condenser Maintenan	Inspection Inspect/Se Megger M	/Clean Spray Nozzles ervice Fan/Fan Motors		Incidence (%)	Frequency (years)							MJ/m².yr Fuel Oil / Propane Et kWh/ft².yr MJ/m².yr Market Composite E	
		, operation of doubtes		1	1	1						kWh/ft².yr MJ/m².yr	1.2 45
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fue System P Eff./COP	el SHW Tank resent (%)				Boiler 10% 0.75		Fuel Share Blended E		Fossil 10% 0.75		Elec. Res. 90% 0.91	
Service Hot Water load (MJ/m².yr) 22.4 (Tertiary Load)		1 0.00	Ti-	F	All Electric EL]		Oil / Propar]	Market Composite El	UI
Wetting Use Percentage 90%	6				kWh/ft².yr MJ/m².yr	0.6 25			kWh/ft².yr MJ/m².yr	0.8 30		kWh/ft².yr MJ/m².yr	0.7 25.5

EXISTING BUILDINGS: Large Office Baseline SIZE: > 100 kW REGION: Island Interconnected

HVAC FANS & PUMPS											
0.1551 W 5.110							. = 0				
SUPPLY FANS								ration & Conti	rol		
System Design Air Flow 3.6	L/s.m²	0.70	CFM/ft²	Control	Ventilati Fixed	on Fan Variable	Fixed	aust Fan Variable	1		
				Control	rixed	Flow	rixed	Flow			
System Static Pressure CAV 750 System Static Pressure VAV 750		3.0		Incidence of Use	75%	25%	100%	FIOW	1		
Fan Efficiency 52%		3.0	wg					Scheduled	+		
Fan Motor Efficiency 85%				Operation	Continuous	Scrieduled	Continuous	Scrieduled			
Sizing Factor 1.00				Incidence of Line	90%	10%	90%	10%	J		
		0.50	W/ft²	Incidence of Use	90%	10%	90%	10%	1		
	W/m²		W/ft²	Comments:							
Tan Design Load VAV 0.0	VV/111	0.50	VV/11	Comments.							
EXHAUST FANS									1		
Washroom Exhaust 100		oom	212 CFM/washro	om							
Washroom Exhaust per gross unit area 0.2			0.03 CFM/ft ²								
Other Exhaust (Smoking/Conference) 0.1			0.02 CFM/ft ²								
Total Building Exhaust 0.3			0.05 CFM/ft ²								
Exhaust System Static Pressure 250			1.0 wg								
Fan Efficiency 40%											
Fan Motor Efficiency 80%											
Sizing Factor 1.0											
Exhaust Fan Connected Load 0.2	W/m²	0.02	W/ft²								
AUXILIARY COOLING EQUIPMENT (Condens	er Pump ar	nd Cooling Tow	er/Condenser Fans)								
Condens	up ui										
Average Condenser Fan Power Draw			0.020 kW/kW	0.07 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser)		1.65 W/m²	0.15 W/ft ²							
3	,										
Condenser Pump											
Pump Design Flow			0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area			0.004 L/s.m ²	0.007 U.S. gpm/ft ²							
Pump Head Pressure			90 kPa	30 ft							
Pump Efficiency			55%								
Pump Motor Efficiency			90%								
Sizing Factor			1.0								
Pump Connected Load			0.81 W/m ²	0.08 W/ft²							
CIRCULATING PUMP (Heating & Cooling)											
3,											
Pump Design Flow @ 5 °C (10 °F) delta T		0.004	L/s.m ²	0.0053 U.S. gpm/ft ² 2.4	U.S. gpm/T	on					
Pump Head Pressure		150	kPa	50 ft							
Pump Efficiency		55%									
Pump Motor Efficiency		90%									
Sizing Factor		0.5									
Pump Connected Load		0.5	W/m²	0.05 W/ft²							
Supply Fan Occ. Period	1	2500	hrs./year								
Supply Fan Unocc. Period Supply Fan Unocc. Period			hrs./year								
Supply Fan Energy Consumption			kWh/m².yr								
Supply Lan Ellergy Consumption		40.1	MANIMUL-'AI								
Exhaust Fan Occ. Period	j	3500	hrs./year								
Exhaust Fan Unocc. Period			hrs./year								
Exhaust Fan Energy Consumption			kWh/m².yr								
Endast all Energy Condumption	I.	1.7	yı								
Condenser Pump Energy Consumption		0.4	kWh/m².yr								
Cooling Tower /Condenser Fans Energy Consum	nption		kWh/m².yr								
Circulating Pump Yearly Operation			hrs./year								
Circulating Pump Energy Consumption		0.4	kWh/m².yr								
Fone and Rumpa Maintenance	Apprel 84	nintananaa Ta-l	•	Incidence Fraguency							
Fans and Pumps Maintenance	Annual Ma	aintenance Task	8	Incidence Frequency (%) (years)							
	Inenact/So	rvice Fans & Mo	ntore	(70) (years)							
		just Belt Tension		 							
	Inspect/Se	rvice Pump & M	Intors						EUI	kWh/ft².yr	4.5
		amp a w							-0.	MJ/m².yr	173.2
									1	.vio/111 .yı	170.2

EXISTING BUILDINGS: Large Office Baseline SIZE: > 100 kW REGION: Island Interconnected

EUISUMMARY							
TOTAL ALL END-USES:	Electricity:		26.5 kWh/ft².yr 1,024.9 MJ/m².yr	Fuel Oil	Propane:	2.4 kWh/ft².yr	92.5 N
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	5.2	202.1		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m ² .yr
ARCHITECTURAL LIGHTING	1.5	59.9	SPACE HEATING	9.2	354.9	2.3	89.5
SPECIAL PURPOSE LIGHTING			SPACE COOLING	1.0	38.3		
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	22.5	0.1	3.0
HVAC FANS & PUMPS	4.5	173.2	FOOD SERVICE EQUIPMENT	0.1	4.0		
REFRIGERATION	0.1	4.0					
MISCELLANEOUS	0.3	10.0					
BLOCK HEATERS							
COMPUTER EQUIPMENT	2.4	91.2					
COMPUTER SERVERS	0.4	16.2					
ELEVATORS	0.1	3.9					
OUTDOOR LIGHTING	0.4	17.0					

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COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Small Office < 100 kW Island Interconnected Baseline CONSTRUCTION 0.38 W/m².°C 0.07 Btu/hr.ft² .°F 20,000 ft² Wall U value (W/m².°C) Typical Building Size 1,859 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² Glazing U value (W/m².°C) 3.97 W/m².°C 0.70 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.30 Defined as Exterior Zone 0.58 Typical # Stories Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A TOTAL Ventilation System Type CAV VAV VAVR System Present (%) 100% 100% Min. Air Flow (%) (Minimum Throttled Ai 60% Occupancy or People Density 274 ft²/person %OA 23.47% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air 42 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: CFM/ft² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation I /s m² operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.66 CFM/ft² 3.34 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² 50% Infiltration Rate Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. 18 Peak Design Cooling Load 520.257 Peak Zone Sensible Load 217,608 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipment 13.2 ft³/lbm All Pneumatic 10,123 DDC/Pneumatic Total air circulation or Design air l/s.m² All DDC Total (should add-up to 100%) PI / PID Proportional Control mode Control Mode Rese Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 14 °C 57.2 °F 24 °C Summer Humidity (%) 50% Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 Winter Unocc. Humidity Enthalpy 50 KJ/ko 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves, Inspection of Control Devices (Dampers, VAV Boxes)

EXISTING BUILDINGS: SIZE:
Small Office < 100 kW
Baseline

FAGE: REGION:
Island Interconnected

LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF)	550 Lux 51.1	ft-candles							
Connected Load		W/ft²							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	2500 6260	Light Level (Lux) % Distribution	450 10%	550 650 80% 10%	6		Total 100%		
Usage During Occupied Period Usage During Unoccupied Period	95% 20%	Weighted Average	INC	CFL T12	T8 HID	T5HO LED	TOTAL		
Fixture Cleaning: Incidence of Practice Interval		System Present (%) CU LLF	0.7 0.65	0.7 0.6 0.65 0.75	0.6 0.6	0.6 0.6 0.80 0.80	100.0%		
Relamping Strategy & Incidence	years Group Spot	Efficacy (L/W)	15	50 72		95 90			
of Practice								kWh/ft².yr MJ/m².yr	4.7 183
ARCHITECTURAL LIGHTING Light Level		ft-candles							
Floor Fraction (ALFF) Connected Load	0.05 31.0 W/m ² 2.9	W/ft²							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	2500 6260	Light Level (Lux) % Distribution	200 10%	300 400 40% 40%			Total 100%		
Usage During Occupied Period Usage During Unoccupied Period	95% 40%	Weighted Average	10/6	4078 407	0 1076		350		
Fixture Cleaning:	4070	System Present (%)	INC 45% 0.7	CFL T12 45% 0.7 0.6	T8 HID 5% 0.6 0.6	T5HO LED 5% 0.6 0.6	TOTAL 100.0%		
Interval	years	LLF Efficacy (L/W)	0.65 15	0.65 0.75 50 72	5 0.80 0.80	0.80 0.80 95 90			
Relamping Strategy & Incidence of Practice	Group Spot	,	·	UI = Load X Hrs.)				kWh/ft².yr MJ/m².yr	0.7 27
SPECIAL PURPOSE LIGHTING Light Level	Lux	ft-candles		Floor frac	ction check: should = 1.0	1.00]		
Floor Fraction (HBLFF) Connected Load	W/m²	W/ft²					•		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	2500 6260	Light Level (Lux) % Distribution	300	500 700	0 1000		Total		
Usage During Occupied Period Usage During Unoccupied Period	0% 100%	Weighted Average		'					
Fixture Cleaning:		System Present (%)	INC	CFL T12	2 T8	MH HPS	TOTAL		
Incidence of Practice Interval	years	CU LLF	0.7 0.65	0.7 0.6 0.65 0.75	0.80 0.80	0.6 0.6 0.55 0.55			
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)	15	50 72	2 84 88	65 90	EUI	kWh/ft².yr	
TOTAL LIGHTING					Overall LP	15.57 W/m²	EUI TOTAL I		5
OFFICE EQUIPMENT & PLUG LOA	DS							MJ/m².yr	210
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads			
Measured Power (W/device)	55	51	100	200	217				
Density (device/occupant) Connected Load	0.9 1.9 W/m²	0.9 1.8 W/m²	0.15 0.6 W/m²	0.1 0.8 W/m²	0.06 0.5 W/m²	1.5 W/m²			
Diversity Occupied Period	0.2 W/ft²	0.2 W/ft²	0.05 W/ft² 80%	0.07 W/ft² 80%	0.05 W/ft² 100%	0.14 W/ft² 80%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year)	50% 2000	50% 2000	50% 2000	50% 2000	100% 2000	50% 2500			
Operation Unocc. Period (hrs./year)	6760	6760	6760	6760	6760	6260			
Total end-use load (occupied period) Total end-use load (unocc. period)	5.8 W/m² 3.8 W/m²	0.5 0.4 W/ft²				Computer Servers Computer Equipment	I	kWh/ft².yr MJ/m².yr kWh/ft².yr	0.42 16.20 2.36
Usage during occupied period Usage during unoccupied period	100% 66%					Plug Loads	EUI	MJ/m².yr kWh/ft².yr MJ/m².yr	91.24 0.72 27.70
FOOD SERVICE EQUIPMENT									
Provide description below:	Fuel Oil / Propane Fuel SI	1	Electricity Fuel Share:	100.0%	Fuel Oil / Propane EUI kWh/ft².yr	0.1	EUI	Electric EUI kWh/ft².yr	
DEEDIGEDATION					MJ/m².yr	5.0		MJ/m².yr	
REFRIGERATION Provide description below:			_				[FIII]	IAA/In/642	0.4
Lunch room/cafeteria/restaurant								kWh/ft².yr MJ/m².yr	0.1 4.0
BLOCK HEATERS & MISCELLANE	ous								
						Block Heaters		kWh/ft².yr MJ/m².yr	
						Miscellaneous	EUI	kWh/ft².yr MJ/m².yr	0.3 10

EXISTING BUILDINGS: SIZE:
Small Office < 100 kW
Baseline

SPACE HEATING

ECTOR BUILDING PROFILE

AGE: REGION:

Island Interconnected

SPACE HEATING													
Heating Plant Type					el Oil / Propa			Elect					
				Stan.	oilers High	Packaged Unit	A/A HP	W. S. HP	I/R Chiller I	Resistance	Total		
		System Present (%)		10%						90%	100%		
		Eff./COP Performance (1 / Eff.)		70% 1.43	80% 1.25	70% 1.43		3.00 0.33	4.50 0.22	1.00 1.00			
		(kW/kW)		1.40	1.20	1.40	0.00	0.00	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load)	49.9 W/m² 383 MJ/m².yı		Btu/hr.ft² kWh/ft².yr										
Sizing Factor	1.00											All Electric EUI	
Electric Fuel Share	90.0%	Fuel Oil / Propane Fuel SI	10.0%	I	Oil Fuel Sha	e e						kWh/ft².yr MJ/m².yr	9.9 383
Boiler Maintenance	Annual N	Maintenance Tasks		Incidence	I								
	Fire Side	e Inspection		(%) 75%	-							Fuel Oil / Propane E kWh/ft².yr	EUI 14.1
	Water S	ide Inspection for Scale Buil	dup	100%								MJ/m².yr	547
		on of Controls & Safeties on of Burner		100% 100%	-							Market Composite E	EIII
		s Analysis & Burner Set-up		90%								kWh/ft².yr	10.3
												MJ/m².yr	39
SPACE COOLING													
A/C Plant Type													
7 (O 1 Kain 1) po			Centrifugal		WSHP			Absorption (Total			
İ		System Present (%)	Standard	HE		Open	DX 100.0%	W. H.	CW	100.0%			
		COP	4.7	5.4	3.5	3.5		0.9	1	100.078			
		Performance (1 / COP)	0.21	0.19	0.29	0.29	0.38	1.11	1.00				
		(kW/kW) Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed	Reset	1								
		Chilled Water	Setpoint		-								
		Condenser Water]								
Setpoint		Chilled Water	7	°C	44.6	°F							
		Condenser Water		°C	86								
		Supply Air	14.0	<u>I</u> -C	57.2	-F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	82 W/m² 111.0 MJ/m².yı	26 Btu/hr.ft² r 2.9 kWh/ft².yr		ft²/Ton									
Sizing Factor	1.00		Operation (oc	c. period)	3000	hrs/year	Note value	cannot be le	ess than 2,	900 hrs/yea	ar)		
A/C Saturation (Incidence of A/C)	75.0%												
Electric Fuel Share	100.0%	Fuel Oil / Propane Fuel SI	n	ī									
		·	1	1									
Chiller Maintenance	Annual N	Maintenance Tasks		Incidence (%)	Frequency (years)								
		Control, Safeties & Purge Ur		(,,,,	()====								
	Inspect 0 Megger	Coupling, Shaft Sealing and Motors	Bearings										
	Condens	ser Tube Cleaning											
		n Analysis Irrent Testing											
		chemical Oil Analysis										All Electric EUI	
												kWh/ft².yr	1.2
Cooling Tower/Air Cooled Condense	r Maintenan Annual N	Maintenance Tasks		Incidence	Frequency							MJ/m².yr	48
Ü				(%)	(years)							Fuel Oil / Propane E	EUI
		on/Clean Spray Nozzles Service Fan/Fan Motors										kWh/ft².yr MJ/m².yr	
	Megger	Motors											
	Inspect/	Verify Operation of Controls										Market Composite E kWh/ft².yr	EUI 1.2
												MJ/m².yr	48
DOMESTIC HOT WATER													
			1				, ,						
Service Hot Water Plant Type		uel SHW Tank Present (%)		-		Boiler 10%		Fuel Share		Fossil 5%		Elec. Res. 95%	
	Eff./COF		i			0.75		Blended Eff	iciency	1.50		0.91	
	22.8	<u> </u>	·			-	•					<u>—</u>	
				A	All Electric EU	I]	Fuel Oi	I / Propane	EUI		Market Composite E	EUI
Service Hot Water load (MJ/m².yr) (Tertiary Load) Wetting Use Percentage	90%				All Electric EU kWh/ft².yr MJ/m².yr	0.6 25		k	I / Propane Wh/ft².yr /IJ/m².yr	0.4 15		Market Composite E kWh/ft².yr MJ/m².yr	0.6 24.5

EXISTING BUILDINGS: Small Office Baseline SIZE: < 100 kW

REGION: Island Interconnected

HVAC FANS & PUMPS												
SUPPLY FANS									ration & Cont	roi		
System Design Air Flow 3.3	L/s.m ² 0.66	CFM/ft²	Control			Fixed	tion Fan Variable	Fixed	aust Fan Variable	1		
			Control			Fixed		Fixed				
System Static Pressure CAV 750 System Static Pressure VAV 750		wg	Incidence of	of Lloo		100%	Flow	100%	Flow	-		
		wg		or Use					0-11-11			
Fan Efficiency 52%			Operation			Continuol	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 85%			to at days and			90%	100/	90%	400/	J		
Sizing Factor 0.50 Fan Design Load CAV 2.6		W/ft²	Incidence of	or Use		90%	10%	90%	10%	1		
Fan Design Load CAV 2.8 Fan Design Load VAV 2.8		W/ft²			omments:							
ran Design Load VAV 2.6	0.20	VV/I (*			omments.							
EXHAUST FANS										1		
Washroom Exhaust 100	L/s.washroom	212 CFM/washro	nom									
Washroom Exhaust per gross unit are: 0.2		0.04 CFM/ft²	,,,,,									
Other Exhaust (Smoking/Conference) 0.1		0.02 CFM/ft ²										
Total Building Exhaust 0.3		0.06 CFM/ft ²										
Exhaust System Static Pressure 250		1.0 wg										
Fan Efficiency 40%		1.0 wg										
Fan Motor Efficiency 80%												
Sizing Factor 0.5		\A//6+2										
Exhaust Fan Connected Load 0.	1 W/m ² 0.01	W/ft²										
AUXILIARY COOLING EQUIPMENT (Condens	cor Bump and Cooling Tou	vor/Condonsor Fons)										
AUNILIAN I COOLING EQUIPMENT (Condens	ser i unip and Cooling Tow	encondenser rans)										
Average Condenser Fan Power Draw		0.020 kW/kW		0.07 k								
(Cooling Tower/Evap. Condenser/ Air Cooled C	ondenser)	1.61 W/m ²		0.15	V/ft²							
Condenser Pump												
Pump Design Flow		0.053 L/s.KW			.S. gpm/Ton							
Pump Design Flow per unit floor area		0.004 L/s.m ²			.S. gpm/ft ²							
Pump Head Pressure		90 kPa		30	t							
Pump Efficiency		55%										
Pump Motor Efficiency		90%										
Sizing Factor		0.5										
Pump Connected Load		0.40 W/m ²		0.04	V/ft²							
CIRCULATING PUMP (Heating & Cooling)												
Pump Design Flow @ 5 °C (10 °F) delta T	0.004	L/s.m²	0.0052	U.S. gpm/ft ²	2	4 U.S. gpm	/Ton					
Pump Head Pressure		kPa	50			ااان مارت	, , , , , ,					
Pump Efficiency	55%	Να	50									
Pump Motor Efficiency	90%											
Sizing Factor	0.5											
Pump Connected Load		W/m²	0.05	\/\//ft2								
amp Someoted Load	0.5	**////	0.05	¥4/11								
Owner to Ford One Border!	0500	h 4										
Supply Fan Occ. Period		hrs./year										
Supply Fan Unocc. Period		hrs./year										
Supply Fan Energy Consumption	23.3	kWh/m².yr										
Exhaust Fan Occ. Period		hrs./year										
Exhaust Fan Unocc. Period		hrs./year										
Exhaust Fan Energy Consumption	1.0	kWh/m².yr										
		1										
Condenser Pump Energy Consumption		kWh/m².yr										
Cooling Tower /Condenser Fans Energy Consur	mption 0.6	kWh/m².yr										
Circulating Pump Yearly Operation		hrs./year										
Circulating Pump Energy Consumption	0.3	kWh/m².yr										
			T									
Fans and Pumps Maintenance	Annual Maintenance Task	S		Frequency								
			(%)	(years)								
	Inspect/Service Fans & Mo											
	Inspect/Adjust Belt Tensio											
	Inspect/Service Pump & M	lotors								EUI	kWh/ft².yr	2.4
										1	MJ/m².yr	91.5

EXISTING BUILDINGS: Small Office Baseline SIZE: < 100 kW REGION: Island Interconnected

EUI SUMMARY							
TOTAL ALL END-USES:	Electricity:		22.5 kWh/ft².yr 872.2 MJ/m².yr	Fuel Oil	/ Propane:	1.4 kWh/ft².yr	55.4
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electi	ricity	Fuel Oil /	Propane
GENERAL LIGHTING	4.7	183.1		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr
ARCHITECTURAL LIGHTING	0.7	27.2	SPACE HEATING	8.9	344.3	1.4	54.7
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.9	36.2		
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	23.8	0.0	0.8
HVAC FANS & PUMPS	2.4	91.5	FOOD SERVICE EQUIPMENT				
REFRIGERATION	0.1	4.0					
MISCELLANEOUS	0.3	10.0					
BLOCK HEATERS							
COMPUTER EQUIPMENT	2.4	91.2					
COMPUTER SERVERS	0.4	16.2					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

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COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Food Retail Baseline CONSTRUCTION 30,000 ft² 0.55 W/m².°C Wall U value (W/m².°C) 0.10 Btu/hr.ft² .°F Typical Building Size 2,788 m² Roof U value (W/m².°C) 0.40 W/m².°C 0.07 Btu/hr.ft² .°F Typical Footprint (m²) 2,788 m² 30,000 ft² 4.17 W/m².°C 0.73 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.06 Defined as Exterior Zone Typical # Stories 0.69 Floor to Floor Height (m) 4.6 m 15.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A TOTAL Ventilation System Type CAV VAV VAVR System Present (%) 100% Min. Air Flow (%) (Minimum Throttled A 50% Occupancy or People Density 323 ft²/person %OA 22.97% m²/person Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period 90% resh Air Requirements or Outside Air 20 L/s.person 42 CFM/person Fresh Air Control Type 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.57 CFM/ft² 2.90 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² Infiltration Rate Operation occupied period 50% (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Peak Design Cooling Load Peak Zone Sensible Load Switchover Point KJ/kg. 18 631.563 245,685 64.4 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm Controls Type System Present (%) HVAC Room 23.4 Btu/lbm Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic DDC/Pneumatic All DDC 11,429 Total air circulation or Design air 2.90 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control Mode Control mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Air Summer Temperature 71.6 °F 55.4 °F 22 °C 13 Summer Humidity (%) 50% 100% Enthalpy
Winter Occ. Temperature
Winter Occ. Humidity 65.5 KJ/kg 22 °C 28.2 Btu/lbm 23.4 Btu/lbm 54.5 71.6 60.8 30% 45% Enthalpy Winter Unocc. Temperature 53 K 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 69.8 Winter Unocc. Humidity 30% 21.5 Btu/lbm Enthalpy 50 KJ/kc Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices

Inspection of Control Devices

nspection of Control Devices (Valves,

(Dampers, VAV Boxes)

EXISTING BUILDINGS: SIZE: Food Retail All Baseline

SECTOR BUILDING PROFILE
ITAGE: REGION:
Island Interconnected

LIGHTING													
GENERAL LIGHTING													
Light Level	500 Lux	46.5	ft-candles										
Floor Fraction (GLFF)	0.90		•										
Connected Load	14.5 W/m²	1.3	W/ft²										
Occ. Period(Hrs./yr.)	5000		Light Level (Lux)		300	500	700	1000			Total		
Unocc. Period(Hrs./yr.)	3760		% Distribution			100%					100%		
Usage During Occupied Period	100%		Weighted Average								500		
Usage During Unoccupied Period	20%					051	T.0			T=110			
First va Classica.			Custom Dragant (0/)	-	INC	CFL	T12 15%	T8	HID 5%		D TOTAL 100.0%		
Fixture Cleaning:			System Present (%) CU		3%	2% 0.7		75%	0.7				
Incidence of Practice Interval			LLF		0.7 0.65	0.65	0.6 0.75	0.6	0.80	0.6 0.0			
interval	years		Efficacy (L/W)		15	50	72	88	65		90		
Relamping Strategy & Incidence	Group Spot		Lilicacy (L/VV)	l	15	30	12	00	00	33	10	J	
of Practice	Oloup Opot										EUI	kWh/ft².yr	7.0
o. r radioo											20.	MJ/m².yr	270
ARCHITECTURAL LIGHTING (COR	(RIDORS)										- 1	1110/1111191	
Light Level	500 Lux	46.5	ft-candles										
Floor Fraction (ALFF)	0.10												
Connected Load	13.5 W/m²	1.3	W/ft²										
			•										
Occ. Period(Hrs./yr.)	5000		Light Level (Lux)		300	500	700	1000			Total		
Unocc. Period(Hrs./yr.)	3760		% Distribution			100%					100%		
Usage During Occupied Period	100%		Weighted Average								500		
Usage During Unoccupied Period	100%												
					INC	CFL	T12	T8	HID	T5HO LE			
Fixture Cleaning:			System Present (%)				15%	75%	8%		100.0%		
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6 0			
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.80 0.8			
			Efficacy (L/W)		15	50	72	88	65	95 9	90		
Relamping Strategy & Incidence	Group Spot										EUI	kWh/ft².yr	4.4
of Practice						EUI = Load	V Uro. V	e	-		EUI	MJ/m².yr	1.1 43
SPECIAL PURPOSE LIGHTING						EUI = LUau /	A 1115. A	SF A GLFI				IVIJ/IIIyi	43
Light Level	300.00 Lux	27.9	ft-candles			Fic	oor fraction	on check:	should = 1.	00 1.0	10		
Floor Fraction (HBLFF)	000.00 Eax	27.0	it danaloo				oor maou	311 0110010	ono aia — 11				
Connected Load	14.0 W/m²	1.3	W/ft²										
			1										
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)		300	500	700	1000			Total	1	
Unocc. Period(Hrs./yr.)	4760		% Distribution		100%						100%		
Usage During Occupied Period	0%		Weighted Average		•			<u> </u>			300		
Usage During Unoccupied Period	100%												
					INC	CFL	T12	T8		MH H	PS TOTAL		
Fixture Cleaning:			System Present (%)			0%				100%	100.0%		
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6	.6		
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.55 0.5			
			Efficacy (L/W)		15	50	72	84	88	65 9	00		
Relamping Strategy & Incidence	Group Spot										[
of Practice											EUI	kWh/ft².yr	
												MJ/m².yr	
TOTAL LIGHTING									Overall LP	14.38 W/m²	EUI TOTAL	IAMb/f+2 vr	8
TOTAL LIGHTING									Overan Ei	14.00 **/111	201101742	MJ/m².yr	312
											- 1		
OFFICE EQUIPMENT & PLUG LOA	DS												
Equipment Type	Compute	rs	Monitors	Prin	ters	Copier	rs	Sen	/ers	Plug Loads			
Manager d Davier (M/davies)	55		E4	100	-	200	-	247					
Measured Power (W/device) Density (device/occupant)	55 0.43		51 0.43	100 0.01		200 0.01	ŀ	217 0.02					
Connected Load		W/m²	0.43 0.7 W/m²		N/m²	0.01 0.1 W	/202		W/m²	1.5 W/m²			
Connected Load		W/ft²	0.7 W/ft²	0.00 \			/ft²	0.1		0.14 W/ft²			
Diversity Occupied Period	90%	VV/I (-	90%	90%	VV/IL-	90%	/11-	100%	VV/IL-	90%			
Diversity Unoccupied Period	50%		50%	50%		50%	-	100%	1	50%			
Operation Occ. Period (hrs./year)	2000		2000	2000		2000	Ī	2600		4100			
Operation Unocc. Period (hrs./year)	6760		6760	6760		6760	Ī	6160		4660			
, , , ,			V	1			I						
Total end-use load (occupied period)	2.9	W/m²	0.3 W/ft ²	to see note:	s (cells with	red indicator i	in upper r	ight corner	, type "SHII	FT R2ömpter Serve	ers EUI	kWh/ft2.yr	0.11
Total end-use load (unocc. period)	1.7	W/m²	0.2 W/ft ²									MJ/m².yr	4.42
										Computer Equipme	ent EUI	kWh/ft².yr	0.78
Usage during occupied period	100%											MJ/m².yr	30.2
Usage during unoccupied period	58%									Plug Loa	ds EUI	kWh/ft².yr	0.84
												MJ/m².yr	32.5
FOOD SERVICE EQUIPMENT	E 1011/5 E					100.00/	г	- 10	/ 5	e I		i	
Provide description below:	Fuel Oil / Propane Fu	iel Share:		Electricity F	uel Share:	100.0%			oil / Propane			Electric EL	
									kWh/ft².yr	2.6	EUI	kWh/ft².yr	3.1
									MJ/m².yr	100.0		MJ/m².yr	120.0
REFRIGERATION													
Provide description below:													
Commercial refrigeration display case	\$			1							EUI	kWh/ft².yr	31.0
Commercial remigeration display case	-			J							20.	MJ/m².yr	1200.0
<u> </u>													00.0
BLOCK HEATERS & MISCELLANE	ous												
	-										-		
										Block Heate	ers EUI	kWh/ft².yr	
												MJ/m².yr	
										Miscellaneo	us EUI	kWh/ft².yr	0.3
											1	NA 1/2 [10

COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: Food Retail

SIZE:

VINTAGE:

REGION: Island Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Boilers A/A HP Packaged Stan. High Rooftop System Present (%) 15% 100% Eff./COP 70% 4.50 1.00 Performance (1 / Eff.) 1.43 1.25 1.43 0.59 0.33 0.22 1.00 (kW/kW) Peak Heating Load 11.5 Btu/hr.ft² 36.2 W/m² Seasonal Heating Load 304 MJ/m².yr 7.8 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI Electric Fuel Share 85.0% Fuel Oil / Propane Fuel Share 15.0% Oil Fuel Share kWh/ft².yr 7.8 MJ/m².yr 304 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection 11 2 Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 434 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% 8.3 MJ/m².yr 323 SPACE COOLING A/C Plant Type Centrifugal Chillers
Standard HE Reciprocating Chillers Absorption Chillers Screw Total DX W. H. CW Chillers Open 10.0% 100.0% System Present (%) 90.0% Performance (1 / COP) 0.21 0.19 0.23 0.28 0.3 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water 44.6 °F Condenser Water 30 °C 86 °F 55.4 °F Supply Air 13.0 °C 66 W/m² 570 ft²/Ton Peak Cooling Load 21 Btu/hr.ft² Seasonal Cooling Load 75.2 MJ/m².yr 1.9 kWh/ft².yr (Tertiary Load) Operation (occ. period 4000 hrs/year Note value cannot be less than 2,900 hrs/year) 1.00 Sizing Factor 65.0% A/C Saturation (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.9 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.9 kWh/ft².vr MJ/m².yr 33 SERVICE HOT WATER Service Hot Water Plant Type Fossil Fuel SHW Avg. Tank Elec. Res. Boiler Fossil System Present (%) 30% Fuel Share Eff./COP 65.00 0.75 Blended Efficiency 0.91 Service Hot Water load (MJ/m².yr) 45.5 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI 90% 1.3 0.5 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr kWh/ft2.yr 1.2 47.0 MJ/m².y MJ/m².yr

EXISTING BUILDINGS: Food Retail Baseline

REGION: Island Interconnected SIZE: Ali

System State Pressure CAV 750 Pa 3.0 vg Incidence of Use 100%	HVAC FANS & PUMPS										
Section Sect	CUIDDI V EANC				Ventilation	and Evhau	int Ean One	ration 8 Co	ntrol		
System Design Air Prove 22 U.s.m. 0.57 CPM/Mr Cortrol Fixed Verifieb Verifieb Fixed Verifieb Fixed Verifieb Fixed Verifieb Verifieb Fixed Verifieb Verifieb Verifieb Fixed Verifieb Verifieb Verifieb Verifieb Verifieb Verifieb	SUPPLY FANS]		
	System Design Air Flow 2.9	L/s.m²	0.57 CFM/ft ²	Control							
in Efficiency	System Static Pressure CAV 750) Pa	3.0 wg			Flow		Flow			
in Motor Efficiency interplaced of Motor in Design Cand OAV			3.0 wg								
Incidence of Use				Operation	Continuous	Scheduled	Continuous	Scheduled			
an Obegin Load CAV 4.5 Wint* 0.42 With* 0.42 With* 0.42 With* 0.42 With* 0.42 With* 0.44 With*											
### Comments: ### Co				Incidence of Use	100%		100%				
National Edward 100 Lfs. washnoom 212 CFM/washnoom 212 CFM/washnoom 213 Markon		5 W/m²		Commenter							
Value Valu	ran besign Load VAV 4.5	VV/III-	0.42 W/II	Comments.							
Name Character	EXHAUST FANS				Į.						
Name Character		٦.,	010 0511								
### EF About Stroker (Smoking) Conference (December 1)				nroom							
O.03 ChMrs Chmust System Statis Pressure O.03 ChMrs Chmust System Statis Pressure O.03 ChMrs Chmust System Statis Pressure O.03 ChMrs O.05 Chmust System Statis Pressure O.05 O.05 Chmust System Statis Pressure O.05											
Arbaus System Static Pressure and Efficiency and Motor Efficiency and Motor Efficiency and Motor Efficiency and System Static Properties and System Static Pressure and Efficiency and System Static Pressure and											
an Efficiency 29% 10 10 10 10 10 10 10 1											
an Motor Efficiency **Transport Factor **Tra	Fan Efficiency 25%		1.0 Wg								
1.0 0.02 W/rP 0.02 W											
Market Fan Connected Load Q W/m² W/											
UXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) verage Condenser Fan Power Draw Condenser Pump Condenser Pump ump Design Pow ump Design Pow ump Design Pow ump Efficiency Ump Efficiency Ump Efficiency Ump Efficiency Ump Connected Load US. gmm/To UM/re		W/m²	0.02 W/ft ²								
Vertage Condenser Fan Power Draw 0.020 kW/kW 0.07 kW/Ton 0.12 W/ftP	U.Z		J.JZ W/II								
Vertage Condenser Fan Power Draw 0.020 kW/kW 0.07 kW/Ton 0.12 W/ftP	ALIVII IADV COOLING FOLUDIENT (C.	D									
1.33 W/m² 0.12 W/ft²	AUXILIARY COOLING EQUIPMENT (Condens	er Pump and Coolin	g I ower/Condenser Fans)							
1.33 W/m² 0.12 W/ft²	Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton							
Condenser Pump Cond		ondenser)									
Tump Design Flow yer unit floor area ump Pesign Flow per unit floor area ump Estign Flow per unit floor area ump Estign Flow per unit floor area ump Estign Flow yer unit floor area ump Estign Flow yer unit floor area ump Estign Flow yer yer yer Estign Flow yer	(Cooming Tomon Evap: Contacticon Time Cooled Co	ondonoon,	1.00	0.12							
United Paragraphic United Unite	Condenser Pump										
United Paragraphic United Unite											
Part Persure				3.0 U.S. gpm/Ton							
Unit Control											
Mym2 W/m2				ft							
1.0 W/m² W/ft²											
W/m²											
Content Cont				101/612							
tump Design Flow @ 5 °C (10 °F) delta T	Pump Connected Load		VV/M²	VV/Tt²							
tump Design Flow @ 5 °C (10 °F) delta T											
tump Head Pressure 100 kPa 500 ft tump Efficiency 50% ump Motor Efficiency 80% izing Factor 0.8 ump Connected Load 0.6 W/m² upply Fan Occ. Period 5000 hrs./year upply Fan Unocc. Period 3760 hrs./year whaust Fan Coc. Period 3760 hrs./year whaust Fan Unocc. Period 5000 hrs./year whaust Fan Unocc. Period 3760 hrs./year whaust Fan Energy Consumption 2.0 kWh/m².yr condenser Pump Energy Consumption 4kWh/m².yr condenser Pump Energy Consumption 0.4 kWh/m².yr condenser Pump Energy Consumption 0.6 kWh/m².yr circulating Pump Yearly Operation 7000 hrs./year circulating Pump Energy Consumption 0.6 kWh/m².yr ans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency Inspect/Service Fans & Motors Inspect/Service Pump & Motors EUI kWh/t².yr 4.0	CIRCULATING PUMP (Heating & Cooling)										
tump Head Pressure 100 kPa 500 ft tump Efficiency 50% ump Motor Efficiency 80% izing Factor 0.8 ump Connected Load 0.6 W/m² upply Fan Occ. Period 5000 hrs./year upply Fan Unocc. Period 3760 hrs./year whaust Fan Coc. Period 3760 hrs./year whaust Fan Unocc. Period 5000 hrs./year whaust Fan Unocc. Period 3760 hrs./year whaust Fan Energy Consumption 2.0 kWh/m².yr condenser Pump Energy Consumption 4kWh/m².yr condenser Pump Energy Consumption 0.4 kWh/m².yr condenser Pump Energy Consumption 0.6 kWh/m².yr circulating Pump Yearly Operation 7000 hrs./year circulating Pump Energy Consumption 0.6 kWh/m².yr ans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency Inspect/Service Fans & Motors Inspect/Service Pump & Motors EUI kWh/t².yr 4.0	Pump Design Flow @ 5 °C (10 °F) delta T		0.003 L/s m ²	0.0042 U.S. gpm/ft ² 2.4	IUS anm/I	Ton					
tump Efficiency tump Motor Efficiency tump M					10.0. gpii i	. 011					
tump Motor Efficiency izizing Factor				30 11							
ump Connected Load 0.8 W/m² 0.05 W/m² 0.05 W/tt² W/tt² 0.05 W/tt² W											
supply Fan Occ. Period	Sizing Factor										
Annual Maintenance Annual Maintenance Annual Maintenance Annual Maintenance Annual Maintenance Inspect/Service Fans & Motors Inspect/Service Fars & Motors Inspect/Service Pump & M	Pump Connected Load		0.6 W/m²	0.05 W/ft ²							
Annual Maintenance Annual Maintenance Annual Maintenance Annual Maintenance Annual Maintenance Inspect/Service Fans & Motors Inspect/Service Fars & Motors Inspect/Service Pump & M											
Annual Maintenance Annual Maintenance Annual Maintenance Annual Maintenance Annual Maintenance Inspect/Service Fans & Motors Inspect/Service Fars & Motors Inspect/Service Pump & M	Supply Fan Occ. Period		5000 hrs /vear								
Supply Fan Energy Consumption 39.7 Wh/m².yr											
ixhaust Fan Occ. Period			39.7 kWh/m².vr								
Schaust Fan Unocc. Period 3760 hrs./jear 2.0 kWh/m².yr											
Schaust Fan Unocc. Period 3760 hrs./jear 2.0 kWh/m².yr	Exhaust Fan Occ. Period		5000 hrs./year								
Xxhaust Fan Energy Consumption 2.0 WWh/m².yr	Exhaust Fan Unocc. Period										
Cooling Tower /Condenser Fans Energy Consumption O.4 kWh/m².yr	Exhaust Fan Energy Consumption										
Cooling Tower /Condenser Fans Energy Consumption O.4 kWh/m².yr											
irrculating Pump Yearly Operation 7000 hrs./year 0.6 kWh/m².yr Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 4.0											
ans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Service Pump & Motors Inspect/Service Pump & Motors Inspect/Service Pump & Motors Inspect/Service Pump & Motors Inspect/Service Pump & Motors EUI kWh/ft²-yr 4.0	Cooling Tower /Condenser Fans Energy Consum	nption	U.4 KWN/m².yr								
ans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Service Pump & Motors Inspect/Service Pump & Motors Inspect/Service Pump & Motors Inspect/Service Pump & Motors Inspect/Service Pump & Motors EUI kWh/ft²-yr 4.0	Circulating Pump Yearly Operation		7000 hrs /vear								
Annual Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years)											
(%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 4.0											
Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 4.0	Fans and Pumps Maintenance	Annual Maintenance	e Tasks								
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 4.0			2.11	(%) (years)							
Inspect/Service Pump & Motors EUI kWh/ft².yr 4.0											
				+					EU	LAA/Ib/612	4.0
MJ/m-,yr 153.9		Inspect/Service Pun	ip α iviotors						EUI		
									1	IVIO/IIIT.YI	100.9

REGION: Island Interconnected EXISTING BUILDINGS: Food Retail Baseline SIZE: Ali

EUI SUMMARY							
TOTAL ALL END-USES:	Electricity:		57.4 kWh/ft².yr 2,222.4 MJ/m².yr	Fuel Oil /	Propane:	1.7 kWh/ft².yr	67.1 N
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	7.0	269.9		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
ARCHITECTURAL LIGHTING (COR	1.1	42.6	SPACE HEATING	6.7	258.3	1.7	65.1
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.6	21.7		
OTHER PLUG LOADS	8.0	32.5	SERVICE HOT WATER	1.2	45.0	0.1	2.0
HVAC FANS & PUMPS	4.0	153.9	FOOD SERVICE EQUIPMENT	3.1	120.0		
REFRIGERATION	31.0	1,200.0					
MISCELLANEOUS	0.3	10.0					
BLOCK HEATERS							
COMPUTER EQUIPMENT	0.8	30.2					
COMPUTER SERVERS	0.1	4.4					
ELEVATORS							
OUTDOOR LIGHTING	0.9	33.9					

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REGION:

EXISTING BUILDINGS:

SIZE:

Large Non-Food Retail > 100 kW Island Interconnected CONSTRUCTION 0.55 W/m².°C 0.10 Btu/hr.ft² .°F 20,000 ft² Wall U value (W/m².°C) Typical Building Size 1,859 m² Roof U value (W/m².°C) 0.40 W/m².°C 0.07 Btu/hr.ft² .°F Typical Footprint (m²) 1,859 20,000 ft² 4.17 W/m².°C 0.73 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space 100% Percent Conditioned Space 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.10 Defined as Exterior Zone Typical # Stories 0.75 Floor to Floor Height (m) 5.0 m 16.5 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 269 ft²/person 12.88% %OA m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 20 L/s.person 42 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor 6.21 L/s.m² Total Air Circulation or Design Air Flow 1.22 CFM/ft² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² CFM/ft² Infiltration Rate L/s.m² 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 571.544 Switchover Point KJ/kg. Peak Design Cooling Load Peak Zone Sensible Load 262,842 28.2 Btu/lbm 23.4 Btu/lbm Room air enthalpy Controls Type System Present (%) HVAC Discharge air enthalpy Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 12,227 DDC/Pneumatic Total air circulation or Design air 6.21 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 57.2 °F 69.8 °F 21 °C 14 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

EXISTING BUILDINGS: Large Non-Food Retail Baseline SIZE: > 100 kW

REGION: Island Interconnected

LIGHTING											
GENERAL LIGHTING Light Level	500 Lux 46.	ft-candles									
Floor Fraction (GLFF) Connected Load	0.95	W/ft²									
										-	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4500 4260	Light Level (Lux) % Distribution	400 25%		600 25%	1000			Total 100%	-	
Usage During Occupied Period	95%	Weighted Average	2376	3076	2370				500	-	
Usage During Unoccupied Period	15%										
Fixture Cleaning:		System Present (%)	10%		T12 20%	T8 55%	HID 5%	T5HO LED 0% 0%			
Incidence of Practice		CU	0.7	0.7	0.6	0.6	0.6	0.6 0.6			
Interval	years	LLF Efficacy (L/W)	0.65 15	0.65 50	0.75 72	0.80	0.80 65	0.80 0.80 95 90			
Relamping Strategy & Incidence of Practice	Group Spot	Emodey (E/VV)	10	30	72	00	00	30 30	EUI	kWh/ft².yr	8.9
ARCHITECTURAL LIGHTING										MJ/m².yr	345
Light Level	500 Lux 46.5	ft-candles									
Floor Fraction (ALFF)	0.05										
Connected Load	31.7 W/m ² 2.9	W/ft²									
Occ. Period(Hrs./yr.)	4500	Light Level (Lux)	300		700	1000			Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	4260 95%	% Distribution Weighted Average	30%	40%	30%				100% 500	-	
Usage During Unoccupied Period	50%	vveignica / tverage							300	-	
First va Classica		Custom Dragont (0/)	INC		T12	T8 50%	HID	T5HO LED			
Fixture Cleaning: Incidence of Practice		System Present (%) CU	30%	5% 0.7	10% 0.6	0.6	0.6	0% 5% 0.6 0.6			
Interval	years	LLF	0.65	0.65	0.75	0.80	0.80	0.80 0.80			
Relamping Strategy & Incidence	Group Spot	Efficacy (L/W)	15	50	72	88	65	95 90			
of Practice	Стопр			EUI = Load	Y Hre Y SE	E X GLEE			EUI	kWh/ft².yr MJ/m².yr	0.9 36
SPECIAL PURPOSE LIGHTING		_							_	IVIO/III .yi	30
Light Level Floor Fraction (HBLFF)	Lux	ft-candles		Flo	oor fraction	check: sho	ould = 1.00	1.00			
Connected Load	W/m²	W/ft²									
			1			1				1	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4000 4760	Light Level (Lux) % Distribution	300	500	700	1000			Total		
Usage During Occupied Period	0%	Weighted Average			ļ						
Usage During Unoccupied Period	100%		INIC	OF	T40	To		MUI LIBO	TOTAL		
Fixture Cleaning:		System Present (%)	INC	CFL	T12	Т8		MH HPS	TOTAL		
Incidence of Practice		CU	0.7	0.7	0.6	0.6	0.6	0.6 0.6			
Interval	years	LLF Efficacy (L/W)	0.65 15	0.65 50	0.75 72	0.80 84	0.80	0.55 0.55 65 90			
Relamping Strategy & Incidence	Group Spot	Emodey (E/VV)	10	50	72	04	00	55 55		j	
of Practice									EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING						Ov	erall LP	21.07 W/m²	EUI TOTAL	kWh/ft² vr	10
										MJ/m².yr	381
OFFICE EQUIPMENT & PLUG LOA	DS										
Equipment Type	Computers	Monitors	Printers	Copier	rs	Servers	S	Plug Loads			
Measured Power (W/device)	55	51	100	200	\vdash	217					
Density (device/occupant)	0.22	0.22	0.01	0.01		0.02					
Connected Load	0.5 W/m²	0.4 W/m²	0.0 W/m²	0.1 W		0.1 W/		1.15 W/m²			
Diversity Occupied Period	0.0 W/ft² 90%	0.0 W/ft² 90%	0.00 W/ft² 90%	0.01 W	/112	0.01 W/ 100%	11-	0.11 W/ft ² 90%			
Diversity Unoccupied Period	50%	50%	50%	50%		100%		50%			
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	2000 6760	2000 6760	2000 6760	2000 6760		2000 6760		4100 4660			
								,			
Total end-use load (occupied period) Total end-use load (unocc. period)	2.1 W/m² 1.2 W/m²	0.2 W/ft² 0.1 W/ft²	to see notes (cells with	red indicator i	ın upper righ	ht corner, ty	pe "SHIFT	©åmputer Servers	EUI	kWh/ft².yr MJ/m².yr	0.11 4.42
Total end-use load (dilocc. period)	1.2 VV/III	0.1 W/It					Co	mputer Equipmen	EUI	kWh/ft².yr	0.49
Usage during occupied period	100%							Dhortond	FIII	MJ/m².yr	19.14
Usage during unoccupied period	59%							Plug Loads	EUI	kWh/ft².yr MJ/m².yr	0.64 24.92
		_							"		
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	5	Electricity Fuel Share:	100.0%		Fuel Oil /	Propane E	ur I	ΔΙ	l Electric EUI	
i rovide description below.	r der on / r ropane r der onare.			100.070	EU		/h/ft².yr	01	EUI	kWh/ft².yr	1.0
						MJ	J/m².yr			MJ/m².yr	38.7
REFRIGERATION											
Provide description below:			¬								
			_						EUI	kWh/ft².yr MJ/m².yr	1.5 58.1
									1	o/1117.y1	JU. I
BLOCK HEATERS & MISCELLANE	ous						-		-		
								Block Heaters	EUI	kWh/ft².yr	0.3
								Minor	FIII	MJ/m².yr	
								Miscellaneous	201	kWh/ft².yr MJ/m².yr	0.3
•											

EXISTING BUILDINGS: Large Non-Food Retail Baseline

SIZE: > 100 kW

REGION: Island Interconnected

SPACE HEATING												_	
Heating Plant Type					uel Oil / Propa pilers	ane Packaged	A/A HP	W. S. HP	ctric H/R Chiller	Resistance	Total		
		System Present	(%)	Stan. 15%	High	Rooftop				85%	100%	1	
		Eff./COP Performance (1		70%	80%	70%			4.50	1.00	10070	! !	
		(kW/kW)	/ EII.)	1.43	1.25	1.43	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	54.5 W/m ² 327 MJ/m ² .yr		17.3 Btu/hr.ft² 8.4 kWh/ft².yr										
Electric Fuel Share	85.0% Fuel C	oil / Propane Fuel	Share 15.0%]	Oil Fuel Sha	ire]				All Electric EUI kWh/ft².yr	8.4
Boiler Maintenance	Annual Ma	aintenance Tasks		Incidence	1							MJ/m².yr	327
	Fire Side	Inspection		(%) 75%	,							Fuel Oil / Propane El kWh/ft².yr	UI 12.1
	Water Sic	le Inspection for S of Controls & Sa		100% 100%								MJ/m².yr	467
	Inspection	of Burner Analysis & Burne		100%								Market Composite E kWh/ft².yr	UI 9.0
	ride odd	Thay sis a Dunic	ост ир	3070	<u> </u>							MJ/m².yr	348
SPACE COOLING													
A/C Plant Type													ļ
			Centrifuga Standard	l Chillers HE	Screw Chillers	Reciprocat Open		Absorption W. H.	Chillers CW	Total			
		System Present COP				5.0%	85.0%)		100.0%			
		Performance (1		0.19		0.27	0.38		1.00				
		(kW/kW) Additional Refrig											
		Related Informati	ion										
Control Mode		Incidence of Use	Fixed	Reset	1								
		Chilled Water	Setpoint										
		Condenser Water	er		<u> </u>								
				,		,							
Setpoint		Chilled Water Condenser Water			44.6 86	°F °F							
		Supply Air	14.0	°C	57.2	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	90 W/m² 106.8 MJ/m².yr		Stu/hr.ft² 420 Wh/ft².yr	ft²/Ton									
Sizing Factor	1.00												
A/C Saturation	75.0%												
(Incidence of A/C)													
Electric Fuel Share	100.0% Fuel 0	il / Propane Fuel	Share]									
Chiller Maintenance	Annual Ma	aintenance Tasks			Frequency								
		ontrol, Safeties &		(%)	(years)								
	Inspect C Megger M		lling and Bearings										
		er Tube Cleaning											
	Eddy Cur	rent Testing										4851 41 518	
	Spectrock	nemical Oil Analys	is									All Electric EUI kWh/ft².yr	1.1
Cooling Tower/Air Cooled Condense	er Maintenan Annual M	aintenance Tasks		Incidence	Frequency							MJ/m².yr	43
-	Inspection	/Clean Spray No	rzles	(%)	(years)							Fuel Oil / Propane El kWh/ft².yr	UI
		ervice Fan/Fan Mo										MJ/m².yr	
		erify Operation of	Controls									Market Composite E	
												kWh/ft².yr MJ/m².yr	1.1 43
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fue	el SHW	Avg. Tank			Boiler	Ī			Fossil		Elec. Res.	
2	System P	resent (%)				10%		Fuel Share		10%		90%	
Service Hot Water load (MJ/m².yr)	Eff./COP 17.3		0.65	1	1	0.75	J	Blended E	ıııcıency	0.75		0.91	
(Tertiary Load)				-	All Electric El	ال]	Fuel 0	Oil / Propan	e EUI		Market Composite E	UI
Wetting Use Percentage	90%				kWh/ft².yr MJ/m².yr	0.5 19			kWh/ft².yr MJ/m².yr	0.6 23		kWh/ft².yr MJ/m².yr	0.5 19.4
				1	ivio/iiir.yi	19	1	1	IVIO/IIIT.YI	23		iviJ/IIF.yI	13.4

COMMERCIAL SECTOR BUILDING PROFILE

VINTAGE:

EXISTING BUILDINGS:

Large Non-Food Retail Baseline

SIZE:

> 100 kW

Inspect/Service Pump & Motors

REGION: Island Interconnected

EUI

kWh/ft².yr

MJ/m².yr

275.9

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan 1.22 CFM/ft² 3.0 wg System Design Air Flow System Static Pressure CAV 6.2 L/s.m² 750 Pa Control red Variable Fixed Variable Flow Flow System Static Pressure VAV 750 Pa wg Incidence of Use 100% 100% Fan Efficiency 60% Operation Continuous Scheduled Continuous Scheduled Fan Motor Efficiency 88% Sizing Factor 1.00 8.8 Incidence of Use 90% 10% 90% 10% Fan Design Load CAV 0.82 W/ft² 8.8 W/m² Fan Design Load VAV 0.82 W/ft² Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 50 L/s.washroom 0.1 L/s.m² 106 CFM/washroom 0.01 CFM/ft² Other Exhaust (Smoking/Conference) 0.1 L/s.m² CFM/ft² Total Building Exhaust 0.2 L/s.m² 0.03 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 1.0 0.2 W/m² 0.02 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.07 kW/Ton 0.17 W/ft² 0.020 kW/kW 1.80 W/m² Condenser Pump Pump Design Flow Pump Design Flow per unit floor area I/s KW U.S. gpm/Ton U.S. gpm/ft² L/s.m² 45 kPa 50% Pump Head Pressure 15 ft Pump Efficiency Pump Motor Efficiency 80% Sizing Factor 1.0 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) 0.0057 U.S. gpm/ft² Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 0.004 L/s.m² 2.4 U.S. gpm/Ton kPa Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 8.0 Pump Connected Load W/ft² W/m² Supply Fan Occ. Period 5500 hrs./year Supply Fan Unocc, Period 3260 hrs./year Supply Fan Energy Consumption 74.4 kWh/m².yr Exhaust Fan Occ. Period 5500 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 3260 hrs./year 1.7 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.5 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 7000 hrs./year kWh/m2.yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts

EXISTING BUILDINGS: SIZE:
Large Non-Food Retail > 100 kW
Baseline

EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		30.3 kWh/ft².yr 1,173.7 MJ/m².yr	Fuel Oil /	Propane:	1.9 kWh/ft².yr	72.4 M	J/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	8.9	344.8		kWh/ft2.yr	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr	
ARCHITECTURAL LIGHTING	0.9	36.5	SPACE HEATING	7.2	278.0	1.8	70.1	
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.8	32.2			
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.4	17.1	0.1	2.3	
HVAC FANS & PUMPS	7.1	275.9	FOOD SERVICE EQUIPMENT	1.0	38.7			
REFRIGERATION	1.5	58.1						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.5	19.1						
COMPUTER SERVERS	0.1	4.4						
ELEVATORS/ESCALATORS								
OUTDOOR LIGHTING	0.9	33.9						

EXISTING BUILDINGS: SIZE: REGION: Non-Food Retail < 100 kW Island Interconnected Baseline CONSTRUCTION 0.43 W/m².°C 0.07 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² 4.17 W/m².°C 0.73 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space 100% Percent Conditioned Space 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.10 Defined as Exterior Zone Typical # Stories 0.75 Floor to Floor Height (m) 5.0 m 16.5 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 269 ft²/person 18.18% %OA m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 20 L/s.person 42 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor 1.25 Total Air Circulation or Design Air Flow 0.87 CFM/ft² 4.40 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.42 L/s.m² 0.08 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 303.354 Peak Zone Sensible Load 149,003 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 6,932 DDC/Pneumatic Total air circulation or Design air 4.40 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 57.2 °F 69.8 °F 21 °C 14 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

EXISTING BUILDINGS: Non-Food Retail Baseline SIZE: < 100 kW

LIGHTING												
GENERAL LIGHTING Light Level	500	Luv	46.5	ft-candles								
Floor Fraction (GLFF)	0.95	Lux	40.5	rt-carides								
Connected Load	20.5	W/m²	1.9	W/ft²								
Occ. Period(Hrs./yr.)	3500			Light Level (Lux)	40	00 500	600	1000		Total	1	
Unocc. Period(Hrs./yr.)	5260			% Distribution	25	% 50%	25%			100%		
Usage During Occupied Period Usage During Unoccupied Period	95% 15%			Weighted Average						500		
					IN		T12					
Fixture Cleaning: Incidence of Practice				System Present (%) CU	10 0.		20%					
Interval		years		LLF	0.6		0.75	0.80 0.80	0.80 0.80			
				Efficacy (L/W)	1	5 50	72	88 65	95 90			
Relamping Strategy & Incidence of Practice	Group	Spot								EUI	kWh/ft².yr	7.5
										201	MJ/m².yr	289
ARCHITECTURAL LIGHTING Light Level	500	Lux [16 E	ft-candles								
Floor Fraction (ALFF)	0.05	Lux	40.5	it-cardies								
Connected Load	31.7	W/m²	2.9	W/ft²								
Occ. Period(Hrs./yr.)	3500			Light Level (Lux)	30	00 500	700	1000		Total		
Unocc. Period(Hrs./yr.)	5260			% Distribution	30		30%			100%		
Usage During Occupied Period Usage During Unoccupied Period	95% 50%			Weighted Average						500		
Usage During Officeupled Feriod	3070				IN	C CFL	T12	T8 HID	T5HO LED	TOTAL	-	
Fixture Cleaning:				System Present (%)	30		10%		0% 5%			
Incidence of Practice Interval	<u> </u>	years		CU LLF	0.		0.6 0.75	0.6 0.6 0.80 0.80	0.6 0.6 0.80 0.80			
				Efficacy (L/W)	1		72					
Relamping Strategy & Incidence of Practice	Group	Spot								EUI	kWh/ft².yr	0.9
or Fractice						EUI = Load	d X Hrs. X	SF X GLFF		EUI	MJ/m².yr	34
SPECIAL PURPOSE LIGHTING		ı [£1		Б	FI 6	dan abada abada a	100	т Т	•	
Light Level Floor Fraction (HBLFF)		Lux		ft-candles		Į.	Floor frac	tion check: should = 1	1.00 1.00	1		
Connected Load		W/m²		W/ft²								
Occ. Period(Hrs./yr.)	3500			Light Level (Lux)	30	00 500	700	1000		Total	1	
Unocc. Period(Hrs./yr.)	5260			% Distribution	30	300	700	1000		Total	-	
Usage During Occupied Period	0%			Weighted Average								
Usage During Unoccupied Period	100%				IN	C CFL	T12	T8	MH HPS	TOTAL		
Fixture Cleaning:				System Present (%)								
Incidence of Practice Interval				CU LLF	0.6		0.6 0.75	0.6 0.6 0.80 0.80	0.6 0.6 0.55 0.55			
Interval		years		Efficacy (L/W)	0.6		72					
Relamping Strategy & Incidence	Group	Spot			<u>.</u>							
of Practice										EUI	kWh/ft².yr MJ/m².yr	
											-	
TOTAL LIGHTING								Overall LF	21.07 W/m ²	EUI TOTAL	.kWh/ft².yr MJ/m².yr	8 323
												OLO
OFFICE EQUIPMENT & PLUG LOA	ADS											
Equipment Type		Compute	rs	Monitors	Printers	Copi	iers	Servers	Plug Loads	1		
Measured Power (W/device)		55		51	100	200		217				
Density (device/occupant)		0.22	\\/\ma2	0.22	0.01	0.01	\A//ma2	0.02	1.45 W/m2			
Connected Load			W/m² W/ft²	0.4 W/m² 0.0 W/ft²	0.0 W/m² 0.00 W/ft²		W/m² W/ft²	0.1 W/m² 0.01 W/ft²	1.15 W/m² 0.11 W/ft²			
Diversity Occupied Period		90%		90%	90%	90%		100%	90%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year)		50% 2000		50% 2000	50% 2000	50% 2000		2000	50% 4100			
Operation Unocc. Period (hrs./year)		6760		6760	6760	6760		6760	4660			
Total and use lead (accomised nation)	Г	2.4	W/m²	0.2 10//6/2	to one notes (selle ui	th sodination		right corner time "CI	IIII (Cellen, des Ces ces	JEIII	LAA/b-/642	0.11
Total end-use load (occupied period) Total end-use load (unocc. period)	-		W/m²	0.2 W/ft ² 0.1 W/ft ²	to see notes (ceils wi	in red indicato	or in upper	right corner, type "SH	iir i damputei Serveis	EUI	kWh/ft².yr MJ/m².yr	4.42
		,							Computer Equipmen	tEUI	kWh/ft².yr	0.49
Usage during occupied period Usage during unoccupied period		100% 59%							Plug Loads	FIII	MJ/m².yr kWh/ft².yr	19.14
osage during diloccupied period		3376							i lug Loau.	SLOI	MJ/m².yr	24.92
FOOD SERVICE EQUIPMENT				-								
Provide description below:		Fuel Oil / P	ropane Fuel Sh	5	Electricity Fuel Share	: 100.0%		Fuel Oil / Propa	ne EUI	Al	l Electric EUI	
				1]	-		EUI kWh/ft².yr		EUI	kWh/ft².yr	
								MJ/m².yr		1	MJ/m².yr	
REFRIGERATION												
Provide description below:					1					EUI	L\\\/b/f+2 · · ·	
					J					201	kWh/ft².yr MJ/m².yr	
										+		
BLOCK HEATERS & MISCELLANE	OUS											
									Block Heaters	EUI	kWh/ft².yr	0.3
									Miscellaneous	EIII	MJ/m².yr	0.3
									wiscellaneous	5 5 0 1	kWh/ft².yr MJ/m².yr	10

EXISTING BUILDINGS: SIZE:
Non-Food Retail < 100 kW

REGION: Island Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistanc Boilers Packaged A/A HP Total Stan High Rooftop System Present (%) 15% 85% 100% Eff./COP 70% 80% 1.70 3.00 1.00 Performance (1 / Eff.) 1.43 1.25 1.43 0.59 0.33 0.22 1.00 (kW/kW) Peak Heating Load 53.9 W/m² 17.1 Btu/hr.ft² 324 MJ/m².vr Seasonal Heating Load 8.4 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 85.0% Fuel Oil / Propane Fuel Share 15.0% Oil Fuel Share 8.4 MJ/m².yr 324 Boiler Maintenance Annual Maintenance Tasks Fuel Oil / Propane EUI kWh/ft².yr (%) 75% Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 462 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% 8.9 MJ/m².yr 344 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Chillers Open W. H. CW System Present (%) COP 100.0% 100.0% Performance (1 / COP) 0.21 0.19 0.23 0.27 0.38 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 14.0 °C Supply Air 96 W/m² 30 Btu/hr.ft² 396 ft²/Ton Peak Cooling Load Seasonal Cooling Load 120.2 MJ/m².yr 3.1 kWh/ft².yr (Tertiary Load) 1.00 Sizing Factor 70.0% A/C Saturation (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 1.3 kWh/ft2.yr MJ/m².yr 49 Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 1.3 kWh/ft².vr MJ/m².yr 49 DOMESTIC HOT WATER Service Hot Water Plant Type Fossil Fuel SHW Avg. Tank Boiler Fossil Elec. Res. System Present (%) 10% Fuel Share 5% Eff./COP 0.65 0.75 Blended Efficiency 1.50 0.91 Service Hot Water load (MJ/m².yr) 17.3 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI 90% 0.3 0.5 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr kWh/ft2.yr MJ/m².yr 18.6 MJ/m2.yı

EXISTING BUILDINGS: SIZE:
Non-Food Retail < 100 kW
Baseline

TAGE: REGION: Island Interconnected

HVAC FANS & PUMPS												
SUPPLY FANS						Ventilation	and Evhau	ot Ean One	ration & Co	ntrol		
SUPPLI FANS							ion Fan		ist Fan	nitoi		
System Design Air Flow 4.	4 L/s.m ²	0.87	CFM/ft ²	Control		Fixed	Variable	Fixed	Variable			
	50 Pa		wg	Control		i ixeu	Flow	1 IXCU	Flow			
	50 Pa	3.0	mg wa	Incidence of Use		100%	I IOW	100%	I IUW			
		3.0	wg				Cabadulad		Cabadulad			
Fan Efficiency 60				Operation		Continuous	Scheduled	Jontinuous	Scheduled			
Fan Motor Efficiency 88				l								
Sizing Factor 1.0				Incidence of Use		90%	10%	90%	10%			
Fan Design Load CAV 6	5.2 W/m ²		W/ft²									
Fan Design Load VAV 6.	.2 W/m²	0.58	W/ft²		Comments:							
EXHAUST FANS												
EXHAUST FANS												
Washroom Exhaust 5	0 L/s.washro	nom	106 CFM/was	shroom								
	.1 L/s.m²		0.02 CFM/ft ²									
	.1 L/s.m²		0.02 CFM/ft ²									
	.2 L/s.m²		0.02 CFM/ft ²									
	50 Pa		1.0 wg									
Fan Efficiency 25												
Fan Motor Efficiency 75												
Sizing Factor 1.												
	0.3 W/m ²	0.03	W/ft²									
0	···	3.00										
AUXILIARY COOLING EQUIPMENT (Conder	nser Pump ar	nd Cooling Tow	er/Condenser Fans)								
Average Condensor For Device Draw		ĺ	0.030 144/444	0.07	AM/Ton							
Average Condenser Fan Power Draw			0.020 kW/kW		kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled (Condenser)		1.91 W/m ²	0.18	VV/ft²							
		•										
Condenser Pump												
·												
Pump Design Flow		j	L/s.KW		J.S. gpm/Ton							
			L/s.m²									
Pump Design Flow per unit floor area					U.S. gpm/ft ²							
Pump Head Pressure			45 kPa	15	π							
Pump Efficiency			50%									
Pump Motor Efficiency			80%									
Sizing Factor			1.0									
Pump Connected Load			W/m²		W/ft²							
		!										
OIDOUL ATINO DUMP (1)												
CIRCULATING PUMP (Heating & Cooling)												
Pump Design Flow @ 5 °C (10 °F) delta T	ĺ	0.004	L/s.m²	0.0061 U.S. gpm/ft ²	2.	4 U.S. gpm/	Ton					
		0.004			2.4	To.S. gpiii/	1011					
Pump Head Pressure			kPa	ft								
Pump Efficiency		50%										
Pump Motor Efficiency		80%										
Sizing Factor		0.8										
Pump Connected Load			W/m²	W/ft²								
		•										
Supply For Occ. Boried	i	EEOO	bro Avoor									
Supply Fan Occ. Period			hrs./year									
Supply Fan Unocc. Period			hrs./year									
Supply Fan Energy Consumption		52.7	kWh/m².yr									
Exhaust Fan Occ. Period		5500	hrs./year									
Exhaust Fan Unocc. Period			hrs./year									
Exhaust Fan Energy Consumption			kWh/m².yr									
Exhaust Fall Ellergy Consumption	I.	2.3	STTEPHE . YI									
Condenses Dimen Factors Consumer #5-	I		IAMb/ma2									
Condenser Pump Energy Consumption	mantin :		kWh/m².yr									
Cooling Tower /Condenser Fans Energy Consu	umption	0.6	kWh/m².yr									
Circulating Pump Yearly Operation		7000	hrs./year									
Circulating Pump Energy Consumption			kWh/m².yr									
Fans and Pumps Maintenance	Annual Ma	aintenance Task	s	Incidence Frequency								
				(%) (years)								
	Inspect/Se	rvice Fans & Mo	otors	, , , , , , , , ,								
		just Belt Tension										
	Inchect/Co	ruico Dumo º M	lotoro	 					Г	EUI	kWh/ft².yr	5.2
	inspect/Se	rvice Pump & M	101015							EUI	MJ/m².yr	200.3

REGION: Island Interconnected

EXISTING BUILDINGS: Non-Food Retail Baseline SIZE: < 100 kW

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		24.3 kWh/ft².yr 942.4 MJ/m².yr	Fuel Oil	Propane:	1.8 kWh/ft².yr	69.9 M.	J/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	7.5	288.7		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	0.9	33.9	SPACE HEATING	7.1	275.0	1.8	69.3	
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.9	34.1			
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	18.1	0.0	0.6	
HVAC FANS & PUMPS	5.2	200.3	FOOD SERVICE EQUIPMENT					
REFRIGERATION								
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.5	19.1						
COMPUTER SERVERS	0.1	4.4						
ELEVATORS/ESCALATORS								
OUTDOOR LIGHTING	0.9	33.9						

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REGION:

EXISTING BUILDINGS:

SIZE:

Large Accommodation > 100 kW Island Interconnected Baseline CONSTRUCTION 0.38 W/m².°C 0.07 Btu/hr.ft² .°F 40,000 ft² Wall U value (W/m².°C) Typical Building Size 3,717 m² Roof U value (W/m².°C) 0.38 W/m².°C 0.07 Btu/hr.ft² .°F Typical Footprint (m²) 1,239 13,333 ft² 3.84 W/m².°C 0.68 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.28 Defined as Exterior Zone Typical # Stories 0.57 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 10% 90% 100% Min. Air Flow (%)
(Minimum Throttled Air 60% Occupancy or People Density 495 ft²/person 5.42% %OA 46 m²/person Occupancy Schedule Occ. Period 50% Occupancy Schedule Unocc. Period 80% resh Air Requirements or Outside Air 8 16 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.59 CFM/ft² 3.01 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 1.00 L/s.m² 0.20 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 492.851 Peak Zone Sensible Load 363,672 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 16,918 DDC/Pneumatic Total air circulation or Design air 3.01 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 71.6 °F 55.4 °F 13 °C 22 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 18 °C 64.4 °F Winter Unocc. Humidity 30% 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

EXISTING BUILDINGS: Large Accommodation Baseline SIZE: > 100 kW

LIGHTING GENERAL LIGHTING (SUITES) Light Level Floor Fraction (GLFF) Connected Load Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period Fixture Cleaning: Incidence of Practice Interval Relamping Strategy & Incidence of Practice LOBBY, BALLROOMS, CORRIDOR Light Level	0.75 14.3 W/m² 1.3 2500 6260 50% 25% years Group Spot S, BACK OF HOUSE OTHER	Internation Internation	Total 100% 125 TOTAL 100.0% EUI kWh/ft².yr 2.8 MJ/m².yr 108
Floor Fraction (ALFF) Connected Load Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period Fixture Cleaning: Incidence of Practice Interval Relamping Strategy & Incidence of Practice	0.25	Wift2 Light Level (Lux) 300 500 700 1000	Total 100% 300 TOTAL 100.0% EUI kWh/ft².yr 2.9 MJ/m².yr 114
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period Fixture Cleaning: Incidence of Practice Interval Relamping Strategy & Incidence of Practice		System Present (%) 1.00	Total 100% 300 TOTAL 100.0%
TOTAL LIGHTING		Overall LP 16.52 W/m²	EUI TOTAL kWh/ft².yr 6 MJ/m².yr 222
OFFICE EQUIPMENT & PLUG LOA			
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	55 0.3 0.4 W/m² 0.0 W/tt² 90% 50% 2000 6760	Nonitors Printers Copiers Servers Plug Loads	
Total end-use load (occupied period) Total end-use load (unocc. period) Usage during occupied period Usage during unoccupied period	2.0 W/m ² 1.0 W/m ² 100% 48%	0.2 W/ft² to see notes (cells with red indicator in upper right corner, type "SHIFT @finputer Servers 0.1 W/ft² Computer Equipment Plug Loads	MJ/m².yr 3.68 EUI kWh/ft².yr 0.45 MJ/m².yr 17.51
FOOD SERVICE EQUIPMENT Provide description below: Kitchen services REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in cool	Fuel Oil / Propane Fuel S	h 2.0% Electricity Fuel Share: 98.0% Fuel Öil / Propane EUI EUI kWh/ft².yr 2.6 MJ/m².yr 100.0	MJ/m².yr 19.12 All Electric EUI EUI kWh/ft².yr 1.3 MJ/m².yr 50.0 EUI kWh/ft².yr 0.8
			MJ/m².yr 30.0
BLOCK HEATERS & MISCELLANE	ous	Block Heaters Miscellaneous	MJ/m².yr

EXISTING BUILDINGS: SIZE:

(Tertiary Load)

REGION:

Large Accommodation > 100 kW Island Interconnected SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Boilers Packaged A/A HP Stan. High Unit System Present (%) 10% 100% 90% Eff./COP 70% 80% 1.70 3.00 1.00 Performance (1 / Eff.) 1.43 1.25 1.43 0.59 0.33 0.22 1.00 (kW/kW) Peak Heating Load 19.0 Btu/hr.ft² 59.8 W/m² 313 MJ/m².vr Seasonal Heating Load 8.1 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 90.0% Fuel Oil / Propane Fuel Share 10.0% Oil Fuel Share ឧ 1 MJ/m².yr 313 Boiler Maintenance Annual Maintenance Tasks Fuel Oil / Propane EUI kWh/ft².yr (%) 75% Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 447 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% 8.4 MJ/m².yr 326 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total HE Chillers Open W. H. CW Standard System Present (%) COP 100.0% 30.0% 70.0% Performance (1 / COP) 0.21 0.19 0.23 0.28 0.38 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 13.0 °C 86 °F 55.4 °F Supply Air 33 W/m² 10 Btu/hr.ft² 1146 ft²/Ton Peak Cooling Load Seasonal Cooling Load 66.7 MJ/m².yr 1.7 kWh/ft².y (Tertiary Load) Operation (occ. perio 3000 hrs/year Note value cannot be less than 2,900 hrs/year) 0.85 Sizing Factor 75.0% A/C Saturation (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.6 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.6 kWh/ft².vr MJ/m².yr 24 DOMESTIC HOT WATER Service Hot Water Plant Type Fossil Fuel SHW Avg. Tank Boiler Fossil Elec. Res. System Present (%) 10% Fuel Share 10% Eff./COP 0.65 0.75 Blended Efficiency 0.75 0.91 Service Hot Water load (MJ/m².yr) 236.6

	All Electric EUI	ruei Oii / Propane EUi	Market Composite E	201
Wetting Use Percentage 90%	kWh/ft².yr 6.7	kWh/ft².yr 8.1	kWh/ft².yr	6.9
	MJ/m².yr 260	MJ/m ² .yr 315	MJ/m².yr	265.5

All Electric EUI

Fuel Oil / Propane EUI

Market Composite EUI

COMMERCIAL SECTOR BUILDING PROFILE

REGION:

Island Interconnected

EUI

kWh/ft².yr MJ/m².yr

86.9

VINTAGE:

EXISTING BUILDINGS:

Fans and Pumps Maintenance

SIZE:

> 100 kW

Large Accommodation
Baseline HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan System Design Air Flow System Static Pressure CAV 3.0 L/s.m² 338 Pa 0.59 CFM/ft² Control Variable Fixed Variable 1.4 wa Flow Flow System Static Pressure VAV 338 Pa wg Incidence of Use 100% 100% Fan Efficiency 45% Operation Continuous Scheduled Continuous Schedule Fan Motor Efficiency 80% Sizing Factor 1.00 Incidence of Use 75% 25% 75% 25% Fan Design Load CAV 0.26 W/ft² 2.8 W/m² 2.8 W/m² Fan Design Load VAV 0.26 W/ft² Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 212 CFM/washroom 0.2 L/s.m² 0.03 CFM/ft² Other Exhaust (Smoking/Conference) 0.1 L/s.m² CFM/ft² Total Building Exhaust 0.3 L/s.m² 0.05 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 1.0 0.3 W/m² 0.03 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.024 kW/kW 0.78 W/m² 0.08 kW/Ton 0.07 W/ft² Condenser Pump 0.053 L/s KW 3.0 U.S. gpm/Ton Pump Design Flow Pump Design Flow per unit floor area 0.003 U.S. gpm/ft² 0.002 L/s.m² Pump Head Pressure Pump Efficiency kPa ft 50% Pump Motor Efficiency 80% Sizing Factor 1.0 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) 0.001 L/s.m² Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 0.0021 U.S. gpm/ft² 2.4 U.S. gpm/Ton 100 kPa 33 ft Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 0.8 Pump Connected Load 0.3 W/m² 0.03 W/ft² Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc, Period 5260 hrs./year Supply Fan Energy Consumption 21.0 kWh/m².yr Exhaust Fan Occ. Period 3500 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 5260 hrs./year 2.6 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.4 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 5000 hrs./year

0.1 kWh/m².yr

Annual Maintenance Tasks

Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors

Incidence Frequency (%)

(years)

EXISTING BUILDINGS: Large Accommodation Baseline SIZE: > 100 kW REGION: Island Interconnected

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		25.6 kWh/ft².yr 993.0 MJ/m².yr	Fuel Oil /	Propane:	2.0 kWh/ft².yr	78.2 MJ/r	m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING (SUITES)	2.8	108.5		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
LOBBY, BALLROOMS, CORRIDORS	2.9	113.7	SPACE HEATING	7.3	281.4	1.2	44.7	
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.5	18.3			
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.0	234.0	0.8	31.5	
HVAC FANS & PUMPS	2.2	86.9	FOOD SERVICE EQUIPMENT	1.3	49.0	0.1	2.0	
REFRIGERATION	0.8	30.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.5	17.5						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS	0.1	3.9						
OUTDOOR LIGHTING	0.4	17.0						

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EXISTING BUILDINGS: SIZE: REGION: Small Accommodation < 100 kW Island Interconnected Baseline CONSTRUCTION 0.38 W/m².°C 0.07 Btu/hr.ft² .°F 20,000 ft² Wall U value (W/m².°C) Typical Building Size 1,859 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² 3.84 W/m².°C 0.68 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space 100% Percent Conditioned Space 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.28 Defined as Exterior Zone Typical # Stories 0.57 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 60% Occupancy or People Density 495 ft²/person 5.24% %OA 46 m²/person Occupancy Schedule Occ. Period 50% Occupancy Schedule Unocc. Period 80% resh Air Requirements or Outside Air 8 16 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) 1.4 3.11 L/s.m² Sizing Factor Total Air Circulation or Design Air Flow 0.61 CFM/ft² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 1.00 L/s.m² 0.20 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 252.853 Peak Zone Sensible Load 188,263 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 8,758 DDC/Pneumatic Total air circulation or Design air 3.11 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 71.6 °F 55.4 °F 13 °C 22 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 18 °C 64.4 °F Winter Unocc. Humidity 30% 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

EXISTING BUILDINGS: Small Accommodation Baseline SIZE: < 100 kW

Baseline													
LIGHTING GENERAL LIGHTING (SUITES) Light Level Floor Fraction (GLFF) Connected Load	125 Lux 0.85 14.3 W/m²	11.6 ft	t-candles V/ft²										
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 50% 25%	%	ight Level (Lux) b Distribution /eighted Average		100 25%	125 50%	150 25%	300				25	
Fixture Cleaning: Incidence of Practice Interval	years	Ci LL	ystem Present (%) U LF fficacy (L/W)		1NC 70% 0.7 0.65	20% 0.7 0.65 50	T12 5% 0.6 0.75 72	T8 5% 0.6 0.80 88	0.6 0.80 65	0% 0.6	DED TOT 0% 100.0 0.6 0.80 90		
Relamping Strategy & Incidence of Practice	Group Spot		, ,				'	'	'	•	EUI	kWh/ft².yr MJ/m².yr	3.2 123
LOBBY, BALLROOMS, CORRIDOR Light Level Floor Fraction (ALFF) Connected Load	300 Lux 0.15 23.3 W/m ²		t-candles //ft²								l	WO/III .yi	123
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 85% 50%	%	ight Level (Lux) 5 Distribution /eighted Average		300 100%	500 CFL	700	1000	LIID	T5HO	,	00	
Fixture Cleaning: Incidence of Practice Interval	years	C LL	ystem Present (%) U LF fficacy (L/W)		40% 0.7 0.65 15	10% 0.7 0.65 50	T12 35% 0.6 0.75 72	T8 10% 0.6 0.80 88	0.6 0.80 65	0% 0.6	5% 100.0 0.6 0.80 90		
Relamping Strategy & Incidence of Practice	Group Spot				E	UI = Load	X Hrs. X S	SF X GLFF			EUI	kWh/ft².yr MJ/m².yr	1.8 68
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	300.00 Lux 14.0 W/m²	27.9 ft	t-candles					n check: sh	nould = 1.0	0	1.00		- 53
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 0% 100%	%	ight Level (Lux) b Distribution /eighted Average		300 100%	500	700	1000				00	
Fixture Cleaning: Incidence of Practice Interval	years	CI LL	ystem Present (%) U LF fficacy (L/W)		0.7 0.65 15	OFL 0% 0.7 0.65 50	0.6 0.75 72	0.6 0.80 84	0.6 0.80 88	100% 0.6	HPS TOT 0% 100.0 0.6 0.55 90		
Relamping Strategy & Incidence of Practice	Group Spot			·	·	·		·		·	EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING								0	verall LP	15.62 W/m²	EUI TOT	AL kWh/ft².yr MJ/m².yr	5 191
OFFICE EQUIPMENT & PLUG LOA	ADS											•	
Equipment Type	Computers		Monitors	Printer	'S	Copie	rs	Serve	rs	Plug Loads			
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	55 0.3 0.4 W/r 0.0 W/r 90% 50% 2000 6760		51 0.3 0.3 W/m ² 0.0 W/ft ² 90% 50% 2000 6760	100 0.05 0.1 W/ 0.01 W/ 90% 50% 2000 6760		200 0.033 0.1 W 0.01 W 90% 50% 2000 6760		217 0.02 0.1 W 0.01 W 100% 100% 2500 6260		1.5 W/m ² 0.14 W/ft ² 70% 25% 3000 5760			
Total end-use load (occupied period) Total end-use load (unocc. period)	2.0 W/r 1.0 W/r		0.2 W/ft² 0.1 W/ft²	to see notes (cells with re	d indicator	in upper ri	ght corner, t		T €a mputer Se		kWh/ft².yr MJ/m².yr kWh/ft².yr	0.10 3.68 0.45
Usage during occupied period Usage during unoccupied period	100% 48%									Plug L	oads EUI	MJ/m².yr kWh/ft².yr MJ/m².yr	17.51 0.49 19.12
FOOD SERVICE EQUIPMENT Provide description below: Kitchen services	Fuel Oil / Propane Fuel \$	Share:		Electricity Fue	l Share:	100.0%	E	EUI kV	/ Propane Vh/ft².yr J/m².yr	EUI 2.6 100.0	EUI	All Electric EUI kWh/ft².yr MJ/m².yr	0.6 25.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coolers/freezers	olers/freezers, refrigerated	buffet cases									EUI	kWh/ft².yr MJ/m².yr	0.4 15.0
BLOCK HEATERS & MISCELLANE	ous									Block I In	aters EUI	kWh/ft².yr	0.3
										Miscellan		MJ/m².yr kWh/ft².yr MJ/m².yr	0.3

EXISTING BUILDINGS: Small Accommodation Baseline

SIZE: < 100 kW

SPACE HEATING													
Heating Plant Type				Fu	uel Oil / Propa	ane		Ele	ctric			Ī	
3 ,1					oilers High	Packaged Unit	A/A HP		H/R Chiller	Resistance	Total		
		System Present (%) Eff./COP		10%		70%	1.70	3.00	4.50	90%	100%		
		Performance (1 / Eff.)		1.43						1.00			
		(kW/kW)	-										
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	64.7 W/m² 351 MJ/m².yr		Btu/hr.ft² kWh/ft².yr									All Electric EUI	
Electric Fuel Share	90.0% Fuel O	il / Propane Fuel Share	10.0%]	Oil Fuel Sha	ire]				kWh/ft².yr	9.1
Boiler Maintenance	Annual Ma	intenance Tasks		Incidence	1							MJ/m².yr	351
	Fire Side I			(%) 75%	_							Fuel Oil / Propane E kWh/ft².yr	13.0
		e Inspection for Scale Build of Controls & Safeties	dup	100%	<u>. </u>							MJ/m².yr	502
	Inspection			100%								Market Composite I kWh/ft².yr	EUI 9.5
	ride Gas /	mayora a Durner det up		3070	<u> </u>							MJ/m².yr	366
SPACE COOLING													
A/C Plant Type											-		
			Centrifuga Standard	Chillers HE	Screw Chillers	Reciprocat Open		Absorption W. H.	Chillers CW	Total			
		System Present (%) COP	4.7	5.4		3.6	100.0%			100.0%			
		Performance (1 / COP)	0.21	0.19		0.28			1.00				
		(kW/kW) Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed	Reset	1						•		
oonii or modo		Chilled Water	Setpoint										
		Condenser Water			1								
Setpoint		Chilled Water Condenser Water	7 30	°C	44.6	°F							
		Supply Air	13.0		55.4								
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	34 W/m² 65.3 MJ/m².yr	11 Btu/hr.ft² 1.7 kWh/ft².yr	1117	ft²/Ton									
Sizing Factor	0.85		Operation	(occ. perio	3000	hrs/vear	Note value	cannot be	less than 2	900 hrs/ve	ar)		
A/C Saturation			орогалог	(ooo. pone		[·	rioto raidi	, car in or bo	1000 110112	,000 1 11 01 7 0	u.,		
(Incidence of A/C)	50.0%												
Electric Fuel Share	100.0% Fuel O	il / Propane Fuel Share]									
Chiller Maintenance	Annual Ma	intenance Tasks		Incidence	Frequency]							
	Inspect Co	ontrol, Safeties & Purge Un	it	(%)	(years)								
		oupling, Shaft Sealing and E											
	Condense	r Tube Cleaning											
		ent Testing										_	
	Spectroch	emical Oil Analysis										All Electric EUI kWh/ft².yr	0.7
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	intenance Tasks		Incidence	Frequency]						MJ/m².yr	27
Cooling Tower/All Cooled Corldense				(%)	(years)							Fuel Oil / Propane B	UI
	Inspect/Se	/Clean Spray Nozzles ervice Fan/Fan Motors										kWh/ft².yr MJ/m².yr	
	Megger M Inspect/Ve	otors rify Operation of Controls										Market Composite I	EUI
						•						kWh/ft².yr MJ/m².yr	0.7 27
DOMESTIC HOT WATER													
			ı			- ·	T					[E. D.	
Service Hot Water Plant Type	Fossil Fue System Pr	esent (%)				Boiler 10%	<u> </u>	Fuel Share		Fossil 10%		Elec. Res. 90%	
Service Hot Water load (MJ/m².yr)	236.6	0.65				0.75		Blended E	fficiency	0.75		0.91	
(Tertiary Load)					All Electric El	п	1	Eucli	Oil / Propan	o ELII	1	Market Composite I	=111
Wetting Use Percentage	90%			,	kWh/ft².yr	6.7	-	ruel	kWh/ft².yr	8.1		kWh/ft².yr	6.9
	_				MJ/m².yr	260			MJ/m².yr	315		MJ/m².yr	265.

COMMERCIAL SECTOR BUILDING PROFILE

VINTAGE:

EXISTING BUILDINGS:

Small Accommodation

SIZE:

< 100 kW

Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors

REGION: Island Interconnected

EUI

kWh/ft².yr MJ/m².yr

46.5

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan System Design Air Flow System Static Pressure CAV 0.61 CFM/ft² 3.1 L/s.m² Control Variable Fixed Variable 338 Pa 1.4 wa Flow Flow System Static Pressure VAV 338 Pa 1.4 wg Incidence of Use 100% 100% Fan Efficiency 45% Operation Continuous Scheduled Continuous Schedule Fan Motor Efficiency 80% Sizing Factor 0.50 Incidence of Use 75% 25% 75% 25% Fan Design Load CAV 0.14 W/ft² 1.5 W/m² 1.5 W/m² 0.14 W/ft² Fan Design Load VAV Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 212 CFM/washroom 0.2 L/s.m² 0.04 CFM/ft² Other Exhaust (Smoking/Conference) 0.1 L/s.m² 0.02 CFM/ft² Total Building Exhaust 0.3 L/s.m² 250 Pa 0.06 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 0.5 0.02 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.024 kW/kW 0.80 W/m² 0.08 kW/Ton 0.07 W/ft² Condenser Pump 0.053 L/s KW 3.0 U.S. gpm/Ton Pump Design Flow Pump Design Flow per unit floor area 0.003 U.S. gpm/ft² 0.002 L/s.m² Pump Head Pressure Pump Efficiency kPa ft 50% Pump Motor Efficiency 80% Sizing Factor 0.5 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) 0.001 L/s.m² Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 0.0021 U.S. gpm/ft² 2.4 U.S. gpm/Ton 100 kPa 33 ft Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 0.5 Pump Connected Load 0.2 W/m² 0.02 W/ft² Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc, Period 5260 hrs./year Supply Fan Energy Consumption 10.9 kWh/m².yr Exhaust Fan Occ. Period 3500 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 5260 hrs./year 1.6 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.4 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 5000 hrs./year 0.1 kWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years)

REGION:

Island Interconnected

EXISTING BUILDINGS: SIZE: Small Accommodation Baseline < 100 kW

EUI SUMMARY 23.5 kWh/ft².yr 908.5 MJ/m².yr Fuel Oil / Propane: 2.1 kWh/ft².yr 81.7 MJ/m².yr TOTAL ALL END-USES: Electricity: Electricity kWh/ft².yr MJ/m².yr 8.2 316.1 0.3 13.4 Fuel Oil / Propane kWh/ft².yr MJ/m².yr 1.3 50.2 END USE: END USE: kWh/ft².yr MJ/m².yr 3.2 123.0 GENERAL LIGHTING (SUITES) GENERAL LIGHTING (SUITES)
LOBBY, BALLROOMS, CORRIDORS
SPECIAL PURPOSE LIGHTING
OTHER PLUG LOADS
HVAC FANS & PUMPS
REFRIGERATION
MISCELLANEOUS SPACE HEATING SPACE COOLING DOMESTIC HOT WATER FOOD SERVICE EQUIPMENT 1.8 68.2 0.5 1.2 0.4 0.3 6.0 19.1 8.0 31.5 234.0 46.5 15.0 25.0 10.0 MISCELLANEOUS
BLOCK HEATERS
COMPUTER EQUIPMENT
COMPUTER SERVERS
ELEVATORS
OUTDOOR LIGHTING 0.5 17.5 0.1 0.4 17.0

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COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: SIZE: REGION: Health Care Baseline ΑII Island Interconnected CONSTRUCTION 0.07 Btu/hr.ft² .°F 95,000 ft² Wall U value (W/m².°C) 0.38 W/m².°C Typical Building Size 8,829 m² Roof U value (W/m2.°C) 0.38 W/m².°C 0.07 Btu/hr.ft².°F Typical Footprint (m²) 1,750 18,830 ft² Glazing U value (W/m².°C) 3.84 W/m².°C 0.68 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) 100% Percent Conditioned Space Percent Conditioned Space Window/Wall Ratio (WIWAR) (%) 0.15 Defined as Exterior Zone Shading Coefficient (SC) Typical # Stories 12.0 ft Floor to Floor Height (m) 3.7 m VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS Ventilation System Type CAVR DDMZ DDMZVV IU 100% O.A TOTAL CAV VAV VAVR System Present (%) 80% Min. Air Flow (%)

(Minimum Throttled Air Volume as Percent of Full Flow) 50% Occupancy or People Density 30 323 ft²/person %OA 34.02% m²/person Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period 90% 75% Fresh Air Requirements or Outside Air 45 95 CFM/person Fresh Air Control Type *(enter a 1, 2 or 3) 1 If Fresh Air Control Type = "2" enter % FA. to the right: 15% 0.5 L/s.m² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.10 CFM/ft² Sizing Factor Total Air Circulation or Design Air Flow 4.41 L/s.m² 0.87 CFM/ft² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² Operation occupied period 50% (air infiltration is assumed to occur during unoccupied hours only if the ventilation system shuts down) Operation unoccupied period 50% Economizer Enthalpy Based Dry-Bulb Based Total Incidence of Use 100% 100% Summary of Design Parameters ####### Switchover Point KJ/ka 18 °C Peak Design Cooling Load Peak Zone Sensible Load 443,312 Btu/lbm 28.2 Btu/lbm Room air enthalov Controls Type System Present (%) HVAC Discharge air enthalpy 23.4 Btu/lbm Equipmer Controls Specific volume of air at 55F & 100% R.H 13.2 ft3/lbm All Pneumatic Design CFM 20,623 DDC/Pneumatic Total air circulation or Design air fk 4.41 l/s.m² All DDC Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Room Supply Air Summer Temperature 24 °C 75.2 °F 57.2 °F 100% 54.5 Summer Humidity (%) 50% 65.5 KJ/kg Enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Winter Occ. Temperature 24 °C 75.2 °F 16.5 61.7 °F Winter Occ. Humidity 30% Enthalpy
Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 45.5 KJ/kg 19.6 Btu/lbm 24 °C 75.2 °F Winter Unocc. Humidity 30% 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication
Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Inspection of PE Switches Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices (Valves, Inspection of Control Devices (Dampers, VAV Boxes)

SIZE:

EXISTING BUILDINGS: Health Care Baseline

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	0.40	ft-candles								
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	8760 40%	Light Level (Lux) % Distribution Weighted Average	50		200 300 50% 50% T12 T8	HID T5F	HO LED	Total 100% 250 TOTAL		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	5% 0.7 0.65	5% 0.7	45% 45% 0.6 0.6 0.75 0.80 72 88	0.6 0.80 0.80	0% .6 0.6	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot								kWh/ft².yr MJ/m².yr	1.1
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.60	ft-candles								
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	8760 65% 20%	Light Level (Lux) % Distribution Weighted Average	300	100%	600 1000			Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC 4% 0.7 0.65	0.7	T12 T8 50% 40% 0.6 0.6 0.75 0.80 72 88	0.6 0. 0.80 0.8	0% 1% .6 0.6	TOTAL 100.0%		
Relamping Strategy & Incidence of Practice	Group Spot		1 -		Irs. X SF X GLFF				kWh/ft².yr MJ/m².yr	5.4 209
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load		ft-candles			fraction check: she	ould = 1.00	1.00		vo/m .yr	203
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 100% 100%	Light Level (Lux) % Distribution Weighted Average	200 50%	50%	500 700		ALL LIDO	Total 100% 250		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC 15% 0.7 0.65	15% 0.7	T12 T8 20% 50% 0.6 0.6 0.75 0.80 72 88	0.6 0. 0.80 0.5		TOTAL 100.0%		
Relamping Strategy & Incidence of Practice	Group Spot								kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING					Ov	verall LPD 13.	72 W/m²	EUI TOTAL I	kWh/ft².yr MJ/m².yr	7 254
OFFICE EQUIPMENT & PLUG LOA		Manitana	Drietere	O a min ma	0	Di				
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load	Computers 54.55 0.48 0.9 W/m² 0.1 W/t²	51 0.48 0.8 W/m ² 0.1 W/ft ²	100 0.02 0.1 W/m² 0.01 W/ft²	200 0.02 0.1 W/m² 0.01 W/ft²		/m² 3.i	g Loads 85 W/m² 36 W/ft²			
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	90% 50% 2000 6760	90% 50% 2000 6760	90% 50% 2000 6760	90% 50% 2000 6760	100% 100% 2600 6160	90 25 411 460	0% 5% 00			
Total end-use load (occupied period) Total end-use load (unocc. period)	5.4 W/m² 2.2 W/m²	0.5 W/ft² 0.2 W/ft²	to see notes (cells with	red indicator in u	pper right corner, ty		npter Servers ter Equipment	l	kWh/ft².yr MJ/m².yr kWh/ft².yr	0.2 8.10 0.9
Usage during occupied period Usage during unoccupied period	100% 40%					Comput	Plug Loads	EUI I	MJ/m².yr kWh/ft².yr MJ/m².yr	35.0 1.7 67.3
FOOD SERVICE EQUIPMENT Provide description below: Commercial food services	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%	EUI kW	/ Propane EUI /h/ft².yr 3. l/m².yr 120.		EUI I	Electric EUI kWh/ft².yr MJ/m².yr	2.1 80.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	lers/freezers, refrigerated buffet case:	s					-		kWh/ft².yr MJ/m².yr	0.4 15.0
BLOCK HEATERS & MISCELLANE	ous					E	Block Heaters		kWh/ft².yr	0.3
							Miscellaneous	EUI I	MJ/m².yr kWh/ft².yr MJ/m².yr	0.3

EXISTING BUILDINGS: Health Care Baseline SIZE:

SPACE HEATING													
Heating Plant Type						el Oil / Prop				ectric			
					Stan.	oilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	ResistanceT	otal	
		System Presen Eff./COP	t (%)		50% 70%		70%	1.70	3.00	4.50	50% 1.00	100%	
		Performance ((kW/kW)	1 / Eff.)		1.43					0.22			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	36.6 W/m² 1052 MJ/m².yr		11.6 B 27.2 k	tu/hr.ft² Wh/ft².yr									
Electric Fuel Share	50.0%	Fuel Oil / Propa	ine Fuel Sh	50.0%	T	Oil Fuel Sha	are		1				All Electric EUI kWh/ft².yr 27.2
Boiler Maintenance		aintenance Tasks		00.070	Incidence	•			1				MJ/m².yr 1052
DOING INVALIDATION	Fire Side Water Sid Inspection Inspection	Inspection le Inspection for a of Controls & Son of Burner Analysis & Burner	Scale Buildup afeties	P	75% 100% 100% 100% 90%								Fuel Oil / Propane EUI kWh/ft²-yr 38.8 MJ/m²-yr 1503 Market Composite EUI kWh/ft²-yr 33.0 MJ/m²-yr 1278
SPACE COOLING													
A/C Plant Type													
		System Presen COP Performance (' (kW/kW) Additional Refri Related Informa	t (%) 1 / COP) gerant	entrifuga tandard 70.0% 4.7 0.21	HE 5.4		Open 3.6	DX 30.0% 2.7		Chillers CW 1 1.00	Total 100.0%		
Control Mode		Incidence of Us Chilled Water Condenser Wat	S	ixed etpoint	Reset								
Setpoint		Chilled Water Condenser Wat Supply Air	ter	7 30 14.0		44.6 86 57.2	°F						
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	67 W/m² 110.4 MJ/m².yr		Btu/hr.ft² kWh/ft².yr	562	ft²/Ton								
Sizing Factor	1.00		0	peration	(occ. perio	3000	hrs/year	Note value	e cannot be	less than 2,9	00 hrs/year)		
A/C Saturation (Incidence of A/C)	60.0%												
Electric Fuel Share	100.0% Fuel C	Oil / Propane Fuel	Share		I								
Chiller Maintenance	Inspect Countries Inspect Coun	er Tube Cleaning	k Purge Unit ealing and Be	arings	Incidence (%)	Frequency (years)							All Electric EUI kWh/ft².yr 1.0
Cooling Tower/Air Cooled Condense	r Maintenan Annual Ma	aintenance Tasks	3		Incidence	Frequency	1						MJ/m².yr 37
	Inspect/So Megger M	n/Clean Spray No ervice Fan/Fan M lotors erify Operation o	lotors		(%)	(years)							Fuel Oil / Propane EUI kWh/ffz.yr MJ/m².yr Market Composite EUI kWh/ft².yr 1.0 MJ/m².yr 37
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Eff./COP	el SHW resent (%)	Avg. Tank 0.65				Boiler 40% 0.75		Fuel Share Blended E		Fossil 40% 0.75		Elec. Res. 60% 0.91
Service Hot Water load (MJ/m².yr) (Tertiary Load)	118.3					All Electric E kWh/ft².yr	UI 3.4]		Oil / Propane			Market Composite EUI
Wetting Use Percentage	90%					MJ/m².yr	130			kWh/ft².yr MJ/m².yr	4.1 158		kWh/ft².yr 3.6 MJ/m².yr 141.1

SIZE:

EXISTING BUILDINGS: Health Care Baseline

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

HVAC FANS & PUMPS													
SUPPLY FANS							\/entilation	and Exhaust	Fan Onera	tion & Contro	ı		
SUFFLI FAINS								ation Fan		ist Fan	"		
System Design Air Flow	4.4 L/s.m ²	0.97	CFM/ft ²	Control			Fixed	Variable	Fixed	Variable			
System Design All Flow System Static Pressure CAV	875 Pa	3.5	wg	COLITION			i-ixeu	Flow	rixeu	Flow			
System Static Pressure VAV	875 Pa		wg	Incidence	of Lloo		80%	20%	100%	FIUW			
	52%	3.3	wg	Operation						Scheduled			
	85%			Operation			Continuo	Ocheduled	Jonanaous	Scrieduled			
	1.00			Incidence	of Lloo		80%	20%	80%	20%			
Fan Design Load CAV	8.7 W/m²	0.01	W/ft²	Incluence	oi ose		0070	2070	0076	2076			
Fan Design Load VAV	8.7 W/m²		W/ft²		C	comments:							
EXHAUST FANS							1						
Washroom Exhaust	100 L/s.wash		212 CFM/wa										
Washroom Exhaust per gross unit area	0.1 L/s.wasi	IIOOIII	0.02 CFM/ft²	SHIOOHI									
Other Exhaust (Smoking/Conference)	0.1 L/s.m²		0.02 CFM/ft²										
			0.10 CFM/ft²										
Total Building Exhaust	0.6 L/s.m ²												
Exhaust System Static Pressure	250 Pa		1.0 wg										
	25%												
	75%												
Sizing Factor	1.0	_	1										
Exhaust Fan Connected Load	0.8 W/m ²	0.08	W/ft²										
AUXILIARY COOLING EQUIPMENT (Cond	lenser Pump	and Cooling Tow	ver/Condenser Fans	i)									
Average Condenser Fan Power Draw			0.034 134/844		0.09 k	M/Ton							
(Cooling Tower/Evap. Condenser/ Air Coole	ed Condenser)		0.024 kW/kW 1.63 W/m²		0.09 k								
Condenser Pump													
Pump Design Flow			0.053 L/s.KW			I.S. gpm/Ton							
Pump Design Flow per unit floor area			0.004 L/s.m ²		0.005 L	I.S. gpm/ft ²							
Pump Head Pressure			100 kPa		33 f								
Pump Efficiency			50%										
Pump Motor Efficiency			80%										
Sizing Factor			1.0										
Pump Connected Load			0.89 W/m²		0.08	N/ft²							
CIRCULATING PUMP (Heating & Cooling))												
Pump Design Flow @ 5 °C (10 °F) delta T		0.003	L/s.m²	0.0043	U.S. gpm/ft ²	2	.4 U.S. gpm/	Ton					
Pump Head Pressure			kPa	0.0043	ft		o.o. gp/11/	1011					
Pump Efficiency		50%	n a	33	1.,								
Pump Motor Efficiency		80%											
Sizing Factor		0.8											
Pump Connected Load			W/m²	0.05	W/ft²								
ump connected Load		0.6	**/**	0.05] vv/it-								
Supply Fan Occ. Period		4000	hrs./year										
Supply Fan Occ. Period Supply Fan Unocc. Period			hrs./year										
Supply Fan Energy Consumption		62.0	kWh/m².yr										
Exhaust Fan Oss Borind		4000	bro Avoor										
Exhaust Fan Occ. Period			hrs./year										
Exhaust Fan Unocc. Period			hrs./year										
Exhaust Fan Energy Consumption		6.4	kWh/m².yr										
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Co	nsumption		kWh/m².yr kWh/m².yr										
Circulating Pump Yearly Operation Circulating Pump Energy Consumption			hrs./year kWh/m².yr										
				T	-								
Fans and Pumps Maintenance	Annual N	/laintenance Task	is .	Incidence									
				(%)	(years)								
		ervice Fans & Me		1									
		djust Belt Tensio		1									
	Inspect/S	ervice Pump & N	Notors	1						E	UI	kWh/ft².yr	6.7
												MJ/m².yr	260.0

EXISTING BUILDINGS: Health Care Baseline SIZE: REGION: Island Interconnected

EUISUMMARY							
TOTAL ALL END-USES:	Electricity:		36.1 kWh/ft².yr 1,397.3 MJ/m².yr	Fuel Oil	Propane:	21.0 kWh/ft².yr	814.8
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	1.1	44.2	·	kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
SECONDARY LIGHTING	5.4	209.4	SPACE HEATING	13.6	526.2	19.4	751.7
TERTIARY LIGHTING			SPACE COOLING	0.6	22.4		
OTHER PLUG LOADS	1.7	67.3	DOMESTIC HOT WATER	2.0	78.0	1.6	63.1
HVAC FANS & PUMPS	6.7	260.0	FOOD SERVICE EQUIPMENT	2.1	80.0		
REFRIGERATION	0.4	15.0					
MISCELLANEOUS	0.3	10.0					
BLOCK HEATERS							
COMPUTER EQUIPMENT	0.9	35.0					
COMPUTER SERVERS	0.2	8.1					
ELEVATORS	0.2	7.7					
OUTDOOR LIGHTING	0.9	33.9					

COMMERCIAL SECTOR BUILDING PROFILE **EXISTING BUILDINGS:** SIZE: REGION: VINTAGE: Island Interconnected Schools Baseline CONSTRUCTION 0.38 W/m².°C 0.07 Btu/hr.ft² .°F 40,000 ft² Wall U value (W/m².°C) Typical Building Size 3,717 m² Roof U value (W/m².°C) 0.38 W/m².°C 0.07 Btu/hr.ft² .°F Typical Footprint (m²) 3,717 m² 40,000 ft² 3.84 W/m².°C 0.68 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 50% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.13 Defined as Exterior Zone Typical # Stories 0.65 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 108 ft²/person 10.15% %OA m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 6 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.58 CFM/ft² 2.96 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.42 L/s.m² 0.08 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 689.051 Peak Zone Sensible Load 385,006 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 17,910 DDC/Pneumatic Total air circulation or Design air 2.96 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 55.4 °F 69.8 °F 13 °C 21 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 18.8 °C 65.84 °F Winter Unocc. Humidity 30% 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year

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Incidence of Annual HVAC Controls Maintenance

Annual Maintenance Tasks

Calibration of Transmitters

Calibration of Panel Gauges Inspection of Auxiliary Devices

Inspection of Control Devices

Incidence

(%)

Incidence of Annual Room Controls Maintenance

Annual Maintenance Tasks

Inspection of PE Switches
Inspection of Auxiliary Devices

Inspection/Calibration of Room Thermosta

Inspection of Control Devices (Valves (Dampers, VAV Boxes)

Incidence

(%)

EXISTING BUILDINGS: Schools Baseline SIZE:

LIGHTING										
GENERAL LIGHTING Light Level	500 Lux	46.5	ft-candles							
Floor Fraction (GLFF)	0.85	40.5	it-cardies							
Connected Load	14.7 W/m²	1.4	W/ft²							
Occ. Period(Hrs./yr.)	2000		Light Level (Lux)	300	500 700	1000		Total	1	
Unocc. Period(Hrs./yr.)	6760		% Distribution		100%			100%		
Usage During Occupied Period Usage During Unoccupied Period	85% 15%		Weighted Average					500	1	
Usage Barring Unbecapied Ferrod	1070			INC	CFL T12		T5HO LED			
Fixture Cleaning:			System Present (%)		70%	30%	0% 0%	100.0%		
Incidence of Practice Interval	years		CU LLF	0.7 0.65	0.7 0.6 0.65 0.75	0.6 0.6 0.80 0.80	0.6 0.6 0.80 0.80			
			Efficacy (L/W)	15	50 72	88 65	95 90			
Relamping Strategy & Incidence	Group Spo	ot						EUI	1.1.1.1/b./f42	3.1
of Practice									kWh/ft².yr MJ/m².yr	122
ARCHITECTURAL LIGHTING		-	-							
Light Level Floor Fraction (ALFF)	400 Lux 0.15	37.2	ft-candles							
Connected Load	18.0 W/m²	1.7	W/ft²							
2 2 1 1 1 1				400	500 700	1000			i	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	2000 6760		Light Level (Lux) % Distribution	400 100%	500 700	1000		Total 100%		
Usage During Occupied Period	90%		Weighted Average					400		
Usage During Unoccupied Period	15%				051 740	Tol	75110	TOT41		
Fixture Cleaning:			System Present (%)	INC 12%	CFL T12 10% 15%	T8 HID 10% 40%	T5HO LED 10% 3%		1	
Incidence of Practice			CU	0.7	0.7 0.6	0.6 0.6	0.6 0.6	100.070		
Interval	years		LLF	0.65	0.65 0.75	0.80 0.80	0.80 0.80			
Relamping Strategy & Incidence	Group Spo	ot	Efficacy (L/W)	15	50 72	88 65	95 90		J	
of Practice	Gloup Spi	ot						EUI	kWh/ft².yr	0.7
		<u>.</u>			EUI = Load X Hrs. X	SF X GLFF			MJ/m².yr	27
SPECIAL PURPOSE LIGHTING Light Level	300.00 Lux	27.9	ft-candles		Floor fract	ion check: should = 1.	.00 1.00	Ī		
Floor Fraction (HBLFF)	500.00 Eux	21.0	it dandes		1 loor mace	ion check. Should = 1.	1.00	1		
Connected Load	W/m²		W/ft²							
Occ. Period(Hrs./yr.)	3000		Light Level (Lux)	300	500 700	1000		Total	1	
Unocc. Period(Hrs./yr.)	5760		% Distribution	100%	500 700	1000		100%		
Usage During Occupied Period	100%		Weighted Average		· ·			300]	
Usage During Unoccupied Period	10%			INIO	051 740	To	MIII LIDO	TOTAL		
Fixture Cleaning:			System Present (%)	INC	CFL T12	T8	MH HPS	TOTAL		
Incidence of Practice			CU	0.7	0.7 0.6	0.6 0.6	0.6 0.6			
Interval	years		LLF	0.65	0.65 0.75	0.80 0.80	0.55 0.55			
Relamping Strategy & Incidence	Group Spo	ot	Efficacy (L/W)	15	50 72	84 88	65 90		J	
of Practice	Стоир орг	Ot .						EUI	kWh/ft².yr	
		<u> </u>							MJ/m².yr	
TOTAL LIGHTING						Overall LP	15.17 W/m ²	EUI TOTAL	kWh/ft².vr	4
									MJ/m².yr	149
OFFICE EQUIPMENT & PLUG LOA	ne									
OTTICE EQUITMENT & LOG EOA	iD3									
Equipment Type	Con	nputers	Monitors	Printers	Copiers	Servers	Plug Loads			
Measured Power (W/device)		55	51	100	200	217				
Density (device/occupant)	<u> </u>	0.05	0.05	0.02	0.02	0.01	0.0141/3			
Connected Load	<u> </u>	0.3 W/m² 0.0 W/ft²	0.3 W/m² 0.0 W/ft²	0.2 W/m ² 0.02 W/ft ²	0.4 W/m² 0.04 W/ft²	0.1 W/m² 0.01 W/ft²	0.2 W/m ² 0.02 W/ft ²			
Diversity Occupied Period		90%	90%	90%	90%	100%	100%			
Diversity Unoccupied Period		50%	50%	50%	50%	100%	50%			
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		2000 6760	2000 6760	2000 6760	2000 6760	2000 6760	3000 5760			
operation choce. I choc (III3./year)		0700	0700	0700	0700	0700	57.00	_		
Total end-use load (occupied period)		1.3 W/m ²	0.1 W/ft ²	to see notes (cells with	red indicator in upper	right corner, type "SHI	FT @mputer Servers		kWh/ft².yr	0.10
Total end-use load (unocc. period)		0.8 W/m ²	0.1 W/ft ²				Computer Equipment		MJ/m².yr kWh/ft².yr	3.68 0.54
Usage during occupied period	10	00%					Computer Equipmen		MJ/m².yr	21.01
Usage during unoccupied period		59%					Plug Loads	EUI	kWh/ft².yr	0.11
									MJ/m².yr	4.23
FOOD SERVICE EQUIPMENT										
Provide description below:	Fuel Oil / Propa	ne Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propan	e EUI		l Electric EUI	
						EUI kWh/ft².yr	0.2		kWh/ft².yr	0.1
						MJ/m².yr	8.0	I	MJ/m².yr	4.0
REFRIGERATION										
Provide description below:				1				(e.u.	LAATIL (612	
				J					kWh/ft².yr MJ/m².yr	3.0
								<u> </u>		3.0
BLOCK HEATERS & MISCELLANE	ous	-								
							Block Heaters	EUI	kWh/ft².yr	
							5.55K FIGURE		MJ/m².yr	
							Miscellaneous	EUI	kWh/ft².yr	0.1
									MJ/m².yr	3

EXISTING BUILDINGS: Schools Baseline SIZE:

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

REGION: Island Interconnected

SPACE HEATING												
Heating Plant Type					el Oil / Propa			Ele			I	
				Stan.	oilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chille	Resistance Total		
		System Present (%) Eff./COP		25% 70%		70%	1.70	3.00	4.50	75% 100° 1.00	%	
		Performance (1 / Eff.) (kW/kW)		1.43					0.22			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	55.8 W/m² 291 MJ/m².yr	17	7.7 Btu/hr.ft² 7.5 kWh/ft².yr	1				ı				
Electric Fuel Share	75.0% Fuel C	il / Propane Fuel Share	25.0%)	Oil Fuel Sha	re]			All Electric EUI kWh/ft².yr	7.5
Boiler Maintenance	Annual Ma	nintenance Tasks		Incidence	1						MJ/m².yr	291
	Fire Side	Inspection		(%) 75%	1						Fuel Oil / Propane E kWh/ft².yr	10.7
	Water Sid	e Inspection for Scale B of Controls & Safeties	uildup	100% 100%							MJ/m².yr	416
	Inspection	of Burner Analysis & Burner Set-u	n	100% 90%							Market Composite I kWh/ft².yr	EUI 8.3
	[. 140 040 .	mayore a Barrier core	P	0070	П						MJ/m².yr	323
SPACE COOLING												
A/C Plant Type			Ot-if			D	Ol-ill	[A b	Obillara	Total		
			Centrifuga Standard		Screw Chillers	Open	DX	Absorption W. H.	CW	Total		
		System Present (%) COP	2.5	5.4		3.6	100.0%		1	100.0%		
		Performance (1 / COF (kW/kW)	0.40	0.19	0.23	0.28	0.37	1.11	1.00			
		Additional Refrigerant Related Information										
		rtolatou milomation										
Control Mode		Incidence of Use	Fixed	Reset	1							
		Chilled Water	Setpoint									
		Condenser Water										
Setpoint		Chilled Water	7	l•c	44.6	°F						
Зефонк		Condenser Water	30	°C	86 55.4	°F						
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	54 W/m² 79.4 MJ/m².yr	17 Btu/hr.f 2.0 kWh/ft²	t² 697	ft²/Ton	30.4							
Sizing Factor	1.00		Operation	(occ. perio	4000	hrs/year	Note value	e cannot be	less than 2	,900 hrs/year)		
A/C Saturation	2.0%					•						
(Incidence of A/C)												
Electric Fuel Share	100.0%	Fuel Oil / Propane Fuel	Sh									
Chiller Maintenance	Annual Ma	intenance Tasks			Frequency							
		ontrol, Safeties & Purge		(%)	(years)							
	Megger M		nd Bearings									
	Condense Vibration	r Tube Cleaning Analysis										
	Eddy Curr	ent Testing emical Oil Analysis									All Electric EUI	
	Орссион	oai oii / aldiyolo		1	1	ļi					kWh/ft².yr MJ/m².yr	1.0 38
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	intenance Tasks			Frequency							
		/Clean Spray Nozzles		(%)	(years)						Fuel Oil / Propane E kWh/ft².yr	UI
	Megger M										MJ/m².yr	
	Inspect/Ve	erify Operation of Contro	ols								Market Composite I kWh/ft².yr	EUI 1.0
											MJ/m².yr	38
DOMESTIC HOT WATER												
Service Hot Water Plant Type	Fossil Fue	el SHW Avg. Ta	ank			Boiler 20%	Į	Fuel Share		Fossil 20%	Elec. Res. 80%	
One-in-like West 1 1 (24)	Eff./COP		.65			0.75		Blended E		0.75	0.91	
Service Hot Water load (MJ/m².yr) (Tertiary Load)	17.3						1					
Wetting Use Percentage	90%			-	All Electric El kWh/ft².yr	0.5			Dil / Propar kWh/ft².yr	0.6	Market Composite I kWh/ft².yr	0.5
					MJ/m².yr	19			MJ/m².yr	23	MJ/m².yr	19.8

EXISTING BUILDINGS: Schools Baseline SIZE:

HVAC FANS & PUMPS													
SUPPLY FANS							Ventilation	and Exhau	ıst Fan One	ration & Co	ontrol		
OCT ET TARG								ion Fan		st Fan	111101		
System Design Air Flow 3.0	L/s.m ²	0.58	CFM/ft ²	Control			Fixed	Variable	Fixed	Variable			
System Static Pressure CAV 250			wg					Flow		Flow			
System Static Pressure VAV 250		1.0	wg	Incidence			100%		100%				
Fan Efficiency 60%				Operation			Continuous	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 88%				la el de e e e	- 4 1 1		050/	750/	050/	750/			
Sizing Factor 1.00 Fan Design Load CAV 1.4	W/m²	0.13	101/613	Incidence	of Use		25%	75%	25%	75%			
	W/m²	0.13			Cc	mments:							
Tan Design Load VAV	VV/111	0.13	VV/IL-		00	mments.							
EXHAUST FANS													
Washroom Exhaust 100	L/s.washro	om	212 CFM/was	hroom									
Washroom Exhaust per gross unit area 0.1			0.01 CFM/ft ²										
Other Exhaust (Smoking/Conference) 0.1			0.02 CFM/ft ²										
Total Building Exhaust 0.2		1	0.03 CFM/ft ²										
	Pa	Ļ	1.0 wg										
Fan Efficiency 25%													
Fan Motor Efficiency 75%													
Sizing Factor 1.0 Exhaust Fan Connected Load 0.2	W/m²	0.02	W/ft²										
LANGUST AN CONFIDENCE LOAD U.Z		0.02	**/15										
AUXILIARY COOLING EQUIPMENT (Condense	er Pump and	d Cooling Tow	er/Condenser Fans)									
		5											
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser)		0.020 kW/kW 1.09 W/m²		0.07 kW 0.10 W								
Condenser Pump													
Pump Design Flow		Γ	0.053 L/s.KW		3.0 U.	S. gpm/Ton							
Pump Design Flow per unit floor area			0.003 L/s.m ²		0.004 U.	S. gpm/ft²							
Pump Head Pressure		1	kPa		ft								
Pump Efficiency			50%										
Pump Motor Efficiency		Į.	80%										
Sizing Factor		-	1.0 W/m²			/ft²							
Pump Connected Load		L	VV/III-			/11-							
CIRCULATING PUMP (Heating & Cooling)													
, , ,													
Pump Design Flow @ 5 °C (10 °F) delta T			L/s.m ²		U.S. gpm/ft ²	2.4	U.S. gpm/	Ton					
Pump Head Pressure		100	kPa	33	ft								
Pump Efficiency		50%											
Pump Motor Efficiency Sizing Factor	-	80% 0.8											
Pump Connected Load	-		W/m²	0.04	W/ft²								
Tump connected Load		0.0	***************************************	0.04	**///								
Supply Fan Occ. Period	Г	2000	hrs./year										
Supply Fan Unocc. Period	-		hrs./year										
Supply Fan Energy Consumption	F		kWh/m².yr										
			•										
Exhaust Fan Occ. Period	-		hrs./year										
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption	-		hrs./year kWh/m².yr										
Exhaust Fan Energy Consumption	L	0.8	MANIMIL. NI										
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consum	nption	0.5	kWh/m².yr kWh/m².yr										
Circulating Pump Yearly Operation	Г	2000	hrs./year										
Circulating Pump Energy Consumption			kWh/m².yr										
Fans and Pumps Maintenance	Annual Mai	intenance Tasks	3	Incidence	Frequency								
				(%)	(years)								
		vice Fans & Mo											
		ust Belt Tension		1									
	Inspect/Serv	vice Pump & M	otors	1							EUI	kWh/ft².yr	0.6 24.0
L												MJ/m².yr	24.0

REGION: Island Interconnected EXISTING BUILDINGS: Schools Baseline SIZE:

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		12.0 kWh/ft².yr 463.6 MJ/m².yr	Fuel Oil /	Propane:	2.8 kWh/ft².yr	108.7 M	J/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	3.1	121.9		kWh/ft2.yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	0.7	27.3	SPACE HEATING	5.6	218.5	2.7	104.1	
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.0	0.8			
OTHER PLUG LOADS	0.1	4.2	DOMESTIC HOT WATER	0.4	15.2	0.1	4.6	
HVAC FANS & PUMPS	0.6	24.0	FOOD SERVICE EQUIPMENT	0.1	4.0			
REFRIGERATION	0.1	3.0						
MISCELLANEOUS	0.1	3.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.5	21.0						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

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COMMERCIAL SECTOR BUILDING PROFILE EXISTING BUILDINGS: SIZE: REGION: VINTAGE: University/College Island Interconnected Baseline CONSTRUCTION 0.38 W/m².°C 0.07 Btu/hr.ft² .°F 70,000 ft² Wall U value (W/m².°C) Typical Building Size 6,506 m² Roof U value (W/m².°C) 0.38 W/m².°C 0.07 Btu/hr.ft² .°F Typical Footprint (m²) 3,253 35,000 ft² Glazing U value (W/m².°C) 3.58 W/m².°C 0.63 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 50% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.30 Defined as Exterior Zone Typical # Stories 0.65 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 90% 10% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 151 ft²/person 17.57% 14 m²/person %OA Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 10 L/s.person 21 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.80 CFM/ft² 4.06 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.14 CFM/ft² 0.70 L/s.m² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Peak Design Cooling Load Peak Zone Sensible Load Switchover Point KJ/kg. ####### 752,785 64.4° Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmen 13.2 ft³/lbm All Pneumatic 35,020 DDC/Pneumatic Total air circulation or Design air 4.06 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Air Summer Temperature 55.4 °F 75.2 °F 13 °C 24 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 65.5 KJ/kg 22 °C 28.2 Btu/lbm 23.4 Btu/lbm 54.5 71.6 °F 60.8 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Da

amper Maintenance		Incidence	Frequency
		(%)	(years)
	Control Arm Adjustment		
	Lubrication		
	Blade Seal Replacement		

Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance

Annual Maintenance Tasks	Incidence (%)
Calibration of Transmitters	
Calibration of Panel Gauges	
Inspection of Auxiliary Devices	
Inspection of Control Devices	

Annual Maintenance Tasks	Incidence
	(%)
Inspection/Calibration of Room Thermostat	
Inspection of PE Switches	
Inspection of Auxiliary Devices	
Inspection of Control Devices (Valves,	
(Dampers, VAV Boxes)	

EXISTING BUILDINGS: University/College Baseline SIZE:

LIGHTING										
GENERAL LIGHTING Light Level	500 Lux	46.5	ft-candles							
Floor Fraction (GLFF)	0.90	40.5	it-caridies							
Connected Load	14.1 W/m²	1.3	W/ft²							
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)	300	500 700	1000		Total		
Unocc. Period(Hrs./yr.)	4760		% Distribution		100%			100%		
Usage During Occupied Period Usage During Unoccupied Period	90% 20%		Weighted Average					500		
				INC	CFL T12		T5HO LED			
Fixture Cleaning: Incidence of Practice			System Present (%) CU	0.7	0.7 0.6	35% 5% 0.6 0.7	0% 0% 0.6 0.6	100.0%		
Interval	years		LLF	0.65	0.65 0.75	0.80 0.80	0.80 0.80			
			Efficacy (L/W)	15	50 72	88 65	95 90			
Relamping Strategy & Incidence of Practice	Group Spot	i .						EUI	kWh/ft².yr	5.4
									MJ/m².yr	207
ARCHITECTURAL LIGHTING COR Light Level	RIDORS 300 Lux	27.0	ft-candles							
Floor Fraction (ALFF)	0.10	21.5	it-candles							
Connected Load	11.4 W/m²	1.1	W/ft²							
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)	300	500 700	1000		Total		
Unocc. Period(Hrs./yr.)	4760		% Distribution	100%				100%		
Usage During Occupied Period Usage During Unoccupied Period	100% 50%		Weighted Average					300		
Usage During Officeupled Feriod	3076			INC	CFL T12	T8 HID	T5HO LED	TOTAL		
Fixture Cleaning:			System Present (%)	8%	10% 15%		0% 2%	100.0%		
Incidence of Practice Interval	years		CU LLF	0.7 0.65	0.7 0.6 0.65 0.75	0.6 0.7 0.80 0.80	0.6 0.6 0.80 0.80			
			Efficacy (L/W)	15	50 72		95 90			
Relamping Strategy & Incidence	Group Spot	:						EUI	LAA#- (612	0.7
of Practice					EUI = Load X Hrs. X	SF X GLFF			kWh/ft².yr MJ/m².yr	0.7 26
SPECIAL PURPOSE LIGHTING			7					_		
Light Level Floor Fraction (HBLFF)	300.00 Lux	27.9	ft-candles		Floor fract	tion check: should = 1	.00 1.00	1		
Connected Load	14.0 W/m²	1.3	W/ft²							
One Berind (Une top)	4000		Liebt Level (Lee)	000	500 700	1000		T-1-1	1	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4000 4760		Light Level (Lux) % Distribution	300 100%	500 700	1000		Total 100%		
Usage During Occupied Period	0%		Weighted Average		ļ.	· · · · · · · · · · · · · · · · · · ·		300		
Usage During Unoccupied Period	100%			INC	CFL T12	Т8	MH HPS	TOTAL		
Fixture Cleaning:			System Present (%)	INC	0%	10	100% 0%			
Incidence of Practice			CU	0.7	0.7 0.6	0.6 0.6	0.6 0.6			
Interval	years		LLF Efficacy (L/W)	0.65 15	0.65 0.75 50 72	0.80 0.80 84 88	0.55 0.55 65 90			
Relamping Strategy & Incidence	Group Spot	:	Lineacy (L/VV)	13	30 12	04 00	05 90		1	
of Practice								EUI	kWh/ft².yr	
									MJ/m².yr	
TOTAL LIGHTING						Overall LP	13.79 W/m ²	EUI TOTAL		6
									MJ/m².yr	233
OFFICE EQUIPMENT & PLUG LOA	DS									
Faulinment Time	Com		Monitors	Drintoro	Coniora	Servers	Divertoods	7		
Equipment Type	Comp	outers	IVIONITORS	Printers	Copiers	Servers	Plug Loads			
Measured Power (W/device)	54	.55	51	100	200	217				
Density (device/occupant)		.31	0.31	0.02	0.02	0.01				
Connected Load		1.2 W/m²	1.1 W/m²	0.1 W/m²	0.3 W/m²	0.1 W/m²	1.3 W/m²			
Diversity Occupied Period		0.1 W/ft² 0%	0.1 W/ft² 90%	0.01 W/ft² 90%	0.03 W/ft² 90%	0.01 W/ft²	0.12 W/ft ² 100%			
Diversity Unoccupied Period	50	0%	50%	50%	50%	100%	50%			
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		000	2000	2000 6760	2000 6760	2600	2000			
Operation Orlocc. Period (riis./year)	67	760	6760	6760	6760	6160	6760			
Total end-use load (occupied period)		3.9 W/m ²	0.4 W/ft ²	to see notes (cells with	red indicator in upper	right corner, type "SHI	FT @mputer Servers		kWh/ft².yr	0.10
Total end-use load (unocc. period)		2.2 W/m²	0.2 W/ft ²				Computer Equipment		MJ/m².yr kWh/ft².yr	3.68
Usage during occupied period	100	0%					Computer Equipmen		MJ/m².yr	51.73
Usage during unoccupied period	55	5%					Plug Loads		kWh/ft².yr	0.65
									MJ/m².yr	25.18
FOOD SERVICE EQUIPMENT										
Provide description below:	Fuel Oil / Propan	e Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propan EUI kWh/ft².yr	e EUI 0.5	EUI	Electric EUI kWh/ft².yr	0.4
				J		MJ/m².yr	20.0		MJ/m².yr	15.0
REFRIGERATION Provide description below:										
]				EUI	kWh/ft².yr	0.5
									MJ/m².yr	20.0
BLOCK HEATERS & MISCELLANE	ous									
							D		1111 11:0	
							Block Heaters		kWh/ft².yr MJ/m².yr	
							Miscellaneous	EUI	kWh/ft².yr	0.3
									MJ/m².yr	10

EXISTING BUILDINGS: University/College Baseline

SIZE:

SPACE HEATING													
Heating Plant Type					el Oil / Propa oilers	ne Packaged	A/A HP	W. S. HP		Resistance	Total		
		2		Stan.	High	Unit	707111	W. O. III	TI/TY OTHER				
		System Present (%) Eff./COP		80% 70%	80%	70%	1.70	3.00	4.50	20% 1.00	100%		
		Performance (1 / Eff.) (kW/kW)		1.43	1.25	1.43	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	52.3 W/m² 297 MJ/m².yr	16.6	Btu/hr.ft² kWh/ft².yr		I							1	
Electric Fuel Share	20.0% Fuel C	il / Propane Fuel Share	80.0%]	Oil Fuel Sha	re]				All Electric kWh/ft².y	
Boiler Maintenance		intenance Tasks		Incidence	1			1				MJ/m².yı	
Doller Wall Reflatice	Fire Side Water Sid	Inspection e Inspection for Scale Build of Controls & Safeties of Burner Analysis & Burner Set-up	dup	75% 100% 100% 100% 90%								Fuel Oil / Propa kWh/ft².y MJ/m².yı Market Compos kWh/ft².y MJ/m².yı	r 10. 42 site EUI r 10.
SPACE COOLING													
A/C Plant Type		System Present (%) COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifuga Standard 50.0% 4.7 0.21	HE 5.4 0.19	Chillers 4.4	Reciproca Open 3.6 0.28	DX 50.0% 2.6		Chillers CW 1 1.00	Total 100.0%			
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Setpoint	Reset									
Setpoint		Chilled Water Condenser Water Supply Air	7 30 13.0		44.6 86 55.4	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	80 W/m² 111.4 MJ/m².yr	25 Btu/hr.ft² 2.9 kWh/ft².yr	474	ft²/Ton									
Sizing Factor	1.00		Operation	(occ. perio	3000	hrs/year	Note value	cannot be	less than 2	,900 hrs/ye	ar)		
A/C Saturation (Incidence of A/C)	15.0%												
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share]									
Chiller Maintenance	Inspect Co Inspect Co Megger M Condense Vibration	r Tube Cleaning		Incidence (%)	Frequency (years)							All Electric kWh/ft²-y	
Cooling Tower/Air Cooling Tower	r Maintages A	sintononoo Taala		Inoide	Ero							MJ/m².yı	
Cooling Tower/Air Cooled Condense	Inspection Inspect/Se Megger M	/Clean Spray Nozzles ervice Fan/Fan Motors		Incidence (%)	Frequency (years)							Fuel Oil / Propa kWh/ft².y MJ/m².yı Market Compo: kWh/ft².y MJ/m².yı	site EUI
SERVICE HOT WATER													
Service Hot Water Plant Type	Eff./COP	el SHW Avg. Tank resent (%) 0.65				Boiler 75% 0.75		Fuel Share Blended E		Fossil 75% 0.75		Elec. Res. 25% 0.91	
Service Hot Water load (MJ/m².yr) (Tertiary Load) Wetting Use Percentage	90%			F	All Electric EU kWh/ft².yr	JI 0.6]		Dil / Propan kWh/ft².yr	e EUI 0.8		Market Compos	
	3070				MJ/m².yr	25			MJ/m².yr	30		MJ/m².yı	

EXISTING BUILDINGS: University/College Baseline SIZE:

HVAC FANS & PUMPS										
SUPPLY FANS				Vantilation	and Evhau	int Ean On	eration & Co	ontrol		
SUPPLY FANS					tion Fan		ust Fan	1		
System Design Air Flow 4.1	L/s.m ² 0.80	CFM/ft ²	Control	Fixed	Variable	Fixed	Variable			
System Static Pressure CAV 750			Control	· ixtou	Flow	1 17100	Flow			
System Static Pressure VAV 750		wg	Incidence of Use	90%	10%	1009				
Fan Efficiency 60%]9	Operation				us Scheduled			
Fan Motor Efficiency 80%			7,513							
Sizing Factor 1.00			Incidence of Use	75%	25%	759	6 25%			
		W/ft²								
Fan Design Load VAV 6.4	W/m² 0.59	W/ft²	Comments:							
EXHAUST FANS	-									
	_									
Washroom Exhaust 100		212 CFM/wa	shroom							
Washroom Exhaust per gross unit area 0.1		0.01 CFM/ft ²								
Other Exhaust (Smoking/Conference) 0.1		0.02 CFM/ft ²								
Total Building Exhaust 0.2		0.03 CFM/ft ²								
Exhaust System Static Pressure 250	Pa	1.0 wg								
Fan Efficiency 25%										
Fan Motor Efficiency 75%										
Sizing Factor 1.0	l	7								
Exhaust Fan Connected Load 0.2	W/m ² 0.02	W/ft²								
AUXILIARY COOLING EQUIPMENT (Condens	er Pump and Cooling Tov	ver/Condenser Fans	s)							
Average Condenser Fan Power Draw		0.024 kW/kW	0.08 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser)	1.87 W/m ²	0.17 W/ft²							
Condenser Pump										
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area		0.004 L/s.m²	0.006 U.S. gpm/ft ²							
Pump Head Pressure		kPa	ft							
Pump Efficiency		50%								
Pump Motor Efficiency		80%								
Sizing Factor		1.0								
Pump Connected Load		W/m²	W/ft²							
CIRCULATING PUMP (Heating & Cooling)										
, y y,										
Pump Design Flow @ 5 °C (10 °F) delta T	0.003	L/s.m ²	0.0051 U.S. gpm/ft ² 2.4	U.S. gpm/	Ton					
Pump Head Pressure	100	kPa	50 ft							
Pump Efficiency	50%									
Pump Motor Efficiency	80%									
Sizing Factor	0.8									
Pump Connected Load	0.7	W/m²	0.06 W/ft ²							
Supply Fan Occ. Period	4000	hrs./year								
Supply Fan Unocc. Period		hrs./year								
Supply Fan Unocc. Period Supply Fan Energy Consumption		nrs./year kWh/m².yr								
Supply Fair Energy Consumption	45.9	KVVIVIII*.YI								
Exhaust Fan Occ. Period	4000	hrs./year								
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period		hrs./year								
		nrs./year kWh/m².yr								
Exhaust Fan Energy Consumption	1.0	I KANIMILE'NI								
Condenser Pump Energy Consumption		kWh/m².yr								
Cooling Tower /Condenser Fans Energy Consun	nption 0.7	kWh/m².yr								
5										
Circulating Pump Yearly Operation		hrs./year								
Circulating Pump Energy Consumption		kWh/m².yr								
			T [=							
Fans and Pumps Maintenance	Annual Maintenance Tasl	KS	Incidence Frequency							
	Inspect/Service Fans & M	otors	(%) (years)							
	Inspect/Adjust Belt Tension		 							
1			+					EUI	kWh/ft².yr	4.8
	Inspect/Service Pump & M	∕lotors								
	Inspect/Service Pump & N	Motors						EUI	MJ/m².yr	185.5

EXISTING BUILDINGS: University/College Baseline SIZE: REGION: Island Interconnected

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		16.5 kWh/ft².yr 637.9 MJ/m².yr	Fuel Oil /	Propane:	9.3 kWh/ft².yr	362.0 MJ	/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	5.4	207.3		kWh/ft2.yr	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr	
ARCHITECTURAL LIGHTING CORF	0.7	26.2	SPACE HEATING	1.5	59.4	8.8	339.2	
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	6.9			
OTHER PLUG LOADS	0.7	25.2	SERVICE HOT WATER	0.2	6.3	0.6	22.8	
HVAC FANS & PUMPS	4.8	185.5	FOOD SERVICE EQUIPMENT	0.4	15.0			
REFRIGERATION	0.5	20.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	1.3	51.7						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS	0.1	3.9						
OUTDOOR LIGHTING	0.4	17.0						

COMMERCIAL SECTOR BUILDING PROFILE EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Warehouse/Wholesale Baseline CONSTRUCTION 0.38 W/m².°C 0.07 Btu/hr.ft² .°F 60,000 ft² Wall U value (W/m².°C) Typical Building Size 5,576 m² Roof U value (W/m².°C) 0.38 W/m².°C 0.07 Btu/hr.ft² .°F Typical Footprint (m²) 5,576 m² 60,000 ft² 3.84 W/m².°C 0.68 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space 100% Percent Conditioned Space 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.05 Defined as Exterior Zone Typical # Stories 0.80 Floor to Floor Height (m) 6.1 m 19.9 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 1076 ft²/person 6.56% 100 m²/person %OA Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 10 L/s.person 21 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 1.53 L/s.m² 0.30 CFM/ft² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 509.519 Peak Zone Sensible Load 387,357 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 18,020 DDC/Pneumatic Total air circulation or Design air 1.53 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 71.6 °F 55.4 °F 13 °C 22 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 60.8 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence

(%)

Inspection/Calibration of Room Thermosta

Inspection of Control Devices (Valves (Dampers, VAV Boxes)

Inspection of PE Switches
Inspection of Auxiliary Devices

(%)

Calibration of Transmitters

Calibration of Panel Gauges Inspection of Auxiliary Devices

Inspection of Control Devices

EXISTING BUILDINGS: Warehouse/Wholesale Baseline

SIZE:

LIGHTING													
HIGH BAY LIGHTING													
Light Level	400 Lux	37.2	ft-candles										
Floor Fraction (GLFF) Connected Load	0.90 10.5 W/m²	1.0	W/ft²										
Occ. Period(Hrs./yr.)	3500		Light Level (Lux)		300	500	700	1000			Total	1	
Unocc. Period(Hrs./yr.)	5260		% Distribution		50%	50%	700	1000			100%		
Usage During Occupied Period Usage During Unoccupied Period	100% 15%		Weighted Average			•					400		
Fixture Cleaning:			System Present (%)		INC	CFL	T12 20%	T8 10%	HID 60%	T5HO L 10%	ED TOTAL 100.0%		
Incidence of Practice Interval	years		CU		0.7 0.65	0.7 0.65	0.6 0.75	0.6	0.7	0.6	0.6		
		_	Efficacy (L/W)		15	50	72	88	65		90		
Relamping Strategy & Incidence of Practice	Group Spot	i									EUI	kWh/ft².yr	3.8 146
OTHER, OFFICE LIGHTING			7									MJ/m².yr	146
Light Level Floor Fraction (ALFF)	500 Lux 0.10	46.5	ft-candles										
Connected Load	20.9 W/m ²	1.9	W/ft²										
Occ. Period(Hrs./yr.)	3000		Light Level (Lux)		300	500	700	1000			Total		
Unocc. Period(Hrs./yr.)	5760		% Distribution			100%					100%		
Usage During Occupied Period Usage During Unoccupied Period	100% 15%		Weighted Average								500	<u>'</u>	
First on Observious			O B		INC	CFL	T12	T8	HID		ED TOTAL		
Fixture Cleaning: Incidence of Practice			System Present (%)		10% 0.7	5% 0.7	60% 0.6	25% 0.6	0.7	0.6	0% 100.0% 0.6	1	
Interval	years		LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80	0.80 65		80 90		
Relamping Strategy & Incidence of Practice	Group Spot	1	zmodoy (z 11)		.01	00		55	00	00	EUI	kWh/ft².yr	0.8
					E	UI = Load	X Hrs. X S	SF X GLFF			EUI	MJ/m².yr	29
SPECIAL PURPOSE LIGHTING Light Level	Lux		ft-candles			FI	oor fractio	n check: s	hould = 1.0	00 1.	00		
Floor Fraction (HBLFF) Connected Load	W/m²		W/ft²										
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)		300	500	700	1000			Total	1	
Unocc. Period(Hrs./yr.)	4760		% Distribution		000	000	7.00	1000			1 Ottai		
Usage During Occupied Period Usage During Unoccupied Period	100%		Weighted Average										
	100%				INC	CFL	T12	Т8			PS TOTAL		
Fixture Cleaning: Incidence of Practice			System Present (%) CU		0.7	0%	0.6	0.6	0.6		0.0%	<u>.</u>	
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.55 0.	55		
Relamping Strategy & Incidence	Group Spot		Efficacy (L/W)		15	50	72	84	88	65	90]	
of Practice	Олоць										EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING								C	Overall LP	11.57 W/m²	EUI TOTAL		4.5
												MJ/m².yr	175
OFFICE EQUIPMENT & PLUG LOA	ADS												
Equipment Type	Comp	outers	Monitors	Pri	nters	Copie	rs	Serve	ers	Plug Loads			
Measured Power (W/device)	54.		51	100	ı E	200		217					
Density (device/occupant) Connected Load		.59 0.3 W/m²	0.59 0.3 W/m²	0.03	W/m²	0.03 0.1 W	I/m²	0.06 0.1 V	V/m²	2 W/m²			
		0.0 W/ft ²	0.0 W/ft²		W/ft²	0.01 W		0.01 V		0.19 W/ft²			
Diversity Occupied Period		0%	90%	90%		90%		100%		90%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year)		000	50% 2000	50% 2000		50% 2000	_	100% 2000		25% 3500			
Operation Unocc. Period (hrs./year)		760	6760	6760		6760		6760		5260			
Total end-use load (occupied period)		2.6 W/m²	0.2 W/ft ²	to see note	es (cells with r	ed indicator	in upper ri	ght corner,	type "SHIF	T @ mputer Serv	ers EUI	kWh/ft².yr	0.11
Total end-use load (unocc. period)		1.0 W/m²	0.1 W/ft²					J		Computer Equipm		MJ/m².yr	4.42
Usage during occupied period	100	0%							,	Computer Equipm	enteoi	kWh/ft².yr MJ/m².yr	0.34 13.30
Usage during unoccupied period	39	9%								Plug Loa	ads EUI	kWh/ft².yr MJ/m².yr	0.83 32.15
												Wi3/III .yi	32.10
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane	e Fuel Share:		Electricity	Fuel Share:	100.0%		Fuel Oi	I / Propane	e EUI	A	I Electric EUI	
·			. ']			E	UI k	Wh/ft².yr /J/m².yr		EUI	kWh/ft².yr MJ/m².yr	
DEEDIGED ATION:								IV	yı			o,yı	
REFRIGERATION Provide description below:				_									
Process				_							EUI	kWh/ft².yr	1.5
												MJ/m².yr	60.0
BLOCK HEATERS & MISCELLANE	ous		·		-								
										Block Heat	ers EUI	kWh/ft².yr	
										Miscellaneo	ous EUI	MJ/m².yr kWh/ft².yr	0.3
										·····oodiiai let		M I/m2 viii	10

EXISTING BUILDINGS: Warehouse/Wholesale Baseline

SIZE:

SPACE HEATING													
Heating Plant Type					Fu	el Oil / Propa			Electi				
					Boiler	Unit Heater	Packaged Rooftop	A/A HP \	W. S. HP H	/R Chiller		Total	
		System Present Eff./COP	it (%)		25% 70%	70%	70%	1.70	3.00	4.50	75% 1.00	100%	
		Performance ((kW/kW)	1 / Eff.)		1.43	1.43	1.43	0.59	0.33	0.22	1.00		
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	40.6 W/m ² 247 MJ/m ² .yr	[KVV/KVV]	12.9 Btu/ 6.4 kWh	/hr.ft² h/ft².yr						I	l		l
Electric Fuel Share	75.0% Fuel C	il / Propane Fue	I Share	25.0%		Oil Fuel Sha	re						All Electric EUI kWh/ft².yr
Boiler Maintenance	Annual Ma	aintenance Tasks		-	ncidence]							MJ/m².yr 2
		Inspection			(%) 75%								Fuel Oil / Propane EUI kWh/ft².yr
	Water Sid	e Inspection for			100%								MJ/m².yr 3
	Inspection	of Controls & S of Burner			100% 100%								Market Composite EUI
	Flue Gas	Analysis & Burn	er Set-up		90%								kWh/ft².yr MJ/m².yr 2
SPACE COOLING													
A/C Plant Type													
ACT and Type		System Presen COP Performance ((kW/kW) Additional Refri Related Informa	Star it (%) 1 / COP) igerant	ntrifugal C Indard 4.7 0.21	Chillers HE 5.4 0.19	Screw Chillers 4.4 0.23	Reciprocat Open 3.6 0.28	DX V 100.0% 2.6 0.38	0.9 1.11	Chillers CW 1 1.00	Total		
Control Mode		Incidence of Us	se Fixe	ed R	Reset		l		I				
SUMUTING		Chilled Water Condenser Wa	Set	point									
Setpoint		Chilled Water Condenser Water Supply Air	ter	7 30 13.0	С	44.6 86 55.4	°F						
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	27 W/m² 39.0 MJ/m².yr		Btu/hr.ft² kWh/ft².yr	1413 ft	² /Ton								
Sizing Factor	1.00		Оре	eration (c	cc. perio	3000	hrs/year	Note value o	cannot be le	ss than 2,	900 hrs/yea	ar)	
A/C Saturation (Incidence of A/C)	5.0%												
Electric Fuel Share	100.0% Fuel C	il / Propane Fue	I Share										
Chiller Maintenance	Inspect Co	nintenance Tasks ontrol, Safeties & oupling, Shaft Se	& Purge Unit		ncidence (%)	Frequency (years)							
	Vibration A	er Tube Cleaning Analysis rent Testing											
Cooling Tower/Air Cooled Condense		nemical Oil Analy		1.	ncidence	Frequency							All Electric EUI kWh/ft².yr MJ/m².yr
TOWNS TOWNS TO COURSE CONTINUE INC.	Inspection Inspect/Se	/Clean Spray No ervice Fan/Fan N	ozzles		(%)	(years)							Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr
	Megger M Inspect/Ve	lotors erify Operation o	f Controls										Market Composite EUI kWh/ft².yr MJ/m².yr
DOMESTIC HOT WATER													
Service Hot Water Plant Type		el SHW resent (%)	Avg. Tank				Boiler 20%		uel Share		Fossil 20%		Elec. Res. 80%
Service Hot Water load (MJ/m².yr) (Tertiary Load)	17.0 Eff./COP		0.65			All Electric EU	0.75		Blended Effi Fuel Oi	/ Propane	0.75		0.91 Market Composite EUI
Wetting Use Percentage	90%					kWh/ft².yr MJ/m².yr	0.5 19		k	Wh/ft².yr 1J/m².yr	0.6 23		kWh/ft².yr MJ/m².yr

COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: SIZE: VINTAGE: Warehouse/Wholesale All

Baseline

REGION: Island Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan System Design Air Flow System Static Pressure CAV 0.30 CFM/ft² 1.5 L/s.m² Control Variable Fixed Variable 300 Pa 1.2 Flow Flow wa System Static Pressure VAV 300 Pa wg Incidence of Use 100% 100% Fan Efficiency 60% Operation Continuous Scheduled Continuous Schedule Fan Motor Efficiency 80% Sizing Factor 1.00 Incidence of Use 80% 20% 80% 20% Fan Design Load CAV 0.09 W/ft² 1.0 W/m² Fan Design Load VAV 0.09 W/ft² Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 212 CFM/washroom 0.01 CFM/ft² 0.0 L/s.m² Other Exhaust (Smoking/Conference) 0.1 L/s.m² CFM/ft² Total Building Exhaust 0.1 L/s.m² 0.03 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 1.0 0.2 W/m² 0.02 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.020 kW/kW 0.54 W/m² 0.07 kW/Ton 0.05 W/ft² Condenser Pump 0.053 L/s KW 3.0 U.S. gpm/Ton Pump Design Flow Pump Design Flow per unit floor area 0.002 U.S. gpm/ft² 0.001 L/s.m² Pump Head Pressure Pump Efficiency kPa ft 50% Pump Motor Efficiency 80% Sizing Factor 1.0 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) 0.001 L/s.m² 0.0017 U.S. gpm/ft² 17 ft Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 2.4 U.S. gpm/Ton 50 kPa Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 0.8 Pump Connected Load 0.1 W/m² 0.01 W/ft² Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc, Period 5260 hrs./year Supply Fan Energy Consumption 7.3 kWh/m².yr Exhaust Fan Occ. Period 3500 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 5260 hrs./year 1.4 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.2 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 5000 hrs./year 0.1 kWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 0.8 MJ/m².yr 32.8

EXISTING BUILDINGS: Warehouse/Wholesale Baseline SIZE: REGION: Island Interconnected

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		14.1 kWh/ft².yr 545.9 MJ/m².yr	Fuel Oil /	Propane:	2.4 kWh/ft².yr	92.7 M	J/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
HIGH BAY LIGHTING	3.8	146.3		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
OTHER, OFFICE LIGHTING	0.8	29.1	SPACE HEATING	4.8	185.1	2.3	88.1	
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.0	0.8			
OTHER PLUG LOADS	0.8	32.1	DOMESTIC HOT WATER	0.4	14.9	0.1	4.5	
HVAC FANS & PUMPS	0.8	32.8	FOOD SERVICE EQUIPMENT					
REFRIGERATION	1.5	60.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.3	13.3						
COMPUTER SERVERS	0.1	4.4						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

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COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Restaurant Baseline CONSTRUCTION 0.38 W/m².°C 0.07 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² Glazing U value (W/m².°C) 3.97 W/m².°C 0.70 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.36 Defined as Exterior Zone 0.58 Typical # Stories Floor to Floor Height (m) 3.7 r 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 60% 40% 100% Min. Air Flow (%) (Minimum Throttled Ai 60% Occupancy or People Density 215 ft²/person %OA 24.92% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air 42 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: CFM/ft² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation I /s m² operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.79 CFM/ft² 4.01 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² 50% Infiltration Rate Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 323,602 Switchover Point KJ/kg. 18 Peak Design Cooling Load Peak Zone Sensible Load 130,664 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipment 13.2 ft³/lbm All Pneumatic 6,078 DDC/Pneumatic Total air circulation or Design air l/s.m² All DDC Total (should add-up to 100%) PI / PID Proportional Control mode Control Mode Rese Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 14 °C 57.2 °F 24 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 Winter Unocc. Humidity Enthalpy 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication
Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves,

(Dampers, VAV Boxes)

Inspection of Control Devices

EXISTING BUILDINGS: SIZE:

Restaurant Baseline

REGION: Island Interconnected

LIGHTING GENERAL LIGHTING 400 Lux 37.2 ft-candles Light Level Floor Fraction (GLFF) 0.50 1.0 W/ft² Connected Load 10.7 W/m² Occ. Period(Hrs./yr.) 4300 Light Level (Lux) 550 650 Total Unocc. Period(Hrs./vr.) 4460 % Distribution 80% 10% 100% Usage During Occupied Period 100% 550 Weighted Average Usage During Unoccupied Period 10% INC CFL T12 T8 HID T5HO LED TOTAL Fixture Cleaning: Incidence of Practice System Present (%) 20.0% 80.0% 100.0% 0.6 0.6 0.6 0.6 0.6 Interval vears 0.65 0.65 0.75 0.80 0.80 0.80 0.80 Efficacy (L/W) 15 50 88 65 95 Relamping Strategy & Incidence Group Spot EUI kWh/ft².yr of Practice 2.4 MJ/m².yr 92 ARCHITECTURAL LIGHTING 300 Lux 27.9 ft-candles Light Level Floor Fraction (ALFF) 0.50 3.2 W/ft² Connected Load 34.4 W/m Occ. Period(Hrs./yr.) 4300 Light Level (Lux) Unocc. Period(Hrs./vr.) 4460 % Distribution 10% 40% 40% 10% 100% Usage During Occupied Period 100% 350 Weighted Average Usage During Unoccupied Period 10% CFL T12 T8 HID T5HO LED TOTAL System Present (%)
CU
LLF Fixture Cleaning: 70% 25% 100.0% 0.6 0.6 Incidence of Practice 0.7 0.7 0.6 0.6 0.6 0.80 Efficacy (L/W) 15 50 84 65 95 90 Relamping Strategy & Incidence Group Spot EUI kWh/ft².vr of Practice 76 EUI = Load X Hrs. X SF X GLFF MJ/m².yr 294 SPECIAL PURPOSE LIGHTING ft-candles Floor fraction check: should = 1.00 1.00 Light Level Lux Floor Fraction (HBLFF) W/ft² W/m² Connected Load Occ. Period(Hrs./yr.) 2500 Light Level (Lux) 300 500 700 1000 Total Unocc. Period(Hrs./yr.) 6260 % Distribution Usage During Occupied Period 0% Weighted Average Usage During Unoccupied Period 100% HPS TOTAL INC CFL T12 T8 МН Fixture Cleaning: System Present (%) Incidence of Practice 0.7 0.7 0.6 0.6 0.6 0.6 0.6 Interval 0.65 0.65 0.75 0.80 0.80 0.55 0.55 Efficacy (L/W) 15 50 84 88 65 Relamping Strategy & Incidence Group Spot of Practice EUI kWh/ft².yr MJ/m².vr EUI TOTAL kWh/ft².yr 10 TOTAL LIGHTING Overall LP 22.57 W/m² 386 MJ/m².yr OFFICE EQUIPMENT & PLUG LOADS Equipment Type Computers Monitors Printers Copiers Servers Plug Loads Measured Power (W/device) 100 200 Density (device/occupant) 0.16 0.16 0.01 0.03 0.4 W/m² Connected Load 0.4 W/m² 0.1 W/m² 0.1 W/m² 1.15 W/m² 0.0 W/ft² 80% 0.00 W/ft² 80% 0.0 W/ft² W/ft² 0.01 W/ft² 0.11 W/ft² Diversity Occupied Period 80% 80% 50% Diversity Unoccupied Period 50% 50% 50% 50% 100% Operation Occ. Period (hrs./year) 2000 2000 2500 Operation Unocc. Period (hrs./year) 6760 6760 6760 6760 6760 6260 Computer Servers EUI Total end-use load (occupied period) 1.8 W/m² 0.2 W/ft² kWh/ft².yr 0.11 1.2 W/m² 0.1 W/ft² MJ/m².yr Total end-use load (unocc. period) 4.42 Computer Equipment EUI kWh/ft².yr 0.41 Usage during occupied period 100% MJ/m2.yr 16.00 Usage during unoccupied period 65% Plug Loads EUI MJ/m².yr 21.24 FOOD SERVICE EQUIPMENT 2.0% Fuel Oil / Propane EUI Provide description below: Fuel Oil / Propane Fuel Share: Electricity Fuel Share: 98.0% All Electric EUI EUI EUI Lunch room/cafeteria/restaurant kWh/ft².vr 0.1 kWh/ft2.vr 34.3 MJ/m².yr MJ/m².yr 1330.0 REFRIGERATION Provide description below: Lunch room/cafeteria/restaurant EUI kWh/ft².yr 16.8 MJ/m².yr 650.0 **BLOCK HEATERS & MISCELLANEOUS** Block Heaters EUI kWh/ft².yr MJ/m².yr kWh/ft².yr Miscellaneous EUI 0.3 MJ/m².yr 10

EXISTING BUILDINGS: Restaurant Baseline SPACE HEATING

SIZE:

REGION: Island Interconnected

SPACE HEATING														
Heating Plant Type						el Oil / Propa		A /A ::=		ctric	Destat	T 1		
					Stan.	ilers I High	Packaged Unit	A/A HP	w. S. HP	H/R Chiller		Total		
		System Present (* Eff./COP	%)		10% 70%	80%	70%	1.70	3.00	4.50	90% 1.00	100%		
		Performance (1 /	Eff.)		1.43	1.25	1.43		0.33		1.00			
		(kW/kW)												
Peak Heating Load	63.6 W/m²		20.2 Btu/h											
Seasonal Heating Load Tertiary Load)	517 MJ/m	².yr	13.3 kWh/f	ft².yr										
Sizing Factor	1.00													
Electric Fuel Share	90.0% Fu	uel Oil / Propane Fuel S	hare	10.0%		Oil Fuel Shar	re		1				All Electric EUI kWh/ft².yr	13.
Boiler Maintenance		al Maintenance Tasks		•					II				MJ/m².yr	51
soller Maintenance	Affilia	ii Maintenance Tasks		"	ncidence (%)								Fuel Oil / Propane E	UI
		ide Inspection Side Inspection for So	ale Buildun		75% 100%								kWh/ft².yr MJ/m².yr	19.1 738
	Inspe	ction of Controls & Saf			100%									
		ction of Burner Gas Analysis & Burner	Set-up		100% 90%								Market Composite E kWh/ft².yr	EUI 13.9
		,											MJ/m².yr	53
SPACE COOLING														
A/C Plant Type														
чс ганстуре				entrifugal Cl		WSHP		ing Chillers			Total			
		System Present (andard	HE		Open	DX 100.0%	W. H.	CW	100.0%			
		COP		4.7	5.4	3.5	3.5	2.6	0.9		100.078			
		Performance (1 / (kW/kW)	COP)	0.21	0.19	0.29	0.29	0.38	1.11	1.00				
		Additional Refrige												
		Related Information	on											
			-	. 15				I						
Control Mode		Incidence of Use	Fixed Setpo		eset									
		Chilled Water												
		Condenser Water												
Cotrolint		Chilled Water		7 °C	•	44.6	o=							
Setpoint		Chilled Water Condenser Water		30 °C	С	44.6 86								
		Supply Air		14.0 °C	С	57.2	°F							
Peak Cooling Load	102 W/m²		u/hr.ft²	371 ft	²/Ton									
Seasonal Cooling Load (Tertiary Load)	126.1 MJ/m	2.yr 3.3 kV	Vh/ft².yr											
Sizing Factor	1.00		Opera	ation (occ. ¡	period)	3000	hrs/year	Note value	cannot be	less than 2,	900 hrs/yea	ar)		
A/C Saturation	70.0%													
(Incidence of A/C)														
Electric Fuel Share	100.0% Fu	uel Oil / Propane Fuel S	hare											
Chiller Maintenance	Annua	al Maintenance Tasks		Ir	ncidence	Frequency								
	lana	ct Control, Safeties & F	Numa I Init		(%)	(years)								
		ct Coupling, Shaft Seal		gs										
		er Motors enser Tube Cleaning												
	Vibrat	ion Analysis												
		Current Testing rochemical Oil Analysis											All Electric EUI	
	Ороск	. conomical on mayor	,										kWh/ft².yr	1.4
Cooling Tower/Air Cooled Condense	r Maintenan Annua	al Maintenance Tasks		Ir	ncidence	Frequency							MJ/m².yr	55
g					(%)	(years)							Fuel Oil / Propane E	.UI
		ction/Clean Spray Nozz ct/Service Fan/Fan Mot											kWh/ft².yr MJ/m².yr	
	Megg	er Motors												
	Inspe	ct/Verify Operation of C	controls										Market Composite E kWh/ft².yr	=UI 1.4
													MJ/m².yr	55
DOMESTIC HOT WATER														
Service Hot Water Plant Type	Eccal	Fuel SHW	Tank	<u> </u>			Boiler	1			Fossil		Elec. Res.	
oervice not water Plant Type	Syste	m Present (%)					10%		Fuel Share		5%		95%	
	l=11.10	OP	0.65				0.75		Blended E	fficiency	1.50		0.91	
Service Hot Water load (M I/m²)														
	700.0													
(Tertiary Load)	700.0					II Electric EU			Fuel (Oil / Propane			Market Composite E	
Service Hot Water load (MJ/m².yr) (Tertiary Load) Wetting Use Percentage						II Electric EU kWh/ft².yr MJ/m².yr	19.9 769			Dil / Propane kWh/ft².yr MJ/m².yr	12.0 467		Market Composite E kWh/ft².yr MJ/m².yr	EUI 19.5 754.1

EXISTING BUILDINGS: Restaurant Baseline

SIZE:

REGION: Island Interconnected

HVAC FANS & PUMPS										
SUPPLY FANS				Ventilation	and Exhau	st Fan Ope	ration & Cont	rol		
				Ventilati			aust Fan	Ī		
System Design Air Flow 4.0	L/s.m ² 0.79	CFM/ft ²	Control	Fixed	Variable	Fixed	Variable			
System Static Pressure CAV 750		wg			Flow		Flow			
System Static Pressure VAV 750		wg	Incidence of Use	60%		100%				
Fan Efficiency 52%			Operation	Continuous	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 85%										
Sizing Factor 1.00			Incidence of Use	90%	10%	90%	10%	1		
		W/ft² W/ft²	Comments:							
Fan Design Load VAV 6.8	W/m² 0.63	VV/IL	Comments:							
EXHAUST FANS				Į.						
Washroom Exhaust 100	L/s.washroom	212 CFM/washro	om							
Washroom Exhaust per gross unit area 0.2		0.04 CFM/ft ²								
Other Exhaust (Smoking/Conference) 0.1		0.02 CFM/ft ²								
Total Building Exhaust 0.3		0.06 CFM/ft ²								
Exhaust System Static Pressure 250		1.0 wg								
Fan Efficiency 40%										
Fan Motor Efficiency 80%										
Sizing Factor 1.0 Exhaust Fan Connected Load 0.2) M/m²	W/ft²								
Exhaust Fan Connected Load 0.2	2 W/m ² 0.02	vv/í t²								
AUXILIARY COOLING EQUIPMENT (Condens	er Pump and Cooling Tow	ver/Condenser Fans)								
•		•								
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser)	2.00 W/m ²	0.19 W/ft²							
Condenser Pump										
Ochachser i ump										
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area		0.005 L/s.m ²	0.008 U.S. gpm/ft ²							
Pump Head Pressure		90 kPa	30 ft							
Pump Efficiency		55%								
Pump Motor Efficiency		90%								
Sizing Factor		1.0								
Pump Connected Load		0.98 W/m ²	0.09 W/ft ²							
CIRCULATING PUMP (Heating & Cooling)										
Pump Design Flow @ 5 °C (10 °F) delta T	0.004	L/s.m ²	0.0065 U.S. gpm/ft ² 2.4	U.S. gpm/T	on					
Pump Head Pressure		kPa	50 ft	J 3F						
Pump Efficiency	55%									
Pump Motor Efficiency	90%									
Sizing Factor	0.5									
Pump Connected Load	0.7	W/m²	0.06 W/ft ²							
Supply Fan Occ. Period	3500	hrs./year								
Supply Fan Unocc. Period		hrs./year								
Supply Fan Energy Consumption		kWh/m².yr								
		•								
Exhaust Fan Occ. Period		hrs./year								
Exhaust Fan Unocc. Period		hrs./year								
Exhaust Fan Energy Consumption	2.0	kWh/m².yr								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consum		kWh/m².yr kWh/m².yr								
Circulating Pump Yearly Operation	5000	hrs./year								
Circulating Pump Fearly Operation Circulating Pump Energy Consumption		kWh/m².yr								
		•	T T=							
Fans and Pumps Maintenance	Annual Maintenance Task	s	Incidence Frequency (%) (years)							
	Inspect/Service Fans & Me	ntors	(%) (years)							
	Inspect/Adjust Belt Tension									
	Inspect/Service Pump & N							EUI	kWh/ft².yr	3.5
									MJ/m².yr	133.9
								1		.00.0

EXISTING BUILDINGS: Restaurant Baseline SIZE: REGION: Island Interconnected

EUISUMMARY							
TOTAL ALL END-USES:	Electricity:		97.5 kWh/ft².yr 3,775.8 MJ/m².yr	Fuel Oil /	Propane:	2.5 kWh/ft².yr	97.2
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	2.4	91.7		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m ² .yr
ARCHITECTURAL LIGHTING	7.6	294.0	SPACE HEATING	12.0	464.9	1.9	73.8
SPECIAL PURPOSE LIGHTING			SPACE COOLING	1.0	38.5		
OTHER PLUG LOADS	0.5	21.2	DOMESTIC HOT WATER	18.9	730.8	0.6	23.3
HVAC FANS & PUMPS	3.5	133.9	FOOD SERVICE EQUIPMENT	33.6	1,303.4	0.0	0.1
REFRIGERATION	16.8	650.0					
MISCELLANEOUS	0.3	10.0					
BLOCK HEATERS							
COMPUTER EQUIPMENT	0.4	16.0					
COMPUTER SERVERS	0.1	4.4					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Large Office > 100 kW Existing Baseline CONSTRUCTION 0.33 W/m².°C 0.06 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.24 W/m².°C 0.04 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² Glazing U value (W/m².°C) 3.52 W/m².°C 0.62 Btu/hr.ft².°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.40 Defined as Exterior Zone Typical # Stories 0.58 Floor to Floor Height (m) 3.7 r 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A TOTAL Ventilation System Type CAV VAV VAVR System Present (%) 75% 100% Min. Air Flow (%) (Minimum Throttled Ai 60% Occupancy or People Density 274 ft²/person %OA 7.43% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 16 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: CFM/ft² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation I /s m² operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.78 CFM/ft² 3.96 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.40 L/s.m² 0.08 CFM/ft² 50% Infiltration Rate Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 190.872 Switchover Point KJ/kg. 18 Peak Design Cooling Load Peak Zone Sensible Load 128,897 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipment 13.2 ft³/lbm All Pneumatic 5,996 DDC/Pneumatic Total air circulation or Design air 3.96 l/s.m² All DDC Total (should add-up to 100%) PI / PID Proportional Control mode Control Mode Fixed Discharge Rese Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 14 °C 57.2 °F 24 °C Summer Humidity (%) 50% Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves, Inspection of Control Devices (Dampers, VAV Boxes)

EXISTING BUILDINGS: Large Office Baseline SIZE: > 100 kW

LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period Fixture Cleaning: Incidence of Practice Interval Relamping Strategy & Incidence of Practice ARCHITECTURAL LIGHTING Light Level	550 Lux 0.90 14.8 W/m² 3300 5460 95% 20% years Group Spot	1.4	ft-candles W/ft² Light Level (Lux) Distribution Weighted Average System Present (%) CU LLF Efficacy (LW)	450 10%	CFL T12 20. 0.7 0.65 0	10%	HID T5HO 0.6 0.6 0.80 0.80 65 95	0.6 0.80 90		:Wh/ft².yr MJ/m².yr	5.2
Connected Load Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period Fixture Cleaning: Incidence of Practice Interval Relamping Strategy & Incidence of Practice	3400 5380 95% 40% Group Spot	2.9		200 10% INC 45% 0.7 0.65 15	CFL T12 45% 0.7 0.65 0	400 500 400 10% 2 T8 F 0.6 0.6 75 0.80 72 84	HID T5HO 5% 0.6 0.6 0.80 0.80 0.80 65 95	LED 5% 0.6 0.80 90	Total 100% 350 TOTAL 100.0%	«Wh/ft².yr	1.5
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period Fixture Cleaning: Incidence of Practice Interval	Lux W/m² 4000 4760 0% 100%		ft-candles W/ft² Light Level (Lux) % Distribution Weighted Average System Present (%) CU LLF Efficacy (LW)	300 INC 0.7 0.65 15	500 CFL 0.7 0.65 0	700 1000 T12 T8 0.6 0.6 0.75 0.80 72 84	MH 0.6 0.6 0.80 0.55 88 65	1.00 HPS 0.6 0.55 90		wynt-yr MJ/m²-yr	60
Relamping Strategy & Incidence of Practice TOTAL LIGHTING	Group Spot					Ove	erall LP 16.38 V			kWh/ft².yr MJ/m².yr kWh/ft².yr	7
OFFICE EQUIPMENT & PLUG LOA	DS									MJ/m².yr	262
Equipment Type Measured Power (W/device) Density (device/occupant)	55 0.9	ers	Monitors 51 0.9	100 0.15	200 0.1	217 0.06	Plug I	Loads			
Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		W/m² W/ft²	1.8 W/m² 0.2 W/ft² 80% 50% 2000 6760	0.6 W/m ² 0.05 W/tt ² 80% 50% 2000 6760	0.8 W/m² 0.07 W/ft² 80% 50% 2000 6760	0.5 W/n 0.05 W/ft 100% 100% 2000 6760					
Total end-use load (occupied period) Total end-use load (unocc. period) Usage during occupied period Usage during unoccupied period	5.8 3.8 100% 66%	W/m² W/m²	0.5 W/tt ² 0.4 W/tt ²				•	uter Servers E r Equipment E Plug Loads E	IUI H	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr kWh/ft².yr	0.42 16.20 2.36 91.24 0.72
FOOD SERVICE EQUIPMENT Provide description below: Lunch room/cafeteria/restaurant	Fuel Oil / Propane Fu	uel Share:		Electricity Fuel Share: [100.0%	EUI kWh	Propane EUI //ft².yr	E	All I	MJ/m².yr Electric EU kWh/ft².yr MJ/m².yr	27.70 I 0.1 4.0
REFRIGERATION Provide description below: Lunch room/cafeteria/restaurant BLOCK HEATERS & MISCELLANE	ous			I				lock Heaters E	EUI F	kWh/ft².yr MJ/m².yr KWh/ft².yr MJ/m².yr KWh/ft².yr KWh/ft².yr	0.1 4.0 0.1 5 0.1 5

EXISTING BUILDINGS: Large Office Baseline SIZE: > 100 kW

SPACE HEATING												
Heating Plant Type					el Oil / Propa		A /A LID		ctric	D : - t	T-4-1	
				Stan.	ilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total	
		System Present (%) Eff./COP		70%	80%	70%	1.70	3.00	4.50	100%	100%	
		Performance (1 / Eff.)		1.43	1.25				0.22	1.00		-
		(kW/kW)										
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	64.3 W/m² 538 MJ/m².yr		Btu/hr.ft² kWh/ft².yr									All Electric EUI
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		I	Oil Fuel Sha	re]				kWh/ft².yr 13.
Boiler Maintenance	Annual Ma	aintenance Tasks		Incidence]							MJ/m².yr 53
	Fire Oids	Inspection		(%) 75%								Fuel Oil / Propane EUI
		e Inspection for Scale Build	dup	100%								kWh/ft².yr MJ/m².yr
		of Controls & Safeties of Burner		100% 100%								Market Composite EUI
	Flue Gas	Analysis & Burner Set-up		90%								kWh/ft².yr 13.
												MJ/m².yr 53
SPACE COOLING												
A/C Plant Type												
			Centrifugal Standard	Chillers HE	WSHP	Reciproca Open	ting Chillers	Absorption W. H.	Chillers CW	Total		
		System Present (%)	20.0%				80.0%		CV	100.0%		
		COP Performance (1 / COP)	4.7 0.21		3.5 0.29	3.5 0.29			1.00			
		(kW/kW)	0.21	0.19	0.23	0.23	0.30	1.11	1.00			
		Additional Refrigerant Related Information										
		rtolated milemidatem										
Control Mode		Incidence of Use	Fixed	Reset]							
			Setpoint									
		Chilled Water Condenser Water										
			1		1							
Setpoint		Chilled Water	7	°C	44.6	°F						
·		Condenser Water	30	°C	86	°F						
		Supply Air	14.0	<u>JI</u> -C	57.2]-F						
Peak Cooling Load Seasonal Cooling Load	60 W/m ² 70.3 MJ/m ² .yr	19 Btu/hr.ft² 1.8 kWh/ft².yr	629	ft²/Ton								
(Tertiary Load)	70.3 W3/IIIyi	1.0 KVVIVIIyi										
Sizing Factor	1.00		Operation (oc	c period)	3000	hrs/vear	Note value	e cannot be	less than 2	900 hrs/ve	ar)	
			Operation (oc	c. period)	5000	i ii o, y cai	reote value	o carinot be	1000 (110112	.,500 1115/yc	ai,	
A/C Saturation (Incidence of A/C)	50.0%											
				т								
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		1								
Chiller Maintenance	Annual Ma	aintenance Tasks		Incidence								
	Inspect Co	ontrol, Safeties & Purge Ur	nit	(%)	(years)							
	Inspect Co Megger M	oupling, Shaft Sealing and I	Bearings									
	Condense	r Tube Cleaning										
	Vibration A	Analysis ent Testing										
		enical Oil Analysis										All Electric EUI
												kWh/ft².yr 0. MJ/m².yr 2
Cooling Tower/Air Cooled Condense	r Maintenan Annual Ma	aintenance Tasks		Incidence								
	Inspection	/Clean Spray Nozzles		(%)	(years)							Fuel Oil / Propane EUI kWh/ft².yr
	Inspect/Se	ervice Fan/Fan Motors										MJ/m².yr
	Megger M Inspect/Ve	erify Operation of Controls										Market Composite EUI
			-									kWh/ft².yr 0. MJ/m².yr 2
												IVIO/III .yi Z
DOMESTIC HOT WATER												
Service Hot Water Plant Type	Fossil Fue					Boiler				Fossil		Elec. Res.
	System P Eff./COP	resent (%) 0.65				0% 0.75		Fuel Share Blended E		0% 0.75		100% 0.91
Service Hot Water load (MJ/m².yr)	22.8	, 0.00	1	1	1	, 00	1			00		
(Tertiary Load)				A	II Electric EL	JI]	Fuel 0	Oil / Propar	ne EUI		Market Composite EUI
Wetting Use Percentage	90%				kWh/ft².yr	0.6			kWh/ft².yr	0.8		kWh/ft².yr 0.
				1	MJ/m².yr	25	l	1	MJ/m².yr	30		MJ/m².yr 25.

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing EXISTING BUILDINGS: Large Office Baseline SIZE: > 100 kW REGION: Labrador Interconnected

HVAC FANS & PUMPS											
SUPPLY FANS					Ventilatio	n and Evhau	st Fan On	eration & Con	trol		
COLLETTANO						ation Fan		aust Fan	7		
System Design Air Flow 4.0	L/s.m ² 0.78	CFM/ft²	Control		Fixed	Variable	Fixed	Variable	1		
			Control		rixeu		rixeu				
		wg	Incidence of Li-		75^	Flow	4000	Flow	-		
System Static Pressure VAV 350		wg	Incidence of Use		75%		100%				
Fan Efficiency 52%			Operation		Continuo	u:Scheduled	Continuou	Scheduled			
Fan Motor Efficiency 85%											
Sizing Factor 1.00		•	Incidence of Use		75%	6 25%	75%	25%	<u></u>		
Fan Design Load CAV 3.1	W/m ² 0.29	W/ft²									
Fan Design Load VAV 3.1	W/m ² 0.29	W/ft²		Comments:							
EXHAUST FANS											
Washroom Exhaust 100	L/s.washroom	212 CFM/washro	om								
Washroom Exhaust per gross unit area 0.2		0.04 CFM/ft ²									
Other Exhaust (Smoking/Conference) 0.1		0.02 CFM/ft ²									
Total Building Exhaust 0.3		0.06 CFM/ft ²									
	Pa	1.0 wg									
		1.0 wg									
Fan Efficiency 40%											
Fan Motor Efficiency 80%											
Sizing Factor 1.0											
Exhaust Fan Connected Load 0.2	2 W/m ² 0.02	W/ft²									
AUXILIARY COOLING EQUIPMENT (Condens	er Pump and Cooling Tow	er/Condenser Fans)									
Average Condenser Fan Power Draw		0.020 kW/kW		kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser)	1.18 W/m²	0.11	W/ft ²							
Condenser Pump											
Pump Design Flow		0.053 L/s.KW	3.0	J.S. gpm/Ton							
Pump Design Flow per unit floor area		0.003 L/s.m ²	0.005	J.S. gpm/ft ²							
Pump Head Pressure		90 kPa	30	ft							
Pump Efficiency		55%	50								
Pump Motor Efficiency		90%									
Sizing Factor		1.0									
Pump Connected Load		0.58 W/m ²	0.05	W/ft²							
CIRCULATING PUMP (Heating & Cooling)											
Pump Design Flow @ 5 °C (10 °F) delta T	0.003	L/s.m²	0.0038 U.S. gpm/ft	2.0	U.S. gpm	/Ton					
				2.4	பு∪.ა. gpm	/ 1 011					
Pump Head Pressure	150	kPa	50 ft								
Pump Efficiency	55%										
Pump Motor Efficiency	90%										
Sizing Factor	0.5										
Pump Connected Load	0.4	W/m²	0.04 W/ft ²								
Supply Fan Occ. Period	3500	hrs./year									
Supply Fan Unocc. Period		hrs./year									
Supply Fan Energy Consumption	21.2	kWh/m².yr									
L											
Exhaust Fan Occ. Period		hrs./year									
Exhaust Fan Unocc. Period		hrs./year									
Exhaust Fan Energy Consumption	1.8	kWh/m².yr									
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consum		kWh/m².yr kWh/m².yr									
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	5000	hrs./year kWh/m².yr									
onousing a unp Energy Condumpatin	<u> </u>	·									
Fans and Pumps Maintenance	Annual Maintenance Task	s	Incidence Frequency								
			(%) (years)								
	Inspect/Service Fans & M										
	Inspect/Adjust Belt Tensio	n on Fan Belts									
	Inspect/Adjust Belt Tensio Inspect/Service Pump & N								EUI	kWh/ft².yr	2.2
									EUI	kWh/ft².yr MJ/m².yr	2.: 85.

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing EXISTING BUILDINGS: Large Office Baseline SIZE: > 100 kW REGION: Labrador Interconnected

EUISUMMARY							
TOTAL ALL END-USES:	Electricity:		28.3 kWh/ft².yr 1,094.9 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electi	icity	Fuel Oil /	Propane
GENERAL LIGHTING	5.2	202.1		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
ARCHITECTURAL LIGHTING	1.5	59.9	SPACE HEATING	13.9	538.2		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.4	14.5		
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	25.0	0.0	0.0
HVAC FANS & PUMPS	2.2	85.1	FOOD SERVICE EQUIPMENT	0.1	4.0		
REFRIGERATION	0.1	4.0					
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.1	5.0					
COMPUTER EQUIPMENT	2.4	91.2					
COMPUTER SERVERS	0.4	16.2					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

EXISTING BUILDINGS: SIZE: REGION: Small Office < 100 kW Existing Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² Glazing U value (W/m².°C) 3.52 W/m².°C 0.62 Btu/hr.ft².°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.30 Defined as Exterior Zone 0.58 Typical # Stories Floor to Floor Height (m) 3.7 r 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A TOTAL Ventilation System Type CAV VAV VAVR System Present (%) 100% 100% Min. Air Flow (%) (Minimum Throttled Ai 60% Occupancy or People Density 274 ft²/person %OA 8.06% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 16 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: CFM/ft² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation I /s m² operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.72 CFM/ft² 3.65 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.40 L/s.m² 0.08 CFM/ft² 50% Infiltration Rate Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 180.760 Switchover Point KJ/kg. 18 Peak Design Cooling Load Peak Zone Sensible Load 118,786 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipment 13.2 ft³/lbm All Pneumatic 5,526 DDC/Pneumatic Total air circulation or Design air 3.65 l/s.m² All DDC Total (should add-up to 100%) PI / PID Proportional Control mode Control Mode Fixed Discharge Rese Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 14 °C 57.2 °F 24 °C Summer Humidity (%) 50% Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves, Inspection of Control Devices (Dampers, VAV Boxes)

EXISTING BUILDINGS: Small Office Baseline SIZE: < 100 kW

LIGHTING GENERAL LIGHTING														
Light Level	550 Lux	51.1	ft-candles											
Floor Fraction (GLFF)	0.95		1											
Connected Load	14.8 W/m²	1.4	W/ft²											
Occ. Period(Hrs./yr.)	2500		Light Level (Lux)		450	550	650					Total	i	
Unocc. Period(Hrs./yr.)	6260		% Distribution		10%	80%	10%					100%	ì	
Usage During Occupied Period Usage During Unoccupied Period	95% 20%		Weighted Average									550	i	
Usage During Unoccupied Feriod	2076				INC	CFL	T12	T8	HID	T5HO	LED	TOTAL	ì	
Fixture Cleaning:			System Present (%)				20.0%	80.0%				100.0%	ì	
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6		ì	
Interval	years		LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80 88	0.80 65	0.80 95	0.80		ì	
Relamping Strategy & Incidence	Group Spot	7	Emodoy (ETT)			00		00	00	00				
of Practice		\Box											kWh/ft².yr	4.7
ARCHITECTURAL LIGHTING													MJ/m².yr	183
Light Level	350 Lux	32.5	ft-candles											
Floor Fraction (ALFF)	0.05		1											
Connected Load	31.0 W/m²	2.9	W/ft²											
Occ. Period(Hrs./yr.)	2500		Light Level (Lux)		200	300	400	500				Total	ì	
Unocc. Period(Hrs./yr.)	6260		% Distribution		10%	40%	40%	10%				100%	ì	
Usage During Occupied Period	95%		Weighted Average									350	i	
Usage During Unoccupied Period	40%				INC	CFL	T12	T8	HID	T5HO	LED	TOTAL	i	
Fixture Cleaning:			System Present (%)		45%	45%	112	10	5%	10110	5%		ì	
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6		ì	
Interval	years		LLF Efficacy (L/W)		0.65	0.65	0.75	0.80	0.80	0.80	0.80		ì	
Relamping Strategy & Incidence	Group Spot	7	Efficacy (L/VV)		15	50	72	84	65	95	90			
of Practice	Олоар Орок	₫										EUI	kWh/ft².yr	0.7
	•				E	UI = Load	X Hrs. X S	SF X GLFF					MJ/m².yr	27
SPECIAL PURPOSE LIGHTING Light Level	Lux		ft-candles			F	loor fractio	n check: sh	ould – 1 0	n	1.00	7		
Floor Fraction (HBLFF)	Lux		it caracs			1.	ioor mactio	il chook. 3i	louid = 1.0		1.00	J		
Connected Load	W/m²		W/ft²											
One Deviced/Live (cr.)	4000		Light Level (Lux)		300	500	700	1000				Total	ì	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4760		% Distribution		300	500	700	1000				Total	ì	
Usage During Occupied Period	0%		Weighted Average				1						ì	
Usage During Unoccupied Period	100%				11.0	051	T.0						ì	
Fixture Cleaning:			System Present (%)		INC	CFL	T12	T8		MH	HPS	TOTAL	ì	
Incidence of Practice			CU CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6		ì	
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.55	0.55		ì	
Relamping Strategy & Incidence	Group Spot	7	Efficacy (L/W)		15	50	72	84	88	65	90			
of Practice	Gloup Spot	+										EUI	kWh/ft².yr	
													MJ/m².yr	
TOTAL LIGHTING								0	verall LP	15.57 V	I/m2	EUI TOTAL	MMh/f+2 vr	5
TOTAL LIGHTING								U	veiali LF	15.57 V	V/111=		MJ/m².yr	210
OFFICE EQUIPMENT & PLUG LOA	DS													
Equipment Type	Compu	ıters	Monitors	Pri	nters	Copie	ers	Serve	rs	Plug L	oads	1		
										9				
Measured Power (W/device)	5	5	51	100		200	-	217						
Density (device/occupant)	0.		0.9	0.15		0.1		0.06						
Connected Load		9 W/m²	1.8 W/m²		W/m²	0.8 W		0.5 W		1.5 V				
Diversity Occupied Period	0.	2 W/ft²	0.2 W/ft² 80%	0.05 80%	W/ft²	0.07 W	V/ft²	0.05 W 100%	//ft²	0.14 V 80%	V/ft²			
Diversity Unoccupied Period	50%		50%	50%	-	50%	-	100%	-	50%				
Operation Occ. Period (hrs./year)	200		2000	2000		2000		2000		2500				
Operation Unocc. Period (hrs./year)	676	0	6760	6760		6760		6760		6260				
Total end-use load (occupied period)	5	8 W/m²	0.5 W/ft ²							Comp	uter Servers	FUI	kWh/ft².yr	0.42
Total end-use load (unocc. period)		8 W/m²	0.4 W/ft²							Comp	0.01		MJ/m².yr	16.20
										Compute	r Equipment		kWh/ft².yr	2.36
Usage during occupied period Usage during unoccupied period	1009 669										Plug Loads		MJ/m².yr kWh/ft².yr	91.24 0.72
osage during unoccupied period	007	76									i iug Loads		MJ/m².yr	27.70
FOOD SERVICE EQUIPMENT	Fuel Oil / Propane	Firel Chara		Clastriait.	Fuel Share:	100.0%		Fuel Oil	/ Propane	eu I		A II	Electric EUI	
Provide description below:	ruei Oii / Propane	ruei Share:		Electricity	ruei Share.	100.0%	E		Vh/ft².yr	EUI			kWh/ft².yr	
									J/m².yr				MJ/m².yr	
REFRIGERATION														
REFRIGERATION Provide description below:														
				7								EUI	kWh/ft².yr	
				_									MJ/m².yr	
BLOCK HEATERS & MISCELLANE	OUS													
DECOR HEATERS & MISCELLANE														
										ВІ	ock Heaters		kWh/ft².yr	0.1
										3.4	iscellaneous		MJ/m².yr kWh/ft².yr	5 0.1
										IVI	isceilai ieuus		MJ/m².vr	5

EXISTING BUILDINGS: Small Office Baseline SIZE: < 100 kW

SPACE HEATING												
Heating Plant Type					el Oil / Propa			Ele]
				Boi Stan.	ilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total	
		System Present (%)					. =0		4.50	100%	100%	
		Eff./COP Performance (1 / Ef	f.)	70% 1.43	80% 1.25	70% 1.43	1.70 0.59	3.00 0.33	4.50 0.22	1.00 1.00		-
		(kW/kW)										_
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	51.3 W/m² 414 MJ/m².yr		16.3 Btu/hr.ft² 10.7 kWh/ft².yr									
Electric Fuel Share	100.0% Fuel 0	Dil / Propane Fuel Shar	re	1	Oil Fuel Sha	re]				All Electric EUI kWh/ft².yr 10.7
Boiler Maintenance	Annual M	aintenance Tasks		Incidence				•				MJ/m².yr 414
	Fire Side Water Sid Inspection Inspection	Inspection de Inspection for Scale n of Controls & Safetie n of Burner Analysis & Burner Se	es	(%) 75% 100% 100% 100% 90%								Fuel Oil / Propane EUI kWh/ft²-yr MJ/m²-yr Market Composite EUI kWh/ft²-yr MJ/m²-yr 414
SPACE COOLING												
A/C Plant Type		System Present (%) COP Performance (1 / C0 (kW/kW) Additional Refrigerar Related Information	OP) 0.2	HE 7 5.4	3.5 0.29	Open 3.5 0.29	DX 100.0% 2.6 0.38		Chillers CW 1 1.00	Total 100.0%		
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Setpoint	Reset								
Setpoint		Chilled Water Condenser Water Supply Air	30	°C	44.6 86 57.2	°F						
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	57 W/m² 67.3 MJ/m².yr	18 Btu/h 1.7 kWh/		ft²/Ton								
Sizing Factor	1.00		Operation (oc	cc. period)	3000	hrs/year	Note value	cannot be	less than 2	900 hrs/yea	ar)	
A/C Saturation (Incidence of A/C)	50.0%											
Electric Fuel Share	100.0% Fuel 0	Oil / Propane Fuel Shar	re	I								
Chiller Maintenance	Annual M	aintenance Tasks			Frequency							
	Inspect C	ontrol, Safeties & Purg	ge Unit	(%)	(years)							
	Inspect C Megger N	oupling, Shaft Sealing Notors	and Bearings									
	Condense	er Tube Cleaning										
		rent Testing										
	Spectroc	hemical Oil Analysis										All Electric EUI kWh/ft².yr 0.7
Cooling Tower/Air Cooled Condense	or Maintones A	ointonones Te-1		Incide	Erocus:	İ						MJ/m².yr 29
Cooling Tower/Air Cooled Condense				Incidence (%)	Frequency (years)							Fuel Oil / Propane EUI
		n/Clean Spray Nozzles ervice Fan/Fan Motors										kWh/ft².yr MJ/m².yr
	Megger N											Market Composite EUI
	inspect/v	enty Operation of Cor	itrois									kWh/ft².yr 0.7
												MJ/m².yr 29
DOMESTIC HOT WATER		·	-									
Service Hot Water Plant Type	Fossil Fu		ank			Boiler		Fuel Ob -		Fossil		Elec. Res.
	Eff./COP	resent (%)	0.65			0% 0.75		Fuel Share Blended E		0% 0.75		100% 0.91
Service Hot Water load (MJ/m².yr) (Tertiary Load)	22.8											
	000/				II Electric EU				Oil / Propan			Market Composite EUI
Wetting Use Percentage	90%				kWh/ft².yr MJ/m².yr	0.6 25			kWh/ft².yr MJ/m².yr	0.8 30		kWh/ft².yr 0.6 MJ/m².yr 25.0

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing EXISTING BUILDINGS: Small Office Baseline SIZE: < 100 kW REGION: Labrador Interconnected

System Dollagh Air Park 328 Us. not 372 CFM Not 173 CFM Not 174 Not 175 CFM Not 175	HVAC FANS & PUMPS											
System Static Pressars VAV Static Pressa	SUPPLY FANS				,	Ventilation	and Exhau	st Fan Ope	eration & Cont	rol		
System Design Air Flow 3.5 U.s.mi 1.72 CPM/ele Cornel Flow The William Part										1		
System Stack Pressure CAV 350 Pa	System Design Air Flow 3.6	L/s.m ² 0.72	CFM/ft ²	Control								
System Static Pressure VAV 350 Pe	System Static Pressure CAV 350				ľ							
Fine Historicary Gyris Fine Motor Efficiency Soft Motor Gorden				Incidence of Use	-	100%		100%				
Fam Motor Efficiency 10		1.4] **9	Operation			Scheduled		Scheduled			
Sizing Fantor 0.05				Operation		COTILITIOO	Concueu	Continuou	Scrieduled			
Fan Design Load CAV				Incidence of Lice	H	750/	250/	750/	250/	_		
Fan Design Load VAV		M/m2 0.42	10/1642	incidence of Use		75%	25%	75%	25%	1		
Washroon February Wash				Camma	mto.							
Washroom Exhaust progress wit are 02 U.s. washroom 212 CFM/washroom 004 CFM/rd	ran besign Load VAV	VV/IIF 0.13	VV/IL-	Contine	IIIS.							
Washroom Enhants per gross unt are 02 U.s.m²	EXHAUST FANS											
Other Exhaust (Smoking)Corderace)	Washroom Exhaust 100	L/s.washroom	212 CFM/washro	om								
Total Building Enhants 2.3 Mn² 2.50 Pa 1.0 wg	Washroom Exhaust per gross unit are: 0.2	L/s.m ²	0.04 CFM/ft ²									
Total Building Eshaust 2.3 Us ms 2.50 Pra 1.0 Vrg 1.0 Vrg 2.00 Pra 1.0 Vrg 2.00 Pra 1.0 Vrg 2.00 Pra 2.00	Other Exhaust (Smoking/Conference) 0.1	L/s.m ²	0.02 CFM/ft ²									
Exhaust System Static Pressure	Total Building Exhaust 0.3											
Fan Efficiency 3015 Sing Factor 0.1 Win? 0.91 Write AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw 0.020 kW/kW 0.11 Write Cooling Tower/Eve, Condenser Air Cooled Condenser) Pump Design Pow Pump Design Pow Pump Pump Air Cooled Condenser Pump Pump Design Pow Pump Pump Design Pow Pump Pump Pump Design Pow Pump Pump												
Fan Motor Efficiency		-										
Soling Factor												
Exhaist Fan Connected Load												
AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap, Condenser) Design Flow De		W/m² 0.04	\/\//f t 2									
Average Condenser Fan Power Draw (Cooling Tower/Evap, Condenser) 0.020 W/M/W 0.07 W/M/T	LANGUST FAIT COTTRECTED LOAD U.1	vv/111 ⁻ 0.01	vv/1t=									
Average Condenser Fan Power Draw (Cooling Tower/Evap, Condenser) 0.020 W/M/W 0.07 W/M/T	AUXILIARY COOLING EQUIPMENT (Condense	er Pump and Cooling Tov	ver/Condenser Fans)									
Cooling Tower(Evap, Condenser)		,	•									
Cooling Tower(Evap, Condenser)	Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton								
Condenser Pump		ndenser)										
Pump Design Flow per unit floor area Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load CRCULATING PUMP (Heating & Cooling) Pump Design Flow @ 5° C (10° F) delta T Pump Head Pressure Pump Efficiency Pump Design Flow @ 5° C (10° F) delta T Pump Head Pressure Pump Efficiency Pump Head Pressure Pump Efficiency Pump Head Pressure Pump Efficiency Pump Motor Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load Vimp Pump Connected Load Vimp Pump Connected Load Vimp Pump Connected Load Vimp Pump Connected Load Vimp Pump Connected Load Vimp Pump Connected Load Vimp Pump Connected Load Vimp Pump Connected Load Vimp Pump Connected Load Vimp Visup Vimp Pump Vimp Pump Vimp Pump Pump Vimp Pump Pump Pump Pump Pump Pump Pump Pu	(222			0.10								
Pump Design Flow per unit floor area 0.003 Js. m² 0.004 U.S. gmm/f² 30 tr.	Condenser Pump											
Pump Design Flow per unit floor area 0.003 Js.m² 0.004 U.S. gmm/fe 300 ft	Pump Design Flow		0.053 L/s KW	3.0 II.S gp	m/Ton							
Pump Head Pressure 90 KPa 30 ft												
Pump Efficiency 90% 90					1016							
Pump Motor Efficiency			90 KPa	30 II								
Sizing Factor 0.5 0.27 W/m² 0.03 W/ft²												
CIRCULATING PUMP (Heating & Cooling) Pump Design Flow @ 5 °C (10 °F) delta T												
CIRCULATING PUMP (Heating & Cooling)												
Pump Design Flow	Pump Connected Load		0.27 W/m²	0.03 W/ft²								
Pump Design Flow	CIDCUIT ATING DUMP (Heating 9 Cooling)											
Pump Head Pressure 150 kPa 50 ft Pump Hotor Efficiency 55% Figure 150 kPa Pump Motor Efficiency 90% Sizing Factor 0.5 Pump Connected Load 0.4 W/m² 0.03 W/t² Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc. Period 5260 hrs./year Supply Fan Energy Consumption 10.8 kW/hr².yr Exhaust Fan Occ. Period 3500 hrs./year Exhaust Fan Unocc. Period 5260 hrs./year Exhaust Fan Cor. Period 5200 hrs./year Exhaust Fan Energy Consumption 0.9 kWh/m².yr Condenser Pump Energy Consumption 0.1 kWh/m².yr Cooling Tower / Condenser Fans Energy Consumption 0.1 kWh/m².yr Circulating Pump Yearly Operation 5000 hrs./year Circulating Pump Energy Consumption 5000 hrs./year KWh/m².yr Insidence Frequency Inspect/Service Fans & Motors Inspect/Service Fans & Motors Inspect/Service Fans & Tension on Fan Belts Inspect/Service Fans & Motors	CINCOLATING FORM (Heating & Cooming)											
Pump Head Pressure 150 kPa 50 ft Pump Motor Efficiency 55% 90% Sizing Factor 0.5 0.5 Pump Connected Load 0.4 W/m² 0.03 W/t² Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc. Period 5260 hrs./year Supply Fan Energy Consumption 10.8 kW/m².yr Exhaust Fan Occ. Period 3500 hrs./year Exhaust Fan Unocc. Period 5260 hrs./year Exhaust Fan Energy Consumption 0.9 kW/m².yr Condenser Pump Energy Consumption 0.1 kW/m².yr Conling Tower /Condenser Fans Energy Consumption 0.1 kW/m².yr Circulating Pump Yearly Operation 5000 hrs./year Circulating Pump Energy Consumption 5000 hrs./year KW/m².yr 10.1 kW/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts 10.00 m²	Pump Design Flow @ 5 °C (10 °F) delta T	0 002	L/s.m ²	0.0036 U.S. apm/ft²	24	U.S. anm/	Ton					
Pump Motor Efficiency 90% Sizing Factor 0.5 Pump Connected Load 0.4 W/m² 0.03 W/ft² Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc. Period 5260 hrs./year Supply Fan Energy Consumption 10.8 kWh/m².yr Exhaust Fan Occ. Period 55260 hrs./year Exhaust Fan Unocc. Period 55260 hrs./year Exhaust Fan Unocc. Period 55260 hrs./year Exhaust Fan Unocc. Period 55260 hrs./year Exhaust Fan Energy Consumption 0.9 kWh/m².yr Condenser Pump Energy Consumption 0.1 kWh/m².yr Cordenser Pump Energy Consumption 0.1 kWh/m².yr Coriculating Pump Yearly Operation 0.1 kWh/m².yr Circulating Pump Yearly Operation 5000 hrs./year Circulating Pump Senergy Consumption 0.1 kWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Bett Tension on Fan Betts					2.4	o.o. gpiii/	. 511					
Pump Motor Efficiency 90% 5izing Factor 0.5 0.5 0.5 0.5 0.03 W/ft² 0.03 W/			N G	30 11								
Sizing Factor Pump Connected Load 0.5 Pump Connected Load 0.5 W/m² 0.03 W/t² Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Unocc. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption Circulating Pump Yearly Operation Circulating Pump Energy Consumption Circulating Pump Energy Consumption Ears and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts			1									
Pump Connected Load O.4 W/m² O.03 W/tt² Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Unocc. Period Supply Fan Coc. Period Supply Fan Coc. Period Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Codenser Pump Energy Consumption Coding Tower /Condenser Fans Energy Consumption Circulating Pump Yearly Operation Circulating Pump Energy Consumption Circulating Pump Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts			1									
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Supply Fan Unocc. Period 5260 Supply Fan Energy Consumption 10.8 Exhaust Fan Occ. Period 3500 Exhaust Fan Unocc. Period 5260 Exhaust Fan Energy Consumption 0.9 Exhaust Fan Energy Consump	rump Connected Load	0.4	VV/III*	U.U3 VV/IT²								
Supply Fan Unocc. Period 5260 hrs./year Wh/m².yr Exhaust Fan Occ. Period 3500 hrs./year kWh/m².yr Condenser Pump Energy Consumption 0.1 kWh/m².yr Cooling Tower /Condenser Fans Energy Consumption 0.4 kWh/m².yr Circulating Pump Yearly Operation kWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	Sunnly Fan Occ. Period	3500	hrs /vear									
Supply Fan Energy Consumption 10.8 kWh/m².yr Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Coling Tower /Condenser Fans Energy Consumption Circulating Pump Yearly Operation Circulating Pump Energy Consumption Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts												
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Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption Circulating Pump Yearly Operation Circulating Pump Energy Consumption Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	Supply ran Energy Consumption	10.8	KVVIVIII*.yi									
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption Circulating Pump Yearly Operation Circulating Pump Energy Consumption Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	Fitnest For One Boded	0500	1 4									
Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption Circulating Pump Yearly Operation Circulating Pump Energy Consumption Circulating Pump Energy Consumption Eans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts												
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Cooling Tower /Condenser Fans Énergy Consumption Out Wht/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption Fans and Pumps Maintenance Annual Maintenance Tasks Incidence (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	Exhaust Fan Energy Consumption	0.9	kWh/m².yr									
Cooling Tower /Condenser Fans Énergy Consumption Out Wht/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption Fans and Pumps Maintenance Annual Maintenance Tasks Incidence (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts			1									
Circulating Pump Energy Consumption kWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence (%) (years)												
Circulating Pump Energy Consumption KWh/m² yr			1									
Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts		5000										
Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	Circulating Pump Energy Consumption		kWh/m².yr									
(%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts												
Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	Fans and Pumps Maintenance	Annual Maintenance Task	rs -									
Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts				(%) (years)								
Inspect/Adjust Belt Tension on Fan Belts		Inspect/Service Fans & M	otors									
Inspect/Service Pump & Motors		Inspect/Adjust Belt Tension	n on Fan Belts									
		Inspect/Service Pump & N	Motors							EUI	kWh/ft².yr	1.1
MJ/m², yr		,								-		43.7

SIZE: < 100 kW

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing EXISTING BUILDINGS: Small Office Baseline REGION: Labrador Interconnected

EUISUMMARY							
TOTAL ALL END-USES:	Electricity:		22.4 kWh/ft².yr 869.4 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electi	icity	Fuel Oil /	Propane
GENERAL LIGHTING	4.7	183.1		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
ARCHITECTURAL LIGHTING	0.7	27.2	SPACE HEATING	10.7	413.9		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.4	14.3		
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	25.0	0.0	0.0
HVAC FANS & PUMPS	1.1	43.7	FOOD SERVICE EQUIPMENT				
REFRIGERATION							
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.1	5.0					
COMPUTER EQUIPMENT	2.4	91.2					
COMPUTER SERVERS	0.4	16.2					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Food Retail Existing Labrador Interconnected Baseline CONSTRUCTION 10,000 ft² 0.38 W/m².°C Wall U value (W/m².°C) 0.07 Btu/hr.ft² .°F Typical Building Size 929 m² Roof U value (W/m2.°C) 0.33 W/m².°C 0.06 Btu/hr.ft² .°F Typical Footprint (m²) 929 m² 10,000 ft² 3.52 W/m².°C 0.62 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.06 Defined as Exterior Zone Typical # Stories 0.69 Floor to Floor Height (m) 4.3 m 14.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A TOTAL Ventilation System Type CAV VAV VAVR System Present (%) 100% Min. Air Flow (%) (Minimum Throttled A 50% Occupancy or People Density 323 ft²/person %OA 37.75% m²/person Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period 90% resh Air Requirements or Outside Air 30 L/s.person 64 CFM/person Fresh Air Control Type 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.52 CFM/ft² 2.65 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Peak Design Cooling Load Peak Zone Sensible Load 301.505 Switchover Point KJ/kg. 18 112,121 64.4 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic DDC/Pneumatic All DDC 5,216 Total air circulation or Design air 2.65 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control Mode Control mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Air Summer Temperature 71.6 °F 55.4 °F 22 °C 13 Summer Humidity (%) 50% 100% Enthalpy
Winter Occ. Temperature
Winter Occ. Humidity 65.5 KJ/kg 22 °C 28.2 Btu/lbm 23.4 Btu/lbm 54.5 71.6 60.8 30% 45% Enthalpy Winter Unocc. Temperature 53 K 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 69.8 Winter Unocc. Humidity 30% 21.5 Btu/lbm Enthalpy 50 KJ/kc Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices nspection of Control Devices (Valves, Inspection of Control Devices (Dampers, VAV Boxes)

EXISTING BUILDINGS: Food Retail Baseline SIZE: Ali

LIGHTING GENERAL LIGHTING									
Light Level		6.5 ft-candles							
Floor Fraction (GLFF) Connected Load	0.90 14.5 W/m²	1.3 W/ft²							
One Beside (Use Aug.)	4500	Links I amel (I am)	000	500 70	1000		Total	1	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4500 4260	Light Level (Lux) % Distribution	300	500 70 100%	00 1000		Total 100%		
Usage During Occupied Period	100%	Weighted Average					500		
Usage During Unoccupied Period	20%		INC	CFL T1	12 T8 HID	T5HO LED	TOTAL	+	
Fixture Cleaning:		System Present (%)	3%	2% 159	% 75% 5%	0% 0%	100.0%		
Incidence of Practice Interval		CU LLF	0.7	0.7 0.6		0.6 0.6 0.80 0.80	.		
interval	years	Efficacy (L/W)	0.65 15	0.65 0.75 50 72		95 90			
Relamping Strategy & Incidence	Group Spot							11411 1710	
of Practice								kWh/ft².yr MJ/m².yr	6.5 251
ARCHITECTURAL LIGHTING (COR									
Light Level Floor Fraction (ALFF)	500 Lux 4	6.5 ft-candles							
Connected Load		1.3 W/ft ²							
Occ. Period(Hrs./yr.)	4500	Light Level (Lux)	300	500 70	00 1000		Total	1	
Unocc. Period(Hrs./yr.)	4260	% Distribution		100%	1000		100%		
Usage During Occupied Period Usage During Unoccupied Period	100% 50%	Weighted Average					500	+	
Coage During Choccopied I chied	5070		INC	CFL T1		T5HO LED			
Fixture Cleaning: Incidence of Practice		System Present (%) CU	0.7	0.7 0.6		0% 0% 0.6 0.6	100.0%	1	
Interval	years	LLF	0.65	0.65 0.75		0.80 0.80			
Delegacion Otrata de O la cidada	0	Efficacy (L/W)	15	50 72	2 88 65	95 90]	
Relamping Strategy & Incidence of Practice	Group Spot						EUI	kWh/ft².yr	0.8
ODEOUT DUDDOOF HOUTING				EUI = Load X Hrs.	X SF X GLFF			MJ/m².yr	32
SPECIAL PURPOSE LIGHTING Light Level	300.00 Lux 2	7.9 ft-candles		Floor fra	ction check: should = 1.	00 1.00	1		
Floor Fraction (HBLFF)						•			
Connected Load	14.0 W/m²	1.3 W/ft²							
Occ. Period(Hrs./yr.)	4000	Light Level (Lux)	300	500 70	00 1000		Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	4760 0%	% Distribution Weighted Average	100%				100% 300	1	
Usage During Unoccupied Period	100%	Weighted Average					300		
First va Classica		Custom Dropout (0()	INC	CFL T1	12 T8	MH HPS 100% 0%	TOTAL	1	
Fixture Cleaning: Incidence of Practice		System Present (%) CU	0.7	0%	6 0.6 0.6	0.6 0.6	100.0%		
Interval	years	LLF	0.65	0.65 0.75	5 0.80 0.80	0.55 0.55			
Relamping Strategy & Incidence	Group Spot	Efficacy (L/W)	15	50 72	2 84 88	65 90		I	
of Practice								kWh/ft².yr	
								MJ/m².yr	
TOTAL LIGHTING					Overall LP	14.39 W/m ²	EUI TOTAL		7
								MJ/m².yr	284
OFFICE EQUIPMENT & PLUG LOA	DS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads]		
Measured Power (W/device)	55	51	100	200	217				
Density (device/occupant) Connected Load	0.43 0.8 W/m²	0.43 0.7 W/m²	0.01 0.0 W/m²	0.01 0.1 W/m²	0.02 0.1 W/m²	1.5 W/m²			
	0.1 W/ft ²	0.1 W/ft ²	0.00 W/ft ²	0.01 W/ft ²	0.01 W/ft ²	0.14 W/ft ²			
Diversity Occupied Period Diversity Unoccupied Period	90%	90% 50%	90% 50%	90% 50%	100%	90% 50%			
Operation Occ. Period (hrs./year)	2000	2000	2000	2000	2600	4100			
Operation Unocc. Period (hrs./year)	6760	6760	6760	6760	6160	4660]		
Total end-use load (occupied period)	2.9 W/m ²	0.3 W/ft ²	to see notes (cells with	red indicator in uppe	er right corner, type "SHII	FT @mputer Servers		kWh/ft².yr	0.03
Total end-use load (unocc. period)	1.7 W/m²	0.2 W/ft ²				Computer Equipment		MJ/m².yr kWh/ft².yr	1.24 0.78
Usage during occupied period	100%					Computer Equipment		MJ/m².yr	30.2
Usage during unoccupied period	58%					Plug Loads		kWh/ft².yr	0.84
							<u> </u>	MJ/m².yr	32.5
FOOD SERVICE EQUIPMENT	F1011/P F10h		Electricity Evel Observ	100.00/	Fuel Oil / Passage	- E.U.		i en anda en u	
Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propane EUI kWh/ft².yr	2.6		kWh/ft².yr	3.1
					MJ/m².yr	100.0		MJ/m².yr	120.0
REFRIGERATION									
Provide description below:			7						
Commercial refrigeration display case	es .		J					kWh/ft².yr MJ/m².yr	25.8 1000.0
							-		
BLOCK HEATERS & MISCELLANE	ous								
						Block Heaters		kWh/ft².yr	0.1
						Miscellaneous		MJ/m².yr kWh/ft².yr	5 0.1
						wilocellarieous		MJ/m².vr	5

EXISTING BUILDINGS: SIZE: Food Retail All

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

VINTAGE: Existing REGION: Labrador Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Boilers Packaged A/A HP Stan. High Rooftop System Present (%) 100% 100% Eff./COP 4.50 1.00 Performance (1 / Eff.) 1.43 1.25 1.43 0.59 0.33 0.22 1.00 (kW/kW) Peak Heating Load 11.4 Btu/hr.ft² 35.8 W/m² Seasonal Heating Load 1137 MJ/m².yr 29.4 kWh/ft2.yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share kWh/ft².yr 20 4 MJ/m2.yr 1137 Boiler Maintenance Annual Maintenance Tasks Fuel Oil / Propane EUI kWh/ft².yr (%) 75% Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 1137 SPACE COOLING A/C Plant Type Centrifugal Chillers
Standard HE Reciprocating Chillers Absorption Chillers Screw Total DX W. H. CW Chillers Open 100.0% System Present (%) 100.0% Performance (1 / COP) 0.21 0.19 0.23 0.28 0.3 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water 44.6 °F Condenser Water 30 °C 86 °F 55.4 °F 13.0 °C Supply Air 95 W/m² 30 Btu/hr.ft² 398 ft²/Ton Peak Cooling Load Seasonal Cooling Load 54.1 MJ/m².yr 1.4 kWh/ft².yr (Tertiary Load) Operation (occ. period 4000 hrs/year Note value cannot be less than 2,900 hrs/year) 1.00 Sizing Factor 25.0% A/C Saturation (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.6 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.6 kWh/ft².vr MJ/m².yr 25 SERVICE HOT WATER Service Hot Water Plant Type Fossil Fuel SHW Avg. Tank Elec. Res. Boiler Fossil System Present (%) 0% Fuel Share 0% 100% Eff./COP 65.00 0.75 Blended Efficiency 0.75 0.91 ervice Hot Water load (MJ/m².yr) 45.5 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI kWh/ft².yr 90% 1.3 1.6 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr 1.3 50.0 MJ/m².y MJ/m².yr

COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: SIZE: Food Retail

VINTAGE: Existing

REGION: Labrador Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan System Design Air Flow System Static Pressure CAV 0.52 CFM/ft² 2.6 L/s.m² Control Variable Fixed Variable 350 1.4 wg Flow Pa Flow System Static Pressure VAV 350 Pa 1.4 wg Incidence of Use 100% 100% Fan Efficiency Continuous Scheduled Continuous Schedule 60% Operation Fan Motor Efficiency 80% Sizing Factor Fan Design Load CAV 1.00 Incidence of Use 100% 100% 0.18 W/ft² 0.18 W/ft² Comments: Fan Design Load VAV 1.9 W/m² EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit are 100 L/s.washroom 212 CFM/washroom 0.04 CFM/ft² 0.2 L/s.m² Other Exhaust (Smoking/Conference) 0.1 L/s.m² 0.02 CFM/ft² Total Building Exhaust 0.3 L/s.m² 0.06 CFM/ft² Exhaust System Static Pressure 1.0 wg Pa 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 0.4 W/m² 0.04 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) 0.07 kW/Ton 0.18 W/ft² 0.020 kW/kW Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 1.90 W/m² Condenser Pump 0.053 L/s KW 3.0 U.S. gpm/Ton Pump Design Flow 0.007 U.S. gpm/ft² Pump Design Flow per unit floor area 0.005 L/s.m² Pump Head Pressure Pump Efficiency kPa ft 50% Pump Motor Efficiency 80% Sizing Factor 1.0 W/ft² Pump Connected Load W/m² CIRCULATING PUMP (Heating & Cooling) Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 2.4 U.S. gpm/Ton 0.004 L/s.m² 0.0060 U.S. gpm/ft² 100 kPa 50 ft Pump Efficiency
Pump Motor Efficiency 50% 80% Sizing Factor 0.8 0.8 W/m² 0.08 W/ft² Pump Connected Load Supply Fan Occ. Period 5000 hrs./year Supply Fan Unocc, Period 3760 hrs./year Supply Fan Energy Consumption 16.9 kWh/m².yr Exhaust Fan Occ. Period 5000 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 3760 hrs./year 3.7 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.3 kWh/m².yr Circulating Pump Yearly Operation 7000 hrs./year Circulating Pump Energy Consumption kWh/m2.yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 1.9 MJ/m2.yr 75.2

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing EXISTING BUILDINGS: Food Retail Baseline SIZE: REGION: Labrador Interconnected

EUI SUMMARY							
TOTAL ALL END-USES:	Electricity		71.8 kWh/ft².yr 2,780.1 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 M
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	6.5	251.1		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m ² .yr
ARCHITECTURAL LIGHTING (COR	0.8	32.5	SPACE HEATING	29.4	1,137.3		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	6.1		
OTHER PLUG LOADS	0.8	32.5	SERVICE HOT WATER	1.3	50.0	0.0	0.0
HVAC FANS & PUMPS	1.9	75.2	FOOD SERVICE EQUIPMENT	3.1	120.0		
REFRIGERATION	25.8	1,000.0					
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.1	5.0					
COMPUTER EQUIPMENT	0.8	30.2					
COMPUTER SERVERS	0.0	1.2					
ELEVATORS							
OUTDOOR LIGHTING	0.9	33.9					

COMMERCIAL SECTOR BUILDING PROFILE EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Large Non-Food Retail > 100 kW Existing Labrador Interconnected CONSTRUCTION 0.38 W/m².°C 0.07 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.28 W/m².°C 0.05 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² 3.52 W/m².°C 0.62 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space 100% Percent Conditioned Space 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.10 Defined as Exterior Zone Typical # Stories 0.75 Floor to Floor Height (m) 4.3 m 14.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 269 ft²/person %OA 9.43% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 18 L/s.person 38 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor 7.64 L/s.m² Total Air Circulation or Design Air Flow 1.50 CFM/ft² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² CFM/ft² Infiltration Rate L/s.m² 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 301.435 Peak Zone Sensible Load 161,666 Room air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Discharge air enthalpy Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 7,521 DDC/Pneumatic Total air circulation or Design air 7.64 l/s.m² All DDC Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 57.2 °F 69.8 °F 21 °C 14 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement

Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance

Annual Maintenance Tasks Incidence (%)

Calibration of Transmitters Inspection/Calibration of Room Thermostat

Calibration of Panel Gauges Inspection of Auxiliary Devices

Inspection of Control Devices

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Inspection of PE Switches
Inspection of Auxiliary Devices

Inspection of Control Devices (Valves (Dampers, VAV Boxes)

EXISTING BUILDINGS: Large Non-Food Retail Baseline SIZE: > 100 kW

LIGHTING													
GENERAL LIGHTING Light Level	500 Lux	46.5	ft-candles										
Floor Fraction (GLFF)	0.95	10.0	Tr odridioo										
Connected Load	20.5 W/m ²	1.9	W/ft²										
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)		400	500	600	1000			Total	7	
Unocc. Period(Hrs./yr.)	4760		% Distribution		25%	50%	25%	1000			1009	6	
Usage During Occupied Period	95%		Weighted Average		2070	0070	2070				50		
Usage During Unoccupied Period	15%												
Firsture Cleaning			Custom Dragant (0/)		INC 10%	CFL 10%	T12	T8 55%	HID 5%	T5HO I	ED TOTA		
Fixture Cleaning: Incidence of Practice			System Present (%)		0.7	0.7	20% 0.6	0.6	0.6		0% 100.09 0.6	0	
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80		.80		
			Efficacy (L/W)		15	50	72	88	65	95	90		
Relamping Strategy & Incidence	Group Spo	ot									Eur	1.14/1-/612	0.0
of Practice											EUI	kWh/ft².yr MJ/m².yr	8.2 317
ARCHITECTURAL LIGHTING												Wio/iii .yi	017
Light Level	500 Lux	46.5	ft-candles										
Floor Fraction (ALFF)	0.05	2.0	14//42										
Connected Load	31.7 W/m²	2.9	W/ft²										
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)		300	500	700	1000			Total		
Unocc. Period(Hrs./yr.)	4760		% Distribution		30%	40%	30%				1009		
Usage During Occupied Period	95%		Weighted Average								50	0	
Usage During Unoccupied Period	50%				INC	CFL	T12	Т8	HID	T5HO I	ED TOTAL		
Fixture Cleaning:			System Present (%)	-	30%	5%	10%	50%	1110	0%	5% 100.09		
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6		0.6		
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80		.80		
Relamping Strategy & Incidence	Group Spo	ot	Efficacy (L/W)		15	50	72	88	65	95	90		
of Practice	Отопр Эрг	Ot									EUI	kWh/ft².yr	0.9
						EUI = Load	X Hrs. X S	SF X GLFF				MJ/m².yr	35
SPECIAL PURPOSE LIGHTING			٦			-							
Light Level Floor Fraction (HBLFF)	Lux		ft-candles			FI	oor fractio	n check: sl	nould = 1.0	0 1	.00		
Connected Load	W/m²		W/ft²										
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)		300	500	700	1000			Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	4760 0%		% Distribution Weighted Average										
Usage During Unoccupied Period	100%		Weighted Average										
3					INC	CFL	T12	T8		MH I	HPS TOTA	L	
Fixture Cleaning:			System Present (%)										
Incidence of Practice Interval			CU LLF		0.7 0.65	0.7 0.65	0.6	0.6	0.6		.55		
interval	years		Efficacy (L/W)		15	50	72	84	88	65	90		
Relamping Strategy & Incidence	Group Spo	ot	,				I						
of Practice											EUI	kWh/ft².yr	
												MJ/m².yr	
TOTAL LIGHTING								С	verall LP	21.07 W/m ²	EUI TOTA	L kWh/ft².yr	9
												MJ/m².yr	352
OFFICE EQUIPMENT & PLUG LOA	ne.												
OFFICE EQUIPMENT & FLUG LOA	ND3												
Equipment Type	Con	mputers	Monitors	Prin	ters	Copie	rs	Serve	ers	Plug Loads			
Measured Power (W/device)		55	51	100		200		217					
Density (device/occupant)		0.22	0.22	0.01		0.01		0.02					
Connected Load		0.5 W/m²	0.4 W/m²		N/m²	0.1 W		0.1 V		1.15 W/m²			
Diversity Occupied Period	<u> </u>	0.0 W/ft² 90%	0.0 W/ft² 90%	90%	/V/Tt²	0.01 W 90%	//Tt²	0.01 W 100%	V/TT²	0.11 W/ft² 90%			
Diversity Unoccupied Period		50%	50%	50%		50%		100%	_	50%			
Operation Occ. Period (hrs./year)		2000	2000	2000		2000		2000		4100			
Operation Unocc. Period (hrs./year)	(6760	6760	6760		6760		6760		4660			
Total end-use load (occupied period)		2.1 W/m ²	0.2 W/ft ²	to see note:	s (cells with r	ed indicator	in upper ri	aht corner	type "SHIF	T @mputer Ser	vers FUII	kWh/ft².yr	0.1
Total end-use load (unocc. period)		1.2 W/m²	0.1 W/ft²	10 000 11010	o (00110 1111111	ou maroutor	аррог	grit corrior,	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	· Campaior Cor	.0.0 20.	MJ/m².yr	4.42
									C	Computer Equipr	nent EUI	kWh/ft².yr	0.5
Usage during occupied period		00%								DiI		MJ/m².yr	19.1
Usage during unoccupied period	;	59%								Plug Lo	ads EUI	kWh/ft².yr MJ/m².yr	0.6 24.9
FOOD SERVICE EQUIPMENT			5		_		_					_	
Provide description below:	Fuel Oil / Propa	ine Fuel Share:		Electricity F	uel Share:	100.0%	-		I / Propane	EUI		All Electric EUI	1.0
				_			ļ.		Wh/ft².yr IJ/m².yr		EUI	kWh/ft².yr MJ/m².yr	1.0 38.7
								.,,					30.1
REFRIGERATION													•
Provide description below:				7							EUI	k\Λ/h/f+2 \r	1.5
				_							EUI	kWh/ft².yr MJ/m².yr	58.1
												. 7	
BLOCK HEATERS & MISCELLANE	ous					-							
										Block Hea	ters FIII	kWh/ft².yr	0.1
										2.00001166		MJ/m².yr	5
										Miscellane	ous EUI	kWh/ft².yr	0.1
I .											1	MJ/m².vr	5

EXISTING BUILDINGS: SIZE: Large Non-Food Retail > 100 kW COMMERCIAL SECTOR BUILDING PROFILE

VINTAGE: Existing

REGION: Labrador Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistanc Packaged A/A HP Total Stan High Rooftop System Present (%) 100% 100% Eff./COP 80% 1.70 3.00 1.00 Performance (1 / Eff.) 1.43 1.25 1.43 0.59 0.33 0.22 1.00 (kW/kW) Peak Heating Load 45.5 W/m² 14.4 Btu/hr.ft² 9.9 kWh/ft².yr 383 MJ/m².vr Seasonal Heating Load (Tertiary Load) Sizing Factor 1.00 All Electric EUI Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share kWh/ft².yr a a MJ/m².yr 383 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% 9.9 MJ/m².yr 383 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Chillers Open W. H. CW System Present (%) COP 100.0% 100.0% Performance (1 / COP) 0.21 0.19 0.23 0.27 0.38 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 14.0 °C Supply Air 95 W/m² 30 Btu/hr.ft² 398 ft²/Ton Peak Cooling Load Seasonal Cooling Load 77.4 MJ/m².yr 2.0 kWh/ft².yr (Tertiary Load) 1.00 Sizing Factor 25.0% A/C Saturation (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.8 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.8 kWh/ft².vr MJ/m².yr 32 DOMESTIC HOT WATER Service Hot Water Plant Type Fossil Fuel SHW Avg. Tank Boiler Fossil Elec. Res. System Present (%) 0% Fuel Share 0% 100% Eff./COP 0.65 0.75 Blended Efficiency 0.75 0.91 Service Hot Water load (MJ/m².yr) 17.3 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI 90% 0.6 0.5 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr kWh/ft2.yr MJ/m².yr

MJ/m2.yı

19.0

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing EXISTING BUILDINGS: Large Non-Food Retail Baseline SIZE: > 100 kW REGION: Labrador Interconnected

HVAC FANS & PUMPS													
SUPPLY FANS							Ventiletien	and Evhau	et Ean One	eration & C	ontrol		
SUFFLI FANS								tion Fan		ust Fan	1		
	٦., ٥	4.50	0514":0								-		
	L/s.m²		CFM/ft ²	Control			Fixed	Variable	Fixed	Variable			
System Static Pressure CAV 350		1.4						Flow		Flow	1		
	Pa	1.4	wg	Incidence	of Use		100%		100%				
Fan Efficiency 60%				Operation			Continuou	Scheduled	Continuou:	s Scheduled	i		
Fan Motor Efficiency 88%													
Sizing Factor 1.00				Incidence	of Lloo		90%	10%	90%	10%	J		
Sizing Factor 1.00	1 14//2	0.47	14//6/2	incluence	ui use		90 %	1076	90%	1070	1		
Fan Design Load CAV 5.	1 W/m²		W/ft²		_								
Fan Design Load VAV 5.1	W/m²	0.47	W/ft²		C	omments:							
EXHAUST FANS													
	_												
Washroom Exhaust 50	L/s.washr	room	106 CFM/was	shroom									
Washroom Exhaust per gross unit area 0.1	L/s.m ²		0.02 CFM/ft ²										
Other Exhaust (Smoking/Conference) 0.1	L/s.m ²		0.02 CFM/ft ²										
Total Building Exhaust 0.2			0.04 CFM/ft ²										
Exhaust System Static Pressure 250													
			1.0 wg										
Fan Efficiency 25%													
Fan Motor Efficiency 75%	ó												
Sizing Factor 1.0													
Exhaust Fan Connected Load 0.3	3 W/m²	0.03	W/ft ²										
0.0	<u> </u>	5.00	1										
AUXILIARY COOLING EQUIPMENT (Condens	er Pump a	nd Cooling Tov	er/Condenser Fans)									
Average Condenser Fan Power Draw			0.020 kW/kW		0.07 k	N/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled C	ondenser)		1.90 W/m ²		0.18 \								
(Cooling Tower/Evap. Condensel/ All Cooled C	orideriser)		1.50		0.10	*/11							
0 1 5													
Condenser Pump													
Pump Design Flow			L/s.KW		lu	.S. gpm/Ton							
Pump Design Flow per unit floor area			L/s.m²			.S. gpm/ft ²							
Pump Head Pressure			45 kPa		15 f								
					15 1								
Pump Efficiency			50%										
Pump Motor Efficiency			80%										
Sizing Factor			1.0										
Pump Connected Load			W/m²		\	V/ft²							
OIDOULATING DUMP (Usedies & Oselies)													
CIRCULATING PUMP (Heating & Cooling)													
Pump Decign Flow @ F °C (40 °F) deli- T		0.004	1 /o m²	0.0000	110 ~~~		U.S. gpm/	Ton					
Pump Design Flow @ 5 °C (10 °F) delta T		0.004		0.0060		2.4	பு∪.௧. gpm/	ι υΠ					
Pump Head Pressure			kPa		ft								
Pump Efficiency		50%											
Pump Motor Efficiency		80%											
Sizing Factor		0.8											
Pump Connected Load		5.0	W/m²		W/ft²								
. ap Jointolla Load			1/	L	. */11								
Supply Fan Occ. Period		5500	hrs./year										
Supply Fan Unocc. Period			hrs./year										
Supply Fan Energy Consumption		42.7	kWh/m².yr										
Supply Lan Ellergy Consumption		42.7	rvviviii.yi										
L			1										
Exhaust Fan Occ. Period			hrs./year										
Exhaust Fan Unocc. Period		3260	hrs./year										
Exhaust Fan Energy Consumption			kWh/m².yr										
3,													
Condenser Pump Energy Consumption			kWh/m².yr										
Cooling Tower /Condenser Fans Energy Consur	nntion	0.4	kWh/m².yr										
Cooming Tower /Condenser Fairs Ellergy Consul	iipiioii	0.4	Kertiviii .yl										
Circulating Duman Vaculty Operation		7000	hen hinne										
Circulating Pump Yearly Operation		7000	hrs./year										
Circulating Pump Energy Consumption			kWh/m².yr										
Fans and Pumps Maintenance	Annual M	aintenance Task	S	Incidence	Frequency								
				(%)	(years)								
	Inspect/C	ervice Fans & M	ntore	(/ / /	() 505)								
		djust Belt Tensio		-									
				-							E	1.3.4.0- /612 -	4.0
	inspect/Se	ervice Pump & N	IUIUIS	1							EUI	kWh/ft².yr	4.2
												MJ/m².yr	163.5

EXISTING BUILDINGS: SIZE:
Large Non-Food Retail > 100 kW

VINTAGE: REGION:

Large Non-Food Retail	> 100 kW	Existing	Labrador Interconnected
Baseline			
ELILGUMMADY			

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		28.8 kWh/ft².yr 1,114.2 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 MJ	/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	8.2	316.7		kWh/ft2.yr	MJ/m ² .yr	kWh/ft².yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	0.9	35.2	SPACE HEATING	9.9	382.6			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	7.9			
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0	
HVAC FANS & PUMPS	4.2	163.5	FOOD SERVICE EQUIPMENT	1.0	38.7			
REFRIGERATION	1.5	58.1						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	0.5	19.1						
COMPUTER SERVERS	0.1	4.4						
ELEVATORS/ESCALATORS								
OUTDOOR LIGHTING	0.9	33.9						

COMMERCIAL SECTOR BUILDING PROFILE EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Small Non-Food Retail < 100 kW Existing Labrador Interconnected Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² 3.52 W/m².°C 0.62 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space 100% Percent Conditioned Space 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.10 Defined as Exterior Zone Typical # Stories 0.75 Floor to Floor Height (m) 4.3 m 14.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 269 ft²/person 19.11% %OA m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 18 L/s.person 38 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 3.77 L/s.m² 0.74 CFM/ft² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.42 L/s.m² 0.08 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 299.238 Peak Zone Sensible Load 159,469 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 7,418 DDC/Pneumatic Total air circulation or Design air l/s.m² All DDC Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 57.2 °F 69.8 °F 21 °C 14 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves

(Dampers, VAV Boxes)

EXISTING BUILDINGS: Small Non-Food Retail Baseline SIZE: < 100 kW

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing

LIGHTING													
GENERAL LIGHTING Light Level	500 Lu	ıy 46.5	ft-candles										
Floor Fraction (GLFF) Connected Load	0.95 20.5 W		W/ft²										
		,											
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)		400	500	600	1000			Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	4760 95%		% Distribution Weighted Average		25%	50%	25%				100% 500		
Usage During Unoccupied Period	15%			'	INC	CFL	T12	Т8	HID	T5HO L	ED TOTAL		
Fixture Cleaning:			System Present (%)		10%	10%	20%	55%	5%		0% 100.0%		
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6		0.6		
Interval	ye	ears	LLF		0.65	0.65 50	0.75	0.80	0.80 65		90		
Relamping Strategy & Incidence of Practice	Group	Spot	Efficacy (L/W)		15	50	72	88	65	95	EUI	kWh/ft².yr	8.2
ARCHITECTURAL LIGHTING												MJ/m².yr	317
Light Level	500 Lu	ıx 46.5	ft-candles										
Floor Fraction (ALFF)	0.05	<u> </u>	3										
Connected Load	31.7 W	/m² 2.9	W/ft²										
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)		300	500	700	1000			Total		
Unocc. Period(Hrs./yr.)	4760		% Distribution		30%	40%	30%				100%		
Usage During Occupied Period Usage During Unoccupied Period	95% 50%		Weighted Average								500		
Usage During Unoccupied Feriod	3078				INC	CFL	T12	Т8	HID	T5HO L	ED TOTAL		
Fixture Cleaning:			System Present (%)		30%	5%	10%	50%		0%	5% 100.0%		
Incidence of Practice			CU LLF		0.7	0.7	0.6	0.6	0.6		0.6		
Interval	ye	ears	Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80	0.80 65		90		
Relamping Strategy & Incidence	Group	Spot											
of Practice					_		V.I V.O	NE V OLE	_		EUI	kWh/ft².yr	0.9
SPECIAL PURPOSE LIGHTING						UI = Load	X HIS. X S	F X GLFF	-			MJ/m².yr	35
Light Level	Lu	IX	ft-candles			FI	oor fractio	n check:	should = 1.0	00 1.	00		
Floor Fraction (HBLFF) Connected Load	W	//m²	W/ft²										
			_	,			,					in the second	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4000 4760		Light Level (Lux) % Distribution		300	500	700	1000			Total		
Usage During Occupied Period	0%		Weighted Average										
Usage During Unoccupied Period	100%												
Eixtura Classing:			System Bresent (9/)	ŀ	INC	CFL	T12	T8		мн н	PS TOTAL		
Fixture Cleaning: Incidence of Practice			System Present (%) CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6		
Interval	ye	ears	LLF		0.65	0.65	0.75	0.80	0.80	0.55 0.	55		
Delemning Ctrotom, 9 Incidence	Croun	Cook	Efficacy (L/W)		15	50	72	84	88	65	90		
Relamping Strategy & Incidence of Practice	Group	Spot									EUI	kWh/ft².yr MJ/m².yr	
									_			-	
TOTAL LIGHTING									Overall LP	21.07 W/m²	EUI TOTAL	kWh/ft².yr MJ/m².yr	9 352
OFFICE EQUIPMENT & PLUG LOA	ADS												
Equipment Type	(Computers	Monitors	Prir	nters	Copie	rs	Serv	vers .	Plug Loads			
71.													
Measured Power (W/device)		55	51	100	-	200		217					
Density (device/occupant)		0.22	0.22	0.01		0.01		0.02					
Connected Load		0.5 W/m² 0.0 W/ft²	0.4 W/m² 0.0 W/ft²	0.00	W/m²	0.1 W 0.01 W		0.1	W/m²	1.15 W/m² 0.11 W/ft²			
Diversity Occupied Period		90%	90%	90%	VV/IL-	90%		100%	VV/IL-	90%			
Diversity Unoccupied Period		50%	50%	50%		50%		100%		50%			
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		2000 6760	2000 6760	2000 6760	-	2000 6760		2000 6760	-	4100 4660			
Operation offoce. I enou (ilis./year)		0700	0700	0700		0700		0700	I	4000			
Total end-use load (occupied period)		2.1 W/m ²	0.2 W/ft ²	to see note	s (cells with re	ed indicator	in upper rig	ght corner	, type "SHIF	T @mputer Serv	ers EUI	kWh/ft².yr	0.1
Total end-use load (unocc. period)		1.2 W/m²	0.1 W/ft ²							Computer Equipm	ont EUI	MJ/m².yr kWh/ft².yr	4.42 0.5
Usage during occupied period		100%							•	Somputer Equipm	lent EOI	MJ/m².yr	19.1
Usage during unoccupied period		59%								Plug Loa	ads EUI	kWh/ft².yr	0.6
												MJ/m².yr	24.9
FOOD SERVICE EQUIPMENT			5										
Provide description below:	Fuel Oil / Pro	opane Fuel Share:		Electricity I	uel Share:	100.0%			il / Propane	EUI		Electric EUI	
							E		kWh/ft².yr MJ/m².yr		EUI	kWh/ft².yr MJ/m².yr	
									ivio/iii .yi			Wio/iii .yi	
REFRIGERATION													
Provide description below:				7							EUI	kWh/ft².yr	
												MJ/m².yr	
DI OOK HEATEDS & MOSEL :	OHE												
BLOCK HEATERS & MISCELLANE	.005												
										Block Heat	ers EUI	kWh/ft².yr	0.1
										Adda	FI "	MJ/m².yr	5
										Miscellaneo	ous EUI	kWh/ft².yr	0.1

EXISTING BUILDINGS: Small Non-Food Retail SIZE: < 100 kW

90%

Wetting Use Percentage

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing

REGION:

Labrador Interconnected

0.6

kWh/ft2.yr

0.5

19.0

kWh/ft².yr MJ/m².yr

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistanc Packaged A/A HP Total Stan High Rooftop System Present (%) 100% 100% Eff./COP 80% 1.70 3.00 1.00 Performance (1 / Eff.) 1.43 1.25 1.43 0.59 0.33 0.22 1.00 (kW/kW) Peak Heating Load 12.4 Btu/hr.ft² 39.0 W/m² 12.8 kWh/ft².yr 495 MJ/m².yr Seasonal Heating Load (Tertiary Load) Sizing Factor 1.00 All Electric EUI Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share kWh/ft².yr 12.8 MJ/m².yr 495 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% 12.8 MJ/m².yr 495 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Chillers Open W. H. CW System Present (%) COP 100.0% 100.0% Performance (1 / COP) 0.21 0.19 0.23 0.27 0.38 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 14.0 °C Supply Air 94 W/m² 30 Btu/hr.ft² 401 ft²/Ton Peak Cooling Load Seasonal Cooling Load 87.0 MJ/m².yr 2.2 kWh/ft².yr (Tertiary Load) 1.00 Sizing Factor 25.0% A/C Saturation (Incidence of A/C) Electric Fuel Share Fuel Oil / Propane Fuel Share 100.0% Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.9 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.9 kWh/ft².vr MJ/m².yr 36 DOMESTIC HOT WATER Service Hot Water Plant Type Fossil Fuel SHW Avg. Tank Boiler Fossil Elec. Res. System Present (%) 0% Fuel Share 0% 100% Eff./COP 0.65 0.75 Blended Efficiency 0.75 0.91 Service Hot Water load (MJ/m².yr) 17.3 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI

kWh/ft2.yr

MJ/m2.yı

SIZE: < 100 kW

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing EXISTING BUILDINGS: Small Non-Food Retail Baseline REGION: Labrador Interconnected

Washroom Educate for gross of a rep 0.7 U.s. m² 0.02 CFM/Mashroom 0.02 CFM/M²	HVAC FANS & PUMPS													
System Design Air Plow Sal Put mile	SUDDI V FANS							Ventiletier	and Evhau	et Ean One	aration & C	ontrol		
System Design AF Prov 3.3 Vanif 0.74 CMM Variable Prov Variable Prov Variable Valid Va	SUFFLI FANS											1		
System Static Pressure CAV 350 Pa	Custom Design Air Flour	0 1/0 == 2	0.74	CEM##2	Control									
System State Pressure VAV 300 Po					Control			rixeu		rixeu				
Fine Efficiency					امام	of I loo		40007	FIOW	4000	FIOW	1		
Sam Motor Efficiency 10			1.4	wg		of Use								
Story Earl Story					Operation			Continuou	Scheduled	Continuou	Scheduled	1		
Fair Design Load CAV 2.5 Wirit 0.23 Wirit														
SEXHAUST FANS	Sizing Factor 1.0	0		,	Incidence	of Use		90%	10%	90%	10%	_		
Washroom Education		.5 W/m ²												
Washroom Educate for gross unit are 0.7 U.s. m² 0.02 CFM/M²	Fan Design Load VAV 2	5 W/m ²	0.23	W/ft²		С	omments:							
Westhroom Eshasis per gross unt are 0.1 U m² 0.02 CFM/RF	EXHAUST FANS													
Weshroom Eshasis per gross unt are 0.1 U an	Washroom Exhaust F	0 I/e waeh	hroom	106 CFM/was	shroom									
Other Echnaus (Smoking) Conference)			1100111		311100111									l
Total Building Exhaust														
Eshaust System Static Pressure 250 759 294 1.0 wg wg 1.0 wg wg wg wg wg wg wg w														
Fan Efficiency 25% 1.0 1														
Fam Motor Efficiency Sizing Factor Condenser Pamp Ower Draw Coordenser Pamp and Cooling Tower/Condenser Fane) Average Condenser Pam Power Draw Coordenser Pump Condenser Pump Pump Design Flow Pump Design Flow Pump Design Flow Pump Design Flow Pump Design Flow Pump Design Flow Pump Beland Pressure Pump Efficiency Pump Beland Pressure Pump Efficiency Pump Design Flow Pump Design Flow Pump Design Flow Pump Design Flow Pump Design Flow Pump Beland Pressure Pump Heatings & Cooling Pump Condenser Pump Pump Design Flow Pump Design Flo				1.0 wg										
Sizing Factor														
Sizing Factor	Fan Motor Efficiency 75	%												
Auxiliary Cooling EquipMent (Condenser Pump and Cooling Tower/Condenser Fans) Auxiliary Cooling EquipMent (Condenser Pump and Cooling Tower/Condenser Fans) Auxiliary Cooling Tower/Condenser Pamp	Sizing Factor 1	0												
AVELIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap, Condenser) Condenser Pump Pump Design Flow Pump Interest Power put Intoriarea Pump Design Flow put unt floor area Pump Design Flow Pump Interest Pump Pump Design Flow Pump Pump Pump Pump Pump Pump Pump Pump	Exhaust Fan Connected Load (.3 W/m ²	0.03	W/ft²										
Average Condenser Fan Power Draw (Cooling Tower(Evap. Condenser) 1.89 Win2 0.18 Win2 Condenser Pump Pump Design Flow Pump Design Flow per unit floor area Pump Nesign Flow Pump Use Supply Factor Pump Morte Efficiency Sizing Factor Pump Connected Load 1.0	Extradect fair controlled Edda		0.00	*****										
Cooling Tower(Evap. Condenser) Air Cooled Condenser) 1.89 W/m² 0.18 W/m²	AUXILIARY COOLING EQUIPMENT (Conder	ser Pump a	and Cooling Tov	/er/Condenser Fans)									
Cooling Tower(Evap. Condenser) Air Cooled Condenser) 1.89 W/m² 0.18 W/m²	-	•	=											
Pump Design Flow per unit flor area Pump Head Pressure Pump Head Pressure Pump Head Pressure Pump Efficiency Sizing Factor Pump Connected Load Dis.m² Ads is Pa Add U.S. Spm/To Is Pa Add U.S. Spm/To Is Pa Add U.S. Spm/To Is	Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled	Condenser)												
Vs.m²	Condenser Pump													
Us.m²	Pump Design Flow			L/s.KW		IJ	.S. apm/Ton							
March Marc														
Pump Motor Efficiency 80% 80														
Pump Notor Efficiency Sizing Factor Pump Connected Load W/m² W/ft²						15 1								
1.0														
W/m² W/ft² W/ft²														
CIRCULATING PUMP (Heating & Cooling) Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure				1.0										
Pump Design Flow @ 5 °C (10 °F) delta T	Pump Connected Load			W/m²		V	V/ft²							
Pump Design Flow @ 5 °C (10 °F) delta T	CIRCULATING PUMP (Heating & Cooling)													
Pump Head Pressure Pump Efficiency Pump Motor Efficiency Pump Connected Load Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Unocc. Period Supply Fan Unocc. Period Supply Fan Unocc. Period Supply Fan Energy Consumption Exhaust Fan Occ. Period Sacon Exhaust Fan Unocc. Period Sacon Exhaust Fan Unocc. Period Sacon Exhaust Fan Energy Consumption Sacon Exhaust Fan Energy Consumption Sacon Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption Circulating Pump Yearly Operation Circulating Pump Energy Consumption Annual Maintenance Annual Maintenance Annual Maintenance Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Adjust Belt Tension on Fan Belts	, , ,													l
Pump Efficiency 50% Pump Motor Efficiency 80% Sizing Factor 0.8 Pump Connected Load W/m² W/ft² Supply Fan Occ. Period 5500 hrs./year Supply Fan Unocc. Period 3260 hrs./year Supply Fan Energy Consumption 21.1 Exhaust Fan Occ. Period 5500 hrs./year Exhaust Fan Occ. Period 5500 hrs./year Exhaust Fan Unocc. Period 5500 hrs./year Exhaust Fan Energy Consumption 2.3 kWh/m².yr Condenser Pump Energy Consumption 2.3 kWh/m².yr Cordenser Pump Energy Consumption 0.4 kWh/m².yr Circulating Pump Yearly Operation 7000 hrs./year KWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	Pump Design Flow @ 5 °C (10 °F) delta T		0.004	L/s.m ²	0.0060	U.S. gpm/ft ²	2.4	U.S. gpm/	Ton					
Pump Efficiency 50% Pump Motor Efficiency 80% Sizing Factor 0.8 Pump Connected Load W/m² W/ft² Supply Fan Occ. Period 5500 hrs./year Supply Fan Unocc. Period 3260 hrs./year Supply Fan Energy Consumption 21.1 kW/fv².yr Exhaust Fan Occ. Period 5500 hrs./year Exhaust Fan Unocc. Period 5500 hrs./year Exhaust Fan Unocc. Period 3260 hrs./year Exhaust Fan Unocc. Period 5500 hrs./year Exhaust Fan Unocc. Period 3260 hrs./year Exhaust Fan Unocc. Period 3260 hrs./year Chrouleting Fan Energy Consumption 2.3 kW/fv².yr Condenser Pump Energy Consumption 0.4 kW/fv².yr Circulating Pump Yearly Operation 0.4 kW/fv².yr Circulating Pump Energy Consumption 0.4 kW/fv².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	Pump Head Pressure			kPa										
Pump Connected Load Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Unocc. Period Supply Fan Energy Consumption Exhaust Fan Unocc. Period Sxhaust Fan Unocc. Perio			50%			J								
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Unocc. Period Supply Fan Unocc. Period Supply Fan Energy Consumption Supply Fan Energy Consumptio														
Pump Connected Load W/m² W/ft² Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Unocc. Period Supply Fan Energy Consumption Exhaust Fan Occ. Period State In Unocc. Perio														
Supply Fan Occ. Period 5500 hrs./year Supply Fan Unocc. Period 3260 hrs./year Supply Fan Energy Consumption 21.1 kWh/m².yr Exhaust Fan Occ. Period 5500 hrs./year hrs./year Exhaust Fan Unocc. Period 3260 hrs./year Exhaust Fan Energy Consumption 2.3 kWh/m².yr Condenser Pump Energy Consumption 2.3 kWh/m².yr Condenser Pump Energy Consumption 0.4 kWh/m².yr Circulating Pump Yearly Operation 0.4 kWh/m².yr Circulating Pump Energy Consumption 0.4 kWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Adjust Bett Tension on Fan Belts Inspect/Adjust Bett Tension on Fan Belts			0.8	\M//m2		\A//6+2								
Supply Fan Unocc. Period 3260 hrs./year WWh/m².yr	ump Connected Load			vv/III=		VV/IL-								
Supply Fan Unocc. Period 3260 hrs./year WWh/m².yr	Supply Fan Occ. Period		5500	hre /vear										
Supply Fan Energy Consumption 21.1 kWh/m².yr Exhaust Fan Occ. Period 5500 hrs./year kwh/m².yr Exhaust Fan Unocc. Period 3260 hrs./year kWh/m².yr Condenser Pump Energy Consumption 2.3 kWh/m².yr Condenser Pump Energy Consumption 0.4 kWh/m².yr Colling Tower /Condenser Fans Energy Consumption 0.4 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 0.4 kWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts														
Exhaust Fan Occ. Period 5500 hrs./year Exhaust Fan Unocc. Period 3260 hrs./year Exhaust Fan Energy Consumption 2.3 kWh/m².yr Condenser Pump Energy Consumption			3260	1110./year										
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption Circulating Pump Yearly Operation Circulating Pump Energy Consumption Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	Supply Fan Energy Consumption		21.1	ĸvv⊓vm².yr										
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption Circulating Pump Yearly Operation Circulating Pump Energy Consumption Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	L			1										
Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption Circulating Pump Yearly Operation Circulating Pump Energy Consumption Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts														
Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption Circulating Pump Yearly Operation Circulating Pump Energy Consumption Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	Exhaust Fan Unocc. Period		3260	hrs./year										
Cooling Tower / Condenser Fans Energy Consumption 0.4 kWh/m² yr Circulating Pump Yearly Operation 7000 hrs./year Circulating Pump Energy Consumption kWh/m² yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence (%) (years) (years) (rspect/Service Fans & Motors (rspect/Adjust Belt Tension on Fan Belts (ser	Exhaust Fan Energy Consumption													
Cooling Tower / Condenser Fans Energy Consumption 0.4 kWh/m² yr Circulating Pump Yearly Operation 7000 hrs./year Circulating Pump Energy Consumption kWh/m² yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence (%) (years) (years) (rspect/Service Fans & Motors (rspect/Adjust Belt Tension on Fan Belts (ser				1										
Circulating Pump Energy Consumption WW/m².yr		ımption	0.4											
Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	Circulating Pump Yearly Operation Circulating Pump Energy Consumption		7000											
(%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	Fane and Dumne Maintenance	Appust A	Asintenance Test	e	Incidence	Frequency								
Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	i ans and i umps maintenance	Ailliudi IV	vianiterative Task	io.										
Inspect/Adjust Belt Tension on Fan Belts		Inon and /C	Contino Essa 9 14	otoro	(70)	(years)								
					1									
													114# #10	
Inspect/Service Pump & Motors		Inspect/S	service Pump & N	lotors	1							EUI		
MJ/m².yr 85.8												1	iviJ/t∏².yr	65.8

EXISTING BUILDINGS: SIZE: Small Non-Food Retail < 100

VINTAGE: REGION:

Small Non-Food Retail	< 100 kW	Existing	Labrador Interconnected
Baseline			

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		27.2 kWh/ft².yr 1,053.3 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ	/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	8.2	316.7		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	0.9	35.2	SPACE HEATING	12.8	495.3			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	8.9			
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0	
HVAC FANS & PUMPS	2.2	85.8	FOOD SERVICE EQUIPMENT					
REFRIGERATION								
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	0.5	19.1						
COMPUTER SERVERS	0.1	4.4						
ELEVATORS/ESCALATORS								
OUTDOOR LIGHTING	0.9	33.9						

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Roof U value (W/m².°C) 0.28	W/m².°C W/m².°C W/m².°C	DR CONDITIO	0.05 0.62	Btu/hr.ft² .º Btu/hr.ft² .º Btu/hr.ft² .º	F		Percent Co Percent Co Defined as Typical # S	otprint (m²) Aspect Ratio anditioned S anditioned S Exterior Zo	Space Space one		1,394 1,394 4 100% 45% 1 3.7	m²	15,000 1 15,000 1	†2	
Ventilation System Type	M	System Present Min. Air Flow (% Minimum Throt	(6)	CAV 90% lume as Pe	CAVR		DDMZVV	VAV 10% 60%	VAVR	IU	100% O.A	100%			
Occupancy or People Density Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air Fresh Air Control Type (enter a (1 = mixed air control, 2 = Fixed fresh air, 3 100%	1, 2 or 3)	50% 80% 8		n r Control Ty	16 /pe = "2" er	ft²/person CFM/person ter % FA. to	the right:	tion and op	eration	%OA 15% 0.5	5.39% L/s.m²		0 CFM/ft²		
Sizing Factor Total Air Circulation or Design Air Flow Infiltration Rate (air infiltration is assumed to occur during unoccu hours only if the ventilation system shuts down)		1.3 3.02	L/s.m² L/s.m²		0.60	CFM/ft ²		Separate M	Make-up air Operation	50%	operation 6 OA) period		L/s.m²	CFM/ft	t²
Economizer	Incidence of Switchover F			y Based KJ/kg. Btu/lbm	Dry-Bul 100% 18 64.4		Total 100%		Peak Desi	gn Cooling Sensible I		196,081 147,639			
Controls Type	All Pneumati DDC/Pneum All DDC Total (should	ic		HVAC Equipment	Room Controls	Total	ı		Discharge Specific volu Design CF	air enthalp me of air at 5	y isf & 100% F r Design air	23.4 13. 6,868	1 Btu/lbm 2 ft³/lbm		
Control mode	Control Mod		Fixed Di		Reset	Total									
Indoor Design Conditions	Winter Occ. Enthalpy	midity (%) Temperature Humidity cc. Temperature	e	21 30% 53 18 30%	KJ/kg. C	69.8 22.8 64.4	Btu/lbm °F Btu/lbm	13 100% 54.5 15 45%	Supply Air °C KJ/kg. °C KJ/kg.	55.4 23.4 59	Btu/lbm				
Damper Maintenance	Control Arm Lubrication Blade Seal R			Incidence (%)	Frequency (years)										
Air Filter Cleaning	Changes/Yea	ar	j												
Incidence of Annual HVAC Controls Maintenance	Annual Maint Calibration o Calibration o Inspection of	tenance Tasks of Transmitters of Panel Gauge f Auxiliary Device f Control Device	s	Incidence (%)		Incidence of		Annual Mai	ntenance T Calibration of PE Swit of Auxiliary of Control	Tasks of Room ches Devices Devices (V	Thermostat	Incidence (%)	0		

SIZE: > 100 kW

EXISTING BUILDINGS: Large Accommodation Baseline

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing

Baseline									
LIGHTING									
GENERAL LIGHTING (SUITES) Light Level	125 Lux 11.6	ft-candles							
Floor Fraction (GLFF)	0.75	_							
Connected Load	12.7 W/m² 1.2	2 W/ft²							
Occ. Period(Hrs./yr.)	2500	Light Level (Lux)	100	125 150	300		Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	6260 50%	% Distribution Weighted Average	25%	50% 25%			100% 125		
Usage During Unoccupied Period	25%	vveignied Average					123		
		0 . 5 . (0)	INC	CFL T12	T8 HID	T5HO LED			
Fixture Cleaning: Incidence of Practice		System Present (%) CU	60% 0.7	20% 5% 0.7 0.6	5% 0.6 0.6	0% 10% 0.6 0.6			
Interval	years	LLF	0.65	0.65 0.75	0.80 0.80	0.80 0.80			
Polomping Stratogy & Insidence	Group Spot	Efficacy (L/W)	15	50 72	88 65	95 90			
Relamping Strategy & Incidence of Practice	Эгоир Эрог						EUI	kWh/ft².yr	2.5
							1	MJ/m².yr	97
LOBBY, BALLROOMS, CORRIDOR Light Level		ft-candles							
Floor Fraction (ALFF)	0.25	_							
Connected Load	23.3 W/m ² 2.2	2 W/ft²							
Occ. Period(Hrs./yr.)	3000	Light Level (Lux)	300	500 700	1000		Total		
Unocc. Period(Hrs./yr.)	5760	% Distribution	100%				100%		
Usage During Occupied Period Usage During Unoccupied Period	85% 50%	Weighted Average					300		
			INC	CFL T12	T8 HID	T5HO LED			
Fixture Cleaning: Incidence of Practice		System Present (%) CU	40% 0.7	10% 35% 0.7 0.6	10% 0.6 0.6	0% 5% 0.6 0.6	100.0%		
Incidence of Practice	years	LLF	0.7	0.65 0.75	0.6 0.6	0.6 0.6	1		
		Efficacy (L/W)	15	50 72	88 65	95 90			
Relamping Strategy & Incidence of Practice	Group Spot						EUI	kWh/ft².yr	2.9
			E	UI = Load X Hrs. X	SF X GLFF			MJ/m².yr	114
SPECIAL PURPOSE LIGHTING	300.00 Lux 27.9	ft-candles		Floor frontis	on check: should = 1.0	0 1.00	T		
Light Level Floor Fraction (HBLFF)	300.00 Lux 27.3	n-candles		FIOOT Hactic	on check. Should = 1.0	1.00	1		
Connected Load	14.0 W/m² 1.3	3 W/ft ²							
Occ. Period(Hrs./yr.)	4000	Light Level (Lux)	300	500 700	1000		Total		
Unocc. Period(Hrs./yr.)	4760	% Distribution	100%	300 700	1000		100%		
Usage During Occupied Period	0%	Weighted Average					300		
Usage During Unoccupied Period	100%		INC	CFL T12	Т8	MH HPS	TOTAL		
Fixture Cleaning:		System Present (%)	1140	0%		100% 0%			
Incidence of Practice		CU	0.7	0.7 0.6	0.6 0.6	0.6 0.6			
Interval	years	LLF Efficacy (L/W)	0.65 15	0.65 0.75 50 72	0.80 0.80 84 88	0.55 0.55 65 90			
Relamping Strategy & Incidence	Group Spot		'			•			
of Practice								kWh/ft².yr MJ/m².yr	
								-	
TOTAL LIGHTING					Overall LP	15.37 W/m ²	EUI TOTAL	kWh/ft².yr MJ/m².yr	5 210
							'	vio/iii .yi	210
OFFICE EQUIPMENT & PLUG LOA	ADS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads]		
1-1 31-									
Measured Power (W/device)	55	51	100	200	217				
Density (device/occupant)	0.3	0.3	0.05	0.033	0.02	4.514// 0			
Connected Load	0.4 W/m² 0.0 W/ft²	0.3 W/m² 0.0 W/ft²	0.1 W/m² 0.01 W/ft²	0.1 W/m² 0.01 W/ft²	0.1 W/m² 0.01 W/ft²	1.5 W/m² 0.14 W/ft²			
Diversity Occupied Period	50%	50%	50%	50%	100%	70%			
Diversity Unoccupied Period	50% 2000	50% 2000	2000	50% 2000	100% 2500	25% 3000			
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	6760	6760	6760	6760	6260	5760			
							lem :	AA II- 1612	
Total end-use load (occupied period) Total end-use load (unocc. period)	1.6 W/m² 1.0 W/m²	0.2 W/ft ² 0.1 W/ft ²	to see notes (cells with r	ea indicator in upper ri	ignτ corner, type "SHIF	। ७amputer Servers		kWh/ft².yr MJ/m².yr	0.10 3.68
		5.1			C	Computer Equipment	EUI	kWh/ft².yr	0.38
Usage during occupied period	100%					Dhort and		MJ/m².yr	14.80
Usage during unoccupied period	59%					Plug Loads		kWh/ft².yr MJ/m².yr	0.49 19.12
FOOD SERVICE FOURTHER									'
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propane	EUI	All	Electric EUI	
Kitchen services]		EUI kWh/ft².yr	1.0	EUI	kWh/ft².yr	1.3
					MJ/m².yr	40.0		MJ/m².yr	50.0
REFRIGERATION									
Provide description below:	Java Kraamana foliosoo 11 // /		7				Eu.	AA/Ib/#+2 -	
Walk-in coolers/freezers, reach-in coo	piers/rreezers, rerrigerated buffet cas	es	_					kWh/ft².yr MJ/m².yr	0.8 30.0
BLOCK HEATERS & MISCELLANE	ous								
						Block Heaters		kWh/ft².yr	0.1
						NA! P		VIJ/m².yr	5
						Miscellaneous		kWh/ft².yr MJ/m².yr	0.1 5
							·		J

EXISTING BUILDINGS: Large Accommodation Baseline SIZE: > 100 kW

SPACE HEATING													
Heating Plant Type					el Oil / Propa			Elec					
				Bo Stan.	ilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller F	ResistanceTo			
		System Present (%) Eff./COP		70%	80%	70%	1.70	3.00	4.50	1.00%	100%		
		Performance (1 / Eff.) (kW/kW)		1.43		1.43			0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	56.8 W/m² 464 MJ/m².yr		Btu/hr.ft² kWh/ft².yr										
Electric Fuel Share	100.0% Fuel O	il / Propane Fuel Share		1	Oil Fuel Sha	re]				All Electric EUI kWh/ft².yr	12.0
Boiler Maintenance		intenance Tasks		Incidence]			1			L	MJ/m².yr	464
	Fire Side I Water Sid Inspection Inspection		łup	(%) 75% 100% 100% 100% 90%								Fuel Oil / Propane E kWh/ft².yr MJ/m².yr Market Composite E kWh/ft².yr MJ/m².yr	
SPACE COOLING											-		
A/C Plant Type													
The Figure 1		System Present (%) COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifuga Standard 4.7 0.21	HE	Chillers 4.4	Reciproca Open 3.6 0.28	100.0% 2.6	W. H.	Chillers CW 1 1.00	Total 100.0%			
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Setpoint	Reset									
Setpoint		Chilled Water Condenser Water Supply Air	7 30 13.0	°C	44.6 86 55.4	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	35 W/m² 46.1 MJ/m².yr	11 Btu/hr.ft² 1.2 kWh/ft².yr	1080	ft²/Ton									
Sizing Factor	0.85		Operation	(occ. perio	3000	hrs/year	Note value	cannot be	less than 2,9	900 hrs/year)			
A/C Saturation (Incidence of A/C)	50.0%												
Electric Fuel Share	100.0% Fuel O	il / Propane Fuel Share]									
Chiller Maintenance	Inspect Co Inspect Co Megger M Condense Vibration / Eddy Curr	r Tube Cleaning		Incidence (%)	Frequency (years)						F	All Electric EUI kWh/ft².yr	0.5
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	aintenance Tasks			Frequency						L	MJ/m².yr	19
	Inspect/Se Megger M	//Clean Spray Nozzles ervice Fan/Fan Motors lotors errify Operation of Controls		(%)	(years)							Fuel Oil / Propane E kWh/tft².yr MJ/m².yr Market Composite E kWh/tft².yr MJ/m².yr	
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fue System Pi Eff./COP					Boiler 0% 0.75		Fuel Share Blended Ef		Fossil 0% 0.75		Elec. Res. 100% 0.91	
Service Hot Water load (MJ/m².yr) (Tertiary Load)	236.6				All Electric EU]		oil / Propane		F	Market Composite E	
Wetting Use Percentage	90%				kWh/ft².yr MJ/m².yr	6.7 260			kWh/ft².yr MJ/m².yr	8.1 315		kWh/ft².yr MJ/m².yr	6.7 260.0

EXISTING BUILDINGS: Large Accommodation Baseline SIZE: > 100 kW

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing

HVAC FANS & PUMPS					
SUPPLY FANS				Ventilation and Exhaust Fan Operation &	Control
SUPPLY FANS				Ventilation and Exhaust Fan Operation & Ventilation Fan Exhaust Fan	Control
System Design Air Flow 3.0	L/s.m ² 0.60	CFM/ft ²	Control	Fixed Variable Fixed Variab	le
System Static Pressure CAV 30		wg		Flow Flow	
System Static Pressure VAV 30			Incidence of Use	100% 100%	
Fan Efficiency 45%			Operation	Continuous Scheduled Continuous Schedu	led
Fan Motor Efficiency 80%					
Sizing Factor 1.00		1	Incidence of Use	75% 25% 75% 25	5%
Fan Design Load CAV 2.5		W/ft²	0		
Fan Design Load VAV 2.5	W/m ² 0.23	W/ft²	Comments:		
EXHAUST FANS					
Washroom Exhaust 100	L/s.washroom	212 CFM/was	shroom		
	L/s.m ²	0.03 CFM/ft ²			
	L/s.m²	0.02 CFM/ft ²			
	L/s.m²	0.05 CFM/ft ²			
	0 Pa	1.0 wg			
Fan Efficiency 25% Fan Motor Efficiency 75%					
Sizing Factor 1.0					
	3 W/m ² 0.03	W/ft²			
Exhaust fan Oofmeeled Eodd C.	0.00	******			
AUXILIARY COOLING EQUIPMENT (Condens	ser Pump and Cooling Tov	er/Condenser Fans)		
	=				
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled C	ondenser)	0.020 kW/kW 0.70 W/m ²	0.07 kW/Ton 0.07 W/ft²		
Condenser Pump					
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton		
Pump Design Flow per unit floor area		0.002 L/s.m ²	0.003 U.S. gpm/ft ²		
Pump Head Pressure		kPa	ft		
Pump Efficiency		50%			
Pump Motor Efficiency Sizing Factor		1.0			
Pump Connected Load		W/m²	W/ft²		
Tump Connected Edad		*******	VVIII		
CIRCULATING PUMP (Heating & Cooling)					
		1		1	
Pump Design Flow @ 5 °C (10 °F) delta T		L/s.m²		U.S. gpm/Ton	
Pump Head Pressure	100	kPa	33 ft		
Pump Efficiency Pump Motor Efficiency	50% 80%				
Sizing Factor	0.8				
Pump Connected Load		W/m²	0.03 W/ft ²		
. ,		1			
Supply Fan Occ. Period	3500	hrs./year			
Supply Fan Unocc. Period		hrs./year			
Supply Fan Energy Consumption	18.8				
		1. ,			
Exhaust Fan Occ. Period		hrs./year			
Exhaust Fan Unocc. Period		hrs./year			
Exhaust Fan Energy Consumption	2.4	kWh/m².yr			
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consum	mption 0.2	kWh/m².yr kWh/m².yr			
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	5000	hrs./year kWh/m².yr			
			T Ie		
Fans and Pumps Maintenance	Annual Maintenance Task	S	Incidence Frequency		
	Inspect/Service Fans & M	ntors	(%) (years)		
	Inspect/Adjust Belt Tensio				
	Inspect/Service Pump & N				EUI kWh/ft².yr 2.0
			· · · · · · · · · · · · · · · · · · ·		MJ/m².yr 77.1
					•

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing EXISTING BUILDINGS: Large Accommodation Baseline SIZE: > 100 kW REGION: Labrador Interconnected

EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		30.1 kWh/ft².yr 1,165.2 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/n	n².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING (SUITES)	2.5	96.8		kWh/ft2.yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
LOBBY, BALLROOMS, CORRIDORS	2.9	113.7	SPACE HEATING	12.0	463.6			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	9.4			
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.7	260.0	0.0	0.0	
HVAC FANS & PUMPS	2.0	77.1	FOOD SERVICE EQUIPMENT	1.3	50.0			
REFRIGERATION	0.8	30.0						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	0.4	14.8						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

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COMMERCIAL SECTOR BUILDING PROFILE EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Small Accommodation < 100 kW Existing Labrador Interconnected Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 7,500 ft² Wall U value (W/m².°C) Typical Building Size 697 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 697 7,500 ft² 3.52 W/m².°C 0.62 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.28 Defined as Exterior Zone Typical # Stories 0.57 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 60% Occupancy or People Density 495 ft²/person 4.53% %OA 46 m²/person Occupancy Schedule Occ. Period 50% Occupancy Schedule Unocc. Period 80% resh Air Requirements or Outside Air 8 16 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.71 CFM/ft² 3.60 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Peak Design Cooling Load Peak Zone Sensible Load 112.083 Switchover Point KJ/kg. 87,862 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 4,087 DDC/Pneumatic Total air circulation or Design air 3.60 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 71.6 °F 55.4 °F 13 °C 22 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 18 °C 64.4 °F Winter Unocc. Humidity 30% 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement

Air Filter Cleaning Changes/Year

Incidence of Annual HVAC Controls Maintenance

Annual Maintenance Tasks Incidence
(%)

Calibration of Transmitters
Calibration of Panel Gauges
Inspection of Auxiliary Devices
Inspection of Control Devices

Annual Maintenance Tasks	Incidence
	(%)
Inspection/Calibration of Room Thermostat	
Inspection of PE Switches	
Inspection of Auxiliary Devices	
Inspection of Control Devices (Valves,	
(Dampers, VAV Boxes)	

EXISTING BUILDINGS: Small Accommodation Baseline SIZE: < 100 kW COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing

Baseline											
LIGHTING											
GENERAL LIGHTING (SUITES) Light Level	125 Lux 11.	6 ft-candles									
Floor Fraction (GLFF)	0.85	o it-caridies									
Connected Load	14.3 W/m ² 1.	3 W/ft²									
Occ. Period(Hrs./yr.)	2500	Light Level (Lux)	100	125	150	300			Total	İ	
Unocc. Period(Hrs./yr.)	6260	% Distribution	25%	50%	25%	000			100%		
Usage During Occupied Period	50%	Weighted Average							125	İ	
Usage During Unoccupied Period	25%		INC	CFL	T12	T8	HID T5HO	LEC	TOTAL	İ	
Fixture Cleaning:		System Present (%)		20%	5%	5%	0%	0%	6 100.0%	İ	
Incidence of Practice		CU	0.7	0.7	0.6	0.6	0.6 0.6	0.6		1	
Interval	years	LLF Efficacy (L/W)	0.65 15	0.65 50	0.75 72	0.80	0.80 0.80 65 95	0.80		1	
Relamping Strategy & Incidence	Group Spot	, , ,			l l						
of Practice										kWh/ft².yr	3.2
LOBBY, BALLROOMS, CORRIDOR	S. BACK OF HOUSE OTHER									MJ/m².yr	123
Light Level	300 Lux 27.	9 ft-candles									
Floor Fraction (ALFF) Connected Load	0.15 23.3 W/m ² 2.	2 W/ft²									
Connected Load	23.3 \\/\frac{11}{11} 2.	2 VV/IL ²									
Occ. Period(Hrs./yr.)	3000	Light Level (Lux)	300	500	700	1000			Total	I	
Unocc. Period(Hrs./yr.) Usage During Occupied Period	5760 85%	% Distribution Weighted Average	100%						100% 300	1	
Usage During Unoccupied Period	50%	vveignied Average							300	İ	
			INC	CFL	T12	T8	HID T5HO			İ	
Fixture Cleaning: Incidence of Practice		System Present (%) CU	40%	10% 0.7	35% 0.6	10% 0.6	0.6 0.6	5% 0.6		İ	
Interval	years	LLF	0.65	0.65	0.6		0.80 0.80	0.80		İ	
		Efficacy (L/W)	15	50	72	88	65 95	90		I	
Relamping Strategy & Incidence	Group Spot								EUI	LAAR-ROOM	4.0
of Practice				EUI = Load >	K Hrs X SE	X GLEE				kWh/ft².yr MJ/m².yr	1.8 68
SPECIAL PURPOSE LIGHTING										ivio/iii .yi	
Light Level	300.00 Lux 27.	9 ft-candles		Flo	or fraction	check: shou	ld = 1.00	1.00			
Floor Fraction (HBLFF) Connected Load	14.0 W/m² 1.	3 W/ft²									
Cormission Esta		<u> </u>									
Occ. Period(Hrs./yr.)	4000	Light Level (Lux)	300	500	700	1000			Total	Ì	
Unocc. Period(Hrs./yr.) Usage During Occupied Period	4760 0%	% Distribution Weighted Average	100%						100% 300	Ì	
Usage During Unoccupied Period	100%	vveignied / tverage							500	Ì	
			INC	CFL	T12	Т8	MH			1	
Fixture Cleaning: Incidence of Practice		System Present (%) CU	0.7	0%	0.6	0.6	0.6 0.6	0%		1	
Interval	years	LLF	0.65	0.65	0.75		0.80 0.55	0.55		Ì	
		Efficacy (L/W)	15	50	72	84	88 65	90		J	
Relamping Strategy & Incidence of Practice	Group Spot								EUI	kWh/ft².yr	
or radice									_	MJ/m².yr	
									E TOTAL	11411 1710	
TOTAL LIGHTING						Over	all LP 15.62	W/m²	EUI TOTAL	kWh/ft².yr MJ/m².yr	5 191
									1	IVIO/III .yı	101
OFFICE EQUIPMENT & PLUG LOA	ADS										
Equipment Type	Computers	Monitors	Printers	Copier	s	Servers	Plua	Loads	7		
Equipment Type	Computers	Wichitots	Timers	Оорісі		OCIVCIS	ı lüğ	Louds			
Measured Power (W/device)	55	51	100	200		217					
Density (device/occupant)	0.3	0.3	0.05	0.033		0.02		_			
Connected Load	0.4 W/m²	0.3 W/m²	0.1 W/m²	0.1 W/		0.1 W/m		W/m²			
Diversity Occupied Period	0.0 W/ft² 50%	0.0 W/ft² 50%	0.01 W/ft² 50%	0.01 W/ 50%	112	0.01 W/ft ²	70%	W/ft²			
Diversity Unoccupied Period	50%	50%	50%	50%		100%	25%				
Operation Occ. Period (hrs./year)	2000	2000	2000	2000		2500	3000				
Operation Unocc. Period (hrs./year)	6760	6760	6760	6760		6260	5760	1	_		
Total end-use load (occupied period)	1.6 W/m²	0.2 W/ft ²	to see notes (cells with	red indicator i	n upper righ	nt corner, type	e "SHIFT @a mpu	ter Servers		kWh/ft².yr	0.10
Total end-use load (unocc. period)	1.0 W/m ²	0.1 W/ft ²			_			E		MJ/m².yr	3.68
Usage during occupied period	100%						Computer	⊏quipmen	ILEO1	kWh/ft².yr MJ/m².yr	0.38 14.80
Usage during unoccupied period	59%							Plug Loads	s EUI	kWh/ft².yr	0.49
										MJ/m².yr	19.12
FOOD SERVICE EQUIPMENT											
Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%			ropane EUI	1		Electric EUI	
Kitchen services			_		EU		ft².yr 1.0 n².yr 40.0	1		kWh/ft².yr MJ/m².yr	0.6 25.0
						IVIJ/II	gı 40.0	1	1	ivio/iii .yi	20.0
REFRIGERATION											
Provide description below: Walk-in coolers/freezers, reach-in coolers/	place/franzare_rafrizarated huffet and	200	7						EUI	kWh/ft².yr	0.4
vvaix-iii coolers/ireezers, reacr-In coo	perameezers, remgerated burret cas	100	_							MJ/m².yr	15.0
									•		
BLOCK HEATERS & MISCELLANE	ous								-		
							Blo	ck Heaters		kWh/ft².yr	0.1
										MJ/m².yr	5
							Mis	scellaneous		kWh/ft².yr MJ/m².yr	0.1
									1	yı	J

EXISTING BUILDINGS: Small Accommodation SIZE:

< 100 kW

COMMERCIAL SECTOR BUILDING PROFILE

VINTAGE: Existing REGION: Labrador Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Packaged A/A HP Total Stan High Unit System Present (%) 100% 100% Eff./COP 80% 1.70 3.00 1.00 Performance (1 / Eff.) 1.43 1.25 1.43 0.59 0.33 0.22 1.00 (kW/kW) Peak Heating Load 20.9 Btu/hr.ft² 65.9 W/m² 14.1 kWh/ft².yr 548 MJ/m².yr Seasonal Heating Load (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share 14.1 MJ/m².yr 548 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 548 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Open W. H. CW Chillers System Present (%) COP 100.0% 100.0% Performance (1 / COP) 0.21 0.19 0.2 0.28 0.38 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 13.0 °C 86 °F 55.4 °F Supply Air 40 W/m² 13 Btu/hr.ft² 945 ft²/Ton Peak Cooling Load Seasonal Cooling Load 51.4 MJ/m².yr 1.3 kWh/ft².yr (Tertiary Load) Operation (occ. perio 3000 hrs/year Note value cannot be less than 2,900 hrs/year) 0.85 Sizing Factor 50.0% A/C Saturation (Incidence of A/C) Electric Fuel Share Fuel Oil / Propane Fuel Share 100.0% Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.5 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.5 kWh/ft².vr MJ/m².yr 21 DOMESTIC HOT WATER Service Hot Water Plant Type Fossil Fuel SHW Avg. Tank Boiler Fossil Elec. Res. System Present (%) 0% Fuel Share 0% 100% Eff./COP 0.65 0.75 Blended Efficiency 0.75 0.91 Service Hot Water load (MJ/m².yr) 236.6 (Tertiary Load) All Electric EUI Fuel Oil / Propane EUI Market Composite EUI 6.7 90% 8.1 6.7 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr kWh/ft2.yr 260 MJ/m².yr 260.0 MJ/m2.yı

EXISTING BUILDINGS: Small Accommodation Baseline

SIZE: < 100 kW

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing

HVAC FANS & PUMPS													
SUPPLY FANS						V	entilation	and Evhau	st Fan One	eration & Co	ontrol		
OCT LI TARO							Ventilat			ust Fan]		
System Design Air Flow 3.6	L/s.m ²	0.71	CFM/ft ²	Control		Fi	ixed	Variable	Fixed	Variable			
System Static Pressure CAV 30		1.2						Flow		Flow			
System Static Pressure VAV 30			wg	Incidence	of Use		100%		100%				
Fan Efficiency 45%]9	Operation		C		Scheduled		Scheduled			
Fan Motor Efficiency 80%				.,									
Sizing Factor 0.50				Incidence	of Use		75%	25%	75%	25%			
	5 W/m²	0.14	W/ft²							1			
Fan Design Load VAV 1.5	W/m²		W/ft²		Comments:								
EXHAUST FANS	_		_										
EXHAUST FANS													
	L/s.wash	hroom	212 CFM/was	shroom									
Washroom Exhaust per gross unit area 0.3			0.06 CFM/ft ²										
Other Exhaust (Smoking/Conference) 0.1			0.02 CFM/ft ²										
Total Building Exhaust 0.4			0.08 CFM/ft ²										
Exhaust System Static Pressure 25			1.0 wg										
Fan Efficiency 25%													
Fan Motor Efficiency 75%													
Sizing Factor 0.5			-										
Exhaust Fan Connected Load 0.3	3 W/m ²	0.02	W/ft²										
AUXILIARY COOLING EQUIPMENT (Condens	er Pump a	and Cooling Tov	ver/Condenser Fans)									
Average Condenser Fan Power Draw			0.020 kW/kW		0.07 kW/Ton								
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled C	andanac=\		0.020 kW/kW 0.80 W/m²		0.07 kW/10n 0.07 W/ft²								
(Cooling Tower/Evap. Condenser/ Air Cooled C	ondenser)		0.80 W/m²		0.07 VV/ft²								
Condenser Pump													
Pump Design Flow			0.053 L/s.KW		3.0 U.S. gpm/To								
Pump Design Flow per unit floor area			0.002 L/s.m ²		0.003 U.S. gpm/ft ²	2							
Pump Head Pressure			kPa		ft								
Pump Efficiency			50%										
Pump Motor Efficiency			80%										
Sizing Factor			0.5										
Pump Connected Load			W/m²		W/ft²								
CIRCULATING PUMP (Heating & Cooling)													
		1	-		, —								
Pump Design Flow @ 5 °C (10 °F) delta T			L/s.m ²		U.S. gpm/ft ²	2.4 U	J.S. gpm/	Γon					
Pump Head Pressure		100		33	ft								
Pump Efficiency		50%											
Pump Motor Efficiency		80%											
Sizing Factor		0.5		_	-								
Pump Connected Load		0.2	W/m²	0.02	W/ft²								
			_										
Supply Fan Occ. Period			hrs./year										
Supply Fan Unocc. Period			hrs./year										
Supply Fan Energy Consumption		11.2	kWh/m².yr										
			1										
Exhaust Fan Occ. Period			hrs./year										
Exhaust Fan Unocc. Period			hrs./year										
Exhaust Fan Energy Consumption		1.9	kWh/m².yr										
			7										
Condenser Pump Energy Consumption			kWh/m².yr										
Cooling Tower /Condenser Fans Energy Consur	nption	0.3	kWh/m².yr										
			٦. ,										
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		5000	hrs./year kWh/m².yr										
		L											
Circulating Fump Energy Consumption			_	Incidence	Frequency								
	Annual N	Maintenance Task	KS										
				(%)	(years)								
Fans and Pumps Maintenance	Inspect/S	Service Fans & M	otors										
	Inspect/S	Service Fans & M Adjust Belt Tensio	otors on on Fan Belts								E. II	1388-1612	
	Inspect/S	Service Fans & M	otors on on Fan Belts								EUI	kWh/ft².yr MJ/m².yr	1.2 48.1

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing EXISTING BUILDINGS: Small Accommodation Baseline SIZE: < 100 kW REGION: Labrador Interconnected

EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		30.0 kWh/ft².yr 1,162.4 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 M.	J/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING (SUITES)	3.2	123.0		kWh/ft2.yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
LOBBY, BALLROOMS, CORRIDORS	1.8	68.2	SPACE HEATING	14.1	547.9			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.3	10.6			
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.7	260.0	0.0	0.0	
HVAC FANS & PUMPS	1.2	48.1	FOOD SERVICE EQUIPMENT	0.6	25.0			
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	0.4	14.8						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:
Existing EXISTING BUILDINGS: Health Care Baseline CONSTRUCTION SIZE: All REGION: Labrador Interconnected

Walt User (Min-17)	CONSTRUCTION															
Rept Used Primer Color	Mall I Luchus (M/m2 9C) 0.22	W/m2 0C		0.00	D4: //b= 442	o-		Tunical De	ildina Cina			0.00	02	05.00	0 442	
Source Value Communication Communicati	, ,				+				-							
Period Contification Space 1979		7			7							2,94	3 m²	31,66	7 ft²	
Percent Conditioned Space	Glazing U value (W/m².°C) 3.52	W/m².°C		0.62	Btu/hr.ft ² .	°F							2			
Windows (
Stading Coefficient (SC) 0.55 S. NOOR CONDITIONS Type Total Patrol Height (m) Type Total A process Type Total Country (S) Type Total Country (S) Type T	Mindows AM - II Dodie (MINMAD) (0/)	٦										45	%			
VENTELATION SYSTEM, BIULDING CONTROLS & RIDDOR CONDITIONS										.one			2			
Vertification System Spuic No. Control State Mount of Control State No. Control Stat	Shading Coefficient (SC)	J								(m)		3	9	12	n ft	
Vertication System Type								1 1001 10 1	loor rieigni	()		J.	<i></i>	12.	<u> </u>	
Vertication System Type																
System Present (%) 80% 90% 90% 90% 90% 90% 90% 90% 90% 90% 9	VENTILATION SYSTEM, BUILDING CONTRO	LS & INDO	OR CONDITIO	ONS												
System Present (%) 80% 90% 90% 90% 90% 90% 90% 90% 90% 90% 9		Г			0.11	0.075	20117									
Max Arr Five 103	Ventilation System Type	-	Custom Drason	4 (0/)		CAVR	DDMZ	DDMZVV			(IU 100% O				
Glistmann Trontind Air Volume as Person of Fall Flow) 30 Prijection 323 Rispanson %OA 8.76%					80%								100)%		
Couplancy of People Deally State					olume as P	ercent of Fu	ıll Flow)		3078	1	1					
Company Sheekade Core. Period 1976 15 15 person 20 GFM/person 20		,					,									
Description State Description State	Occupancy or People Density		30	m²/persoi	n	323	ft²/person				%OA	9.76	%			
Frosh Air Requirements or Casilad Air Frosh Air Requirements or Casilad Air Frosh Air Control Type ferse at 1, 2 or 3 1 Fresh Air Control Type "2" enter fix Fa. to the right 0.5	Occupancy Schedule Occ. Period		90%				•									
Fresh Air Control Type																
If Fresh And Control Type = "3" enter Make-up Air Vertilation and operation 0.5 U.s.m" 0.15 OFMM?	Fresh Air Requirements or Outside Air		15	L/s.perso	n	32	CFM/perso	n								
If Fresh And Control Type = "3" enter Make-up Air Vertilation and operation 0.5 U.s.m" 0.15 OFMM?	From Air Control Trans	4.00\		16 E A	- Ot LT		-t0/ FA t-	a dia a stratata			1 40	.01			1	
Sorie Factor Total At Control Market processor Design Air Flow 5.12 Us.m² 1.01 CPM/n² 1.01 CPM/n² Separate Makes, pair (10% CA) Operation cocquied period Operation uncocqued perio			1						ation and or	neration			0	10 CFM/ft2		
Size part of the control of the cont	1 - mixed all control, 2 = Fixed fleshall, 3 1007	o ireairair)		comA	ii Contitor I	ype – o e	ina make-up	, An Vendic	anon anu op	JUIGUUII				I OF WITH		
Total Air Circulation of Design Air Plow Separate Make-up air unit (100% OA) Operation occopies period Operation occopies occopies Operation occopies period Operation occopies period Operation occopies period Operation occopies period Operation occopi	Sizing Factor	Γ	3								.1					
Intritation Rate G.70 U.s.m.* G.14 CFM/ft* Coperation coupled period G.70 Gord intritation is assumed to occur during unoccupied G.70 Gord G.70 Gord G.70 Gord G.70 Gord G.70 G.		ľ		L/s.m²		1.01	CFM/ft ²									_
Control Type System Present (%) HVAC Room Supply Air Total Specific voter of white of the verdistation system shuts down)	_	<u> </u>							Separate I							CFM/ft ²
Economizer			0.70	L/s.m²		0.14	CFM/ft ²			Operation	occupied p	period				
Economizer		pied								Operation	unoccupie	d period	50	0%		
Incidence of Use	nours only if the ventilation system shuts down)															
Incidence of Use	Economizer			Enthaln	v Rased	Dry-Ru	lh Rased	Total	1							
Switchover Point Kuke 18 C Routh 64.4 F	Loonomizer	Incidence of	f Use	Entrap	Dasca					Summary	of Design	Parameters				
Sturter Stur					KJ/ka.			10070						##		
Control Type																
All Pneumatic Sepective volume of as at \$67 & 100%, R.H. 13.2 ft Mbm Design CPM 31,497 Total and or circulation or Design air file 5.12 Vs.m²					•			•	_	Room air	enthalpy		28	.2 Btu/lbm		
All Pneumatic DoC/Pneumatic DoC/Pneumatic DoC/Pneumatic DoC/Pneumatic DoC/Pneumatic DoC/Pneumatic DoC/Pneumatic DoC/Pneumatic Doc DoC/Pneumatic Doc	Controls Type	System Pre	esent (%)													
DDC/Pneumatic					Equipmen	Controls						55F & 100% R				
Control mode												. Danian nis				
Total (should add-up to 100%)			nauc							Total all C	irculation o	r Design air	IK 5.12	VS.III*		
Control Mode			ld add-up to 10	0%)												
Control Mode		rotal (onotal	ia ada ap to 10	070)		1	J									
Indoor Design Conditions				Propo	ortional	PI / PID	Total									
Indoor Design Conditions Summer Temperature	Control mode	Control Mod	de													
Indoor Design Conditions				Fixed D	ischarge	Reset										
Summer Temperature 24 °C 75.2 °F 14 °C 57.2 °F 50%		Control Stra	ategy													
Summer Temperature 24 °C 75.2 °F 14 °C 57.2 °F 15.5 °C 50%	Indoor Design Conditions				1	Room			1	Supply Air	r					
Summer Humidity (%) 50%	mador Besign Conditions	Summer Te	emperature		24		75.2	۰F	14			7.2 °F				
Winter Occ. Temperature								1								
Winter Occ. Humidity 30% Enthalpy 53 KJ/kg. 22.8 Btu/lbm 45.5 KJ/kg. 19.6 Btu/lbm 45.5 KJ/kg. 19							28.2	Btu/lbm								
Enthalpy 53 KJ/kg. 22.8 Btu/lbm 45.5 KJ/kg. 19.6 Btu/lbm						°C	75.2	°F			6	1.7 °F				
Winter Unocc. Temperature Winter Unocc. Humidity 30% Enthalpy 50 KJ/kg. 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement			. Humidity			16.10		Dr. /**				O D: "				
Winter Unocc. Humidity			co Tamporoti:	70					45.5	KJ/kg.	19	.o Btu/lbm				
Enthalpy 50 KJ/kg. 21.5 Btt/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices (Valves, Inspection of Control Devices (Valves, Inspection of Control Devices (Valves, Inspection of Control Devices (Valves, Inspection of Control Devices (Valves, Inspection of Control Devices (Valves, Inspection of Control Devices (Valves, Inspection of Control Devices (Valves, Inspection of Control Devices (Valves, Inspection of Paciliary Devices Inspection of Control Devices (Valves, I				C			15.2] [
Damper Maintenance Incidence Frequency (years)			oo. I fairmanty				21.5	Btu/lbm								
Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspec					, 30		, 2	,	1							
Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspec							-									
Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Contr	Damper Maintenance															
Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual Room Controls Maintenance Annual Maintenance Tasks Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices (Valves,					(%)	(years)										
Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices (Valves,			n Adjustment		-		-									
Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Annual HVAC Controls Maintenance Annual Maintenance Tasks Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspection of			Penlacomort		1		-									
Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Control Devices Inspection		Diaue Sedi I	replacement		1	1	J									
Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Control Devices Inspection																
Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Control Devices Inspection	Air Filter Cleaning	Changes/Ye	ear			Ī										
Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Inspection of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices (Valves,	_					_							_			
Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices Inspection of Control Devices Inspection of Control Devices							Incidence of	f Annual R	oom Contro	ols Mainter	nance					
(%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices Inspection of Control Devices Inspection of Control Devices	Incidence of Annual HVAC Controls Maintenance															
(%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices Inspection of Control Devices		Amount 184:	atanana - T- '		Inniel	1			A mm. :-1 8.4	intan	Taale		In-1-1			
Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices Inspection of Control Devices Inspection of Control Devices		Annual Mair	ntenance Tasks	5					Annual Ma	aintenance	ı asks					
Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices Inspection of Control Devices		Calibration	of Transmitters	:	(70)	1			Inspection	/Calibration	n of Room	Thermostat				
Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices					1	1										
Inspection of Control Devices Inspection of Control Devices (Valves,						1								_		
						1			Inspection	of Control	Devices (\	/alves,				
(Dampers, VAV Boxes)									(Dampers,	, VAV Boxe	es)					

EXISTING BUILDINGS: Health Care Baseline SIZE:

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:
Existing

LIGHTING GENERAL LIGHTING Light Level	250 Lux 23.2	ft-candles								
Floor Fraction (GLFF) Connected Load	0.40	W/ft²								
Occ. Period(Hrs./yr.)	8760	Light Level (Lux)	5	100	200	300		Tot	tal	
Unocc. Period(Hrs./yr.)		% Distribution		100	50%	50%			100%	
Usage During Occupied Period Usage During Unoccupied Period	40%	Weighted Average	l l	051	T40	To	LIID TELIO	150 70	250	
Fixture Cleaning:		System Present (%)		5%	T12 45%	T8 45%	HID T5HO	0% 10	OTAL 00.0%	
Incidence of Practice Interval	years	CU LLF	0.7 0.65		0.6 0.75	0.6 0.80	0.6 0.6 0.80 0.80	0.6		
		Efficacy (L/W)	15		72	88	65 95	90		
Relamping Strategy & Incidence of Practice	Group Spot							EUI	kWh/ft².yr MJ/m².yr	1.1 44
SECONDARY LIGHTING		7.							IVIJ/TIF.YI	44
Light Level Floor Fraction (ALFF)	500 Lux 46.5	ft-candles								
Connected Load	17.0 W/m² 1.6	W/ft²								
Occ. Period(Hrs./yr.)	8760	Light Level (Lux)	30		600	1000		Tot		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	65%	% Distribution Weighted Average		100%					100% 500	
Usage During Unoccupied Period	20%		INC	C CFL	T12	Т8	HID T5HO	LED TO	OTAL	
Fixture Cleaning:		System Present (%)	49	5%	50%	40%	0%	1% 10	0.0%	
Incidence of Practice Interval	years	CU LLF	0.7 0.65		0.6 0.75	0.6	0.6 0.6 0.80 0.80	0.6		
		Efficacy (L/W)	15		72	88	65 95	90		
Relamping Strategy & Incidence of Practice	Group Spot			FIII Lood	VIII VC	E V OLFE		EUI	kWh/ft².yr	5.4
TERTIARY LIGHTING		7		EUI = Load					MJ/m².yr	209
Light Level Floor Fraction (HBLFF)	250.00 Lux 23.2	ft-candles		FI	loor fraction	n check: should	= 1.00	1.00		
Connected Load	11.9 W/m² 1.1	W/ft²								
Occ. Period(Hrs./yr.)	4000	Light Level (Lux)	20		500	700		Tot		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	4760 100%	% Distribution Weighted Average	50%	50%					100% 250	
Usage During Unoccupied Period	100%		INC	C CFL	T12	Т8	МН	HPS TO	OTAL	
Fixture Cleaning:		System Present (%)	15%	15%	20%	50%		0% 10	00.0%	
Incidence of Practice Interval	years	CU	0.7 0.65		0.6 0.75	0.6	0.6 0.6 0.80 0.55	0.6		
		Efficacy (L/W)	15		72	88	88 65	90		
Relamping Strategy & Incidence of Practice	Group Spot							EUI	kWh/ft².yr	
TOTAL LIGHTING						Overal	II LPD 13.72 W	//m² FIII.T/	MJ/m².yr OTAL kWh/ft².yr	7
TOTAL LIGHTING						Overai	15.72 W	,,,,,,	MJ/m².yr	254
OFFICE EQUIPMENT & PLUG LOA	ADS									
Equipment Type	Computers	Monitors	Printers	Copie	rs	Servers	Plug Lo	ads		
Measured Power (W/device)	54.55	51	100	200	-	217				
Density (device/occupant)	0.48	0.48	0.02	0.02		0.04				
Connected Load	0.9 W/m² 0.1 W/ft²	0.8 W/m² 0.1 W/ft²	0.1 W/m ² 0.01 W/ft ²	0.1 W 0.01 W		0.3 W/m ² 0.02 W/ft ²	3.85 W 0.36 W			
Diversity Occupied Period	90%	90%	90%	90%		100%	90%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year)	50% 2000	50% 2000	50% 2000	50% 2000		100% 2600	25% 4100			
Operation Unocc. Period (hrs./year)	6760	6760	6760	6760		6160	4660			
Total end-use load (occupied period)	5.4 W/m²	0.5 W/ft²	to see notes (cells wit	n red indicator	in upper rig	tht corner, type "	'SHIFT F2Computer	Servers EUI	kWh/ft².yr	0.2
Total end-use load (unocc. period)	2.2 W/m²	0.2 W/ft ²					Computer Ed	quipment EUI	MJ/m².yr kWh/ft².yr	8.10 0.9
Usage during occupied period Usage during unoccupied period	100% 40%						Pli	ıg Loads EUI	MJ/m².yr kWh/ft².yr	35.0 1.7
osage daming unoccupied period	4070							ig Louds Loi	MJ/m².yr	67.3
FOOD SERVICE EQUIPMENT	Fuel Oil / Person 5 101		Electricity 5 10	400.007		F 0.1.7-	FI I			
Provide description below: Commercial food services	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%	E	Fuel Oil / Pr		EUI	All Electric EUI kWh/ft².yr	2.1
			_			MJ/m².			MJ/m².yr	80.0
REFRIGERATION Provide description below:										
Walk-in coolers/freezers, reach-in coo	olers/freezers, refrigerated buffet case	es	I					EUI	kWh/ft².yr MJ/m².yr	0.4 15.0
BLOCK HEATERS & MISCELLANE	OUS								iviJ/III÷.YI	10.0
BLOCK REALERS & MISCELLANE	:003									
							Block	Heaters EUI	kWh/ft².yr MJ/m².yr	0.1 5
							Misce	ellaneous EUI	kWh/ft².yr	0.1
									MJ/m².yr	5

EXISTING BUILDINGS: Health Care

SIZE:

COMMERCIAL SECTOR BUILDING PROFILE

VINTAGE: Existing

REGION: Labrador Interconnected

Baseline SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric

A/A HP | W. S. HP | H/R Chiller | Resistance Total Boilers Packaged Stan High Unit 10% System Present (%) 100% 90% Eff./COP Performance (1 / Eff.) 80% 3.00 0.33 1.00 70% 70% 1.70 4.50 1.43 0.22 0.59 (kW/kW) Peak Heating Load 29.1 W/m² 9.2 Btu/hr.ft² 5.9 kWh/ft².yr Seasonal Heating Load 229 MJ/m².yr (Tertiary Load) 1.00 Sizing Factor All Electric EUI 90.0% Fuel Oil / Propane Fuel Share 10.0% 5.9 Electric Fuel Share Oil Fuel Share kWh/ft2.yr MJ/m².yr 229 Boiler Maintenance Annual Maintenance Tasks Incidence Fuel Oil / Propane EUI (%) kWh/ft².yr Fire Side Inspection 75% 100% 8.5 Water Side Inspection for Scale Buildup MJ/m².yr 328 Inspection of Controls & Safeties 100% Inspection of Burner 100% Market Composite EUI Flue Gas Analysis & Burner Set-up 90% MJ/m².yr 239 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total HE Chillers Open DX W. H. CW 100.0% System Present (%) COP 50.0% 50.0% 0.0 Performance (1 / COP) 0.2 0.19 0.23 0.37 1.00 0.28 1.1 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 86 °F 57.2 °F Supply Air 14.0 °C 17 Btu/hr.ft² 704 ft²/Ton Peak Cooling Load Seasonal Cooling Load 51.5 MJ/m².yr 1.3 kWh/ft².yr (Tertiary Load) Operation (occ. perio 3000 hrs/year Note value cannot be less than 2,900 hrs/year) 1.00 Sizing Factor A/C Saturation 35.0% (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI kWh/ft².yr 0.5 MJ/m².yr 21 Cooling Tower/Air Cooled Condenser Maintenand Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI (%) (years) Inspection/Clean Spray Nozzles kWh/ft2.yr Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.5 kWh/ft2.yr MJ/m².yr 21

DOMESTIC	нот	WATER

Service Hot Water Plant Type System Present (%) 0.65

Fossil Fuel SHW Avg. Tank 0% Eff./COP 0.75

Fuel Share 0% 100% Blended Efficiency 0.75 0.91

Service Hot Water load (MJ/m².yr) 118.3

(Tertiary Load)

All Electric EUI 3.4 Wetting Use Percentage 90% kWh/ft2.vi

1140 60		
kWh/ft².yr 4.1 kW	√ft².yr	
MJ/m².yr 158 MJ	m².yr	13

3.4

130.0

COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: Health Care Baseline

SIZE: VINTAGE: Existing

REGION: Labrador Interconnected

HVAC FANS & PUMPS Ventilation and Exhaust Fan Operation & Control
Ventilation Fan Exhaust Fan SUPPLY FANS System Design Air Flow 5.1 L/s.m² 750 Pa 1.01 CFM/ft² Control Fixed Variable Fixed Variable System Static Pressure CAV Flow Flow 3.0 wg System Static Pressure VAV Fan Efficiency 750 52% 20% cheduled Pa 3.0 Incidence of Use 80% 100% ontinuou Fan Motor Efficiency 85% Sizing Factor 1.00 Incidence of Use 80% 80% 20% 20% Fan Design Load CAV 8.7 W/m² 0.81 W/ft² Fan Design Load VAV 0.81 W/ft² Comments: 8.7 W/m² EXHAUST FANS 100 L/s.washroom Washroom Exhaust 212 CFM/washroom Washroom Exhaust per gross unit are 0.1 L/s.m² 0.01 CFM/ft² Other Exhaust (Smoking/Conference) 0.5 L/s.m² 0.10 CFM/ft² Total Building Exhaust 0.6 L/s.m² 0.11 CFM/ft² Exhaust System Static Pressure Fan Efficiency 250 Pa 1.0 wg Fan Motor Efficiency 75% Sizing Factor 1.0 Exhaust Fan Connected Load 0.8 W/m² 0.07 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) 0.017 kW/kW 0.89 W/m² Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.06 kW/Ton 0.08 W/ft² Condenser Pump Pump Design Flow 0.053 L/s.KW 3.0 U.S. gpm/Ton Pump Design Flow per unit floor area 0.003 L/s.m² 0.004 U.S. gpm/ft² Pump Head Pressure 100 kPa 33 ft Pump Efficiency 50% Pump Motor Efficiency 80% Sizing Factor 0.07 W/ft² Pump Connected Load 0.71 W/m² CIRCULATING PUMP (Heating & Cooling) 0.002 L/s.m² 100 kPa 0.0034 U.S. gpm/ft² 2.4 U.S. gpm/Ton Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure Pump Efficiency 50% Pump Motor Efficiency 80% Sizing Factor 0.8 Pump Connected Load 0.04 W/ft² 0.5 W/m² Supply Fan Occ. Period Supply Fan Unocc. Period 4000 hrs./year 4760 hrs./year Supply Fan Energy Consumption 61.6 kWh/m².yr Exhaust Fan Occ. Period 4000 hrs./year Exhaust Fan Unocc, Period 4760 hrs./vear Exhaust Fan Energy Consumption 5.9 kWh/m².yr Condenser Pump Energy Consumption 0.8 kWh/m².yr Cooling Tower /Condenser Fans Energy Consumption 0.2 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 7000 hrs./year 0.3 kWh/m².yr Annual Maintenance Tasks Incidence Frequency Fans and Pumps Maintenance (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts
Inspect/Service Pump & Motors EUI kWh/ft².vr 6.4 248.0

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:
Existing EXISTING BUILDINGS: Health Care Baseline SIZE: REGION: Labrador Interconnected

EUISUMMARY							
TOTAL ALL END-USES:	Electricity:		28.6 kWh/ft².yr 1,108.7 MJ/m².yr	Fuel Oil	Propane:	0.8 kWh/ft².yr	32.8
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	1.1	44.2	•	kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
SECONDARY LIGHTING	5.4	209.4	SPACE HEATING	5.3	206.5	0.8	32.8
TERTIARY LIGHTING			SPACE COOLING	0.2	7.3		
OTHER PLUG LOADS	1.7	67.3	DOMESTIC HOT WATER	3.4	130.0	0.0	0.0
HVAC FANS & PUMPS	6.4	248.0	FOOD SERVICE EQUIPMENT	2.1	80.0		
REFRIGERATION	0.4	15.0					
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.4	15.0					
COMPUTER EQUIPMENT	0.9	35.0					
COMPUTER SERVERS	0.2	8.1					
ELEVATORS	0.1	3.9					
OUTDOOR LIGHTING	0.9	33.9					

REGION:

EXISTING BUILDINGS:

SIZE:

Labrador Interconnected CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 40,000 ft² Wall U value (W/m².°C) Typical Building Size 3,717 m² Roof U value (W/m².°C) 0.28 W/m².°C 0.05 Btu/hr.ft² .°F Typical Footprint (m²) 3,717 40,000 ft² 3.52 W/m².°C 0.62 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 50% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.13 Defined as Exterior Zone Typical # Stories 0.65 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 108 ft²/person 18.16% m²/person %OA Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 6 L/s.person 13 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.65 CFM/ft² 3.30 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.42 L/s:m² 0.08 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Drv-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 947.110 Switchover Point KJ/kg. Peak Design Cooling Load Peak Zone Sensible Load 424,335 28.2 Btu/lbm 23.4 Btu/lbm Room air enthalpy Controls Type System Present (%) HVAC Room Discharge air enthalpy Specific volume of air at 5F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 19,740 DDC/Pneumatic Total air circulation or Design air 3.30 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 55.4 °F 69.8 °F 13 °C 21 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 18.8 °C 65.84 °F Winter Unocc. Humidity 30% 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

EXISTING BUILDINGS: Schools SIZE:

LIGHTING														
GENERAL LIGHTING Light Level	500	Lux	46.5	ft-candles										
Floor Fraction (GLFF) Connected Load	0.85	W/m²		W/ft²										
Connected Load	14.7	VV/III	1.4	Wite										
Occ. Period(Hrs./yr.)	2000			Light Level (Lux)		300	500	700	1000			Total]	
Unocc. Period(Hrs./yr.) Usage During Occupied Period	6760 85%			% Distribution Weighted Average			100%					100%		
Usage During Unoccupied Period	15%			Troigina 7 Troings		INC	CFL	T12	Т8	HID	T5HO L	ED TOTAL		
Fixture Cleaning:				System Present (%)		IINC	CFL	70%	30%	ПІО		0% 100.0%		
Incidence of Practice				CU		0.7	0.7	0.6	0.6	0.6		0.6		
Interval		years		LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80	0.80 65		90		
Relamping Strategy & Incidence of Practice	Group	Spot					<u>'</u>	,			"	EUI	kWh/ft².yr	3.1
ARCHITECTURAL LIGHTING													MJ/m².yr	122
Light Level	400	Lux	37.2	ft-candles										
Floor Fraction (ALFF) Connected Load	0.15 16.6	W/m²	1.5	W/ft²										
		1				400	500	700	4000	1		T =	٦	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	2000 6760			Light Level (Lux) % Distribution		400 100%	500	700	1000			Total 100%	_	
Usage During Occupied Period	90%			Weighted Average						I		400		
Usage During Unoccupied Period	15%					INC	CFL	T12	T8	HID	T5HO L	.ED TOTAL	-	
Fixture Cleaning:				System Present (%)		10%	10%	15%	10%	30%	20%	5% 100.0%		
Incidence of Practice				CU		0.7	0.7	0.6	0.6	0.6		0.6		
Interval		years		LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80	0.80 65		90		
Relamping Strategy & Incidence of Practice	Group	Spot		,		'						EUI	kWh/ft².yr	0.6
						Е	UI = Load	d X Hrs. X S	SF X GLF	F		EUI	MJ/m².yr	25
SPECIAL PURPOSE LIGHTING Light Level	300.00	Luv	27.0	ft-candles			le le	loor fractic	n check:	should = 1.	00 1	.00		
Floor Fraction (HBLFF)	300.00	Lux	21.5	11-caridies			Ŀ	iooi naciic	TI CHECK.	3110010 = 1.	00 1	.00		
Connected Load		W/m²		W/ft²										
Occ. Period(Hrs./yr.)	3000	1		Light Level (Lux)		300	500	700	1000			Total	1	
Unocc. Period(Hrs./yr.)	5760			% Distribution		100%						100%		
Usage During Occupied Period Usage During Unoccupied Period	100%			Weighted Average								300	4	
		y				INC	CFL	T12 ES	T8 Mag	T8 Elec	MH F	IPS TOTAL	_	
Fixture Cleaning: Incidence of Practice		1		System Present (%) CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6	-	
Interval		years		LLF		0.65	0.65	0.75	0.80	0.80		.55		
Delemning Ctratem, 9 Incidence	Group	Cont		Efficacy (L/W)		15	50	72	84	88	65	90		
Relamping Strategy & Incidence of Practice	Gloup	Spot										EUI	kWh/ft².yr	
													MJ/m².yr	
TOTAL LIGHTING										Overall LP	14.96 W/m ²	EUI TOTAI	_ kWh/ft².yr MJ/m².yr	4 147
OFFICE EQUIPMENT & PLUG LOA	\De													
	ADS													
Equipment Type		Computers		Monitors	Pri	inters	Copie	ers	Sen	vers	Plug Loads			
Manager d Davis (M/davisa)				54	400	,	000	-	047	1				
Measured Power (W/device) Density (device/occupant)		55 0.05		51 0.05	0.02		200 0.02		217 0.01					
Connected Load		0.3 W/m		0.3 W/m ²		W/m²	0.4 V			W/m²	0.2 W/m ²			
Diversity Occupied Period		0.0 W/ft	2	0.0 W/ft² 90%	90%	W/ft²	0.04 V 90%	N/ft²	0.01 100%	W/ft²	0.02 W/ft ²			
Diversity Unoccupied Period		50%		50%	50%		50%		100%		50%			
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		2000 6760		2000 6760	2000 6760		2000 6760		2000 6760		3000 5760			
Operation Office. Period (fils:/year)		0700		6760	0700	'	0700		6760		3760			
Total end-use load (occupied period)		1.3 W/m	2	0.1 W/ft²	to see not	es (cells with re	ed indicator	r in upper ri	ght corner	r, type "SHI	FT @mputer Sen	ers EUI	kWh/ft².yr	0.10
Total end-use load (unocc. period)		0.8 W/m	12	0.1 W/ft²							Computer Equipn	nent EUI	MJ/m².yr kWh/ft².yr	3.68 0.54
Usage during occupied period		100%											MJ/m².yr	21.01
Usage during unoccupied period		59%									Plug Lo	ads EUI	kWh/ft².yr MJ/m².yr	0.11 4.23
													IVI3/III .yi	4.20
FOOD SERVICE EQUIPMENT Provide description below:		Fuel Oil / Propa	no Euol Ch		Electricity	Fuel Share:	100.0%	Г	Euol (il / Bronon	o Elli	Λ	II Electric EUI	
Provide description below.		ruei Oii / Piopa	rie ruei Si	1	Electricity	ruei Snare.	100.0%	E	EUI	Dil / Propana kWh/ft².yr	0.2	EUI	kWh/ft².yr	0.1
										MJ/m².yr	8.0		MJ/m².yr	4.0
REFRIGERATION														
Provide description below:					_									
					_							EUI	kWh/ft².yr MJ/m².yr	0.03
													.zioziir.yl	1.1
BLOCK HEATERS & MISCELLANE	ous				·	<u></u>								
											Block Hea	ters EUI	kWh/ft².yr	0.0
													MJ/m².yr	2
											Miscellane	ous EUI	kWh/ft².yr	0.0

EXISTING BUILDINGS: Schools SIZE:

SPACE HEATING												
Heating Plant Type				el Oil / Propa			Elec					
			Boi Stan.	ilers I High	Packaged Unit	A/A HP	W. S. HP	H/R Chille	Resistance	Total		
		System Present (%) Eff./COP	20% 70%	80%	70%	1.70	3.00	4.50	80% 1.00	100%		
		Performance (1 / Eff.) (kW/kW)	1.43	1.25	1.43			0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	41.1 W/m² 417 MJ/m².yr	13.0 Btw/hr.ft 10.8 kWh/ft²;		1					I			
Electric Fuel Share	80.0%	Fuel Oil / Propane Fuel Sh 20.0	%	Oil Fuel Shar	re]				All Electric EUI kWh/ft².yr	10.8
Boiler Maintenance	Annual Ma	aintenance Tasks	Incidence							L	MJ/m².yr	417
		Inspection e Inspection for Scale Buildup of Controls & Safeties	(%) 75% 100% 100%								Fuel Oil / Propane E kWh/ft².yr MJ/m².yr	15.4 595
	Inspection	of Burner Analysis & Burner Set-up	100% 90%							-	Market Composite E kWh/ft².yr MJ/m².yr	11.7 453
SPACE COOLING										,		
A/C Plant Type												
		System Present (%)	d HE	Screw Chillers 4.4 0.23	Open 3.6 0.28	DX 100.0%	0.9	CW 1 1.00	Total			
Control Mode		Incidence of Use Fixed Setpoin Chilled Water Condenser Water	Reset							1		
Setpoint		Condenser Water 3	7 °C 60 °C 8.0 °C	44.6 86 55.4	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	75 W/m² 68.1 MJ/m².yr	24 Btu/hr.ft² 50 1.8 kWh/ft².yr	ft²/Ton									
Sizing Factor	1.00	Operation	on (occ. perio	4000	hrs/year	Note value	e cannot be	less than 2	,900 hrs/ye	ear)		
A/C Saturation (Incidence of A/C)	2.0%											
Electric Fuel Share	100.0%	Fuel Oil / Propane Fuel Sh										
Chiller Maintenance	Inspect Co Inspect Co Megger W Condense Vibration . Eddy Cun	r Tube Cleaning	Incidence (%)	Frequency (years)						F	All Electric EUI kWh/fr2.yr	0.8
Cooling Tower/Air Cooled Condense		nintenance Tasks	Incidence (%)	Frequency (years)						[MJ/m².yr Fuel Oil / Propane E kWh/ft².yr	32 UI
	Inspect/Se Megger M	ervice Fan/Fan Motors									MJ/m².yr Market Composite E kWh/ft².yr MJ/m².yr	0.8 32
DOMESTIC HOT WATER												
Service Hot Water Plant Type	Fossil Fue System P Eff./COP				Boiler 0% 0.75		Fuel Share Blended Et		Fossil 0% 0.75		Elec. Res. 100% 0.91	
Service Hot Water load (MJ/m².yr) (Tertiary Load) Wetting Use Percentage	90%			II Electric EU kWh/ft².yr	I 0.5]		Dil / Propar kWh/ft².yr	ne EUI 0.6	-	Market Composite E kWh/ft².yr	UI 0.5
g				MJ/m².yr	19			MJ/m².yr	23		MJ/m².yr	19.0

COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: SIZE:

VINTAGE: REGION: Labrador Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan System Design Air Flow System Static Pressure CAV 3.3 L/s.m² 350 Pa 0.65 CFM/ft² Control Variable Fixed Variable 1.4 wa Flow Flow System Static Pressure VAV 350 Pa wg Incidence of Use 100% 100% Fan Efficiency 60% Operation Continuous Scheduled Continuous Schedule Fan Motor Efficiency 88% Sizing Factor 1.00 Incidence of Use 50% 50% 50% 50% Fan Design Load CAV 0.20 W/ft² 2.2 W/m² 2.2 W/m² Fan Design Load VAV 0.20 W/ft² Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 212 CFM/washroom 0.01 CFM/ft² 0.1 L/s.m² Other Exhaust (Smoking/Conference) 0.1 L/s.m² CFM/ft² Total Building Exhaust 0.2 L/s.m² 250 Pa 0.03 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 1.0 0.2 W/m² 0.02 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.020 kW/kW 1.50 W/m² 0.07 kW/Ton 0.14 W/ft² Condenser Pump 0.053 L/s KW 3.0 U.S. gpm/Ton Pump Design Flow Pump Design Flow per unit floor area 0.006 U.S. gpm/ft² 0.004 L/s.m² Pump Head Pressure Pump Efficiency kPa ft 50% Pump Motor Efficiency 80% Sizing Factor 1.0 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) 0.003 L/s.m² 0.0048 U.S. gpm/ft² Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 2.4 U.S. gpm/Ton 100 kPa 33 ft Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 0.8 Pump Connected Load 0.6 W/m² 0.06 W/ft² Supply Fan Occ. Period 2000 hrs./year Supply Fan Unocc, Period 6760 hrs./year Supply Fan Energy Consumption 11.8 kWh/m².yr Exhaust Fan Occ. Period 2000 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 6760 hrs./year 1.1 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.4 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 2000 hrs./year 0.3 kWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr

MJ/m².yr

48.8

EXISTING BUILDINGS: Schools SIZE: REGION: Labrador Interconnected

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		15.6 kWh/ft².yr 603.0 MJ/m².yr		Fuel Oil / F	3.1 kWh/ft².yr	119.1 M	J/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	3.1	121.9		kWh/ft2.yr	MJ/m².yr	kWh/ft².yr	MJ/m ² .yr	
ARCHITECTURAL LIGHTING	0.6	25.2	SPACE HEATING	8.6	333.4	3.1	119.1	
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.0	0.6			
OTHER PLUG LOADS	0.1	4.2	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0	
HVAC FANS & PUMPS	1.3	48.8	FOOD SERVICE EQUIPMENT	0.1	4.0			
REFRIGERATION	0.0	1.1						
MISCELLANEOUS	0.0	1.5						
BLOCK HEATERS	0.0	1.5						
COMPUTER EQUIPMENT	0.5	21.0						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

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COMMERCIAL SECTOR BUILDING PROFILE **EXISTING BUILDINGS:** SIZE: REGION: VINTAGE: University/College Existing Labrador Interconnected Baseline CONSTRUCTION 0.33 W/m².°C 0.06 Btu/hr.ft² .°F 70,000 ft² Wall U value (W/m².°C) Typical Building Size 6,506 m² Roof U value (W/m².°C) 0.33 W/m².°C 0.06 Btu/hr.ft² .°F Typical Footprint (m²) 3,253 35,000 ft² Glazing U value (W/m².°C) 3.52 W/m².°C 0.62 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 50% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.30 Defined as Exterior Zone Typical # Stories 0.65 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A VAV 10% TOTAL Ventilation System Type CAV VAVR System Present (%) 90% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 151 ft²/person 16.85% 14 m²/person %OA Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period 90% resh Air Requirements or Outside Air 10 L/s.person 21 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: 0.5 L/s.m² 50% operation (%) (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.10 CFM/ft² Sizing Factor Total Air Circulation or Design Air Flow

Infiltration Rate (air infiltration is assumed to occur during unoccupied hours only if the ventilation system shuts down)

Economizer

Controls Type

Control mode

Indoor Design Conditions

	Enthalpy Based	Dry-Bulb Based	Total
Incidence of Use		100%	100%
Switchover Point	KJ/kg.	18 °C	
	Btu/lbm	64.4 °F	

System Present (%)	HVAC	Room
	Equipment	Controls
All Pneumatic		
DDC/Pneumatic		
All DDC		
Total (should add-up to 100%)		

4.24 L/s.m²

0.70 L/s.m²

	Propo	rtional	PI / PID	Total
Control Mode				
	Fixed Di	scharge	Reset	
Control Stratogy				

		Room				Supply Air	•	
Summer Temperature	24	°C	75.2	°F	13	°C	55.4	°F
Summer Humidity (%)	50%				100%			
Enthalpy	65.5	KJ/kg.	28.2	Btu/lbm	54.5	KJ/kg.	23.4	Btu/lbm
Winter Occ. Temperature	22	°C	71.6	°F	16	°C	60.8	°F
Winter Occ. Humidity	30%				45%			
Enthalpy	53	KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	19.6	Btu/lbm
Winter Unocc. Temperature	21	°C	69.8	°F				
Winter Unocc. Humidity	30%			•				

0.83 CFM/ft²

0.14 CFM/ft²

Separate Make-up air unit (100% OA)

Operation occupied period

Room air enthalpy Discharge air enthalpy

Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves,

(Dampers, VAV Boxes)

Operation unoccupied period

Summary of Design Parameters Peak Design Cooling Load Peak Zone Sensible Load

Specific volume of air at 55F & 100% R
Design CFM

Total air circulation or Design air

L/s.m²

50%

####### 784,929

28.2 Btu/lbm 23.4 Btu/lbm

13.2 ft³/lbm 36,515

l/s.m²

CFM/ft²

	Winter Occ. Humidity	30%				45%	i	
	Enthalpy	53	KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	
	Winter Unocc. Temperature	21	°C	69.8	°F			
	Winter Unocc. Humidity	30%						
	Enthalpy	50	KJ/kg.	21.5	Btu/lbm			
				_				
Damper Maintenance		Incidence	Frequency					
		/ 0/ \	(voore)					

Control Arm Adjustment Lubrication
Blade Seal Replacement

Calibration of Panel Gauges Inspection of Auxiliary Devices

Inspection of Control Devices

Air Filter Cleaning	Changes/Year		Incidence of Annual Room Controls Maintenance	
Incidence of Annual HVAC Controls Maintenand	ce			
	Annual Maintenance Tasks	Incidence (%)	Annual Maintenance Tasks In	ncidence (%)
	Calibration of Transmitters		Inspection/Calibration of Room Thermostat	

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EXISTING BUILDINGS: SIZE: University/College All

Baseline

VINTAGE: Existing REGION: Labrador Interconnected

LIGHTING GENERAL LIGHTING 500 Lux 46.5 ft-candles Light Level Floor Fraction (GLFF) 0.90 1.3 W/ft² Connected Load 14.1 W/m² Occ. Period(Hrs./yr.) 4000 Light Level (Lux) 1000 700 Unocc. Period(Hrs./vr.) 4760 % Distribution 100% 100% Usage During Occupied Period 90% 500 Weighted Average Usage During Unoccupied Period 20% INC CFL T12 T5HO LED TOTAL Fixture Cleaning: Incidence of Practice 0% 0% System Present (%) 60% 35% 5% 100.0% 0.6 0.7 0.6 Interval 0.65 0.65 0.75 0.80 0.80 0.80 0.80 Efficacy (L/W) 15 88 65 95 90 Relamping Strategy & Incidence Group Spot EUI kWh/ft².yr of Practice 5.4 MJ/m².yr 207 ARCHITECTURAL LIGHTING CORRIDORS 300 Lux 27.9 ft-candles Light Level Floor Fraction (ALFF) 0.10 11.4 1.1 W/ft² Connected Load 4000 Light Level (Lux) 500 700 1000 Unocc. Period(Hrs./vr.) 4760 % Distribution 100% 100% Usage During Occupied Period 100% 300 Weighted Average Usage During Unoccupied Period 50% INC T12 T5HO TOTAL System Present (%)
CU
LLF Fixture Cleaning: 8% 10% 15% 65% 0% 2% 100.0% Incidence of Practice 0.6 0.7 0.6 0.6 0.6 Interval 0.80 0.80 0.80 Efficacy (L/W) 15 50 88 65 95 90 Relamping Strategy & Incidence Group Spot EUI of Practice kWh/ft².vr 0.7 EUI = Load X Hrs. X SF X GLFF MJ/m².y 26 SPECIAL PURPOSE LIGHTING 300.00 Lux 27.9 ft-candles Floor fraction check: should = 1.00 1.00 Light Level Floor Fraction (HBLFF) 0.6 W/ft² 6.6 W/m² Connected Load Occ. Period(Hrs./yr.) 4000 Light Level (Lux) 300 500 700 1000 Total Unocc. Period(Hrs./yr.) 4760 % Distribution Usage During Occupied Period 0% Weighted Average 300 Usage During Unoccupied Period 100% TOTAL INC CFL T12 T8 HID T5HO LED Fixture Cleaning: System Present (%) 100% 100.0% 0% 0% Incidence of Practice 0.7 0.7 0.6 0.6 0.6 0.6 0.6 Interval 0.65 0.65 0.75 0.80 0.80 0.80 0.80 Efficacy (L/W) 72 84 65 95 Relamping Strategy & Incidence Group Spot of Practice EUI kWh/ft².yr MJ/m².vr EUI TOTAL kWh/ft².yr TOTAL LIGHTING Overall LP 13.79 W/m² 233 OFFICE EQUIPMENT & PLUG LOADS Equipment Type Computers Monitors Printers Copiers Servers Plug Loads Measured Power (W/device) 54.55 100 Density (device/occupant) 0.31 0.31 0.02 0.02 0.01 Connected Load 0.1 W/m² W/m² 1.3 W/m² 0.1 0.12 W/ft² 100% 0.1 W/ft² 0.1 W/ft² 0.01 W/ft² 0.03 W/ft² 0.01 W/ft² Diversity Occupied Period 50% Diversity Unoccupied Period 50% 50% 50% 100% 50% Operation Occ. Period (hrs./year) 2000 2000 2000 Operation Unocc. Period (hrs./year) 6760 6760 6760 6760 Total end-use load (occupied period) 3.9 W/m² 0.4 W/ft² to see notes (cells with red indicator in upper right corner, type "SHIFT @mputer Servers EUI kWh/ft².yr 0.10 2.2 W/m² 0.2 W/ft² MJ/m².yr Total end-use load (unocc. period) 3.68 Computer Equipmen t EUI kWh/ft².yr 1.34 Usage during occupied period 100% MJ/m2.yr 51.73 Usage during unoccupied period 55% Plug Loads EUI MJ/m².yr 25.18 FOOD SERVICE EQUIPMENT Fuel Oil / Propane Fuel Share: Electricity Fuel Share: 100.0% Fuel Oil / Propane EUI Provide description below: EUI EUI kWh/ft².vr 0.5 kWh/ft2.vr 0.4 MJ/m².yr 15.0 MJ/m².yr REFRIGERATION Provide description below: EUI kWh/ft².yr 0.5 MJ/m².yr 20.0 **BLOCK HEATERS & MISCELLANEOUS** Block Heaters EUI kWh/ft².yr 0.1 MJ/m².yr kWh/ft².yr Miscellaneous EUI 0.1 MJ/m².yr

EXISTING BUILDINGS: University/College Baseline SIZE:

90%

Wetting Use Percentage

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

VINTAGE: Existing REGION: Labrador Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Packaged A/A HP Total Stan High Unit System Present (%) 100% 100% Eff./COP 80% 1.70 3.00 1.00 Performance (1 / Eff.) 1.43 1.25 1.43 0.59 0.33 0.22 1.00 (kW/kW) Peak Heating Load 49.7 W/m² 15.8 Btu/hr.ft² 463 MJ/m².vr Seasonal Heating Load 12.0 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share MJ/m².yr 463 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% 12.0 MJ/m².yr 463 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Chillers Open W. H. CW System Present (%) COP 100.0% 100.0% Performance (1 / COP) 0.21 0.19 0.2 0.28 0.38 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 13.0 °C 86 °F 55.4 °F Supply Air 81 W/m² 26 Btu/hr.ft² 466 ft²/Ton Peak Cooling Load Seasonal Cooling Load 76.4 MJ/m².yr 2.0 kWh/ft².yr (Tertiary Load) Operation (occ. perio 3000 hrs/year Note value cannot be less than 2,900 hrs/year) 1.00 Sizing Factor 25.0% A/C Saturation (Incidence of A/C) Electric Fuel Share Fuel Oil / Propane Fuel Share 100.0% Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.9 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.9 kWh/ft².vr MJ/m².yr 33 SERVICE HOT WATER Service Hot Water Plant Type Fossil Fuel SHW Avg. Tank Boiler Fossil Elec. Res. System Present (%) 0% Fuel Share 0% 100% Eff./COP 0.65 0.75 Blended Efficiency 0.75 0.91 Service Hot Water load (MJ/m².yr) 22.8 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI

kWh/ft2.yr

MJ/m2.yı

0.6

0.8

kWh/ft2.yr

0.6

kWh/ft².yr MJ/m².yr

EXISTING BUILDINGS: University/College Baseline SIZE: COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing

HVAC FANS & PUMPS													
SUPPLY FANS							Ventilation a	and Exhau	st Fan Ope	eration & C	ontrol		
30.12.17.110							Ventilation			ust Fan]		
System Design Air Flow	4.2 L/s.m ²	0.83 CFM/f	t²	Control				/ariable	Fixed	Variable			
	500 Pa	2.0 wg	•	Control			i ixou	Flow	1 17100	Flow			
	500 Pa	2.0 wg		Incidence	of Use		90%	10%	100%		1		
	60%	2.0		Operation	51 030		Continuous			s Scheduler	4		
	30%			Орегация			Continuous	Joricadica	JOH KIII IGOG	docriodalec	1		
	.00			Incidence	of Lloo		75%	25%	75%	25%	-		
	4.4 W/m²	0.41 W/ft ²		incluence	JI USE		1576	2370	1370	2370	2		
	4.4 W/m²	0.41 W/ft²			Com	ments:							
Tan Design Load VAV	4.4	0.41			Com	nenta.							
EXHAUST FANS							1						
	00 L/s.washro		12 CFM/wa	shroom									
	0.1 L/s.m ²		01 CFM/ft ²										
	0.1 L/s.m ²		02 CFM/ft ²										
Total Building Exhaust (0.2 L/s.m ²	0.	03 CFM/ft ²										
Exhaust System Static Pressure	250 Pa		1.0 wg										
Fan Efficiency 2	25%	,	= -										
	75%												
	1.0												
	0.2 W/m ²	0.02 W/ft ²											
ALLYH IADY COOLING FOLIDMENT (Co	B	101T10		- >									
AUXILIARY COOLING EQUIPMENT (Conde	enser Pump an	a cooling I ower/Cor	iuenser Fans	5)									
Average Condenser Fan Power Draw		0.0	20 kW/kW		0.07 kW/T	on							
(Cooling Tower/Evap. Condenser/ Air Cooled	(Condenser)		62 W/m²		0.15 W/ft ²								
(Occurring Tower/Evap. Condensell 7th Cocled	2 OUNGERBOI)		02 777111		0.10								
Condenser Pump													
Condenser i ump													
Pump Design Flow		0.0	53 L/s.KW		3.0 U.S.	anm/Ton							
Pump Design Flow Pump Design Flow per unit floor area			004 L/s.m²		0.006 U.S.								
Pump Head Pressure		0.0			0.006 U.S.	gpm/n-							
		-	kPa 0%		π								
Pump Efficiency													
Pump Motor Efficiency			0%										
Sizing Factor			1.0		1,000								
Pump Connected Load			W/m²		W/ft								
CIRCULATING PUMP (Heating & Cooling)													
Dump Docian Flow @ 5 °C (10 °F) dolto T	F	0.003 L/s.m ²		0.0053	II C apm/ft2	2.4	U.S. gpm/T	on					
Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure	-			50	U.S. gpm/ft ²	2.4	go.s. gpm/ i	OH					
	-	100 kPa		50	π								
Pump Efficiency	ļ	50%											
Pump Motor Efficiency	}	80%											
Sizing Factor	}	0.8		0.00	101/642								
Pump Connected Load		0.7 W/m²		0.06	W/ft²								
Supply Fan Occ. Period		4000 hrs./ye											
Supply Fan Unocc. Period	Ī	4760 hrs./ye											
Supply Fan Energy Consumption	Ī	31.9 kWh/m	n².yr										
•	-												
Exhaust Fan Occ. Period	Ī	4000 hrs./ye	ear										
Exhaust Fan Unocc. Period	Ī	4760 hrs./ye											
Exhaust Fan Energy Consumption	ļ	1.6 kWh/n											
 ·	-												
Condenser Pump Energy Consumption	ſ	kWh/n											
Cooling Tower /Condenser Fans Energy Con-	sumption	0.4 kWh/m	n².yr										
	_												
-	ſ	6000 hrs./ye											
			n².vr										
		kWh/n											
Circulating Pump Energy Consumption		· ·	,.										
Circulating Pump Yearly Operation Circulating Pump Energy Consumption Fans and Pumps Maintenance	Annual Ma	intenance Tasks			Frequency								
Circulating Pump Energy Consumption		intenance Tasks		Incidence (%)	Frequency (years)								
Circulating Pump Energy Consumption	Inspect/Ser	intenance Tasks											
Circulating Pump Energy Consumption	Inspect/Ser	intenance Tasks vice Fans & Motors ust Belt Tension on Fa											
Circulating Pump Energy Consumption	Inspect/Ser	intenance Tasks									EUI	kWh/ft².yr MJ/m².yr	3. 122.

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing EXISTING BUILDINGS: University/College Baseline SIZE: REGION: Labrador Interconnected

EUI SUMMARY							
TOTAL ALL END-USES:	Electricity:		25.7 kWh/ft².yr 994.8 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	ricity	Fuel Oil /	Propane
GENERAL LIGHTING	5.4	207.3		kWh/ft2.yr	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr
ARCHITECTURAL LIGHTING CORF	0.7	26.2	SPACE HEATING	12.0	463.4		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	8.3		
OTHER PLUG LOADS	0.7	25.2	SERVICE HOT WATER	0.6	25.0	0.0	0.0
HVAC FANS & PUMPS	3.2	122.1	FOOD SERVICE EQUIPMENT	0.4	15.0		
REFRIGERATION	0.5	20.0					
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.1	5.0					
COMPUTER EQUIPMENT	1.3	51.7					
COMPUTER SERVERS	0.1	3.7					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Warehouse/Wholesale Existing Labrador Interconnected Baseline CONSTRUCTION 0.38 W/m².°C 0.07 Btu/hr.ft² .°F 20,000 ft² Wall U value (W/m².°C) Typical Building Size 1,859 m² Roof U value (W/m².°C) 0.38 W/m².°C 0.07 Btu/hr.ft² .°F Typical Footprint (m²) 1,859 20,000 ft² 3.52 W/m².°C 0.62 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.05 Defined as Exterior Zone Typical # Stories 0.80 Floor to Floor Height (m) 6.1 m 20.1 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 1076 ft²/person 6.49% 100 m²/person %OA Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 15 L/s.person 32 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.45 CFM/ft² 2.31 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 254.531 Peak Zone Sensible Load 195,583 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 9,099 DDC/Pneumatic Total air circulation or Design air 2.31 l/s.m² All DDC Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 55.4 °F 71.6 °F 13 °C 22 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 60.8 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

EXISTING BUILDINGS: SIZE: Warehouse/Wholesale All

Baseline

VINTAGE: Existing REGION: Labrador Interconnected

LIGHTING HIGH BAY LIGHTING 400 Lux 37.2 ft-candles Light Level Floor Fraction (GLFF) 0.90 1.0 W/ft² Connected Load 10.5 W/m² Occ. Period(Hrs./yr.) 3500 Light Level (Lux) Total 700 1000 Unocc. Period(Hrs./vr.) 5260 % Distribution 50% 50% 100% Usage During Occupied Period 100% Weighted Average 400 Usage During Unoccupied Period 15% INC CFL T5HO LED TOTAL T12 Fixture Cleaning: Incidence of Practice System Present (%) 20% 10% 60% 10% 100.0% 0.6 0.7 0.6 0.6 0.6 Interval 0.65 0.65 0.75 0.80 0.80 0.80 0.80 Efficacy (L/W) 15 88 Relamping Strategy & Incidence Group Spot EUI kWh/ft².yr of Practice 3.8 MJ/m².y 146 OTHER, OFFICE LIGHTING 500 Lux 46.5 ft-candles Light Level Floor Fraction (ALFF) 0.10 1.9 W/ft² Connected Load 20.9 Light Level (Lux) 500 700 1000 Unocc. Period(Hrs./vr.) 5760 % Distribution 100% 100% Usage During Occupied Period 500 Weighted Average 100% Usage During Unoccupied Period 15% INC T12 T5HO TOTAL System Present (%)
CU
LLF Fixture Cleaning: 10% 5% 60% 25% 0% 0% 100.0% 0.6 Incidence of Practice 0.7 0.6 0.7 0.6 0.6 0.6 Interval 0.80 0.80 0.80 Efficacy (L/W) 15 50 88 65 95 90 Relamping Strategy & Incidence Group Spot EUI kWh/ft².vr of Practice 0.8 EUI = Load X Hrs. X SF X GLFF MJ/m².y 29 SPECIAL PURPOSE LIGHTING ft-candles Floor fraction check: should = 1.00 1.00 Light Level Lux Floor Fraction (HBLFF) W/ft² W/m Connected Load Occ. Period(Hrs./yr.) 4000 Light Level (Lux) 300 500 700 1000 Total Unocc. Period(Hrs./yr.) 4760 % Distribution Usage During Occupied Period 0% Weighted Average Usage During Unoccupied Period 100% HPS TOTAL INC CFL T12 T8 MH Fixture Cleaning: System Present (%) 0% 0.0% 0% Incidence of Practice 0.7 0.7 0.6 0.6 0.6 0.6 0.6 Interval 0.65 0.65 0.75 0.80 0.80 0.55 Efficacy (L/W) 72 84 88 65 Relamping Strategy & Incidence Group Spot of Practice EUI kWh/ft².yr MJ/m².vr EUI TOTAL kWh/ft².yr 4.5 TOTAL LIGHTING Overall LP 11.57 W/m² 175 OFFICE EQUIPMENT & PLUG LOADS Equipment Type Computers Monitors Printers Copiers Servers Plug Loads Measured Power (W/device) 54.55 Density (device/occupant) 0.59 0.59 0.03 0.03 0.06 Connected Load 0.0 W/m² W/m² 2 W/m² 0.3 W/m² 0.3 W/m² 0.1 0.0 W/ft² 0.0 W/ft² 0.00 W/ft² 0.01 W/ft² 0.01 W/ft² 0.19 W/ft² Diversity Occupied Period 90% 50% 25% Diversity Unoccupied Period 50% 50% 50% 100% Operation Occ. Period (hrs./year) 2000 2000 2000 Operation Unocc. Period (hrs./year) 6760 6760 6760 6760 Total end-use load (occupied period) 2.6 W/m² 0.2 W/ft² 0.1 W/ft² to see notes (cells with red indicator in upper right corner, type "SHIFT @mputer Servers EUI kWh/ft².yr 0.11 1.0 W/m² MJ/m².yr Total end-use load (unocc. period) 4.42 Computer Equipmen t EUI kWh/ft².yr 0.34 Usage during occupied period 100% MJ/m2.yr 13.30 kWh/ft².yr Usage during unoccupied period Plug Loads EUI MJ/m².yr 32.15 FOOD SERVICE EQUIPMENT All Electric EUI Fuel Oil / Propane Fuel Share: Electricity Fuel Share: 100.0% Fuel Oil / Propane EUI Provide description below: EUI EUI kWh/ft².vr kWh/ft2.vr MJ/m².yr MJ/m².yr REFRIGERATION Provide description below Process EUI kWh/ft².yr MJ/m².yr 60.0 **BLOCK HEATERS & MISCELLANEOUS** Block Heaters EUI kWh/ft².yr 0.1 MJ/m².yr kWh/ft².yr Miscellaneous EUI 0.1 MJ/m².yr

EXISTING BUILDINGS: Warehouse/Wholesale

SIZE:

90%

Wetting Use Percentage

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

VINTAGE: Existing REGION: Labrador Interconnected

0.6

kWh/ft2.yr

0.5

18.7

kWh/ft².yr MJ/m².yr

Baseline SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Packaged A/A HP Total Boiler Unit Heater Rooftop System Present (%) 100% 100% Eff./COP 1.70 3.00 1.00 Performance (1 / Eff.) 1.43 1.43 1.43 0.59 0.33 0.22 1.00 (kW/kW) Peak Heating Load 15.2 Btu/hr.ft² 48.0 W/m² 11.0 kWh/ft².yr 427 MJ/m².vr Seasonal Heating Load (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share 11.0 MJ/m².yr 427 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 427 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Open W. H. CW Chillers System Present (%) COP 100.0% 100.0% Performance (1 / COP) 0.21 0.19 0.2 0.28 0.38 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 13.0 °C 86 °F 55.4 °F Supply Air 40 W/m² 13 Btu/hr.ft² 943 ft²/Ton Peak Cooling Load Seasonal Cooling Load 30.2 MJ/m².yr 0.8 kWh/ft².yr (Tertiary Load) Operation (occ. perio 3000 hrs/year Note value cannot be less than 2,900 hrs/year) 1.00 Sizing Factor 5.0% A/C Saturation (Incidence of A/C) Electric Fuel Share Fuel Oil / Propane Fuel Share 100.0% Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.3 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.3 kWh/ft².vr MJ/m².yr 13 DOMESTIC HOT WATER Service Hot Water Plant Type Fossil Fuel SHW Avg. Tank Boiler Fossil Elec. Res. System Present (%) 0% Fuel Share 0% 100% Eff./COP 0.65 0.75 Blended Efficiency 0.75 0.91 Service Hot Water load (MJ/m².yr) 17.0 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI

kWh/ft2.yr

MJ/m2.yı

COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS:

Warehouse/Wholesale Baseline

SIZE:

VINTAGE:

Existing

REGION: Labrador Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan System Design Air Flow System Static Pressure CAV 2.3 L/s.m² 300 Pa 0.45 CFM/ft² Control Variable Fixed Variable 1.2 Flow Flow wa System Static Pressure VAV 300 Pa wg Incidence of Use 100% 100% Fan Efficiency 60% Operation Continuous Scheduled Continuous Schedule Fan Motor Efficiency 80% Sizing Factor 1.00 Incidence of Use 80% 20% 80% 20% Fan Design Load CAV 0.13 W/ft² 1.4 W/m² 0.13 W/ft² Fan Design Load VAV Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 212 CFM/washroom 0.02 CFM/ft² 0.1 L/s.m² Other Exhaust (Smoking/Conference) 0.1 L/s.m² 0.02 CFM/ft² Total Building Exhaust 0.2 L/s.m² 250 Pa 0.04 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 1.0 0.3 W/m² 0.03 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.020 kW/kW 0.80 W/m² 0.07 kW/Ton 0.07 W/ft² Condenser Pump 0.053 L/s KW 3.0 U.S. gpm/Ton Pump Design Flow Pump Design Flow per unit floor area 0.003 U.S. gpm/ft² 0.002 L/s.m² Pump Head Pressure Pump Efficiency kPa ft 50% Pump Motor Efficiency 80% Sizing Factor 1.0 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) 0.002 L/s.m² 50 kPa Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 0.0025 U.S. gpm/ft² 17 ft 2.4 U.S. gpm/Ton Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 0.8 Pump Connected Load 0.02 W/ft² 0.2 W/m² Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc, Period 5260 hrs./year Supply Fan Energy Consumption 11.1 kWh/m².yr Exhaust Fan Occ. Period 3500 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 5260 hrs./year 2.1 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.2 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 5000 hrs./year kWh/m2.yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr MJ/m².yr 48.3

EXISTING BUILDINGS: Warehouse/Wholesale Baseline

SIZE: All

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing

TOTAL ALL END-USES:	Electricity	:	20.8 kWh/ft².yr 806.9 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
HIGH BAY LIGHTING	3.8	146.3		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
OTHER, OFFICE LIGHTING	0.8	29.1	SPACE HEATING	11.0	427.0		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.0	0.6		
OTHER PLUG LOADS	0.8	32.1	DOMESTIC HOT WATER	0.5	18.7	0.0	0.0
HVAC FANS & PUMPS	1.2	48.3	FOOD SERVICE EQUIPMENT				
REFRIGERATION	1.5	60.0					
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.1	5.0					
COMPUTER EQUIPMENT	0.3	13.3					
COMPUTER SERVERS	0.1	4.4					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Existing Restaurant Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² Glazing U value (W/m².°C) 3.52 W/m².°C 0.62 Btu/hr.ft².°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.36 Defined as Exterior Zone Typical # Stories 0.58 Floor to Floor Height (m) 3.7 r 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 60% 40% 100% Min. Air Flow (%) (Minimum Throttled Ai 60% Occupancy or People Density 215 ft²/person %OA 9.29% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 16 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: CFM/ft² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation I /s m² operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.79 CFM/ft² 4.03 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.40 L/s.m² 0.08 CFM/ft² 50% Infiltration Rate Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 210.389 Switchover Point KJ/kg. 18 Peak Design Cooling Load Peak Zone Sensible Load 131,371 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipment 13.2 ft³/lbm All Pneumatic 6,111 DDC/Pneumatic Total air circulation or Design air 4.03 l/s.m² All DDC Total (should add-up to 100%) Proportional PI / PID Control mode Control Mode Fixed Discharge Rese Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 14 °C 57.2 °F 24 °C Summer Humidity (%) 50% Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication
Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves,

(Dampers, VAV Boxes)

Inspection of Control Devices

EXISTING BUILDINGS: Restaurant Baseline SIZE: COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing

LIGHTING														
GENERAL LIGHTING	400 1	07.0	7.6											
Light Level Floor Fraction (GLFF)	400 Lux 0.50	31.2	ft-candles											
Connected Load	10.7 W/m²	1.0	W/ft²											
Connected Load	10.7	1.0	VV/It-											
Occ. Period(Hrs./yr.)	4300		Light Level (Lux)		400	550	650					Total	li .	
Unocc. Period(Hrs./yr.)	4460		% Distribution		100%	000						100%	i	
Usage During Occupied Period	100%		Weighted Average									400	i	
Usage During Unoccupied Period	10%		110.9										i	
	1971				INC	CFL	T12	T8	HID	T5HO	LED	TOTAL	i	
Fixture Cleaning:			System Present (%)			U	20.0%	80.0%				100.0%	ii	
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6		i	
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.80	0.80	1	ii	
			Efficacy (L/W)		15	50	72	88	65	95	90	1	İ	
Relamping Strategy & Incidence	Group Spot	\neg												
of Practice	9.554	+										EUI	kWh/ft².yr	2.4
01110000		_											MJ/m².yr	92
ARCHITECTURAL LIGHTING							-	-		-		1	, , , , , , , , , , , , , , , , , , ,	-
Light Level	300 Lux	27.9	ft-candles											
Floor Fraction (ALFF)	0.50		J *											
Connected Load	30.7 W/m²	2.9	W/ft²											
00111121212			1											
Occ. Period(Hrs./yr.)	4300		Light Level (Lux)		200	300	400	500				Total	i,	
Unocc. Period(Hrs./yr.)	4460		% Distribution				100%					100%		
Usage During Occupied Period	100%		Weighted Average									400		
Usage During Unoccupied Period	10%											1		
3					INC	CFL	T12	T8	HID	T5HO	LED	TOTAL		
Fixture Cleaning:			System Present (%)		60%	25%	-				15%	100.0%		
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6			
Interval	years		LLF	-	0.65	0.65	0.75	0.80	0.80	0.80	0.80	1	İ	
I I I I I I I I I I I I I I I I I I I			Efficacy (L/W)		15	50	72	84	65	95	90		ii	
Relamping Strategy & Incidence	Group Spot	7	Lilloddy (Live,											
of Practice	Оточр орох	+										EUI	kWh/ft².yr	6.8
OI Flactice	L				EU.	II – I nad	X Hrs. X S	E X GI FF					MJ/m².yr	262
SPECIAL PURPOSE LIGHTING						I - Louc	A 1113. A 5	FAGLII					IVIO/III .yı	202
Light Level	Lux		ft-candles			FI	loor fraction	n check: st	nould = 1.0	n	1.00	1		
Floor Fraction (HBLFF)	Lux		I l'-Cariales			j	IUUI IIGUGG	II GIEGI. S.	IUuiu - 1.0	J	1.00	J		
Connected Load	W/m²		W/ft²											
Connected Load	V V / 111		Jvv/n-											
O Davia d/Llea Are \	4000		1 'what I as sal / Line)		300	500	700	1000				Total	1	
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)	+	300	500	700	1000				Total	ii	
Unocc. Period(Hrs./yr.)	4760		% Distribution									-	1	
Usage During Occupied Period	0%		Weighted Average										in .	
Usage During Unoccupied Period	100%				:110		7.0						ii	
				L	INC	CFL	T12	T8	-	MH	HPS	TOTAL	1	
Fixture Cleaning:			System Present (%)										ii	
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6	Г	ii	
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.55	0.55]	ii	
			Efficacy (L/W)		15	50	72	84	88	65	90	İ	İ	
Relamping Strategy & Incidence	Group Spot	\exists												
of Practice		\exists											kWh/ft².yr	
													MJ/m².yr	
TOTAL LIGHTING								0	verall LP	20.72 W	/m²	EUI TOTAL		9
													MJ/m².yr	354
OFFICE EQUIPMENT & PLUG LOA	DS													
			T									٦		
Equipment Type	Compu	uters	Monitors	Printe	ers	Copie	ers	Serve	rs	Plug L	oads	_		
Measured Power (W/device)	-	55	51	100		200	<u></u>	217						
Density (device/occupant)	0.1		0.16	0.01		200		0.06						
Connected Load		.4 W/m²	0.4 W/m²	0.01 0.1 W	I/m²		V/m²	0.1 W	//m²	1.15 W	I/m²			
Connected Load		.0 W/ft²	0.0 W/ft²	0.00 W			V/ft²	0.01 W		0.11 W				
Diversity Occupied Period	809		80%	80%	/11	80%	//10	100%	./10	80%	/11			
Diversity Unoccupied Period	500		50%	50%		50%		100%		50%				
Operation Occ. Period (hrs./year)	200		2000	2000	<u> </u>	2000	<u></u>	2000	-	4100				
Operation Unocc. Period (hrs./year)	676		6760	6760	⊢	6760	-	6760	-	4660				
Operation Office. Feriod (fils:/year)	070	30	0700	0700		0700		0700		4000		J		
Total end-use load (occupied period)	1	.8 W/m²	0.2 W/ft ²							Compi	uter Servers	EIII	kWh/ft².yr	0.11
Total end-use load (unocc. period)		.2 W/m²	0.1 W/ft²							Comp	itei Seiveis		MJ/m².yr	4.42
rotal end-use load (driocc. period)	1.	.Z VV/III-	0.1 W/IE							Computo	r Equipment		kWh/ft².yr	0.41
Usage during occupied period	1009	0/								Computer	Equipment		MJ/m².yr	16.00
Usage during occupied period	659										Plug Loads		kWh/ft².yr	0.60
osage during unoccupied period	05	70									riug Luaus		MJ/m².yr	23.23
												ļ	IVIJ/IIIyI	23.23
FOOD SERVICE EQUIPMENT														
Provide description below:	Fuel Oil / Propane	Euol Chara:		Electricity Fu	ol Chara:	100.0%		Fuel Oil	/ Propane	EIII I		ΔII	Electric EUI	
Lunch room/cafeteria/restaurant	ruei Oii / Propane	ruei Snare.		l Electricity Fu	ei Share.	100.0%	=		Wh/ft².yr	0.1			kWh/ft².yr	34.3
Lunch room/caretena/restaurant				J			-							1330.0
								IVI	1J/m².yr	5.0			MJ/m².yr	1330.0
REFRIGERATION														
Provide description below:														
Lunch room/cafeteria/restaurant				1								EUI	IAMb/f+2 vr	16.8
Lunch room/caretena/restaurant				J									kWh/ft².yr	
													MJ/m².yr	650.0
DI CON LIEATEDO O MICOELLANE	0110													
BLOCK HEATERS & MISCELLANE	005													
												ELII	14 A / In / 642	
										Bk	ock Heaters		kWh/ft².yr	0.1
											ock Heaters scellaneous		kWh/ft².yr MJ/m².yr kWh/ft².yr	0.1 5 0.1

EXISTING BUILDINGS: Restaurant Baseline

SIZE:

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing

SPACE HEATING											
Heating Plant Type		Fu	el Oil / Propa	ine		Elec	tric			1	
		Stan.	oilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
	System Present (%)							100%	100%		
	Eff./COP Performance (1 / Eff.)	70% 1.43		70% 1.43	1.70 0.59	3.00 0.33	4.50 0.22	1.00		-	
	(kW/kW)					0.00	-				
Peak Heating Load 58.9 W/m² Seasonal Heating Load 492 MJ/m².yr (Tertiary Load) 1.00	18.7 Btu/hr.ft² 12.7 kWlv/ft².yr										
Electric Fuel Share 100.0% Fuel C	oil / Propane Fuel Share	T	Oil Fuel Sha	re						All Electric EUI kWh/ft².yr	12.7
	aintenance Tasks	Incidence	1							MJ/m².yr	492
Fire Side Water Sid Inspection Inspection	Inspection le Inspection for Scale Buildup n of Controls & Safeties n of Burner Analysis & Burner Set-up	(%) 75% 100% 100% 100% 90%								Fuel Oil / Propane E kWh/ft².yr MJ/m².yr Market Composite E kWh/ft².yr	EUI 12.7
										MJ/m².yr	492
SPACE COOLING											
A/C Plant Type	Centrifuga Standard System Present (%)	HE		Open	DX 100.0%	Absorption W. H.	CW	Total			
	COP 4.7 Performance (1 / COP) 0.21			3.5 0.29	2.6 0.38	0.9 1.11	1.00				
	(kW/kW) Additional Refrigerant										
	Related Information										
Control Mode	Incidence of Use Fixed Setpoint Chilled Water Condenser Water	Reset									
		1	_								
Setpoint		°C °C	44.6 86 57.2	°F							
Peak Cooling Load 66 W/m² Seasonal Cooling Load 72.9 MJ/m²-yr (Tertiary Load)	21 Btw/hr.ft² 570 1.9 kWh/ft².yr	ft²/Ton									
Sizing Factor 1.00	Operation (oc	c. period)	3000	hrs/year	Note value	cannot be	ess than 2	,900 hrs/yea	ır)		
A/C Saturation (Incidence of A/C)											
Electric Fuel Share 100.0% Fuel C	il / Propane Fuel Share	I									
	aintenance Tasks	Incidence (%)	Frequency (years)								
Inspect C	ontrol, Safeties & Purge Unit oupling, Shaft Sealing and Bearings										
Megger M Condense	lotors er Tube Cleaning										
Vibration	Analysis										
	rent Testing nemical Oil Analysis									All Electric EUI	
										kWh/ft².yr MJ/m².yr	0.8 32
Cooling Tower/Air Cooled Condenser Maintenan Annual Ma	aintenance Tasks		Frequency								
Inspection	VClean Spray Nozzles	(%)	(years)							Fuel Oil / Propane E kWh/ft².yr	UI
Inspect/Si Megger N	ervice Fan/Fan Motors									MJ/m².yr	
	erify Operation of Controls									Market Composite E	
										kWh/ft².yr MJ/m².yr	0.8 32
DOMESTIC HOT WATER										•	
		T			ì						
Service Hot Water Plant Type Fossil Fue System P	el SHW Tank resent (%)			Boiler 0%		Fuel Share		Fossil 0%		Elec. Res. 100%	
Service Hot Water load (MJ/m².yr) 700.0 (Tertiary Load)	0.65			0.75		Blended Ef	ficiency	0.75		0.91	
Wetting Use Percentage 90%		/	All Electric EU kWh/ft².yr MJ/m².yr	19.9 769			il / Propan kWh/ft².yr MJ/m².yr	e EUI 24.1 933		Market Composite E kWh/ft².yr MJ/m².yr	19.9 769.2

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing EXISTING BUILDINGS: Restaurant Baseline SIZE: REGION: Labrador Interconnected

HVAC FANS & PUMPS										
SUPPLY FANS				Ventilation	and Exhau	st Fan Ope	eration & Cont	rol		
					tion Fan		aust Fan	1		
System Design Air Flow 4.0	L/s.m ² 0.7	9 CFM/ft ²	Control	Fixed	Variable	Fixed	Variable			
System Static Pressure CAV 350				1	Flow		Flow			
System Static Pressure VAV 350		wg	Incidence of Use	60%	11011	100%				
Fan Efficiency 52%		••9	Operation	Continuou	Schodulad		Scheduled			
Fan Motor Efficiency 85%			Орегалогі	Continuou	Concueu	Continuou	Scrieduled			
			Incidence of Line	75%	25%	75%	250/	J		
Sizing Factor 1.00	M/2 0.0	0 14/6/2	Incidence of Use	75%	25%	75%	25%	1		
Fan Design Load CAV 3.2		0 W/ft²	0							
Fan Design Load VAV 3.2	W/m² 0.3	0 W/ft²	Comments:							
EXHAUST FANS				l.						
Washroom Exhaust 100	L/s.washroom	212 CFM/washro	om							
Washroom Exhaust per gross unit area 0.2	L/s.m ²	0.04 CFM/ft ²								
Other Exhaust (Smoking/Conference) 0.1	L/s.m ²	0.02 CFM/ft ²								
Total Building Exhaust 0.3		0.06 CFM/ft ²								
Exhaust System Static Pressure 250		1.0 wg								
Fan Efficiency 40%										
Fan Motor Efficiency 80%	1									
Sizing Factor 1.0	†									
Exhaust Fan Connected Load 0.2	W/m² 0.0	2 W/ft²								
LA IQUST FAIT CUTHECTED LUID U.2	vv/III- 0.0.	∠ vv/It⁻								
AUXILIARY COOLING EQUIPMENT (Condense	er Pump and Cooling To	wer/Condenser Fans)								
	. ,	•								
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser)	1.30 W/m²	0.12 W/ft ²							
(g	,									
Condenser Pump										
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/To	n						
Pump Design Flow per unit floor area		0.004 L/s.m²	0.005 U.S. gpm/ft²							
Pump Head Pressure		90 kPa	30 ft							
Pump Efficiency		55% KF a	30 11							
Pump Motor Efficiency		90%								
Sizing Factor		1.0	0.00							
Pump Connected Load		0.64 W/m²	0.06 W/ft ²							
CIRCULATING PUMP (Heating & Cooling)										
Ontoo Extinto Form (Fleating & Cooming)										
Pump Design Flow @ 5 °C (10 °F) delta T	0.00	3 L/s.m ²	0.0042 U.S. gpm/ft ²	2.4 U.S. gpm/	Ton					
Pump Head Pressure	15		50 ft							
Pump Efficiency	55%									
Pump Motor Efficiency	90%									
Sizing Factor	0.5									
Pump Connected Load		4 W/m²	0.04 W/ft²							
. amp Somiotica Load		<u></u> /	0.04							
Supply Fan Occ. Period	SEUC	hrs./year								
Supply Fan Unocc. Period		0 hrs./year								
Supply Fan Energy Consumption	14.	3 kWh/m².yr								
		□. ,								
Exhaust Fan Occ. Period		hrs./year								
	526	0 hrs./year								
Exhaust Fan Unocc. Period		8 kWh/m².yr								
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption	1.									
Exhaust Fan Unocc. Period	0.3	3 kWh/m².yr 4 kWh/m².yr								
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consum	1. 0. nption 0.	4 kWh/m².yr								
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consum Circulating Pump Yearly Operation	1. 0. nption 0.	4 kWh/m².yr hrs./year								
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consum	1. 0. nption 0.	4 kWh/m².yr								
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower / Condenser Fans Energy Consum Circulating Pump Yearly Operation Circulating Pump Energy Consumption	1. 0. 0. 5000	4 kWh/m².yr hrs./year kWh/m².yr								
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower / Condenser Fans Energy Consum Circulating Pump Yearly Operation Circulating Pump Energy Consumption	1. 0. nption 0.	4 kWh/m².yr hrs./year kWh/m².yr	Incidence Frequency							
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower / Condenser Fans Energy Consum Circulating Pump Yearly Operation Circulating Pump Energy Consumption	1. 0. 0. 5000 Annual Maintenance Tas	4 kWh/m².yr hrs./year kWh/m².yr	Incidence Frequency (%) (years)							
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower / Condenser Fans Energy Consum Circulating Pump Yearly Operation Circulating Pump Energy Consumption	Annual Maintenance Tas	4 kWh/m².yr hrs./year kWh/m².yr sks								
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consum Circulating Pump Yearly Operation	Annual Maintenance Tas	4 kWh/m².yr hrs./year kWh/m².yr sks								
Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower / Condenser Fans Energy Consum Circulating Pump Yearly Operation Circulating Pump Energy Consumption	1. 0. 0. 5000 Annual Maintenance Tas	4 kWh/m².yr hrs./year kWh/m².yr kwh/m².yr kks flotors on on Fan Belts						EUI	kWh/ft².yr	1.6

REGION:

Labrador Interconnected

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing EXISTING BUILDINGS: Restaurant Baseline SIZE:

EUI SUMMARY							
TOTAL ALL END-USES:	Electricity:		96.4 kWh/ft².yr 3,734.2 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	2.4	91.7		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
ARCHITECTURAL LIGHTING	6.8	262.4	SPACE HEATING	12.7	492.0		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	7.9		
OTHER PLUG LOADS	0.6	23.2	DOMESTIC HOT WATER	19.9	769.2	0.0	0.0
HVAC FANS & PUMPS	1.6	60.4	FOOD SERVICE EQUIPMENT	34.3	1,330.0		
REFRIGERATION	16.8	650.0					
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.1	5.0					
COMPUTER EQUIPMENT	0.4	16.0					
COMPUTER SERVERS	0.1	4.4					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

Terms Used in Building Profile Summaries

Profile Term	Explanation
Building envelope	Defines the thermal characteristics of a building's
	exterior components
U-value	The rate of heat loss, in Btu per hour per square foot per
	degree Fahrenheit (BTU/hr. f ² .ºF) through walls, roofs
	and windows. The U-value is the reciprocal of the R-
	value
Shading coefficient (SC)	Is a measure of the total amount of heat passing through
	the glazing compared with that through a single clear
	glass
Window-to-wall ratio	Defines the ratio of window to insulated exterior wall area
General lighting	Defines the lighting types that are used within the main
	areas of a building, e.g., for a School, the area is
	classrooms and the lighting type is fluorescent; for a
LDD	Food Retail store, the main area is the retail floor.
LPD	Lighting power density expressed in terms of W/ft ²
Lux	The amount of visible light per square meter incident on
	a surface (lumen/m²)
Inc	Incandescent lamps
CFL T12	Compact fluorescent lamps
T12	T12 fluorescent lamps with magnetic ballasts
T8	T8 fluorescent lamps with electronic ballasts
MH	Metal halide lamps
HPS	High-pressure sodium lamps
HID	High-intensity discharge lighting includes both MH and HPS
T5HO	T5 High Output fluorescent lamps
LED	Light Emitting Diode lamps
Secondary lighting	Defines the lighting types that are used within the
	secondary areas of a building, e.g., for a School, the
	secondary areas are corridors, lobbies, foyers, etc.
Outdoor lighting	Defines the outdoor lighting including parking lot and
	façade
Overall LPD	The total floor weighted LPD that includes general,
5	secondary, and outdoor
Fans	Defines the mix of air handling systems
CAV	Constant air volume
VAV	Variable air volume
Space heating	Defines the mix of heating equipment types found within
ASHP	the stock of buildings
WSHP	Air-source heat pump
	Water-source heat pump
Resistance	Electric resistance heating equipment including boilers
Fuel Oil / Propane	and baseboard heaters Fossil fuel fired equipment, including space heating,
ruei Oii / Propane	domestic hot water heating, and cooking equipment
Space cooling	Defines the mix of cooling equipment types found within
Space cooling	the stock of buildings
Centrifugal	Standard centrifugal chillers with a full load performance
	of 0.75 kW/ton
Centri HE	High-efficiency centrifugal chillers assumed to have a
	performance of <0.65 kW/ton
Recip open	Semi-hermetic reciprocating chillers
DX	Direct expansion cooling equipment that use small
	tonnage hermetic compressors

Appendix B Background-Section 4: Base Year Peak Load

Introduction

Appendix B provides additional detailed information related to each of the major steps employed in the generation of the Commercial sector Base Year peak loads. The discussion is organized as follows:

- Overview of peak load methodology
- Segmentation of commercial sub sectors
- Detailed results

B.1 Overview of Peak Load Profile Methodology

As noted in the main text, development of the electric peak load estimates employs four specific factors as outlined below:

- Monthly Usage Allocation Factor: This factor represents the percent of annual electric energy usage that is allocated to each month. This set of monthly fractions (percentages) reflects the seasonality of the load shape, whether a facility, process or end use, and is dictated by weather or other seasonal factors. This allocation factor can be obtained from either (in decreasing order of priority): (a) monthly consumption statistics from end-use load studies; (b) monthly seasonal sales (preferably weather normalized) obtained by subtracting a "base" month from winter and summer heating and cooling months; or (c) heating or cooling degree days on an appropriate base.
- Weekend to Weekday Factor: This factor is a ratio that describes the relationship between
 weekends and weekdays, reflecting the degree of weekend activity inherent in the facility or end
 use. This may vary by month or season. Based on this ratio, the average electric energy per
 day type can be computed from the corresponding monthly electric energy.
- Peak Day Factor: This factor reflects the degree of daily weather sensitivity associated with the load shape, particularly heating or cooling; it compares a peak (e.g., hottest or coldest) day to a typical weekday in that month.
- Per Unit Hourly Factor: The relationship of load among different hours of the day for each day type (weekday, weekend day, peak day) and for each month reflects the operating hours of the electric equipment or end use within facilities by sub sector. For example, for lighting, this would be affected by time of day, season (affected by daylight), and space type, where applicable. For the Base Year, lighting is treated on an aggregate basis by facility.

The four factors (sets of ratios) defined above provide the basis for converting annual energy to any hourly demand specified including the grouping of hours used in the four peak periods defined in this study. Exhibit 101, below, illustrates how each of the above four factors is applied sequentially to a known annual energy value to produce a peak load value, defined as a specific peak period. In the example, the 36-hour winter peak period is used. The winter peak is defined as follows:

The morning period from 7 am to noon and the evening period from 4 pm to 8 pm on the four coldest days in the December to March period; this is a total of 36 hours per year.³⁹

³⁹ Source: NL (Feb 2014) http://hydroblog.nalcorenergy.com/meeting-peak-demand/

Exhibit 101 Illustrative Application of Annual Energy to Peak Period Value Factors

The Winter Peak demand is computed based on the average demand for the 36-hour period. The NL peak is assumed to occur on the four coldest days in December and January.

The following steps are required:

- Step 1: The monthly usage allocation factor for December and January are applied to the annual energy use to calculate December and January energy use.
- Step 2: The average weekday in December and January is calculated based on the formula shown below, which adjusts the average day type use to reflect any difference in typical weekend use versus typical weekday use.

$$\frac{1}{(Days \ in \ Month) * \left(\frac{5}{7} + \left(\frac{2}{7} * Weekend \ Ratio\right)\right)}$$

- Step 3: The peak day factor is then applied to the average weekday electric energy use to determine the peak day use for the four peak days (as defined by the NL utilities).
- Step 4: The average peak over the 9 hours of peak period per day is then calculated based on allocating the peak day use according to the per unit hourly load factor for a peak winter day, using the percentage of use in those hours versus the daily usage for the peak day.

It should be noted that the methodology shown in Exhibit 101 produces aggregate diversified average loads for all customers or end uses in the defined sub sector.

Exhibit 102 provides a specific numeric example for the calculation of Winter Peak Period demand (kW). The example presented in Exhibit 102 is for secondary lighting use in large office buildings, prior to adjustment for fuel share. The example shows how the annual consumption of 10,000 kWh can be converted to a peak demand value for the Winter Peak Period by the calculation of a corresponding hours-use value.

Exhibit 102 Sample Hours-Use Calculation for Office Secondary Lighting

Winter Peak Period =

$$\frac{\textit{Annual kWh} \times \textit{Mo. Allocation (Dec)}}{\textit{Days in Month} \times \left[\frac{5}{7} + \left(\frac{2}{7} \times \textit{Weekend Ratio}\right)\right]} \times \textit{Peak Day Factor} \times \textit{Peak Hour \% Daily kWh}$$

Winter Peak Period =

$$\frac{10,000 \text{ [Ann. kWh]} \times 14.75\% \text{ [Mo. Alloc.]}}{62 \times \left[\frac{5}{7} + \left(\frac{2}{7} \times 1.0 \text{ [Dec. Wkend Ratio]}\right)\right]} \times 1.0 \text{ [Peak Day Fact.]} \times 0.06410 \text{ [Peak Hr \% Day kWh]}$$

= 1.525 kW

Hours-use Factor =

$$\frac{10,000 \text{ [annual kWh]}}{1.525 \text{ [Winter Peak Period]}} = 6,557 \text{ [Winter Peak Hours Use]}$$

This means that any applicable Office annual secondary lighting kWh can be converted to average demand in kW during the 36-hour winter peak period by dividing by 6,557 hours.

B2 Segmentation of Commercial Buildings

The Commercial sector segmentation used to generate the electric peak load profiles is the same as that used for electric energy use. That is, there is a load profile that corresponds to each combination of sub sector and end use. Exhibit 103 shows the Commercial sub sectors and end uses that were addressed.

Exhibit 103 Commercial Segmentation Used for Electric Peak Load Calculations

Sub sectors (Large Office, Small Office, Large Non-Food Retail, Small Non-Food Retail, Food Retail, Large Accommodation, Small Accommodation, Healthcare, School, Universities and College, Warehouse/Wholesale, Restaurant)

End uses (general lighting, secondary lighting, outdoor lighting, computer equipment, computer servers, other plug load, food service equipment, refrigeration, elevator, miscellaneous equipment, space heating space cooling, HVAC fans & pumps, domestic hot water, block heaters, street lighting)

Exhibit 104 describes the assumptions and data sources for the load profile factors that were used to develop the corresponding hours-use factors. To produce a demand for a combination of sub sector and end use, the corresponding annual energy is divided by the hours-use factor for the peak period for the applicable load shape. For certain end uses that are assumed to have no usage during the winter months (e.g., cooling) the hours-use values are considered infinite (noted by 1E+15), resulting in virtually zero demand when divided into annual energy.

Most of the studies referenced in the exhibit are the same as those used to develop hours-use factors for the CDM Potential Study completed for NL in 2008 and are also the same as those used for studies in other provinces. For most end uses, hours-use factors remain very stable from year to year and across jurisdictions, as long as the peak period of interest is the same. The amount of energy consumed varies from year to year and from place to place, but the shape of the load – when the energy is used – remains very similar.

In this analysis, therefore, the initial estimate of peak demand used the hours-use factors from the 2008 CDM Potential Study. The results were within a few percent of utility measured values. The team then calibrated the model by adjusting the hours-use factors for the weather-sensitive end uses (such as space heating) for all three sectors simultaneously, until the model peak demand output agreed closely with the Utilities' measured peak demand.

Exhibit 104 Commercial End Use Load Shape Parameters

Load Shape #	End Use	Monthly Breakdown	Wkend / Wkday Ratio	Peak Day Factor	Hourly Profile
2001	General lighting – Office	RG&E Office lighting	App. 0.50 RG&E Office lighting	1.00 assumed	Office lighting - RG&E 1991 Study ⁴⁰
2002	General lighting – Non-food Retail	RG&E Retail lighting	RG&E Retail lighting	1.00 assumed	RG&E Retail lighting
2003	General lighting – Food Retail	RG&E Grocery lighting	RG&E Grocery lighting	1.00 assumed	RG&E Grocery lighting
2004	General lighting – Accommodation	RG&E Hotel/Motel lighting	RG&E Hotel/Motel lighting	1.00 assumed	RG&E Hotel/Motel lighting
2005	General lighting – Healthcare	RG&E Hospital/Long- term Care lighting	RG&E Hospital/Long- term Care lighting	1.00 assumed	RG&E Hospital/Long-term Care lighting
2006	General lighting – Schools, Universities and Colleges	RG&E College lighting	RG&E College lighting	1.00 assumed	RG&E College lighting
2007	General lighting – Restaurant	RG&E Full- serve Restaurant lighting	RG&E Full-serve Restaurant lighting	1.00 assumed	RG&E Full-serve Restaurant lighting
2008	General lighting – Warehouse	RG&E Warehouse lighting	RG&E Warehouse lighting	1.00 assumed	RG&E Warehouse lighting
2009	General lighting – Small Office and Other Commercial	RG&E Office lighting	RG&E Office lighting (modified) ⁴¹	1.00 assumed	RG&E Office lighting (modified)
2010	General lighting – Small Non-food Retail	RG&E Small Non-food Retail lighting	RG&E Non-food Retail lighting (modified)	1.00 assumed	RG&E Non-food Retail lighting (modified)
2011	Secondary lighting – Office & Education	Architectural lighting model	1.00 assumed	1.00 assumed	Architectural lighting model 6 am-6 pm 100%, 50% evening, 10% overnight
2012	Secondary lighting – Retail & Restaurant	Architectural lighting model	1.00 assumed	1.00 assumed	Architectural lighting model 6 am-10 pm 100%, 50% evening, 10% overnight
2013	Secondary lighting – Health & Warehouse	Architectural lighting model	1.00 assumed	1.00 assumed	Architectural lighting model 6 am-10 pm 100%, 80% evening, 50% overnight
2014	Secondary lighting – all other	Architectural lighting model	1.00 assumed	1.00 assumed	Architectural lighting model 6 am-6 pm 100%, 50% evening, 10% overnight
2015	Refrigeration – Restaurant, Accommodation, Health	RG&E Restaurant refrigeration	RG&E total Restaurant refrigeration	RG&E total Restaurant refrigeration	RG&E total Restaurant refrigeration
2016	Refrigeration – Food Retail	RG&E Grocery refrigeration	RG&E Grocery refrigeration	RG&E Grocery refrigeration	RG&E Grocery refrigeration
2017	Refrigeration – Warehouse / Wholesale	RG&E Warehouse refrigeration	RG&E Warehouse refrigeration	RG&E Warehouse refrigeration	RG&E Warehouse refrigeration
2018	Refrigeration – Schools, Universities and Colleges	RG&E School refrigeration	RG&E School refrigeration	RG&E School refrigeration	RG&E School refrigeration
2019	Refrigeration – all Other Commercial	RG&E total Commercial refrigeration	RG&E total Commercial refrigeration	RG&E total Commercial refrigeration	RG&E total Commercial refrigeration
2020	Streetlighting	Based on dusk- to-dawn lighting model	1.00 assumed	1.00 assumed	Dusk-to-dawn model, average St. John's sunrise/ sunset

Rochester Gas & Electric Company; 1991 DSM Evaluation Report Load Shape working papers.
 Modifications for per-unit load shapes for Small Office and Small Non-food Retail reduced overnight loads by 50% after 6 pm (Office) and after 9 pm (Non-food Retail).

Exhibit 104 Commercial End Use Load Shape Parameters (cont'd...)

Load Shape #	End Use	Monthly Breakdown	Wkend / Wkday Ratio	Peak Day Factor	Hourly Profile
2021	Outdoor lighting	Based on outdoor lighting model	1.00 assumed	1.00 assumed	Outdoor lighting model, with RG&E 1991 study factors (0.55 overnight, 0.1 day, 1.0 eve.)
2022	Space heating – Office	St. John's Newfoundland 1971-2000 (30- year) Normal HDD; then calibrated to actual utility demand ⁴²	1.00 assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 Study for Office Space Heating
2023	Space heating – Retail Food/Non-Food	10-year average St. John's HDD	1.00 assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for Retail Space heating
2024	Space heating – Accommodation/ Healthcare	St. John's Newfoundland 1971-2000 (30- year) Normal HDD; then calibrated to actual utility demand	1.00 assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for Hospital/Long-term care space heating
2025	Space heating – School / University and College	St. John's Newfoundland 1971-2000 (30- year) Normal HDD; then calibrated to actual utility demand	1.00 assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for School space heating
2026	Space heating – Restaurant	St. John's Newfoundland 1971-2000 (30- year) Normal HDD; then calibrated to actual utility demand	1.00 assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for total Restaurant space heating
2027	Space heating – all Other Commercial	St. John's Newfoundland 1971-2000 (30- year) Normal HDD; then calibrated to actual utility demand	1.00 assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for Commercial space heating
2028	Food service equipment – Restaurant	RG&E total Restaurant cooking	RG&E total Restaurant cooking	RG&E total Restaurant cooking	RG&E total Restaurant cooking
2029	Food service equipment – Accommodation / Healthcare	RG&E total Hospital/Long- term Care cooking	RG&E total Hospital/Long- term Care Cooking	RG&E total Hospital/Long- term Care Cooking	RG&E total Hospital/Long- term Care cooking
2030	Food service equipment – Food Retail	RG&E Grocery cooking	RG&E Grocery cooking	RG&E Grocery cooking	RG&E Grocery cooking
2031	Food service equipment – School/University	RG&E School cooking	RG&E School cooking	RG&E School cooking	RG&E School cooking
2032	Food service equipment – all Other Commercial	RG&E School cooking	RG&E School cooking	RG&E School cooking	RG&E School cooking
2033	Domestic hot water (DHW) – Restaurant	RG&E Restaurant water heat	RG&E Restaurant water heat	RG&E Restaurant water heat	RG&E Restaurant water heat
2034	Domestic hot water (DHW) – Accommodation / Health	RG&E total Commercial water heat	RG&E total Commercial water heat	RG&E total Commercial water heat	RG&E total Commercial water heat

 $^{\rm 42}$ Heating degree days on an 18°C base for period 2001 - 2010 for the St. John's weather station.

Exhibit 104 Commercial End Use Load Shape Parameters (cont'd...)

Load Shape #	End Use	Monthly Breakdown	Wkend / Wkday Ratio	Peak Day Factor	Hourly Profile
2035	DHW – Food Retail and Non-Food Retail	RG&E Retail water heat	RG&E Retail water heat	RG&E Retail water heat	RG&E Retail water heat
2036	DHW - School / University	RG&E School water heat	RG&E School water heat	RG&E School water heat	RG&E School water heat
2037	DHW – all Other Commercial	RG&E water heat Commercial	RG&E water heat Commercial	RG&E water heat Commercial	RG&E water heat Commercial
2038	Space cooling – All Commercial	Assumed 100% off winter peak	1.00 various studies	Assumed 100% off winter peak	RG&E 1991 study for Commercial space cooling
2039	Computer, plug load	RG&E Office lighting	RG&E Office lighting	1.00 assumed	RG&E Office lighting
2040	Elevators	NYC subways	NYC subways (0.7881)	1.0 Assumed	NYC subways (6 am-6 pm), arch Office lighting (6 pm –6 am)
2041	Engine Block Heaters	Monthly shape for Labrador assumed similar to SK; then calibrated to actual utility demand	1.00 assumed	Peak Day factor assumed similar to SK	Flat, average 7.9 hrs/day for 90 days ⁴³

Exhibit 105 shows the distinct hour-use values developed for each combination of peak period, sector, sub sector and end use employed in this study, as generated from the applicable load shape.

The hours-use value represents the divisor to convert annual energy (e.g., MWh) to that peak period demand. For example, dividing the annual electricity consumed for general lighting in offices by the hours-use value for the Annual Peak Hour (i.e. 5,771) will convert annual MWh to demand at the annual system peak hour (6 pm).

1′

⁴³ Ontario Power Authority – OPA Measures and Assumptions List (prescriptive) as of January 31, 2010; 1,450 watts at 7.9 hours/day x 90 days.

Exhibit 105 Commercial Sector Load Shape Hours-Use Values

Region	Sub-sector	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting
	Large Office	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Small Office	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Large Non-food Retail	964	6,393	6,393	7,130	6,393	2,657	5,790	6,393	6,393	6,393	7,139	8,453	6,393	1.E+15	2,520	7,139
	Small Non-food Retail	964	6,393	6,393	7,130	6,393	2,657	5,790	6,393	6,393	6,393	7,139	8,453	6,393	1.E+15	2,520	7,139
	Food Retail	964	6,393	6,393	7,130	6,393	7,307	6,778	6,393	6,393	6,393	7,139	8,772	6,393	1.E+15	2,520	7,139
	Large Accomodation	964	6,393	6,393	6,207	6,393	6,152	6,535	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	3,386	7,139
	Small Accomodation	964	6,393	6,393	6,207	6,393	6,152	6,535	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	3,386	7,139
	Healthcare	964	7,488	7,488	6,207	7,488	6,152	6,800	7,488	7,488	7,488	7,139	8,490	7,488	1.E+15	3,386	7,139
	Schools	964	6,557	6,557	4,128	6,557	2,657	4,578	6,557	6,557	6,557	7,139	9,841	6,557	1.E+15	2,989	7,139
Island	Universities and Colleges	964	6,557	6,557	4,128	6,557	2,657	6,156	6,557	6,557	6,557	7,139	9,841	6,557	1.E+15	2,989	7,139
	Warehouse/Wholesale	964	7,488	7,488	6,207	7,488	2,657	5,387	7,488	7,488	7,488	7,139	7,801	7,488	1.E+15	3,116	7,139
	Restaurants	964	6,393	6,393	6,141	6,393	5,190	7,841	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	3,294	7,139
	Labrador Isolated C/I Buildings	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Island Isolated C/I Buildings	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Large Other Buildings	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Small Other Buildings	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Other Institutional	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Non-Buildings	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Street Lighting	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139
	Large Office	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Small Office	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Large Non-food Retail	1,148	6,393	6,393	7,130	6,393	2,657	5,790	6,393	6,393	6,393	7,139	8,453	6,393	1.E+15	3,002	7,139
	Small Non-food Retail	1,148	6,393	6,393	7,130	6,393	2,657	5,790	6,393	6,393	6,393	7,139	8,453	6,393	1.E+15	3,002	7,139
	Food Retail Large Accomodation	1,148 1,148	6,393 6,393	6,393 6,393	7,130 6,207	6,393 6,393	7,307 6,152	6,778 6,535	6,393 6,393	6,393 6,393	6,393 6,393	7,139 7,139	8,772 8,490	6,393 6,393	1.E+15 1.E+15	3,002 4,033	7,139
	Small Accomodation	1,148	6,393	6,393	6,207	6,393	6,152	6,535	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	4,033	7,139 7,139
	Healthcare	1,148	7,488	7,488	6,207	7,488	6,152	6,800	7,488	7,488	7,488	7,139	8,490	7,488	1.E+15	4,033	7,139
	Schools	1,148	6,557	6.557	4,128	6.557	2.657	4,578	6,557	6,557	6.557	7,139	9,841	6,557	1.E+15	3,561	7,139
Labrador	Universities and Colleges	1,148	6,557	6.557	4,128	6.557	2.657	6,156	6.557	6,557	6.557	7,139	9.841	6.557	1.E+15	3,561	7,139
	Warehouse/Wholesale	1,148	7,488	7,488	6,207	7,488	2.657	5,387	7,488	7,488	7,488	7,139	7,801	7,488	1.E+15	3,712	7,139
	Restaurants	1,148	6,393	6,393	6,141	6,393	5,190	7,841	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	3,924	7,139
	Labrador Isolated C/I Buildings	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Island Isolated C/I Buildings	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Large Other Buildings	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Small Other Buildings	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Other Institutional	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Non-Buildings	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Street Lighting	6,882	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	6,882	7,139

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Exhibit 106 Commercial Sector Load Shape Hours-Use Values (cont'd...)

Region	Sub-sector	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting
	Large Office	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Small Office	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Large Non-food Retail	821	6,393	6,393	7,130	6,393	2,657	5,790	6,393	6,393	6,393	7,139	8,453	6,393	1.E+15	2,146	7,139
	Small Non-food Retail	821	6,393	6,393	7,130	6,393	2,657	5,790	6,393	6,393	6,393	7,139	8,453	6,393	1.E+15	2,146	7,139
	Food Retail	821	6,393	6,393	7,130	6,393	7,307	6,778	6,393	6,393	6,393	7,139	8,772	6,393	1.E+15	2,146	7,139
	Large Accomodation	821	6,393	6,393	6,207	6,393	6,152	6,535	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	2,883	7,139
	Small Accomodation	821	6,393	6,393	6,207	6,393	6,152	6,535	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	2,883	7,139
	Healthcare	821	7,488	7,488	6,207	7,488	6,152	6,800	7,488	7,488	7,488	7,139	8,490	7,488	1.E+15	2,883	7,139
	Schools	821	6,557	6,557	4,128	6,557	2,657	4,578	6,557	6,557	6,557	7,139	9,841	6,557	1.E+15	2,545	7,139
Isolated	Universities and Colleges	821	6,557	6,557	4,128	6,557	2,657	6,156	6,557	6,557	6,557	7,139	9,841	6,557	1.E+15	2,545	7,139
	Warehouse/Wholesale	821	7,488	7,488	6,207	7,488	2,657	5,387	7,488	7,488	7,488	7,139	7,801	7,488	1.E+15	2,653	7,139
	Restaurants	821	6,393	6,393	6,141	6,393	5,190	7,841	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	2,805	7,139
	Labrador Isolated C/I Buildings	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Island Isolated C/I Buildings	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Large Other Buildings	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Small Other Buildings	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Other Institutional	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Non-Buildings	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Street Lighting	3,137	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	3,137	7,139

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Since the Utilities do not conduct regular class or end-use load analysis studies, there is no actual total (or sub sector) end-use load profile upon which to calibrate the load profile models developed for this study. The best option for calibrating NL-specific load profile parameters is the weather-sensitive loads, since that is the most area specific.

Since separately metered space heating end-use load data was not available from the Utilities, normal weather for the past 10 years was used to determine monthly allocations, and weekend/weekday ratios were developed from similar studies for another Canadian utility.

For peak day factors, analysis of the past 30 years' average vs. peak weather conditions (in heating degree days) for St. John's was analyzed to determine typical peak day factors for normal weather, which ranged from about 1.4 to 1.5 for winter months. For non weather-sensitive end uses, a factor of 1.0 was assumed, absent specific load study data.

B.3 Detailed Results

The following exhibits shows peak demand by region, sub sector and end use for the peak period identified for this study.

Exhibit 107 Commercial Sector Base Year (2014) Peak Hour Demand, Island Interconnected, by Sub Sector and End Use (MW)*

Sub Sector	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
Large Office	-	4	1	2	0	0	9	7	0	1	1	0	2	4	30	-	62
Small Office	-	3	1	2	-	-	7	3	0	1	1	0	1	3	24	-	45
Large Non-food Retail	-	0	0	1	-	1	6	4	0	0	0	1	1	1	11	-	27
Small Non-food Retail	-	0	0	1	-	-	7	4	0	1	1	-	1	2	16	-	33
Food Retail	-	0	0	1	-	3	3	2	0	0	0	10	0	1	7	-	29
Large Accomodation	-	0	0	6	0	1	1	1	0	0	0	0	1	0	5	-	16
Small Accomodation	-	0	0	3	-	0	1	0	0	0	0	0	0	0	3	-	7
Healthcare	-	0	0	3	0	3	1	4	0	1	0	0	3	1	16	-	33
Schools	-	1	0	2	-	1	9	1	0	0	1	0	1	0	26	-	43
Universities and Colleges	-	2	0	0	0	1	6	5	0	1	0	0	1	0	4	-	22
Warehouse/Wholesale	-	0	0	1	-	-	4	1	0	1	0	1	1	0	8	-	16
Restaurants	-	0	0	7	-	13	0	1	0	0	0	2	1	0	4	-	28
Large Other Buildings	-	1	0	3	0	3	5	3	0	1	0	2	1	1	14	-	35
Small Other Buildings	-	1	0	3	0	3	5	3	0	1	0	2	1	1	13	-	32
Other Institutional	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Buildings	-	-	-	-	-	-	-	-	30	-	-	-	-	-	-	-	30
Street Lighting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5
Grand Total	-	13	2	34	1	30	64	39	33	7	6	18	16	15	180	5	463

^{*}Results are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.

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Exhibit 108 Commercial Sector Base Year (2014) Peak Hour Demand, Labrador Interconnected, by Sub Sector and End Use (MW)*

Sub Sector	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
Small Office	0.0	0.1	0.0	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.5	-	1
Large Non-food Retail	0.0	0.0	0.0	0.1	-	0.1	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.9	-	2
Small Non-food Retail	0.0	0.0	0.0	0.1	-	-	0.7	0.2	0.0	0.1	0.1	-	0.1	0.0	2.2	-	4
Food Retail	0.0	0.0	0.0	0.1	-	0.2	0.2	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.6	-	3
Large Accomodation	0.0	0.0	0.0	0.6	-	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.7	-	2
Small Accomodation	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0
Healthcare	0.1	0.1	0.0	0.7	0.0	0.4	0.1	0.5	0.0	0.1	0.1	0.0	0.4	0.0	0.8	-	3
Schools	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	-	3
Universities and Colleges	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	1
Warehouse/Wholesale	0.0	0.0	0.0	0.1	-	-	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	2
Restaurants	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2
Large Other Buildings	0.1	0.2	0.0	2.0	0.0	1.8	1.4	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.1	-	15
Small Other Buildings	0.1	0.2	0.0	1.0	0.0	1.0	1.1	0.6	0.0	0.2	0.1	0.4	0.4	0.1	4.3	-	10
Other Institutional	0.2	0.2	-	0.9	-	0.2	2.2	1.3	0.1	0.3	0.2	0.2	0.7	0.1	2.7	-	9
Non-Buildings	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	1
Street Lighting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0
Grand Total	1	1	0	7	0	5	7	4	1	1	1	2	3	0	23	0	56

^{*}Results are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.

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Exhibit 109 Commercial Sector Base Year (2014) Peak Hour Demand, Isolated, by Sub Sector and End Use (MW)*

Sub Sector	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
Labrador Isolated C/I																	
Buildings	0.1	0.2	-	0.1	-	0.2	1.2	0.2	-	0.1	0.1	0.4	0.2	-	0.2	-	3.0
Island Isolated C/I																	
Buildings	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.2
Street Lighting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
Grand Total	0.1	0.2	-	0.1	-	0.2	1.3	0.2	-	0.1	0.1	0.4	0.3	-	0.2	0.1	3.3

^{*}Results are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.

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Appendix C Background-Section 5: Reference Case Electricity Use

Introduction

Appendix C provides additional detailed information related to the construction of the Commercial sector Reference Case. The appendix discusses the following:

- Natural change assumptions
- Expected growth in building stock
- CEEAM archetype summaries new buildings

C.1 Natural Change Assumptions

For the purposes of this study, "natural" changes to electricity consumption are defined as those changes to electricity usage patterns that occur without incentive or other intervention. Expected natural changes in electricity consumption patterns over the study period take into account four major factors:

- Naturally-occurring improvements in equipment efficiency
- Expected stock penetration by more efficient equipment
- Changes in equipment density, e.g., computers and plug loads, etc.
- Changes in electric share in end uses for which fuel may vary, such as space heating and water heating.

Note that the first two factors will have the effect of reducing electricity consumption, while the third and fourth factor may result in either increased or decreased electricity demand.

Based on the assessment of current trends, the most significant natural changes are expected to involve the following end uses:

- Space cooling
- Lighting
- Computer equipment and other plug loads
- Water heating
- Space heating

Further discussion of these changes follows and, in each case, the discussion identifies the technical change, the major driver(s) and the assumed electricity impact.

Space Cooling

As a result of natural conservation and efficiency gains, it is assumed that new space cooling equipment will provide improved electricity performance compared to existing equipment. Packaged rooftop units are available on the market with energy-efficiency ratios (EER) exceeding 12.0.⁴⁴ Similarly, new VFD centrifugal chillers achieve performance efficiencies in the region of 0.35 kW/ton. The combined effects of natural conservation and efficiency gains are estimated to result in a decrease of 5% in space cooling EUI over the length of the study. At the same time, the saturation of cooling equipment in new buildings will increase.

⁴⁴ See http://www.energence.com/res/pdf/52W81_energence_58937_0709.pdf for example. Current federal energy-efficiency regulations require a minimum EER of 10.3 for rooftop air conditioning units with a capacity of 5.5 - 11 tons.

As illustrated in Exhibit 110, the net effect of efficiency gains and increased space cooling saturation is expected to reduce energy consumption for space cooling in existing commercial buildings. Increases in overall space cooling energy use through time are expected to be due entirely to the construction of new building stock (Exhibit 111).

Exhibit 110 Reference Case Space Cooling Electricity Use in Existing Buildings by Sub Sector and Milestone Year – Existing Buildings (MWh/yr.)

Sub-Sector	2014	2017	2020	2023	2026	2029
Large Office	10,209	10,107	10,005	9,903	9,801	9,699
Small Office	7,928	7,849	7,769	7,690	7,611	7,532
Large Non-food Retail	3,224	3,192	3,160	3,128	3,095	3,063
Small Non-food Retail	4,984	4,935	4,885	4,835	4,785	4,735
Food Retail	1,610	1,594	1,577	1,561	1,545	1,529
Large Accomodation	1,210	1,198	1,186	1,174	1,162	1,150
Small Accomodation	411	407	403	399	394	390
Healthcare	2,446	2,397	2,373	2,349	2,325	2,300
Schools	279	277	274	271	268	265
Universities and Colleges	1,341	1,328	1,315	1,301	1,288	1,274
Warehouse/Wholesale	114	113	112	110	109	108
Restaurants	1,007	997	987	977	967	957
Labrador Isolated C/I Buildings	0	0	0	0	0	0
Island Isolated C/I Buildings	0	0	0	0	0	0
Large Other Buildings	2,936	2,906	2,877	2,848	2,818	2,789
Small Other Buildings	2,711	2,672	2,645	2,618	2,591	2,564
Other Institutional	219	217	214	212	210	208
Non-Buildings	0	0	0	0	0	0
Street Lighting	0	0	0	0	0	0
Grand Total	40,630	40,187	39,781	39,375	38,969	38,564

Exhibit 111 Reference Case Space Cooling Electricity Use in New Buildings by Sub Sector and Milestone Year – New Buildings (MWh/yr.)

Sub-Sector	2014	2017	2020	2023	2026	2029
Large Office	0	356	850	1,527	2,012	2,569
Small Office	0	213	751	1,220	1,555	1,940
Large Non-food Retail	0	101	312	497	635	791
Small Non-food Retail	0	77	323	574	768	985
Food Retail	0	26	105	181	236	299
Large Accomodation	0	28	105	177	229	289
Small Accomodation	0	6	34	64	85	110
Healthcare	0	17	99	188	254	329
Schools	0	23	91	159	211	269
Universities and Colleges	0	91	243	380	491	613
Warehouse/Wholesale	0	5	17	27	35	43
Restaurants	0	19	74	124	159	200
Labrador Isolated C/I Buildings	0	0	0	0	0	0
Island Isolated C/I Buildings	0	0	0	0	0	0
Large Other Buildings	0	80	269	442	570	716
Small Other Buildings	0	1	109	260	378	507
Other Institutional	0	2	4	6	7	9
Non-Buildings	0	0	0	0	0	0
Street Lighting	0	0	0	0	0	0
Grand Total	0	1,046	3,387	5,826	7,626	9,669

Lighting

As a result of natural conservation, it is assumed that the replacement of existing T12 fluorescent lighting and electromagnetic ballasts with new T8 fluorescent lamps and electronic ballasts and even some LED lamps and fixtures will continue. Similarly, CFLs and LED lamps will continue to increase their market share over incandescent lamps, particularly in sub sectors such as Hotel/Motel and Non-food Retail. In addition, LED fixtures designed for outdoor applications will gain market share from MH and HPS fixtures.

The continued growth of CFLs, T8 lighting/electronic ballasts, and LED lamps and fixtures is being driven by:

- Recent improvements in LED lighting efficacy combined with rapidly declining costs
- Increased consumer recognition of the operating cost savings
- Energy regulations that are gradually removing electromagnetic fluorescent ballasts and incandescent lighting products from the marketplace

Overall, the Reference Case assumes that by 2030 the energy intensity of general and secondary lighting in the existing building stock will decrease by 10%, while the energy intensity of outdoor lighting will decrease by 20%.

Exhibit 112 shows the impact of these EUI improvements on indoor lighting ⁴⁵ energy consumption, while Exhibit 113 shows indoor lighting energy use by sub sector and milestone year in new construction. Exhibit 114 and Exhibit 115 show the energy consumption in existing and new construction for outdoor lighting. Again, all increases in overall lighting energy use through time are expected to be due entirely to the construction of new building stock.

Exhibit 112 Reference Case Indoor Lighting Electricity Use by Sub Sector and Milestone Year – Existing Buildings (MWh/yr.)

Sub-Sector	2014	2017	2020	2023	2026	2029
Large Office	69,866	68,469	67,072	65,674	64,277	62,880
Small Office	46,547	45,616	44,685	43,754	42,824	41,893
Large Non-food Retail	40,054	39,252	38,451	37,650	36,849	36,048
Small Non-food Retail	50,833	49,816	48,799	47,783	46,766	45,749
Food Retail	23,933	23,454	22,976	22,497	22,018	21,540
Large Accomodation	15,282	14,977	14,671	14,365	14,060	13,754
Small Accomodation	5,890	5,772	5,654	5,536	5,418	5,301
Healthcare	30,169	28,722	28,136	27,550	26,964	26,377
Schools	55,194	54,090	52,987	51,883	50,779	49,675
Universities and Colleges	45,256	44,351	43,446	42,541	41,636	40,731
Warehouse/Wholesale	24,656	24,163	23,670	23,177	22,684	22,191
Restaurants	10,710	10,496	10,281	10,067	9,853	9,639
Labrador Isolated C/I Buildings	8,517	8,246	8,078	7,910	7,741	7,573
Island Isolated C/I Buildings	800	771	756	740	724	708
Large Other Buildings	50,707	49,693	48,679	47,665	46,651	45,636
Small Other Buildings	44,114	43,065	42,186	41,307	40,429	39,550
Other Institutional	17,273	16,927	16,582	16,236	15,891	15,545
Grand Total	539,801	527,882	517,109	506,336	495,563	484,790

⁴⁵ Including general and secondary lighting

Exhibit 113 Reference Case Indoor Lighting Electricity Use by Sub Sector and Milestone Year – New Buildings (MWh/yr.)

Sub-Sector	2017	2020	2023	2026	2029
Large Office	1,527	3,646	6,549	8,628	11,017
Small Office	801	2,836	4,608	5,879	7,336
Large Non-food Retail	849	2,623	4,170	5,328	6,645
Small Non-food Retail	570	2,412	4,284	5,743	7,368
Food Retail	296	1,211	2,084	2,715	3,435
Large Accomodation	192	707	1,192	1,548	1,952
Small Accomodation	34	182	336	450	579
Healthcare	137	797	1,516	2,048	2,647
Schools	730	2,857	4,993	6,608	8,429
Universities and Colleges	426	1,140	1,784	2,307	2,880
Warehouse/Wholesale	436	1,414	2,274	2,919	3,649
Restaurants	122	475	795	1,024	1,286
Labrador Isolated C/I Buildings	0	1,144	1,510	1,859	2,209
Island Isolated C/I Buildings	0	125	160	195	230
Large Other Buildings	615	2,044	3,351	4,324	5,424
Small Other Buildings	13	922	2,135	3,095	4,140
Other Institutional	116	233	351	469	589
Grand Total	6,863	24,767	42,091	55,138	69,816

Exhibit 114 Reference Case Outdoor Lighting Electricity Use by Sub Sector and Milestone Year – Existing Buildings (MWh/yr.)

Sub-Sector	2014	2017	2020	2023	2026	2029
Large Office	4,524	4,343	4,162	3,981	3,800	3,619
Small Office	3,756	3,606	3,455	3,305	3,155	3,005
Large Non-food Retail	3,583	3,440	3,296	3,153	3,010	2,866
Small Non-food Retail	5,305	5,093	4,881	4,669	4,456	4,244
Food Retail	2,612	2,507	2,403	2,298	2,194	2,089
Large Accomodation	1,172	1,125	1,079	1,032	985	938
Small Accomodation	523	502	481	460	439	418
Healthcare	4,036	3,764	3,608	3,451	3,294	3,137
Schools	6,281	6,030	5,779	5,528	5,276	5,025
Universities and Colleges	3,289	3,157	3,026	2,894	2,763	2,631
Warehouse/Wholesale	2,385	2,289	2,194	2,098	2,003	1,908
Restaurants	474	455	436	417	398	379
Labrador Isolated C/I Buildings	739	701	671	642	613	584
Island Isolated C/I Buildings	69	66	63	60	57	55
Large Other Buildings	4,741	4,551	4,362	4,172	3,982	3,793
Small Other Buildings	4,365	4,174	4,000	3,827	3,653	3,479
Other Institutional	1,406	1,350	1,294	1,237	1,181	1,125
Grand Total	49,260	47,154	45,189	43,224	41,260	39,295

Exhibit 115 Reference Case Outdoor Lighting Electricity Use by Sub Sector and Milestone Year – New Buildings (MWh/yr.)

Sub-Sector	2017	2020	2023	2026	2029
Large Office	126	300	539	710	907
Small Office	79	280	456	581	725
Large Non-food Retail	101	311	495	633	789
Small Non-food Retail	68	289	513	688	882
Food Retail	54	219	378	492	623
Large Accomodation	21	78	132	172	217
Small Accomodation	5	26	48	65	83
Healthcare	22	129	246	332	429
Schools	96	377	658	871	1,111
Universities and Colleges	37	99	155	201	251
Warehouse/Wholesale	50	161	259	333	416
Restaurants	8	30	50	65	81
Labrador Isolated C/I Buildings	0	142	188	231	274
Island Isolated C/I Buildings	0	16	20	24	29
Large Other Buildings	71	236	388	500	627
Small Other Buildings	2	114	262	380	508
Other Institutional	12	25	37	50	62
Grand Total	752	2,834	4,825	6,327	8,016

Computer Equipment, Computer Servers and Other Plug Loads

Computer equipment and other plug loads will continue to grow as a result of increased density of computers and peripherals per occupant, increased use of server load, and growth in other peripherals, such as telephone network equipment. Increased penetration of laptops, more efficient server hardware and higher penetration of ENERGY STAR® rated computer equipment and other plug loads is expected to counterbalance the effect of increasing hardware density to some degree.

Overall, the Reference Case assumes that by 2030 the energy intensity of computer equipment and plug loads in the existing building stock will increase by 10%. The impact on electricity use in existing buildings and new buildings is shown in Exhibit 116 and Exhibit 117, below.

Exhibit 116 Computer and Plug Load Energy Use in by Sub Sector and Milestone Year –Existing Buildings (MWh/yr.)

Sub-Sector	2014	2017	2020	2023	2026	2029
Large Office	36,032	36,752	37,473	38,194	38,914	39,635
Small Office	29,916	30,514	31,112	31,711	32,309	32,907
Large Non-food Retail	5,119	5,222	5,324	5,426	5,529	5,631
Small Non-food Retail	7,580	7,731	7,883	8,035	8,186	8,338
Food Retail	5,152	5,255	5,358	5,461	5,564	5,667
Large Accomodation	2,769	2,824	2,880	2,935	2,990	3,046
Small Accomodation	1,240	1,264	1,289	1,314	1,339	1,364
Healthcare	13,131	13,012	13,267	13,522	13,777	14,032
Schools	10,708	10,922	11,136	11,350	11,564	11,778
Universities and Colleges	15,622	15,935	16,247	16,559	16,872	17,184
Warehouse/Wholesale	7,009	7,149	7,289	7,429	7,569	7,709
Restaurants	1,169	1,193	1,216	1,239	1,263	1,286
Labrador Isolated C/I Buildings	1,728	1,741	1,775	1,809	1,843	1,878
Island Isolated C/I Buildings	162	163	166	169	172	176
Large Other Buildings	15,065	15,366	15,668	15,969	16,270	16,572
Small Other Buildings	13,485	13,700	13,969	14,238	14,506	14,775
Other Institutional	3,287	3,353	3,418	3,484	3,550	3,616
Grand Total	169,173	172,096	175,470	178,845	182,219	185,593

Exhibit 117 Computer and Plug Load Energy Use in by Sub Sector and Milestone Year – New Buildings (MWh/yr.)

Sub-Sector	2017	2020	2023	2026	2029
Large Office	1,002	2,392	4,295	5,659	7,226
Small Office	631	2,234	3,630	4,631	5,779
Large Non-food Retail	144	445	708	904	1,128
Small Non-food Retail	98	413	733	983	1,261
Food Retail	71	290	499	650	822
Large Accomodation	49	180	304	394	497
Small Accomodation	11	60	111	149	191
Healthcare	71	410	779	1,052	1,360
Schools	164	642	1,122	1,485	1,894
Universities and Colleges	176	471	737	953	1,190
Warehouse/Wholesale	146	473	761	977	1,222
Restaurants	19	74	123	159	199
Labrador Isolated C/I Buildings	0	292	386	475	564
Island Isolated C/I Buildings	0	32	41	50	59
Large Other Buildings	230	770	1,263	1,629	2,044
Small Other Buildings	4	331	774	1,122	1,502
Other Institutional	26	53	79	106	133
Grand Total	2,841	9,561	16,344	21,378	27,070

Water Heating

Electricity consumption for water heating is expected to stay constant within the existing building stock. However, it will grow within the new building stock, as electric water heating fuel shares are expected to be higher in new buildings than in existing ones. This is largely driven by an expected increase in electric space heating in the new building stock (see below), and the fact that buildings rarely maintain oil or propane service for water heating alone.

Exhibit 118 illustrates the increased difference in electric water heating penetration between existing and new buildings. This leads to a growth in electricity use for water heating, which will outpace growth in floor area.

Exhibit 118 Electric DHW Share by Sub Sector - Existing and New Buildings (%)

Sub Sector	Island - Existing Buildings	Island - New Buildings	- Existing	Labrador - New Buildings
Large Office	90%	100%	100%	100%
Small Office	95%	100%	100%	100%
Large Non-Food Retail	90%	100%	100%	100%
Small Non-Food Retail	95%	100%	100%	100%
Food Retail	90%	100%	100%	100%
Large Accomodation	90%	100%	100%	100%
Small Accomodation	90%	100%	100%	100%
Healthcare	60%	100%	100%	100%
Schools	80%	100%	100%	100%
Universities and Colleges	25%	100%	100%	100%
Warehouse / Wholesale	80%	100%	100%	100%
Restaurant	95%	100%	100%	100%

It should be noted that the electric fuel share and space cooling saturation was not estimated for all sub sectors. Rather, the end use EUIs for the other sub sectors was derived based on a weighted average of the EUIs for specific sub sectors. Section 5.3 includes more details on how this approach was implemented.

Space Heating

In recent years, electric space heating penetrations in new commercial construction have exceeded the historical average, a trend that is presently expected to continue. Similar to the discussion of water heating energy above, electricity consumption for space heating is expected to stay constant within the existing building stock, but to grow rapidly within the new building stock. The penetration of high performance, electrically powered heating equipment is expected to remain low over the study period.

Exhibit 119 illustrates the increased difference in electric space heating penetration between existing and new buildings. This leads to a growth in electricity use for space heating, which will outpace growth in floor area.

Exhibit 119 Electric Space Heating Share by Sub Sector – Existing and New Buildings (%)

Sub Sector	Island - Existing Buildings	Island - New Buildings	Labrador - Existing Buildings	
Large Office	85%	100%	100%	100%
Small Office	90%	100%	100%	100%
Large Non-Food Retail	85%	100%	100%	100%
Small Non-Food Retail	85%	100%	100%	100%
Food Retail	85%	100%	100%	100%
Large Accomodation	90%	100%	100%	100%
Small Accomodation	90%	100%	100%	100%
Healthcare	50%	100%	100%	100%
Schools	75%	100%	100%	100%
Universities and Colleges	20%	100%	90%	100%
Warehouse / Wholesale	75%	100%	80%	100%
Restaurant	90%	100%	100%	100%

It should be noted that the electric fuel share and space cooling saturation was not estimated for all sub sectors. Rather, the end use EUIs for the other sub sectors was derived based on a weighted average of the EUIs for specific sub sectors. Section 5.3 includes more details on how this approach was implemented.

Overall Impact of Natural Changes

As illustrated in Exhibit 120, the overall impact of the natural changes in energy usage patterns described above are very minimal, as load growth is anticipated by the Utilities in each milestone year. Virtually all growth in electricity use through the study period occurs within the new building stock.

Exhibit 120 Total Energy Use by Sub Sector and Milestone Year - Existing Sub sectors (MWh/yr.)

Sub-Sector	2014	2017	2020	2023	2026	2029
Large Office	273,262	272,302	271,343	270,383	269,423	268,463
Small Office	193,065	192,503	191,941	191,379	190,816	190,254
Large Non-food Retail	123,515	122,641	121,767	120,892	120,018	119,144
Small Non-food Retail	148,847	147,719	146,592	145,465	144,338	143,211
Food Retail	173,352	172,856	172,360	171,864	171,368	170,871
Large Accomodation	69,655	69,346	69,036	68,727	68,418	68,109
Small Accomodation	28,191	28,073	27,955	27,837	27,719	27,601
Healthcare	161,941	157,667	157,155	156,643	156,131	155,619
Schools	174,289	173,145	172,001	170,857	169,714	168,570
Universities and Colleges	124,745	124,007	123,270	122,532	121,794	121,057
Warehouse/Wholesale	79,216	78,766	78,317	77,867	77,418	76,968
Restaurants	105,467	105,248	105,028	104,808	104,588	104,368
Labrador Isolated C/I Buildings	17,062	16,693	16,530	16,366	16,203	16,040
Island Isolated C/I Buildings	1,505	1,466	1,451	1,435	1,420	1,405
Large Other Buildings	217,045	216,113	215,181	214,249	213,318	212,386
Small Other Buildings	182,923	181,429	180,617	179,806	178,995	178,184
Other Institutional	45,979	69,261	85,623	85,285	84,947	84,608
Non-Buildings	204,856	207,490	214,805	221,041	225,350	230,330
Street Lighting	37,127	36,851	36,931	36,999	37,043	37,086
Grand Total	2,362,042	2,373,575	2,387,902	2,384,436	2,379,020	2,374,274

C.2 Expected Growth in Building Stock

The next step in developing the Reference Case involved the development and application of estimated levels of floor space growth in each building sub sector over the study period. The stock growth rates were derived from the sales forecast data provided by the Utilities. The derivation of floor space data in each of the milestone periods applied the following steps:

- As described above for the existing building stock, estimate and apply the expected impact of natural changes within the new building stock over the study period. Efficiency improvements are expected to be more moderate within the new building stock through time. Computer and other plug load growth are expected to be consistent in both existing and new buildings.
- Add floor space at a rate consistent with the utility forecast of electricity consumption growth for each combination of sub sector and milestone year.

A summary of the total new commercial floor space at each milestone period is provided in Exhibit C11.

Exhibit 121 New Commercial Building Floor Space, by Sub Sector and Milestone Year (ft2)

Sub-Sector	2017	2020	2023	2026	2029
Large Office	287,000	686,000	1,231,000	1,622,000	2,071,000
Small Office	181,000	640,000	1,040,000	1,328,000	1,656,000
Large Non-food Retail	115,000	356,000	565,000	722,000	901,000
Small Non-food Retail	78,000	330,000	586,000	785,000	1,007,000
Food Retail	41,000	169,000	291,000	379,000	479,000
Large Accomodation	49,000	179,000	302,000	392,000	495,000
Small Accomodation	11,000	60,000	110,000	148,000	190,000
Healthcare	25,000	144,000	273,000	369,000	477,000
Schools	220,000	860,000	1,503,000	1,989,000	2,537,000
Universities and Colleges	85,000	226,000	354,000	458,000	572,000
Warehouse/Wholesale	113,000	368,000	591,000	759,000	949,000
Restaurants	18,000	68,000	114,000	147,000	185,000
Labrador Isolated C/I Buildings	0	354,000	467,000	575,000	683,000
Island Isolated C/I Buildings	0	39,000	49,000	60,000	71,000
Large Other Buildings	127,000	422,000	693,000	894,000	1,121,000
Small Other Buildings	3,000	190,000	443,000	642,000	859,000
Other Institutional	23,000	45,000	68,000	91,000	115,000
Grand Total	1,374,000	5,136,000	8,682,000	11,361,000	14,370,000

C.3 Results by Region

This section of the appendix presents the reference case electricity consumption for the three regions.

Exhibit 122 - Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Island Interconnected (MWh/yr.)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0	24,326	4,319	5,999	1,033	1,067	53,893	46,186	2,666	7,386	4,524	1,067	15,973	10,209	94,614	0	273,262
	2017	0	25,489	4,526	6,179	1,062	1,096	54,127	47,938	2,740	7,739	4,469	1,096	15,870	10,463	96,854	0	279,648
Large Office	2020	0	26,914	4,779	6,427	1,101	1,137	54,868	50,370	2,843	8,172	4,462	1,137	15,850	10,855	99,960	0	288,877
Lai go omoo	2023	0	28,686	5,093	6,768	1,156	1,194	56,281	53,700	2,984	8,710	4,520	1,194	15,942	11,430	104,216	0	301,873
	2026	0	30,093	5,343	7,013	1,195	1,234	56,989	56,085	3,085	9,137	4,510	1,234	15,916	11,813	107,265	0	310,912
	2029	0	31,637	5,617	7,293	1,240	1,280	57,962	58,826	3,201	9,606	4,526	1,280	15,935	12,268	110,768	0	321,441
	2014	0	19,802	3,516	5,155	0	0	39,734	19,864	2,170	6,012	3,682	868	5,902	7,866	74,726	0	189,299
	2017	0	20,624	3,662	5,268	0	0	39,687	20,687	2,217	6,262	3,614	868	5,837	8,000	76,011	0	192,738
Small Office	2020	0	22,091	3,922	5,552	0	0	40,774	22,759	2,335	6,708	3,666	868	5,852	8,457	79,243	0	202,226
	2023	0	23,420	4,158	5,799	0	0	41,617	24,563	2,437	7,111	3,692	868	5,850	8,844	82,057	0	210,419
	2026	0	24,483	4,347	5,976	0	0	41,994	25,852	2,510	7,434	3,669	868	5,815	9,099	84,069	0	216,118
	2029	0	25,645	4,553	6,179	0	0	42,544	27,333	2,594	7,787	3,664	868	5,792	9,403	86,379	0	222,741
	2014	0	7	435	1,685	0	3,817	33,975	27,191	985	2,456	3,344	5,725	3,596	3,168	27,391	0	115,655
	2017	0	-,	457	1,740	0	3,930	34,073	27,841	1,015	2,578	3,309	5,895	3,579	3,236	27,913	0	117,546
Large Non-food Retail	2020	0	,	493	1,858	0	4,169	35,037	29,214	1,076	2,780	3,384	6,253	3,621	3,415	29,015	0	122,450
3	2023	0	, -	525	1,959	0	4,377	35,788	30,409	1,130	2,963	3,433	6,565	3,649	3,566	29,974	0	126,614
	2026	0	,	552	2,036	0	4,532	36,175	31,301	1,170	3,112	3,435	6,797	3,651	3,671	30,690	0	129,511
	2029	0	7	581	2,122	0	4,708	36,712	32,317	1,215	3,275	3,456	7,062	3,664	3,795	31,505	0	132,927
	2014	0	,	631	2,577	0	0	41,215	28,604	1,428	3,559	4,845	0	4,845	4,863	39,263	0	134,563
	2017	0	2,825	652	2,614	0	0	40,907	28,989	1,447	3,678	4,717	0	4,783	4,890	39,807	0	135,310
Small Non-food Retail	2020	0	2,996	691	2,729	0	0	41,689	30,189	1,508	3,900	4,729	0	4,794	5,077	41,499	0	139,801
	2023	0	3,169	732	2,847	0	0	42,512	31,420	1,570	4,127	4,746	0	4,808	5,270	43,236	0	144,436
	2026	0	3,315	765	2,938	0	0	42,950	32,363	1,618	4,316	4,714	0	4,796	5,406	44,566	0	147,748
	2029	0	3,472	801	3,040	0	0	43,544	33,423	1,671	4,521	4,702	0	4,794	5,565	46,061	0	151,595
	2014	0	,	322	3,279	0	8,744	19,666	11,213	729	2,369	2,473	87,439	3,103	1,584	18,821	0	161,939
	2017	0	,	333	3,332	0	8,871	19,534	11,373	739	2,451	2,427	88,630	3,074	1,594	19,013	0	163,644
Food Retail	2020	0	, -	354	3,495	0	9,262	19,944	11,866	772	2,604	2,492	92,300	3,115	1,657	19,604	0	169,881
	2023	0	7	374	3,651	0	9,637	20,320	12,337	803	2,753	2,551	95,809	3,152	1,717	20,169	0	175,824
	2026	0	7	390	3,763	0	9,906	20,480	12,677	826	2,873	2,565	98,337	3,161	1,756	20,577	0	179,972
	2029	0	2,781	408	3,892	0	10,214	20,719	13,064	851	3,004	2,595	101,222	3,180	1,802	21,041	0	184,773

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Exhibit 122 - Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Island Interconnected (MWh/yr.) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0	1,104	232	14,755	244	3,090	6,841	5,480	631	1,205	1,070	1,892	7,169	1,153	17,745	0	62,610
	2017	0	1,146	241	15,076	249	3,120	6,787	5,582	643	1,253	1,048	1,910	7,131	1,170	18,081	0	63,437
Large Accomodation	2020	0	1,222	258	15,946	262	3,202	6,876	5,858	676	1,341	1,062	1,960	7,275	1,234	18,994	0	66,167
Large Accomodation	2023	0	1,295	275	16,766	274	3,279	6,951	6,118	708	1,426	1,073	2,008	7,402	1,294	19,853	0	68,720
	2026	0	1,354	288	17,364	283	3,336	6,969	6,308	731	1,494	1,069	2,042	7,456	1,335	20,481	0	70,508
	2029	0	1,418	302	18,046	293	3,400	7,009	6,524	757	1,568	1,071	2,082	7,538	1,383	21,196	0	72,586
	2014	0	525	110	7,022	0	750	3,690	1,397	300	574	509	450	2,047	402	9,485	0	27,262
	2017	0	541	114	7,097	0	757	3,633	1,412	303	591	494	454	2,023	405	9,570	0	27,393
Small Accomodation	2020	0	571	120	7,417	0	788	3,633	1,475	315	626	494	473	2,054	428	9,932	0	28,326
oman Accomodation	2023	0	602	127	7,752	0	820	3,636	1,541	328	662	496	492	2,088	453	10,313	0	29,310
	2026	0	628	133	7,998	0	844	3,619	1,590	338	691	491	506	2,102	470	10,593	0	30,004
	2029	0	656	139	8,278	0	871	3,609	1,645	348	723	489	523	2,124	491	10,910	0	30,805
	2014	0	3,645	844	8,124	807	8,332	4,604	27,075	1,042	7,008	3,534	1,562	21,812	2,338	54,806	0	145,533
	2017	0	3,741	866	8,207	812	8,383	4,544	27,256	1,048	7,192	3,415	1,572	21,480	2,332	55,087	0	145,934
Healthcare	2020	0	3,919	907	8,598	835	8,624	4,605	28,107	1,078	7,534	3,379	1,617	21,536	2,389	56,406	0	149,535
ricalificat C	2023	0	4,107	950	9,026	861	8,887	4,681	29,036	1,111	7,896	3,352	1,666	21,638	2,454	57,848	0	153,511
	2026	0	4,264	987	9,340	879	9,080	4,712	29,719	1,135	8,199	3,295	1,703	21,597	2,495	58,908	0	156,313
	2029	0	4,433	1,026	9,694	900	9,299	4,759	30,490	1,162	8,522	3,249	1,744	21,607	2,545	60,104	0	159,534
	2014	0	7,376	1,293	5,337	0	1,404	42,801	8,422	1,053	1,486	5,957	1,053	9,582	267	76,730	0	162,762
	2017	0	7,640	1,339	5,443	0	1,427	42,544	8,597	1,070	1,540	5,813	1,070	9,509	287	78,070	0	164,350
Schools	2020	0	8,131	1,425	5,753	0	1,492	43,437	9,108	1,119	1,639	5,852	1,119	9,666	352	81,980	0	171,072
Comodic	2023	0	8,622	1,511	6,064	0	1,558	44,340	9,622	1,168	1,738	5,892	1,168	9,825	417	85,912	0	177,836
	2026	0	9,029	1,583	6,299	0	1,607	44,809	10,009	1,205	1,820	5,863	1,205	9,897	465	88,874	0	182,665
	2029	0	9,470	1,660	6,564	0	1,663	45,449	10,446	1,247	1,909	5,861	1,247	10,004	520	92,219	0	188,258
	2014	0	1,742	579	1,958	0	0	19,171	4,292	1,310	4,212	2,223	7,861	3,812	108	24,251	0	71,518
	2017	0	1,816	603	2,016	0	0	19,199	4,363	1,339	4,389	2,183	8,034	3,756	112	24,817	0	72,627
Warehouse/Wholesale	2020	0	1,936	643	2,144	0	0	19,727	4,521	1,403	4,679	2,203	8,419	3,724	122	26,071	0	75,593
	2023	0	2,046	680	2,257	0	0	20,144	4,660	1,460	4,945	2,210	8,757	3,688	131	27,172	0	78,147
	2026	0	2,136	710	2,341	0	0	20,357	4,763	1,501	5,164	2,192	9,009	3,641	137	27,993	0	79,943
	2029	0	2,234	742	2,436	0	0	20,651	4,880	1,549	5,401	2,184	9,295	3,598	145	28,925	0	82,041
	2014	0	410	113	18,743	0	33,431	2,352	3,434	256	545	435	16,672	7,540	989	11,925	0	96,846
	2017	0	426	118	19,090	0	34,019	2,345	3,484	261	565	425	16,965	7,471	998	12,259	0	98,426
Restaurants	2020	0	455	126	20,077	0	35,690	2,411	3,627	274	603	430	17,799	7,552	1,042	13,210	0	103,295
	2023	0	481	133	20,971	0	37,205	2,466	3,757	285	639	432	18,554	7,612	1,081	14,072	0	107,689
	2026	0	503	139	21,605	0	38,280	2,492	3,850	294	667	429	19,090	7,610	1,106	14,684	0	110,749
	2029	0	526	145	22,334	0	39,514	2,529	3,956	303	698	427	19,705	7,630	1,136	15,386	0	114,290

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Exhibit 122 - Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Island Interconnected (MWh/yr.) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0	6,633	1,116	7,707	356	7,918	28,123	21,288	1,335	3,972	3,382	16,038	9,791	2,667	42,605	0	152,930
	2017	0	6,888	1,159	7,884	363	8,062	28,012	21,697	1,360	4,125	3,312	16,320	9,715	2,717	43,401	0	155,014
Large Other Buildings	2020	0	7,318	1,231	8,314	379	8,409	28,545	22,688	1,420	4,383	3,336	17,005	9,809	2,877	45,329	0	161,045
Large Girler Ballaringe	2023	0	7,722	1,299	8,706	394	8,726	28,982	23,593	1,475	4,625	3,346	17,630	9,878	3,020	47,088	0	166,485
	2026	0	8,055	1,355	8,994	404	8,959	29,154	24,258	1,515	4,824	3,318	18,089	9,877	3,119	48,380	0	170,301
	2029	0	8,414	1,416	9,322	416	9,224	29,426	25,014	1,561	5,040	3,304	18,612	9,903	3,234	49,851	0	174,736
	2014	0	6,124	1,028	6,768	196	7,039	26,977	17,711	1,293	3,876	3,410	15,178	8,068	2,502	40,739	0	140,908
	2017	0	6,216	1,044	6,736	195	7,005	26,309	17,625	1,286	3,934	3,258	15,105	7,868	2,465	40,541	0	139,586
Small Other Buildings	2020	0	6,480	1,088	6,932	200	7,168	26,329	18,073	1,316	4,101	3,205	15,438	7,834	2,532	41,519	0	142,214
Omail Other Ballangs	2023	0	6,812	1,144	7,224	206	7,411	26,622	18,740	1,361	4,312	3,192	15,934	7,861	2,644	42,975	0	146,438
	2026	0	7,094	1,191	7,444	211	7,595	26,712	19,245	1,395	4,490	3,150	16,309	7,842	2,723	44,075	0	149,476
	2029	0	7,393	1,241	7,690	217	7,799	26,874	19,807	1,432	4,680	3,118	16,726	7,839	2,814	45,300	0	152,930
	2014	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	2017	0	0	0	0	0	0	- 1	0	0	0	0	0	0	0	0	0	0
Other Institutional	2020	0	0	0	0	0	0		0		0	0	0	0	0	0	0	0
Cirior motitational	2023	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0
	2026	0	0	0	0	0	0	-	0		0	0	0	0	0	0	0	0
	2029	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2014	0	0	0	0	0	0	0	0	199,788	0	0	0	0	0	0	0	199,788
	2017	0	0	0	0	0	0		0	202,428	0	0	0	0	0	0	0	202,428
Non-Buildings	2020	0	0	0	0	0	0		0	209,684	0	0	0	0	0	0	0	209,684
Tion Zamamigo	2023	0	0	0	0	0	0	-	0	215,870	0	0	0	0	0	0	0	215,870
	2026	0	0	0	0	0	0		0	,	0	0	0	0	0	0	0	220,132
	2029	0	0	0	0	0	0		0	,	0	0	0	0	0	0	0	225,065
	2014	0	0	0	0	0	0		0		0	0	0	0	0	0	34,828	34,828
	2017	0	0	0	0	0	0	0	0		0	0	0	0		0	34,448	34,448
Street Lighting	2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34,448	34,448
J	2023	0	0	0	0	0	0	0	0		0	0	0	0	0	0	34,448	34,448
	2026	0	0	0	0	0	0		0		0	0	0	0	0	0	34,448	34,448
	2029	0	0	0	0	0	0	-	0	Ü	0	0	0	0	0	0	34,448	34,448
	2014	0	88,376	15,241	90,302	3,375	78,454	362,591	257,551	216,895	49,463	42,624	159,621	108,235	39,433	544,430	34,828	2,091,418
	2017	0	91,785	15,837	91,928	3,428	79,565	360,841	262,546		51,251	41,629	161,780	107,035	40,062	553,168	34,448	2,115,128
Grand Total	2020	0	97,147	16,790	96,580	3,539	82,892	366,864	274,072	227,786	54,213	41,771	168,321	107,594	41,969	575,210	34,448	2,189,196
J. a.i.a rotar	2023	0	102,723	17,780	101,210	3,665	86,092	373,116	286,179		57,226	41,937	174,644	108,266	43,977	597,963	34,448	2,263,916
	2026	0	107,274	18,585	104,598	3,758	88,412	375,865	295,079	239,480	59,706	41,619	179,242	108,190	45,348	614,744	34,448	2,316,347
	2029	0	112,213	19,459	108,450	3,863	91,054	379,961	305,198	245,013	62,388	41,485	184,476	108,393	46,961	633,796	34,448	2,377,160

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Exhibit 123 Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Labrador Interconnected (MWh/yr)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneou s Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	22	395	70	108	0			189	22	120	74	0		62	1,793	0	3,766
	2017	22	403	72	108	0			190	22	122	71	0		61	1,794	0	3,757
Small Office	2020	22	422	75	111	0		-	195	22	128	70	0		64	1,867	0	3,871
	2023	23	439	78	114	0		-	199	23	133	68	0	113	65	1,931	0	3,968
	2026	23	456	81	116	0		-	203	23	139	67	0		67	1,992	0	4,062
	2029	24	473	84	119	0		-	207	24	144	66	0		69	2,053	0	4,154
	2014	35	135	31	134	0			1,154	35	176	239	410		56	2,699	0	7,860
	2017	36	139	32	135	0		,	1,165	36	181	231	413	245	57	2,716	0	7,863
Large Non-food Retail	2020	36 36	142 146	33 34	136 137	0		2,175	1,176	36 36	185 190	224 216	416	241 237	57	2,733	0	7,867 7,870
	2023	36	150	34 35	137	0		2,146 2.117	1,187 1,198	36	190	208	419 421	237	58 59	2,751 2,768	0	7,870
	2020	37	153	35	139	0		,	1,196	37	200	200	421	233	59	2,786	0	7,879
	2014	68	260	60	258	0		-	1,163	68	338	460	0	-	121	6,716	0	14,283
	2017	68	266	61	259	0	-		1,174	68	346	444	0	-	121	6,743	0	14,247
	2020	70	280	65	267	0		_	1,174	70	364	441	0		131	6,923	0	14,581
Small Non-food Retail	2023	72	292	67	275	0	_	_	1,303	72	381	435	0		139	7,082	0	14,865
	2026	74	305	70	282	0	_	_	1,362	74	397	430	0		147	7,239	0	15,144
	2029	76	317	73	289	0		,	1,422	76	413	425	0	461	155	7,395	0	15,422
	2014	21	124	5	205	0	493		309	21	133	139	4,105	133	25	4,669	0	11,414
	2017	21	127	5	206	0	493	1,012	310	21	136	134	4,112	131	25	4,671	0	11,403
	2020	21	130	5	207	0	497	997	316	21	140	130	4,142	129	25	4,680	0	11,441
Food Retail	2023	21	133	6	208	0	500	982	321	21	144	126	4,168	127	26	4,688	0	11,472
	2026	21	136	6	210	0	503	967	327	21	147	121	4,194	125	26	4,696	0	11,501
	2029	21	140	6	211	0	506	952	332	21	151	117	4,220	123	26	4,704	0	11,530
	2014	30	90	22	1,572	0	302	585	466	30	116	103	181	687	57	2,803	0	7,044
	2017	30	92	23	1,578	0	303	575	469	30	118	99	182	675	57	2,812	0	7,044
Large Accomodation	2020	30	94	23	1,584	0	305	564	472	30	121	95	182	663	57	2,822	0	7,043
Large Accomodation	2023	31	96	24	1,589	0	306	554	476	31	124	91	183	651	57	2,831	0	7,042
	2026	31	98	24	1,595	0	307	543	479	31	127	88	183	639	56	2,841	0	7,041
	2029	31	100	25	1,601	0	308	533	482	31	129	84	184	627	56	2,850	0	7,041
	2014	4	12	3	208	0	20	98	38	4	15	14	12		9	438	0	929
	2017	4	12	3	208	0		96	38	4	16	13	12		8	438	0	927
Small Accomodation	2020	4	13	3	214	0			40	4	16	13	12		9	452	0	950
aii / ioooiiiouutioii	2023	4	13	3	219	0	21	95	41	4	17	13	13	53	9	464	0	969
	2026	4	14	3	224	0			41	4	18	12	13		9	476	0	988
	2029	4	14	4	229	0	22	93	42	4	18	12	13	53	9	488	0	1,007

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Exhibit 123 Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Labrador Interconnected (MWh/yr) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneou s Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	222	518	120	1,924	57	1,184	654	3,671	74	996	502	222	3,099	108	3,057	0	16,408
	2017	171	407	94	1,483	44	913	494	2,829	57	783	372	171	2,341	83	2,356	0	12,598
Healthcare	2020	171	417	97	1,491	44	917	487	2,851	57	802	358	172	2,305	83	2,368	0	12,621
	2023	172	427	99	1,498	45	922	480	2,872	58	822	345	173	2,268	83	2,379	0	12,642
	2026	172	437	101	1,506	45	927	472	2,893	58	841	331	174	2,231	84	2,391	0	12,662
	2029	172	447	104	1,513	45	931	465	2,914	58	860	318	175	2,194	84	2,403	0	12,683
	2014	29	402	70	363	0	76	2,331	933	29	81	324	21	481	12	6,374	0	11,527
	2017	29	411	72	365	0	77	2,293	937	29	83	313	21	474	12	6,402	0	11,518
Schools	2020	29	424	74	369	0	78	2,270	945	29	85	304	22	470	13	6,471	0	11,583
0000	2023	29	436	76	373	0	79	2,245	953	29	88	294	23	465	14	6,534	0	11,639
	2026	30	449	79	377	0	79	2,220	961	30	90	285	23	461	14	6,597	0	11,693
	2029	30	461	81	381	0	80	2,195	969	30	93	275	24	456	15	6,659	0	11,748
	2014	15	157	11	76	0	46	631	372	15	77	52	61	80	25	1,410	0	3,028
	2017	15	161	11	76	0	46	620	373	15	78	50	61	78	25	1,416	0	3,028
Universities and Colleges	2020	15	165	12	77	0	46	610	374	15	80	48	61	77	26	1,421	0	3,027
omiroromos ana conogos	2023	15	169	12	77	0	46	599	376	15	82	46	62	76	26	1,426	0	3,027
	2026	15	173	12	77	0	46	589	377	15	84	44	62	74	26	1,432	0	3,027
	2029	16	176	13	78	0	47	578	378	16	86	42	62	73	26	1,437	0	3,027
	2014	48	127	42	178	0	0	1,396	461	48	307	162	572	278	6	4,074	0	7,698
	2017	48	130	43	179	0	0	1,372	462	48	314	156	574	272	6	4,082	0	7,685
Warehouse/Wholesale	2020	49	134	45	182	0	0	1,365	467	49	325	152	584	268	6	4,131	0	7,756
War chouse, Wholesale	2023	49	139	46	185	0	0	1,356	472	49	336	148	592	263	6	4,175	0	7,816
	2026	50	143	48	188	0	0	1,347	476	50	346	144	600	258	7	4,218	0	7,874
	2029	51	148	49	190	0	0	1,337	481	51	357	140	609	254	7	4,260	0	7,932
	2014	12	37	10	1,776	0	3,071	212	140	12	54	39	1,501	606	18	1,136	0	8,622
	2017	12	38	10	1,777	0	3,073	208	140	12	55	38	1,502	594	18	1,137	0	8,612
Restaurants	2020	12	39	11	1,801	0	3,114	206	141	12	57	37	1,522	587	19	1,150	0	8,707
nestaurants	2023	12	40	11	1,822	0	3,150	204	143	12	58	35	1,539	580	19	1,161	0	8,787
	2026	12	41	11	1,842	0	3,184	202	144	12	60	34	1,556	573	20	1,172	0	8,865
	2029	12	42	12	1,862	0	3,219	200	145	12	62	33	1,573	565	20	1,183	0	8,941
	2014	358	1,384	272	5,426	50	4,743	7,904	6,537	229	1,689	1,359	6,162	4,889	269	22,842	0	64,115
	2017	359	1,418	279	5,447	50	4,762	7,774	6,572	230	1,729	1,311	6,186	4,807	269	22,912	0	64,104
Large Other Buildings	2020	360	1,451	285	5,469	50	4,780	7,644	6,606	231	1,770	1,262	6,210	4,724	269	22,982	0	64,094
Large Other Dullulings	2023	361	1,484	292	5,490	51	4,799	7,513	6,641	232	1,810	1,213	6,234	4,642	270	23,053	0	64,084
	2026	362	1,517	298	5,512	51	4,818	7,383	6,676	233	1,850	1,164	6,259	4,560	270	23,123	0	64,076
	2029	363	1,550	305	5,533	51	4,837	7,253	6,711	234	1,891	1,116	6,283	4,478	270	23,194	0	64,068

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Exhibit 123 Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Labrador Interconnected (MWh/yr) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneou s Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	238	1,099	212	2,757	31	2,645	6,188	3,936	157	1,147	955	3,513	2,881	209	16,047	0	42,015
	2017	238	1,123	217	2,761	31	2,649	6,074	3,945	158	1,172	919	3,519	2,828	208	16,070	0	41,910
Small Other Buildings	2020	242	1,177	227	2,842	32	2,726	6,108	4,102	162	1,228	909	3,622	2,837	222	16,450	0	42,889
oman other bundings	2023	246	1,226	237	2,912	33	2,793	6,122	4,239	166	1,280	897	3,711	2,838	234	16,781	0	43,715
	2026	250	1,275	247	2,980	34	2,859	6,132	4,372	170	1,331	883	3,798	2,837	246	17,104	0	44,518
	2029	254	1,324	256	3,048	34	2,923	6,141	4,504	174	1,382	869	3,885	2,836	258	17,424	0	45,313
	2014	412	1,212	0	2,407	0	537	12,713	8,247	412	2,075	1,406	1,763	4,559	219	10,017	0	45,979
	2017	415	1,246	0	2,423	0	542	12,550	8,319	415	2,133	1,362	1,775	4,494	218	33,698	0	69,591
Other Institutional	2020	418	1,280	0	2,438	0	547	12,387	8,392	418	2,191	1,318	1,788	4,428	218	50,460	0	86,285
Other institutional	2023	421	1,314	0	2,454	0	552	12,225	8,466	421	2,250	1,274	1,801	4,362	218	50,522	0	86,281
	2026	425	1,348	0	2,470	0	558	12,063	8,540	425	2,308	1,231	1,814	4,297	217	50,585	0	86,280
	2029	428	1,382	0	2,486	0	563	11,902	8,615	428	2,366	1,187	1,827	4,232	217	50,648	0	86,282
	2014	0	0	0	0	0	0	0	0	5,068	0	0	0	0	0	0	0	5,068
	2017	0	0	0	0	0	0	0	0	5,063	0	0	0	0	0	0	0	5,063
Non-Buildings	2020	0	0	0	0	0	0	0	0	5,121	0	0	0	0	0	0	0	5,121
Tion Buildings	2023	0	0	0	0	0	0	0	0	5,171	0	0	0	0	0	0	0	5,171
	2026	0	0	0	0	0	0	0	0	5,218	0	0	0	0	0	0	0	5,218
	2029	0	0	0	0	0	0	0	0	5,264	0	0	0	0	0	0	0	5,264
	2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,756	1,756
	2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,845	1,845
Street Lighting	2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,912	1,912
Oli cet Lighting	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,967	1,967
	2026	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,998	1,998
	2029	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,030	2,030
	2014	1,512	5,951	929	17,392	138	13,390	41,065	27,616	6,224	7,323	5,828	18,523	18,592	1,197	84,075	1,756	251,513
	2017	1,467	5,971	923	17,005	125	13,154	40,276	26,922	6,206	7,267	5,511	18,528	17,576	1,171	107,246	1,845	271,194
Grand Total	2020	1,480	6,167	955	17,188	127	13,309	39,951	27,320	6,279	7,494	5,360	18,733	17,365	1,199	124,911	1,912	289,749
Grand Total	2023	1,493	6,355	985	17,353	128	13,447	39,583	27,686	6,341	7,714	5,202	18,917	17,142	1,224	125,779	1,967	291,316
	2026	1,506	6,543	1,016	17,516	129	13,584	39,211	28,049	6,401	7,933	5,043	19,098	16,917	1,248	126,634	1,998	292,823
	2029	1,518	6,729	1,046	17,678	130	13,719	38,838	28,411	6,459	8,152	4,884	19,278	16,692	1,272	127,485	2,030	294,321

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Exhibit 124 Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Isolated (MWh/yr.)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	305	1,051	0	149	0	496	6,909	1,132	0	677	739	3,416	1,608	0	580	0	17,062
	2017	301	1,059	0	148	0	490	6,689	1,118	0	682	701	3,375	1,557	0	573	0	16,693
Labrador Isolated C/I	2020	351	1,258	0	172	0	573	7,498	1,409	0	810	813	3,931	1,724	0	650	0	19,187
Buildings	2023	367	1,335	0	180	0	599	7,663	1,501	0	860	830	4,109	1,756	0	674	0	19,874
	2026	382	1,410	0	187	0	624	7,815	1,590	0	908	844	4,279	1,785	0	698	0	20,521
	2029	397	1,486	0	194	0	650	7,968	1,679	0	956	858	4,449	1,814	0	721	0	21,173
	2014	0	99			0	47	649	106	0	64	69	321	151	0	0	0	1,505
	2017	0	99		0	0	46	626	105	0	64	66	316		0	0	0	1,466
Island Isolated C/I	2020	0	120		0	0	55	716	136	0	78	78	377	164	0	0	0	1,725
Buildings	2023	0	128	0		0	57	732	145	0	82	80	393	168	0	0	0	1,786
	2026	0	135	0	0	0	60	748	154	0	87	82	411	171	0	0	0	1,847
	2029	0	143	0	0	0	62	765	163	0	92	83	428	174	0	0	0	1,910
	2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	544	544
	2017	0	0	0	0	0	0	0	0	0	0	0	0	Ü	0	0	557	557
Street Lighting	2020	0		-	0	0	0	0	0	0	0	0	0	-	0	0	571	571
0 0	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	584	584
	2026	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	596	596
	2029	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	609	609
	2014	305	1,150			0	542	7,558	1,238	0	740	808	3,737	1,759	0	580	544	19,112
	2017	301	1,158	0	-	0	536	7,315	1,223	0	746	766	3,691	1,703	0	573	557	18,716
Grand Total	2020	351	1,378	0	172	0	627	8,214	1,545	0	887	892	4,308	1,889	0	650	571	21,483
	2023	367	1,463	0		0	656	8,396	1,647	0	942	910	4,502	1,924	0	674	584	22,244
	2026	382	1,546	0		0	684	8,563	1,744	0	995	925	4,689	1,956	0	698	596	22,965
	2029	397	1,628	0	194	0	712	8,733	1,842	0	1,048	941	4,877	1,988	0	721	609	23,691

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C.4 CEEAM Archetype Summaries – New Buildings

This section includes summary profiles of the twelve new building archetypes constructed for this study. **Exhibit 125** presents a table of contents for the CEEAM building profiles that follow. A glossary of terms and acronyms used in the building profiles is included at the end of this appendix.

Exhibit 125 Table of Contents - New CEEAM Building Profiles

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N/A	Terms Used in Building Profiles	C – 143

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

REGION:

NEW BUILDINGS:

SIZE:

Large Office > 100 kW Baseline CONSTRUCTION 0.42 W/m².°C 0.07 Btu/hr.ft² .°F 40,000 ft² Wall U value (W/m².°C) Typical Building Size 3,717 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 1,859 20,000 ft² Glazing U value (W/m².°C) 2.80 W/m².°C 0.49 Btu/hr.ft².°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.60 Defined as Exterior Zone Typical # Stories 0.58 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 50% 50% 100% Min. Air Flow (%) (Minimum Throttled Ai 60% Occupancy or People Density 274 ft²/person %OA 13.04% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air 42 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: CFM/ft² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation I /s m² operation (%) Sizing Factor Total Air Circulation or Design Air Flow 1.18 CFM/ft² 6.01 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² 50% Infiltration Rate Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. 18 Peak Design Cooling Load 1.586.900 Peak Zone Sensible Load 678,953 28.2 Btu/lbm Room air enthalpy 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Discharge air enthalpy Specific volume of air at 55F & 100% R
Design CFM Equipment 13.2 ft³/lbm All Pneumatic 31,585 DDC/Pneumatic Total air circulation or Design air 6.01 l/s.m² All DDC Total (should add-up to 100%) PI / PID Proportional Control mode Control Mode Rese Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 14 °C 57.2 °F 24 °C Summer Humidity (%) 50% Enthalpy Winter Occ. Temperature 23.4 Btu/lbm 65.5 KJ/kg 28.2 Btu/lbm 54.5 73.4 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 19.6 Btu/lbm 23 °C 30% 73.4 °F Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves, Inspection of Control Devices (Dampers, VAV Boxes)

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: Large Office Baseline SIZE: > 100 kW

REGION: Island Interconnected

LIGHTING													
GENERAL LIGHTING Light Level	500 Lux	46.5	ft-candles										
Floor Fraction (GLFF)	0.90												
Connected Load	12.9 W/m²	1.2	W/ft²										
Occ. Period(Hrs./yr.)	3300		Light Level (Lux)		300	500	700	1000			Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	5460 95%		% Distribution Weighted Average			100%					100% 500		
Usage During Unoccupied Period	20%		vveignled Average								500		
					INC	CFL	T12	T8	HID	T5HO LE			
Fixture Cleaning: Incidence of Practice			System Present (%) CU		0.7	0.7	0.6	100% 0.6	0.6	0% 09			
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.80 0.80			
Delegación Otrada es a la sida es	0	т	Efficacy (L/W)		15	50	72	88	65	95 90)		
Relamping Strategy & Incidence of Practice	Group Spot										EUI	kWh/ft².yr	4.6
		1										MJ/m².yr	177
ARCHITECTURAL LIGHTING Light Level	350 Lux	32.5	ft-candles										
Floor Fraction (ALFF)	0.10	02.0	Tr danales										
Connected Load	15.1 W/m²	1.4	W/ft²										
Occ. Period(Hrs./yr.)	3400		Light Level (Lux)		200	300	400	500			Total		
Unocc. Period(Hrs./yr.)	5360		% Distribution		10%	40%	40%	10%			100%		
Usage During Occupied Period Usage During Unoccupied Period	95% 40%		Weighted Average								350		
Osage During Onoccupied Feriod	40 %				INC	CFL	T12	T8	HID	T5HO LE	TOTAL		
Fixture Cleaning:			System Present (%)		10%	30%		40%	5%	15% 09			
Incidence of Practice Interval	years		CU LLF		0.7 0.65	0.7	0.6 0.75	0.6	0.6	0.6 0.6 0.80 0.80			
The var	years		Efficacy (L/W)		15	50	72	88	65	95 90			
Relamping Strategy & Incidence	Group Spot										ELU	134/1-/612	0.0
of Practice		1			Е	JI = Load	X Hrs. X	SF X GLFF				kWh/ft².yr MJ/m².yr	0.8 29
SPECIAL PURPOSE LIGHTING			1										
Light Level Floor Fraction (HBLFF)	Lux		ft-candles			Flo	oor fracti	on check: sh	ould = 1.0	0 1.00)		
Connected Load	W/m²		W/ft²										
				1									
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4000 4760		Light Level (Lux) % Distribution		300	500	700	1000			Total		
Usage During Occupied Period	0%		Weighted Average		ļ	ļ							
Usage During Unoccupied Period	100%				INC	CEL	T40	то		MIII IID	TOTAL		
Fixture Cleaning:			System Present (%)		INC	CFL	T12	T8		MH HP	S TOTAL		
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6 0.6			
Interval	years		LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80 84	0.80	0.55 0.58 65 90			
Relamping Strategy & Incidence	Group Spot	T	Efficacy (L/VV)		10	50	12	04	00	05 90	,		
of Practice		Ī										kWh/ft².yr	
												MJ/m².yr	
TOTAL LIGHTING								O	verall LP	13.13 W/m ²	EUI TOTAL		5
												MJ/m².yr	206
OFFICE EQUIPMENT & PLUG LOA	DS												
.				5			1				7		
Equipment Type	Comput	ers	Monitors	Print	ers	Copie	rs	Server	'S	Plug Loads			
Measured Power (W/device)	55	7	51	100		200		50					
Density (device/occupant)	0.9		0.9	0.15		0.1	•	0.26					
Connected Load	1.9	W/m²	1.8 W/m²	0.6 V		0.8 W		0.5 W		1.5 W/m²			
Diversity Occupied Period	0.2 80%	W/ft²	0.2 W/ft² 80%	0.05 V 80%	V/ft²	0.07 W	//ft²	0.05 W	/ft²	0.14 W/ft² 80%			
Diversity Unoccupied Period	50%		50%	50%		50%	-	100%		50%			
Operation Occ. Period (hrs./year)	2000		2000	2000		2000		2000		2500			
Operation Unocc. Period (hrs./year)	6760		6760	6760		6760		6760		6260			
Total end-use load (occupied period)		W/m²	0.5 W/ft ²							Computer Server		kWh/ft².yr	0.42
Total end-use load (unocc. period)	3.8	W/m²	0.4 W/ft ²							Computer Equipmen		MJ/m².yr kWh/ft².yr	16.20 2.36
Usage during occupied period	100%	ı								Computer Equipmen		MJ/m².yr	91.24
Usage during unoccupied period	66%									Plug Load	s EUI	kWh/ft².yr	0.72
												MJ/m².yr	27.70
FOOD SERVICE EQUIPMENT													
Provide description below: Lunch room/cafeteria/restaurant	Fuel Oil / Propane F	uel Share:		Electricity F	uel Share:	100.0%			/ Propane			Electric EU	
Lunch room/caretena/restaurant				_					Vh/ft².yr J/m².yr	0.1 5.0		kWh/ft².yr MJ/m².yr	0.10 4.00
									, ,		1		
REFRIGERATION Provide description below:													
Lunch room/cafeteria/restaurant				1							EUI	kWh/ft².yr	0.10
				_								MJ/m².yr	4.00
BLOCK HEATERS & MISCELLANEO	ous												
DESCRIPTION OF WISCELLANE													
										Block Heater		kWh/ft².yr	
										Miscellaneou		MJ/m².yr kWh/ft².yr	0.26
												MJ/m².yr	10.00

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: Large Office Baseline SIZE: > 100 kW

REGION: Island Interconnected

SPACE HEATING													
Heating Plant Type				Fi	uel Oil / Propa	ne	1	Fle	ectric			1	
rieating riant Type				Во	oilers	Packaged	A/A HP		H/R Chiller	Resistance	Total		
		System Present (%)		Stan.	High	Unit				100%	100%		
		Eff./COP Performance (1 / Eff.)		70% 1.43	80%	75% 1.33				1.00			
		(kW/kW)											
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	53.1 W/m² 302 MJ/m².yr		Btw/hr.ft² kWh/ft².yr									All Electric EUI	
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		I	Oil Fuel Sha	re						kWh/ft².yr	7.8
Boiler Maintenance	Fire Side Water Sid Inspection Inspection	aintenance Tasks Inspection e Inspection for Scale Built of Controls & Safeties of Burner Analysis & Burner Set-up	dup	Incidence (%) 75% 100% 100% 90%								Fuel Oil / Propane Et kWh/tr².yr MJ/m².yr Market Composite E kWh/tr².yr MJ/m².yr	
SPACE COOLING													
A/C Plant Type													
, vo r min 1 ypo			Centrifuga		WSHP			s Absorptio		Total			
		System Present (%)	Standard	HE 20.0%		Open	DX 80.0%		CW	100.0%			
		COP Performance (1 / COP)	4.7 0.21			3.5 0.29							
		(kW/kW) Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Line	Fixed	Deset	1			1					
Control Mode		Incidence of Use Chilled Water	Fixed Setpoint	Reset									
		Condenser Water]								
Setpoint		Chilled Water Condenser Water Supply Air		°C ○°C	44.6 86 57.2	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	125 W/m² 129.0 MJ/m².yr	40 Btu/hr.ft² 3.3 kWh/ft².yr	302	ft²/Ton									
Sizing Factor	1.00		Operation (oc	c. period)	3000	hrs/year	Note valu	e cannot be	e less than 2	,900 hrs/yea	ar)		
A/C Saturation (Incidence of A/C)	90.0%												
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		I									
Chiller Maintenance	Annual Ma	aintenance Tasks		Incidence (%)	Frequency (years)								
		ontrol, Safeties & Purge Ur		(70)	(years)								
	Megger M		Bearings										
	Condense Vibration	r Tube Cleaning Analysis											
	Eddy Curr	rent Testing nemical Oil Analysis										All Electric EUI	
	<u></u>	,										kWh/ft².yr MJ/m².yr	1.4 53
Cooling Tower/Air Cooled Condense	r Maintenan Annual Ma	aintenance Tasks		Incidence									
		/Clean Spray Nozzles		(%)	(years)							Fuel Oil / Propane El kWh/ft².yr	UI
	Megger M											MJ/m².yr	
	Inspect/Ve	erify Operation of Controls										Market Composite E kWh/ft².yr	UI 1.4
												MJ/m².yr	53
DOMESTIC HOT WATER													
Service Hot Water Plant Type		resent (%)			Std. Boiler			Fuel Shar		Fossil		Elec. Res. 100%	
Service Hot Water load (MJ/m².yr)	22.8 Eff./COP	0.550	0.600	0.900	0.750	0.900	j	Blended B	inciency	#DIV/0!		0.94	
(Tertiary Load) Wetting Use Percentage	90%			- /	All Electric EU kWh/ft².yr	0.6		Fuel	Oil / Propan kWh/ft².yr	#DIV/0!		Market Composite E kWh/ft².yr #	DIV/0!
					MJ/m².yr	24			MJ/m².yr	#DIV/0!		MJ/m².yr #	DIV/0!

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

REGION:

NEW BUILDINGS: Large Office Baseline

SIZE: > 100 kW

Island Interconnected HVAC FANS & PUMPS

SUPPLY FANS				Ventilation	and Evhau	et Fan One	eration & Contr
OCT ET TARO					tion Fan		aust Fan
System Design Air Flow 6.0	L/s.m²	1.18 CFM/ft ²	Control	Fixed	Variable	Fixed	Variable
System Static Pressure CAV 750		3.0 wg			Flow		Flow
System Static Pressure VAV 750	Pa	3.0 wg	Incidence of Use	50%	50%	100%	
Fan Efficiency 52%	, i		Operation	Continuou	Scheduled	Continuous	Scheduled
Fan Motor Efficiency 85%							
Sizing Factor 1.00			Incidence of Use	75%	25%	75%	25%
		0.95 W/ft ²					
Fan Design Load VAV 10.2	W/m²	0.95 W/ft ²	Comments:				
XHAUST FANS							
	-						
	L/s.washroom	212 CFM/wash	nroom				
Washroom Exhaust per gross unit area 0.1		0.02 CFM/ft ²					
Other Exhaust (Smoking/Conference) 0.1		0.02 CFM/ft²					
Total Building Exhaust 0.2 Exhaust System Static Pressure 250		0.04 CFM/ft²					
Exhaust System Static Pressure 250 Fan Efficiency 40%		1.0 wg					
Fan Motor Efficiency 40%							
Sizing Factor 1.0	+						
Exhaust Fan Connected Load 0.2	W/m²	0.02 W/ft ²					
.Xildast Fair Connected Edda 5.2	**/	3.02 W/IT					
UXILIARY COOLING EQUIPMENT (Condense	or Pump and Cooling	Towar/Condensor Fans)					
•	or a unip and cooling	•					
Average Condenser Fan Power Draw		0.018 kW/kW	0.06 kW/Ton				
Cooling Tower/Evap. Condenser/ Air Cooled Co	indenser)	2.24 W/m²	0.21 W/ft²				
Condensor Ruma							
Condenser Pump							
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton				
Pump Design Flow per unit floor area		0.007 L/s.m²	0.010 U.S. gpm/ft²				
Pump Head Pressure		100 kPa	33.333333 ft				
Pump Efficiency		55%	30.000000				
Pump Motor Efficiency		90%					
Sizing Factor		1.0					
Pump Connected Load		1.34 W/m²	0.12 W/ft ²				
·							
CIRCULATING PUMP (Heating & Cooling)							
Pump Design Flow @ 5 °C (10 °F) delta T	0	.005 L/s.m²	0.0079 U.S. gpm/ft ²	2.4 U.S. gpm/	Ton		
Pump Head Pressure	- 0	150 kPa	50 ft	2.4 U.S. ypm/	1011		
Pump Efficiency		55%					
Pump Motor Efficiency		90%					
Sizing Factor		0.5					
Pump Connected Load		0.8 W/m²	0.08 W/ft²				
. ,							
Supply Fan Occ. Period	3	500 hrs./year					
Supply Fan Occ. Feriod Supply Fan Unocc. Period		i260 hrs./year					
Supply Fan Energy Consumption		62.2 kWh/m².yr					
Supply Fair Elicity Consumption		OZ.Z KYVIVIII . yi					
Exhaust Fan Occ. Period	3	500 hrs./year					
Exhaust Fan Unocc. Period		260 hrs./year					
Exhaust Fan Energy Consumption		1.2 kWh/m².yr					
	<u> </u>						
Condenser Pump Energy Consumption		1.7 kWh/m².yr					
Cooling Tower /Condenser Fans Energy Consum	ption	0.6 kWh/m².yr					
-							
Circulating Pump Yearly Operation	5	000 hrs./year					
Circulating Pump Energy Consumption		kWh/m².yr					
ans and Pumps Maintenance	Annual Maintenance	Tasks	Incidence Frequency				
	Inspect/Service Fans	& Motore	(%) (years)				
	inspect/Service Fans	a woods					

Cooling Tower /Condenser Fans Energy Consu	umption 0.6 kWh/m².yr						
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	5000 hrs./year kWh/m².yr						
Fans and Pumps Maintenance	Annual Maintenance Tasks		Frequency				
	Inspect/Service Fans & Motors	(%)	(years)				
	Inspect/Adjust Belt Tension on Fan Belts						
	Inspect/Service Pump & Motors				EUI	kWh/ft².yr	6.1
						MJ/m².yr	236.4

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: Large Office Baseline SIZE: > 100 kW REGION: Island Interconnected

EUI SUMMARY							
TOTAL ALL END-USES:	Electricity:		25.6 kWh/ft².yr 990.8 MJ/m².yr	Fuel Oil	Propane: #DI	W/0! kWh/ft².yr	# DIV/0! MJ
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electi	icity	Fuel Oil /	Propane
GENERAL LIGHTING	4.6	176.9		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
ARCHITECTURAL LIGHTING	0.8	29.2	SPACE HEATING	7.8	302.1		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	1.2	48.0		
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	24.2	#DIV/0!	#DIV/0!
HVAC FANS & PUMPS	6.1	236.4	FOOD SERVICE EQUIPMENT	0.1	4.0		
REFRIGERATION	0.1	4.0					
MISCELLANEOUS	0.3	10.0					
BLOCK HEATERS							
COMPUTER EQUIPMENT	2.4	91.2					
COMPUTER SERVERS	0.4	16.2					
ELEVATORS	0.1	3.9					
OUTDOOR LIGHTING	0.4	17.0					

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

REGION:

NEW BUILDINGS:

SIZE:

Small Office < 100 kW Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 20,000 ft² Wall U value (W/m².°C) Typical Building Size 1,859 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² Glazing U value (W/m².°C) 2.80 W/m².°C 0.49 Btu/hr.ft².°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.35 Defined as Exterior Zone Typical # Stories 0.58 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A TOTAL Ventilation System Type CAV VAV VAVR System Present (%) 100% 50% 150% Min. Air Flow (%) (Minimum Throttled Ai 60% Occupancy or People Density 274 ft²/person %OA 13.99% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air 42 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: CFM/ft² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation I /s m² operation (%) Sizing Factor Total Air Circulation or Design Air Flow 1.10 CFM/ft² 5.61 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² 50% Infiltration Rate Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 770.463 Switchover Point KJ/kg. 18 Peak Design Cooling Load Peak Zone Sensible Load 316,489 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipment 13.2 ft³/lbm All Pneumatic 14,723 DDC/Pneumatic Total air circulation or Design air 5.61 l/s.m² All DDC Total (should add-up to 100%) PI / PID Proportional Control mode Control Mode Rese Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 14 °C 57.2 °F 24 °C Summer Humidity (%) 50% Enthalpy Winter Occ. Temperature 23.4 Btu/lbm 65.5 KJ/kg 28.2 Btu/lbm 54.5 73.4 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 19.6 Btu/lbm 23 °C 30% 73.4 °F Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves, Inspection of Control Devices (Dampers, VAV Boxes)

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: Small Office Baseline SIZE: < 100 kW

LIGHTING										
GENERAL LIGHTING Light Level	500 Lux	46.5	ft-candles							
Floor Fraction (GLFF)	0.95	40.5	It-cardies							
Connected Load	12.9 W/m²	1.2	W/ft²							
Occ. Period(Hrs./yr.)	2500		Light Level (Lux)	300	500 700	1000		Total	1	
Unocc. Period(Hrs./yr.)	6260		% Distribution	300	100%	1000		100%	1	
Usage During Occupied Period	95%		Weighted Average	,	•			500		
Usage During Unoccupied Period	20%			INC	CFL T12	2 T8 HID	T5HO LED	TOTAL	-	
Fixture Cleaning:			System Present (%)	INC	OIL 112	100%	0% 0%			
Incidence of Practice			CU	0.7	0.7 0.6		0.6 0.6			
Interval	years		LLF Efficacy (L/W)	0.65 15	0.65 0.75 50 72		0.80 0.80 95 90			
Relamping Strategy & Incidence	Group Spot	1	Lineacy (Livv)	13	30 12	00 00	93 90	.1	1	
of Practice									kWh/ft².yr	4.1
ARCHITECTURAL LIGHTING									MJ/m².yr	160
Light Level	350 Lux	32.5	ft-candles							
Floor Fraction (ALFF) Connected Load	0.05	1.0	1141/642							
Connected Load	12.9 W/m²	1.2	W/ft²							
Occ. Period(Hrs./yr.)	2500		Light Level (Lux)	200	300 400			Total	1	
Unocc. Period(Hrs./yr.) Usage During Occupied Period	6260 95%		% Distribution Weighted Average	10%	40% 40%	6 10%		100% 350		
Usage During Unoccupied Period	40%		Weighted Average					330	1	
				INC	CFL T12		T5HO LED			
Fixture Cleaning: Incidence of Practice			System Present (%) CU	5% 0.7	30% 0.7 0.6	40% 5% 0.6 0.6	15% 5% 0.6 0.6			
Interval	years		LLF	0.65	0.65 0.75		0.80 0.80			
			Efficacy (L/W)	15	50 72	88 65	95 90	1]	
Relamping Strategy & Incidence of Practice	Group Spot	<u> </u>						EUI	kWh/ft².yr	0.3
					EUI = Load X Hrs.)	X SF X GLFF			MJ/m².yr	11
SPECIAL PURPOSE LIGHTING	I		ft-candles		Ele ex free	tion check: should = 1.	00 1.00	٦		
Light Level Floor Fraction (HBLFF)	Lux		rt-candles		FIOOT Had	tion check: Should = 1.	00 1.00	_		
Connected Load	W/m²		W/ft²							
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)	300	500 700	1000		Total	1	
Unocc. Period(Hrs./yr.)	4760		% Distribution	300	300 700	1000		I Otal	1	
Usage During Occupied Period	0%		Weighted Average	,	•					
Usage During Unoccupied Period	100%			INC	CFL T12	2 T8	MH HPS	TOTAL		
Fixture Cleaning:			System Present (%)		OI E TIZ	10	IVIII TII C	TOTAL		
Incidence of Practice			CU	0.7	0.7 0.6		0.6 0.6			
Interval	years		LLF Efficacy (L/W)	0.65 15	0.65 0.75 50 72		0.55 0.55 65 90			
Relamping Strategy & Incidence	Group Spot	t	Emodey (ETT)	1.0	00 12	0.1 001	00 00			
of Practice									kWh/ft².yr	
									MJ/m².yr	
TOTAL LIGHTING						Overall LP	12.92 W/m ²	EUI TOTAL		4
									MJ/m².yr	172
OFFICE EQUIPMENT & PLUG LOA	DS									
Equipment Type	Comp	outere	Monitors	Printers	Copiers	Servers	Plug Loads	7		
Equipment Type	Comp	Juleis	WOTHOTS	Timeis	Copieis	Servers	r lug Luaus	-		
Measured Power (W/device)		55	51	100	200	50				
Density (device/occupant)		0.9	0.9	0.15	0.1	0.26				
Connected Load		1.9 W/m²	1.8 W/m²	0.6 W/m²	0.8 W/m²	0.5 W/m²	1.5 W/m²			
Diversity Occupied Period		0.2 W/ft ²	0.2 W/ft² 80%	0.05 W/ft² 80%	0.07 W/ft ² 80%	0.05 W/ft² 100%	0.14 W/ft² 80%			
Diversity Unoccupied Period	50	0%	50%	50%	50%	100%	50%			
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		760	2000 6760	2000 6760	2000 6760	2000 6760	2500 6260			
Operation office. I endd (183./year)	07	00	0700	0700	0700	0700	0200	Ш		
Total end-use load (occupied period)		5.8 W/m²	0.5 W/ft²				Computer Servers		kWh/ft².yr	0.42
Total end-use load (unocc. period)	:	3.8 W/m ²	0.4 W/ft ²				Computer Equipment		MJ/m².yr kWh/ft².yr	16.20 2.36
Usage during occupied period	100								MJ/m².yr	91.24
Usage during unoccupied period	66	6%					Plug Loads		kWh/ft².yr	0.72
								1	MJ/m².yr	27.70
FOOD SERVICE EQUIPMENT	E 1011/D	F 101		E E	400.00/		I		i = =	
Provide description below:	Fuel Oil / Propane	e Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propane EUI kWh/ft².yr	e EUI		Electric EUI kWh/ft².yr	
						MJ/m².yr			MJ/m².yr	
REFRIGERATION										
Provide description below:				_						
			-]					kWh/ft².yr	
									MJ/m².yr	
BLOCK HEATERS & MISCELLANE	ous									
							Block Heaters	FIII	kWh/ft².yr	
							DIOUR HEALEIS		MJ/m².yr	
							Miscellaneous	EUI	kWh/ft².yr	0.26
								1	MJ/m².yr	10.00

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: Small Office Baseline SIZE: < 100 kW

SPACE HEATING												
Heating Plant Type					el Oil / Propa		A /A LID	Elec		Dociotopor	Total]
		2		Stan.	High	Packaged Unit	A/A HP	W. S. HP I	1/R Chiller			
		System Present (%) Eff./COP		70%	80%	75%	1.70	3.00	4.50	100%	100%	
		Performance (1 / Eff.) (kW/kW)		1.43	1.25	1.33	0.59	0.33	0.22	1.00		
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	48.9 W/m² 275 MJ/m².yr		Btu/hr.ft² kWh/ft².yr									
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		1	Oil Fuel Sha	re]				All Electric EUI kWh/ft².yr 7.1
Boiler Maintenance	Annual Ma	aintenance Tasks		Incidence	1			•				MJ/m².yr 275
	Fire Side	Inspection		(%) 75%								Fuel Oil / Propane EUI kWh/ft².yr
		e Inspection for Scale Buil of Controls & Safeties	dup	100% 100%								MJ/m².yr
	Inspection	of Burner Analysis & Burner Set-up		100% 90%								Market Composite EUI kWh/ft².yr 7.1
SPACE COOLING												MJ/m².yr 275
A/C Plant Type												
A/C Flant Type			Centrifugal Standard	Chillers HE	WSHP	Reciprocat Open	ing Chillers	Absorption W. H.	Chillers CW	Total		
		System Present (%) COP	Standard 4.7	20.0%	3.5	3.5	80.0%		CVV	100.0%		
		Performance (1 / COP)	0.21			0.29		1.11	1.00			
		(kW/kW) Additional Refrigerant										
		Related Information										
Control Mode		Incidence of Use	Fixed	Reset	1							
		Chilled Water	Setpoint									
		Condenser Water										
Setpoint		Chilled Water	7	°c	44.6	°F						
		Condenser Water Supply Air		°C	86 57.2	°F						
Peak Cooling Load	121 W/m²	39 Btu/hr.ft²		ft²/Ton								
Seasonal Cooling Load (Tertiary Load)	122.1 MJ/m².yr	3.2 kWh/ft².yr		T								
Sizing Factor	1.00		Operation (oc	c. period)	3000	hrs/year	Note value	e cannot be	ess than 2	900 hrs/ye	ar)	
A/C Saturation (Incidence of A/C)	90.0%											
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		I								
Chiller Maintenance	Annual Ma	aintenance Tasks		Incidence (%)	Frequency (years)							
		ontrol, Safeties & Purge Un oupling, Shaft Sealing and		(/	()							
	Megger N											
	Vibration .	Analysis ent Testing										
		emical Oil Analysis										All Electric EUI kWh/ft².yr 1.3
Cooling Tower/Air Cooled Condense	Maintanan Annual Me	sintananaa Taalaa		Incidence	Frequency							MJ/m².yr 51
Cooling Tower/Air Cooled Condense				(%)	(years)							Fuel Oil / Propane EUI
	Inspect/Se	/Clean Spray Nozzles ervice Fan/Fan Motors										kWh/ft².yr MJ/m².yr
	Megger M Inspect/Ve	erify Operation of Controls										Market Composite EUI
												kWh/ft².yr 1.3 MJ/m².yr 51
DOMESTIC HOT WATER												
Service Hot Water Plant Type	Fossil Fue System P Eff./COP	el SHW Std. Tank resent (%) 100.00% 0.550			Std. Boiler 0.750	Cnd. Boil. 0.900		Fuel Share Blended Ef	ficiency	Fossil 0% 55000.00		Elec. Res. 100% 0.94
Service Hot Water load (MJ/m².yr) (Tertiary Load)	22.8	0.550	, 0.000	•	•		J					
Wetting Use Percentage	90%			A	All Electric EU kWh/ft².yr MJ/m².yr	0.6 24			il / Propan kWh/ft².yr MJ/m².yr	0.0 0		Market Composite EUI kWh/ft².yr 0.6 MJ/m².yr 24.2
									,			

NEW BUILDINGS: Small Office Baseline SIZE: < 100 kW COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

HVAC FANS & PUMPS											
SUPPLY FANS					Ventilation	n and Exhau	st Fan Ope	eration & Contro	ol		
						ation Fan		aust Fan			
System Design Air Flow	5.6 L/s.m ²	1 10	CFM/ft ²	Control	Fixed	Variable	Fixed	Variable			
System Static Pressure CAV	750 Pa	3.0				Flow		Flow			
System Static Pressure VAV	750 Pa		wg	Incidence of Line	100%		100%	I IUW			
		3.0	l wa	Incidence of Use				O - b - d · · ·			
an Efficiency	52%			Operation	Continuo	Scheduled	Continuous	Scheduled			
an Motor Efficiency	85%										
Sizing Factor	0.50			Incidence of Use	75%	25%	75%	25%			
an Design Load CAV	4.8 W/m ²	0.44	W/ft²	•							
Fan Design Load VAV	4.8 W/m ²	0.44	W/ft ²	Comments:							
EXHAUST FANS											
_											
Washroom Exhaust	100 L/s.was	hroom	212 CFM/washro	oom							
Washroom Exhaust per gross unit area	0.2 L/s.m ²		0.04 CFM/ft ²								
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²		0.02 CFM/ft ²								
Total Building Exhaust	0.3 L/s.m ²		0.06 CFM/ft ²								
Exhaust System Static Pressure	250 Pa		1.0 wg								
			1.0 wg								
an Efficiency	40%										
an Motor Efficiency	80%										
Sizing Factor	0.5										
Exhaust Fan Connected Load	0.1 W/m²	0.01	W/ft ²								
	V	0.01	1								
AUXILIARY COOLING EQUIPMENT (Condenser Pump	and Cooling Tov	•								
Average Condenser Fan Power Draw			0.018 kW/kW	0.06 kW/Ton							
Cooling Tower/Evap. Condenser/ Air C	Condenser		2.17 W/m²	0.20 W/ft²							
Cooming Towork Lyap. Condensel/ All C	, solica con luci isel)		Z.17 VV/III	0.20 VV/I							
Condenser Pump											
Pump Design Flow			0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area			0.006 L/s.m²	0.009 U.S. gpm/ft ²							
Pump Head Pressure			100 kPa	33.333333 ft							
Pump Efficiency			55%								
Pump Motor Efficiency			90%								
Sizing Factor			0.5								
Pump Connected Load			0.65 W/m²	0.06 W/ft ²							
ump Connected Load			0.03 W/III	0.00							
CIRCULATING PUMP (Heating & Cod	oling)										
Pump Design Flow @ 5 °C (10 °F) del	ta T	0.005	L/s.m²	0.0077 U.S. gpm/ft ² 2	.4 U.S. gpm	/Ton					
	ld I				.4 U.S. gpiii	/1011					
Pump Head Pressure			kPa	50 ft							
Pump Efficiency		55%									
Pump Motor Efficiency		90%									
Sizing Factor		0.5									
Pump Connected Load			W/m²	0.07 W/ft ²							
ump connected Lodd		0.0	J **/III-	O.O/ WY/IC							
Supply For Occ. Boried		2500	hra Avoor								
Supply Fan Occ. Period			hrs./year								
Supply Fan Unocc. Period			hrs./year								
Supply Fan Energy Consumption		46.7	kWh/m².yr								
3,			•								
xhaust Fan Occ. Period		3500	hrs./year								
xhaust Fan Unocc. Period			hrs./year								
xhaust Fan Energy Consumption		0.9	kWh/m².yr								
			-								
			kWh/m².yr								
Condenser Pump Energy Consumption			kWh/m².yr								
	y Consumption		7. /								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energ	y Consumption	F000									
Cooling Tower /Condenser Fans Energo Circulating Pump Yearly Operation	y Consumption	5000									
Cooling Tower /Condenser Fans Energo Circulating Pump Yearly Operation	y Consumption	5000	hrs./year kWh/m².yr								
Cooling Tower /Condenser Fans Energ Circulating Pump Yearly Operation Circulating Pump Energy Consumption			kWh/m².yr	Incidence Frequency							
Cooling Tower /Condenser Fans Energ Circulating Pump Yearly Operation Circulating Pump Energy Consumption		5000 Maintenance Task	kWh/m².yr	Incidence Frequency							
cooling Tower /Condenser Fans Energ circulating Pump Yearly Operation circulating Pump Energy Consumption	Annual	Maintenance Task	kWh/m².yr	Incidence Frequency (%) (years)							
Cooling Tower /Condenser Fans Energ	Annual Inspect/	Maintenance Task Service Fans & M	kWh/m².yr								
Cooling Tower /Condenser Fans Energ Circulating Pump Yearly Operation Circulating Pump Energy Consumption	Annual Inspect/	Maintenance Task Service Fans & M Adjust Belt Tensio	kWh/m².yr					Г	EIII	<i>ΝΛ/h/642 ve</i>	
ooling Tower /Condenser Fans Energ irculating Pump Yearly Operation irculating Pump Energy Consumption	Annual Inspect/	Maintenance Task Service Fans & M	kWh/m².yr					[EUI	kWh/ft².yr MJ/m².yr	1

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: Small Office Baseline SIZE: < 100 kW REGION: Island Interconnected

EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		22.1 kWh/ft².yr 855.1 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 MJ	l/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	4.1	160.2		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	0.3	11.3	SPACE HEATING	7.1	275.2			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	1.2	45.6			
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	24.2	0.0	0.0	
HVAC FANS & PUMPS	4.6	176.4	FOOD SERVICE EQUIPMENT					
REFRIGERATION								
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	2.4	91.2						
COMPUTER SERVERS	0.4	16.2						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

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COMMERCIAL SECTOR BUILDING PROFILE NEW BUILDINGS: SIZE: REGION: VINTAGE: Food Retail Baseline CONSTRUCTION 30,000 ft² 0.28 W/m².°C Wall U value (W/m².°C) 0.05 Btu/hr.ft² .°F Typical Building Size 2,788 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 1,225 m² 13,181 ft² 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 40% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.11 Defined as Exterior Zone Typical # Stories 0.69 Floor to Floor Height (m) 6.0 m 19.7 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A TOTAL Ventilation System Type CAV VAV VAVR System Present (%) 100% Min. Air Flow (%) (Minimum Throttled Ai 50% Occupancy or People Density 484 ft²/person %OA 15.81% 45 m²/person Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period 90% resh Air Requirements or Outside Air 20 L/s.person 42 CFM/person Fresh Air Control Type 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.55 CFM/ft² 2.81 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² Infiltration Rate Operation occupied period 50% (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Peak Design Cooling Load Peak Zone Sensible Load Switchover Point KJ/kg. 18 232.012 118,985 64.4 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm Controls Type System Present (%) HVAC Room 23.4 Btu/lbm Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic DDC/Pneumatic All DDC 5,535 Total air circulation or Design air 2.81 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control Mode Control mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Air Summer Temperature 71.6 °F 55.4 °F 22 °C 13 Summer Humidity (%) 50% 100% Enthalpy
Winter Occ. Temperature
Winter Occ. Humidity 65.5 KJ/kg 22 °C 30% 28.2 Btu/lbm 23.4 Btu/lbm 54.5 71.6 60.8 45% Enthalpy Winter Unocc. Temperature 53 K 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 69.8 Winter Unocc. Humidity 30% 21.5 Btu/lbm Enthalpy 50 KJ/kc Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance

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Annual Maintenance Tasks

Inspection of PE Switches Inspection of Auxiliary Devices Inspection of Control Devices (Valves,

(Dampers, VAV Boxes)

Inspection/Calibration of Room Thermosta

Incidence

(%)

Annual Maintenance Tasks

Calibration of Transmitters

Calibration of Panel Gauges Inspection of Auxiliary Devices

Inspection of Control Devices

Incidence

(%)

NEW BUILDINGS: SIZE: Food Retail

Baseline

VINTAGE:

REGION: Island Interconnected

LIGHTING GENERAL LIGHTING 500 Lux 46.5 ft-candles Liaht Level Floor Fraction (GLFF) 0.90 1.2 W/ft² Connected Load 13.2 W/m² Occ. Period(Hrs./yr.) 5000 Light Level (Lux) 500 600 1000 % Distribution Weighted Average Unocc. Period(Hrs./vr.) 3760 100% 100% Usage During Occupied Period 100% 500 Usage During Unoccupied Period 20% INC T12 T8 LED TOTAL CFL T5H0 System Present (%)
CU
LLF 2% 0.7 3% 0.7 10% 0.7 0% ixture Cleaning: 55% 30% 100.0% Incidence of Practice 0.6 0.6 0.6 Interval 0.65 0.65 0.75 0.80 0.80 0.80 0.80 Efficacy (L/W) 50 88 65 95 Relamping Strategy & Incidence Group Spot EUI kWh/ft2.yr of Practice 6.4 MJ/m².yr 246 SECONDARY LIGHTING 46.5 ft-candles Light Level 500 Lux Floor Fraction (ALFF) 0.10 12.8 W/m² 1.2 W/ft² Connected Load 5000 Light Level (Lux) 500 700 1000 Unocc. Period(Hrs./vr.) 3760 % Distribution 100% 100% Usage During Occupied Period Weighted Average 100% 500 Usage During Unoccupied Period 50% INC CFL T12 T8 TOTAL System Present (%)
CU
LLF Fixture Cleaning: 80% 5% 15% 0% 100.0% 0.7 0.6 Incidence of Practice 0.6 0.6 0.6 0.6 0.80 0.80 Efficacy (L/W) 15 50 72 88 65 95 90 Relamping Strategy & Incidence Group Spot kWh/ft² vr of Practice EUI 0.8 EUI = Load X Hrs. X SF X GLFF MJ/m².yr 32 TERTIARY LIGHTING ft-candles Floor fraction check: should = 1.00 1.00 Light Level Lux Floor Fraction (HBLFF) W/ft² Connected Load W/m² Occ. Period(Hrs./yr.) Light Level (Lux)
% Distribution
Weighted Average 4000 300 500 700 1000 Total Unocc. Period(Hrs./yr.) 4760 Usage During Occupied Period 0% Jsage During Unoccupied Period 100% HPS TOTAL INC CFL T12 T8 МН System Present (%)
CU
LLF
Efficacy (L/W) Fixture Cleaning: 0% 0.0% Incidence of Practice 0.7 0.7 0.6 0.6 0.6 0.6 0.6 Interval 0.65 0.65 0.75 0.80 0.80 0.55 0.55 15 50 72 84 88 65 Relamping Strategy & Incidence Group Spot of Practice EUI kWh/ft².yr MJ/m².vr EUI TOTAL kWh/ft².yr TOTAL LIGHTING Overall LP 13.18 W/m² 278 OFFICE EQUIPMENT & PLUG LOADS Equipment Type Computers Monitors Printers Copiers Servers Plug Loads Measured Power (W/device) 100 Density (device/occupant) 0.65 0.65 0.03 0.01 0.01 0.0 W/m² Connected Load 0.7 W/m² 1.5 W/m² 0.8 W/m² 0.0 W/m² 0.1 W/m² 0.1 W/ft² 90% 0.00 W/ft² 90% 0.14 W/ft² 90% 0.1 W/ft² 0.00 W/ft² 0.01 W/ft² Diversity Occupied Period 90% Diversity Unoccupied Period 50% 50% 50% 50% 100% 50% Operation Occ. Period (hrs./year) 2000 2000 Operation Unocc. Period (hrs./year) 6760 6760 6760 6760 6160 Total end-use load (occupied period) 2.9 W/m² 0.3 W/ft² to see notes (cells with red indicator in upper right corner, type "SHIFT @mputer Servers EUI kWh/ft2.yr 0.11 1.7 W/m² 0.2 W/ft² MJ/m².yr 4.42 Total end-use load (unocc. period) Computer Equipme tEUI kWh/ft².yr 0.76 Usage during occupied period 100% MJ/m².yr 29.56 Usage during unoccupied period Plug Loads EUI MJ/m².yr 32.51 FOOD SERVICE EQUIPMENT Fuel Oil / Propane Fuel Share: Electricity Fuel Share: 100.0% Fuel Oil / Propane EUI Provide description below: EUI EUI kWh/ft².vr 2.6 kWh/ft2.vr 3.1 MJ/m².yr 100.0 MJ/m².yr 120.0 REFRIGERATION Provide description below Commercial refrigeration display cases EUI kWh/ft².yr 29.0 MJ/m².yr 1125.0 **BLOCK HEATERS & MISCELLANEOUS** Block Heaters EUI kWh/ft².yr MJ/m².yr kWh/ft².yr Miscellaneous EUI 0.3 MJ/m².yr 10

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: Food Retail Baseline SIZE:

Ne

SPACE HEATING													
Heating Plant Type					uel Oil / Propa pilers	ane Packaged	A/A HP		ctric H/R Chiller	Resistanc	Total		
		System Present (%)		Stan.	High	Rooftop	. , , , , , ,			100%			
		Eff./COP		80%			3.20	3.00	4.50	1.00			
		Performance (1 / Eff.) (kW/kW)		1.25	1.14	1.05	0.31	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	32.0 W/m² 181 MJ/m².yr		Btu/hr.ft² kWh/ft².yr								Γ	All Electric EUI	
Electric Fuel Share	100.0% Fuel 0	Oil / Propane Fuel Share			Oil Fuel Sha	are		I				kWh/ft².yr	4.7
Boiler Maintenance	Annual M	faintenance Tasks		Incidence	1						l	MJ/m².yr	181
	Fire Side	e Inspection		(%) 75%	<u>, </u>							Fuel Oil / Propane EL kWh/ft².yr	JI
		ide Inspection for Scale Bui on of Controls & Safeties	ildup	100%							Į	MJ/m².yr	
	Inspectio	on of Burner Analysis & Burner Set-up		100%)							Market Composite El kWh/ft².yr	JI 4.7
	ride Gas	7 may sis & Burner Set up		3070	2							MJ/m².yr	181
SPACE COOLING													
A/C Plant Type													
			Centrifugal Standard	Chillers HE	Screw Chillers	Reciprocat Open	ting Chillers	Absorption W. H.	Chillers CW	Total			
		System Present (%) COP	4.7				100.0%	0.9		100.0%			
		Performance (1 / COP)	0.21				0.37	1.11	1.00				
		(kW/kW) Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Line	Fixed	Deset	1 1	Į.	ļ.	Į.			J		
Control Mode		Incidence of Use	Fixed Setpoint	Reset									
		Chilled Water Condenser Water			_								
					_								
Setpoint		Chilled Water		°C	44.6								
		Condenser Water Supply Air	13.0	°C	55.4	°F °F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	24 W/m² 77.8 MJ/m².yr	8 Btu/hr.ft² 2.0 kWh/ft².y		ft²/Ton									
	1.00		Operation	/aaa masias	4000	lhen 6 cone	Note velve		laga than 2	000 hrs/10			
Sizing Factor	1.00		Operation (occ. period	1 4000	nrs/year	Note value	e cannot be	less than 2	900 nrs/ye	ear)		
A/C Saturation (Incidence of A/C)	80.0%												
Electric Fuel Share	100.0%	Fuel Oil / Propane Fuel S	ih										
Chiller Maintenance	Annual M	1aintenance Tasks		Incidence	Frequency	1							
		Control, Safeties & Purge U	Init	(%)	(years)								
	Inspect C	Coupling, Shaft Sealing and											
		ser Tube Cleaning											
		n Analysis rrent Testing											
		chemical Oil Analysis										All Electric EUI	0.0
	<u> </u>					-						kWh/ft².yr MJ/m².yr	0.8 30
Cooling Tower/Air Cooled Condense	r Maintenan Annual M	faintenance Tasks		Incidence (%)	Frequency (years)						[Fuel Oil / Propane EL	JI
		on/Clean Spray Nozzles Service Fan/Fan Motors				1						kWh/ft².yr MJ/m².yr	
		Motors									l r		
			3]						Market Composite El kWh/ft².yr	
		/erify Operation of Controls		•									8.0
		erify Operation of Control			•							MJ/m².yr	30
DOMESTIC HOT WATER		erify Operation of Controls											
DOMESTIC HOT WATER Service Hot Water Plant Type	Inspect/V	uel SHW Std. Tan	k PV Tank	Cond. Tnl	Std. Boiler	Cnd. Boil.		510		Fossil		MJ/m².yr	
Service Hot Water Plant Type	Fossil Fu System F Eff./COP	uel SHW Std. Tan Present (%) 0.00%	k PV Tank					Fuel Share Blended E		Fossil 0% 0.55		MJ/m².yr	
Service Hot Water Plant Type Service Hot Water load (MJ/m².yr)	Inspect/V Fossil Fu System F	uel SHW Std. Tan Present (%) 0.009	k PV Tank							0%		MJ/m².yr Elec. Res. 100%	
Service Hot Water Plant Type	Fossil Fu System F Eff./COP	uel SHW Std. Tan Present (%) 0.009	k PV Tank	0.900		0.900		Blended E		0% 0.55		MJ/m².yr Elec. Res. 100%	30

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New REGION: Island Interconnected NEW BUILDINGS: Food Retail Baseline SIZE: Ali

HVAC FANS & PUMPS												
								0				
SUPPLY FANS							n and Exhau tion Fan		eration & Co ust Fan	ontrol		
System Design Air Flow	2.8 L/s.m ²	0.55	CFM/ft²	Control		Fixed	Variable	Fixed	Variable			
	750 Pa	3.0		Control		i ixeu	Flow	TIACU	Flow			
	750 Pa	3.0	wg	Incidence of Use		100%		100%	1 IOW			
	730 T a	3.0	wg	Operation			Scheduled		Schodulad			
	80%			Operation		Continuo	NOCI leduled	Continuous	o ci ieduied			
	.00			Incidence of Use		100%		100%				
	4.4 W/m²	0.41	W/ft²	incluence or ose		10070	,	10070				
	4.4 W/m²		W/ft²		Comments:							
r an Boolgin Load 1711		0.11	*****		Commonto.							
EXHAUST FANS						1				I		
Washroom Exhaust 1	00 L/s.wasl		040 0514/									
	0.2 L/s.wasi 0.2 L/s.m ²	nioom	212 CFM/wash 0.03 CFM/ft²	iroom								
	0.1 L/s.m ²		0.03 CFM/ft²									
	0.1 L/s.m²		0.02 CFM/ft²									
	250 Pa		1.0 wg									
			1.0 wg									
	25%											
	75%											
	1.0	0.00	101/642									
Exhaust Fan Connected Load	0.4 W/m ²	0.03	W/ft²									
AUXILIARY COOLING EQUIPMENT (Conde	enser Pump	and Cooling Tov	er/Condenser Fans)									
Average Condenses For Dower B			0.000 144/1444		0.07 WW/Ton							
Average Condenser Fan Power Draw			0.020 kW/kW		0.07 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled	Condenser)		0.49 W/m ²		0.05 W/ft ²							
Condenser Pump												
Pump Design Flow			0.053 L/s.KW		3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area			0.001 L/s.m ²	(0.002 U.S. gpm/ft ²							
Pump Head Pressure			kPa		ft							
Pump Efficiency			50%									
Pump Motor Efficiency			80%									
Sizing Factor			1.0									
Pump Connected Load			W/m²		W/ft²							
CIRCULATING PUMP (Heating & Cooling)												
						7	_					
Pump Design Flow @ 5 °C (10 °F) delta T		0.001	L/s.m ²	0.0015 U.S. g	gpm/ft ² 2.4	U.S. gpm/	Ton					
Pump Head Pressure			kPa	50 ft								
Pump Efficiency		50%										
Pump Motor Efficiency		80%										
Sizing Factor		0.8										
Pump Connected Load			W/m²	W/ft²								
Supply Fan Occ. Period		5000	hrs./year									
Supply Fan Unocc. Period			hrs./year									
Supply Fan Energy Consumption			kWh/m².yr									
Cappy . a.i Energy Consumption		30.3										
Exhaust Fan Occ. Period		5000	hrs./year									
Exhaust Fan Unocc. Period			hrs./year									
Exhaust Fan Onocc. Period Exhaust Fan Energy Consumption			kWh/m².yr									
Exhaust Fair Energy Consumption		3.1	KTTIVIII . yi									
Condenser Pump Energy Consumption			kWh/m².yr									
Cooling Tower /Condenser Fans Energy Con	sumption	0.4	kWh/m².yr									
		0										
Circulating Pump Yearly Operation		7000	hrs./year									
Circulating Pump Energy Consumption		7000	kWh/m².yr									
on outside in the Energy Consumption												
Fans and Pumps Maintenance	Annual I	Maintenance Task	S	Incidence Frequ	ency							
·				(%) (yea								
	Inspect/S	Service Fans & M	otors	, /								
		Adjust Belt Tensio										
		Service Pump & N								EUI	kWh/ft².yr	3.9
	1			1							MJ/m².yr	151.1
										1		.01.1

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

REGION: Island Interconnected

NEW BUILDINGS: Food Retail Baseline SIZE:

EUI SUMMARY **53.1** kWh/ft².yr **2,056.5** MJ/m².yr Fuel Oil / Propane: 0.0 kWh/ft².yr 0.0 MJ/m².yr TOTAL ALL END-USES: Electricity: Electricity kWh/ft².yr MJ/m².yr 4.7 181.2 0.6 24.2 Fuel Oil / Propane kWh/ft².yr MJ/m².yr END USE: kWh/ft².yr MJ/m².yr 6.4 246.5 END USE: END USE:
GENERAL LIGHTING
SECONDARY LIGHTING
TERTIARY LIGHTING
OTHER PLUG LOADS
HVAC FANS & PUMPS
REFRIGERATION
MISCELLANEOUS
BLOCK HEATERS
COMPUTER EQUIPMENT
COMPUTER SERVERS
ELEVATORS
OUTDOOR LIGHTING SPACE HEATING SPACE COOLING DOMESTIC HOT WATER FOOD SERVICE EQUIPMENT 8.0 31.6 32.5 151.1 0.8 1.3 3.1 50.0 0.0 0.0 120.0 3.9 29.0 0.3 1,125.0 10.0 8.0 29.6 0.1 1.3 50.4

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NEW BUILDINGS: SIZE: REGION: VINTAGE: Large Non-Food Retail > 100 kW New Island Interconnected CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 20,000 ft² Wall U value (W/m².°C) Typical Building Size 1,859 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 1,859 20,000 ft² 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space 100% Percent Conditioned Space 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.10 Defined as Exterior Zone Typical # Stories 0.78 Floor to Floor Height (m) 6.0 m 19.7 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 269 ft²/person 15.06% %OA m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 20 L/s.person 42 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor 5.31 L/s.m² Total Air Circulation or Design Air Flow 1.05 CFM/ft² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² CFM/ft² Infiltration Rate L/s.m² 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 533.548 Peak Zone Sensible Load 224,846 Room air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Discharge air enthalpy Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 10,460 DDC/Pneumatic Total air circulation or Design air 5.31 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 57.2 °F 69.8 °F 21 °C 14 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication
Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

NEW BUILDINGS: Large Non-Food Retail Baseline SIZE: > 100 kW COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

LIGHTING GENERAL LIGHTING															
Light Level	500	Lux	46.5	ft-candles											
Floor Fraction (GLFF) Connected Load	0.95 15.9	W/m²		W/ft²											
Occ. Period(Hrs./yr.)	4500	1		Light Level (Lux)		300	500	700	1000			То	tol		
Unocc. Period(Hrs./yr.)	4260			% Distribution		300	100%	700	1000				100%		
Usage During Occupied Period	95%			Weighted Average						•			500		
Usage During Unoccupied Period	15%					INC	CFL	T12	T8	HID	T5HO	LED T	OTAL		
Fixture Cleaning:				System Present (%)		5%	10%		55%	10%	20%	0% 10	00.0%		
Incidence of Practice Interval				CU LLF		0.7 0.65	0.7	0.6 0.75	0.6	0.7	0.6	0.6			
mterval		years		Efficacy (L/W)		15	50	72	88	65	95	90			
Relamping Strategy & Incidence	Group	Spot					,	•		,				A.II. (7:0	
of Practice												EUI		Wh/ft².yr IJ/m².yr	6.9 267
ARCHITECTURAL LIGHTING	-	1	1												
Light Level Floor Fraction (ALFF)	500 0.05	Lux	46.5	ft-candles											
Connected Load		W/m²	1.5	W/ft²											
Occ. Boriod(Hrs. hr.)	4500	1		Light Level (Lux)		300	500	700	1000			To	ital		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4260			% Distribution		300	100%	700	1000				100%		
Usage During Occupied Period	95%			Weighted Average						I			500		
Usage During Unoccupied Period	50%					INC	CFL	T12	T8	HID	T5HO	LED TO	OTAL		
Fixture Cleaning:				System Present (%)		5%	10%	112	20%	10%	50%		00.0%		
Incidence of Practice				CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6			
Interval		years		LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80	0.80 65	0.80 (95	90			
Relamping Strategy & Incidence	Group	Spot	1	Lineacy (L/VV)		15	30	12	00	03	95	30			
of Practice										_		EUI		Wh/ft².yr	0.5
SPECIAL PURPOSE LIGHTING						<u> </u>	EUI = Load	X Hrs. X	SF X GLF	<u> </u>			IV	1J/m².yr	19
Light Level		Lux		ft-candles			F	loor fraction	n check:	should = 1.	00	1.00			
Floor Fraction (HBLFF) Connected Load		W/m²		W/ft²											
Connected Edad		, **/111]**///											
Occ. Period(Hrs./yr.)	4000			Light Level (Lux)		300	500	700	1000			То	ital		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	4760 0%			% Distribution Weighted Average											
Usage During Unoccupied Period	100%			Ü											
Fixture Cleaning:				System Present (%)		INC	CFL	T12	T8		MH	HPS T	OTAL		
Incidence of Practice				CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6			
Interval		years		LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80	0.80	0.55 (65	90			
Relamping Strategy & Incidence	Group	Spot	7	Efficacy (L/VV)		15	30	12	04	00	65	90			
of Practice												EUI		Wh/ft².yr	
													IV	1J/m².yr	
TOTAL LIGHTING										Overall LP	15.88 W/m ²	EUIT		Wh/ft².yr	7
													IV	1J/m².yr	285
OFFICE EQUIPMENT & PLUG LOA	ADS														
Equipment Type	1	Compu	tore	Monitors	Driv	nters	Copie	are	Sor	vers	Plug Loads				
Equipment Type		Compu	1612	IVIOTIILOIS	FIII	illers	Copie	315	Sei	veis	Flug Loads				
Measured Power (W/device)		5	5	51	100		200	+	217]					
Density (device/occupant)		0.22	2	0.22	0.01		0.01		0.02						
Connected Load			W/m² W/ft²	0.4 W/m² 0.0 W/ft²		W/m² W/ft²	0.1 V 0.01 V			W/m² W/ft²	1.15 W/m² 0.11 W/ft²				
Diversity Occupied Period		90%		90%	90%	VV/IL-	90%	v/1t-	100%	VV/IL-	90%				
Diversity Unoccupied Period		50%		50%	50%		50%		100%		50%				
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		2000 6760		2000 6760	2000 6760	-	2000 6760	+	2000 6760		4100 4660				
						l.									
Total end-use load (occupied period) Total end-use load (unocc. period)			1 W/m² 2 W/m²	0.2 W/ft ² 0.1 W/ft ²	to see note	es (cells with r	ed indicator	in upper ri	ght corne	r, type "SHI	FT @mputer Ser	vers EUI		Wh/ft².yr IJ/m².yr	0.11 4.42
Total end-use load (driocc. period)		1.4	2] VV/III-	0.1 VV/It-							Computer Equip	ment EUI		Wh/ft².yr	0.49
Usage during occupied period		100%												1J/m².yr	19.14
Usage during unoccupied period		59%	ó								Plug Lo	oads EUI		Wh/ft².yr 1J/m².yr	0.64 24.92
														·····	21.02
FOOD SERVICE EQUIPMENT Provide description below:		Fuel Oil /	Propane Fuel Sh	5	Electricity I	Fuel Share:	100.0%	Г	Euol (Dil / Propan	o El II			Electric EUI	
i Tovide description below.		i dei Oii/	i Topane i dei oi	iai c.	Liectricity	i dei onare.	100.078	E	EUI	kWh/ft².yr	e LOI	EUI		Wh/ft².yr	1.0
					_					MJ/m².yr			N	1J/m².yr	38.7
REFRIGERATION															
Provide description below:					_										
					_							EUI		Wh/ft².yr IJ/m².yr	1.5 58.1
													IV	S,111 .y1	JU. I
BLOCK HEATERS & MISCELLANE	ous				·										
											Block Hea	aters EUI	k\	Wh/ft².yr	
											NA!			IJ/m².yr	
											Miscellan	eous EUI		Wh/ft².yr 1.J/m².yr	0.3

NEW BUILDINGS: SIZE: Large Non-Food Retail > 100 kW

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

VINTAGE: New REGION: Island Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistanc Packaged A/A HP Total Stan High Rooftop System Present (%) 100% 100% Eff./COP 80% 3.20 3.50 1.00 Performance (1 / Eff.) 1.33 1.25 1.33 0.31 0.29 0.22 1.00 (kW/kW) Peak Heating Load 33.1 W/m² 10.5 Btu/hr.ft² 179 MJ/m².vr Seasonal Heating Load 4.6 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share 46 MJ/m².yr 179 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 179 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Recprocting Chillers | Absorption Chillers Total Standard HE Chillers Open DX CW 100.0% System Present (%) COP 100.0% Performance (1 / COP) 0.21 0.19 0.23 0.27 0.37 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 14.0 °C Supply Air 84 W/m² 27 Btu/hr.ft² 450 ft²/Ton Peak Cooling Load Seasonal Cooling Load 115.1 MJ/m².yr 3.0 kWh/ft².yr (Tertiary Load) 1.00 Sizing Factor 90.0% A/C Saturation (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 1.0 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 1.0 kWh/ft².vr MJ/m².yr 38 DOMESTIC HOT WATER Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW Fossil Elec. Res. System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.900 0.750 0.900 Blended Efficiency 0.55 0.91 Service Hot Water load (MJ/m².yr) 17.3 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI 90% 0.8 0.5 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr kWh/ft2.yr MJ/m².yr MJ/m2.yı 19.0

NEW BUILDINGS: SIZE: Large Non-Food Retail > 100 kW VINTAGE:

REGION: Island Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan System Design Air Flow System Static Pressure CAV 5.3 L/s.m² 750 Pa 1.05 CFM/ft² Control red Variable Fixed Variable 3.0 wa Flow Flow System Static Pressure VAV 750 Pa 3.0 wg Incidence of Use 100% 100% Fan Efficiency 60% Operation Continuous Scheduled Continuous Schedule Fan Motor Efficiency 88% 1.00 7.5 W/m² 7.5 W/m² Sizing Factor Incidence of Use 75% 25% 50% 50% Fan Design Load CAV 0.70 W/ft² Comments: Fan Design Load VAV 0.70 W/ft² EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 50 L/s.washroom 106 CFM/washroom 0.1 L/s.m² 0.01 CFM/ft² Other Exhaust (Smoking/Conference) 0.1 L/s.m² CFM/ft² Total Building Exhaust 0.2 L/s.m² 0.03 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 1.0 0.2 W/m² 0.02 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.07 kW/Ton 0.16 W/ft² 0.020 kW/kW 1.68 W/m² Condenser Pump Pump Design Flow Pump Design Flow per unit floor area I/s KW U.S. gpm/Ton U.S. gpm/ft² L/s.m² 45 kPa 50% Pump Head Pressure 15 ft Pump Efficiency Pump Motor Efficiency 80% Sizing Factor 1.0 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 0.0053 U.S. gpm/ft² 0.004 L/s.m² 2.4 U.S. gpm/Ton kPa Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 8.0 W/ft² Pump Connected Load W/m² Supply Fan Occ. Period 5500 hrs./year Supply Fan Unocc, Period 3260 hrs./year Supply Fan Energy Consumption 59.9 kWh/m².yr Exhaust Fan Occ. Period 5500 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 3260 hrs./year 1.5 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.5 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 7000 hrs./year kWh/m2.yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 5.8 MJ/m².yr 222.8

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New REGION: Island Interconnected NEW BUILDINGS: Large Non-Food Retail Baseline SIZE: > 100 kW

EUISUMMARY							
TOTAL ALL END-USES:	Electricity:	:	24.0 kWh/ft².yr 929.1 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 M.
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil / Propa	ane
GENERAL LIGHTING	6.9	266.6		kWh/ft2.yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
ARCHITECTURAL LIGHTING	0.5	18.6	SPACE HEATING	4.6	178.8		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.9	34.1		
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0
HVAC FANS & PUMPS	5.8	222.8	FOOD SERVICE EQUIPMENT	1.0	38.7		
REFRIGERATION	1.5	58.1					
MISCELLANEOUS	0.3	10.0					
BLOCK HEATERS							
COMPUTER EQUIPMENT	0.5	19.1					
COMPUTER SERVERS	0.1	4.4					
ELEVATORS/ESCALATORS							
OUTDOOR LIGHTING	0.9	33.9					
Fuel Specific EUIs for Heating Co	oling & DHW						

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	٦			1								1			
` '	W/m².°C W/m².°C			Btu/hr.ft ² . ^c Btu/hr.ft ² . ^c				uilding Size ootprint (m²)			929 929	m ²	10,000 10,000		
) W/m².°C			Btu/hr.ft ² .				Aspect Rati			529	IIIF	10,000	11-	
2.00 (V//// 2)			0.10	Diam	•		Percent C	onditioned	Space		100%				
Window/Wall Ratio (WIWAR) (%) 0.10								onditioned a s Exterior Z			45%				
Shading Coefficient (SC) 0.78							Typical #	Stories			1]			
							Floor to F	loor Height	(m)		6.0	m	19.7	ft	
WENTH ATION OVOTEN BUILDING CONTRO	N 0 0 IND	OOD OONDITIO	NIO												
VENTILATION SYSTEM, BUILDING CONTRO	DLS & IND	OOR CONDITIO	DNS												
Ventilation System Type		Custom Drocon	4 (0/)	CAV 100%		DDMZ	DDMZVV	VAV	VAVR	. IU	100% O.A	TOTA 100			
		System Preser Min. Air Flow (9	%)					50%				100	70		
		(Minimum Thro	ttled Air Vo	lume as Pe	ercent of Fu	III Flow)									
Occupancy or People Density			m²/persor	1	269	ft²/person				%OA	17.20%]			
Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period		90%													
Fresh Air Requirements or Outside Air		20	L/s.persor	n	42	CFM/perso	n								
Fresh Air Control Type *(enter	a 1, 2 or 3)	1	If Fresh Ai	r Control T	ype = "2" er	nter % FA. to	o the right:			34%	Ţ				
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)		If Fresh Ai	r Control T	ype = "3" er	nter Make-up	Air Ventila	ation and op	eration	0.5			IO CFM/ft ²		
Sizing Factor		1.4								50%	operation	(%)			
Total Air Circulation or Design Air Flow		4.65	L/s.m ²		0.92	CFM/ft ²		Separate N	Anko un ni	r unit /1000	/ OA)		L/s.m²	CFM/	1+2
Infiltration Rate		0.42	L/s.m²		0.08	CFM/ft ²		Separate i	Operation	occupied p	period	50'	%	CFIWI/	t-
(air infiltration is assumed to occur during unocc hours only if the ventilation system shuts down)	upied								Operation	unoccupie	d period	50'	%		
								7							
Economizer	Incidence	of Use	Enthalp	y Based	100%	lb Based	Total 100%		Summarv	of Design	Parameters	;			
	Switchove	er Point		KJ/kg.	18				Peak Desi	ign Cooling	Load	294,94			
				Btu/lbm	64.4	°F		1	Peak Zone Room air	e Sensible enthalpy	Load	140,59 28.	3 2 Btu/lbm		
Controls Type	System P	resent (%)		HVAC	Room				Discharge	air enthalp		23.	4 Btu/lbm		
	All Pneum	atic		Equipment	Controls				Specific volu Design CF		55F & 100% F	R 13 6,54	.2 ft³/lbm 0		
	DDC/Pne	umatic							Total air c	irculation o	r Design air		l/s.m²		
	All DDC Total (sho	uld add-up to 10	0%)												
			Propo	rtional	PI / PID	Total	1								
Control mode	Control M	ode	•			Total									
	Control St	trategy	Fixed Di	scharge	Reset										
			I	I	_			1	0 1 1:				_		
Indoor Design Conditions	Summer 7	Гетрегаture		21	Room °C	69.8	°F	14	Supply Air °C	57.2	°F	1			
		lumidity (%)		50%	14.10	00.0	I Day ///	100%	12.1/1						
	Enthalpy Winter Oc	c. Temperature			KJ/kg. °C	28.2 69.8		54.5 15	KJ/kg. °C		Btu/lbm °F				
		c. Humidity		30%		00.0	I Day ///	45%	12.1/1	40.0	7 Day //h				
	Enthalpy Winter Un	occ. Temperatu	re		KJ/kg. °C	69.8	Btu/lbm °F	45.5	KJ/kg.	19.6	Btu/lbm	J			
		occ. Humidity		30%		24.5	T Day/llbane								
	Enthalpy			50	KJ/kg.	21.5	Btu/lbm						_		
Damper Maintenance				Incidence	Frequency										
				(%)	(years)										
	Control Au Lubricatio	rm Adjustment n													
		al Replacement													
Air Filter Cleaning	Changes/	Year]										
		7				Incidence o	f Annual R	oom Contro	ols Mainter	nance]			
Incidence of Annual HVAC Controls Maintenance	e	_													
	Annual Ma	aintenance Tasks	3	Incidence				Annual Ma	intenance ⁻	Tasks		Incidend	e		
	Calibration	n of Transmitters	3	(%)	-			Inspection	Calibration	n of Room	Thermostat	(%)	+		
	Calibration	n of Panel Gaug	es		1			Inspection	of PE Swi	tches					
		of Auxiliary Devi			+			Inspection Inspection		y Devices Devices (\	/alves.		_		
								(Dampers,			•				
İ															

NEW BUILDINGS: Small Non-Food Retail Baseline SIZE: < 100 kW

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

LIGHTING GENERAL LIGHTING															
Light Level	500 L	ux	46.5	ft-candles											
Floor Fraction (GLFF) Connected Load	0.95 18.8 W	V/m²		W/ft²											
Occ. Period(Hrs./yr.)	3500			Light Level (Lux)		300	500	700	1000	1			Total	İ	
Unocc. Period(Hrs./yr.)	5260			% Distribution		300	100%	700	1000			-	100%	İ	
Usage During Occupied Period Usage During Unoccupied Period	95% 15%			Weighted Average									500		
Fixture Cleaning:				System Present (%)		INC 10%	CFL 5%	T12	T8 55%	HID 30%	T5HO 0%	LED 0%	TOTAL 100.0%	1	
Incidence of Practice				CU	/	0.7	0.7	0.6	0.6	0.7	0.6	0.6	100.070	İ	
Interval	y	rears		LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80 88	0.80 65	0.80 95	0.80		l	
Relamping Strategy & Incidence of Practice	Group	Spot		Emodey (E11)			00		- 50	- 55	30			kWh/ft².yr	6.8
ARCHITECTURAL LIGHTING														MJ/m².yr	265
Light Level	500 L	.ux	46.5	ft-candles											
Floor Fraction (ALFF) Connected Load	0.05 16.6 W	V/m²	1.5	W/ft²											
Occ. Period(Hrs./yr.)	3500			Light Level (Lux)		300	500	700	1000				Total	İ	
Unocc. Period(Hrs./yr.)	5260			% Distribution			100%						100%	l	
Usage During Occupied Period Usage During Unoccupied Period	95% 50%			Weighted Average									500	l	
						INC	CFL	T12				LED	TOTAL		
Fixture Cleaning: Incidence of Practice				System Present (%))	5% 0.7	10% 0.7	0.6	20%	20%	40% 0.6	5% 0.6	100.0%	1	
Interval	y	rears		LLF		0.65	0.65	0.75	0.80	0.80	0.80	0.80		l	
Relamping Strategy & Incidence	Group	Spot		Efficacy (L/W)		15	50	72	88	65	95	90		ı	
of Practice	Croup	Орог					-111 1	I V I I V	0E V 0L E	-			EUI	kWh/ft².yr	0.5
SPECIAL PURPOSE LIGHTING						ŀ	EUI = Load	1 X Hrs. X	SF X GLF	F				MJ/m².yr	18
Light Level Floor Fraction (HBLFF)	L	ux		ft-candles			F	loor fract	ion check:	should = 1	.00	1.00			
Connected Load	v	V/m²		W/ft²											
Occ. Period(Hrs./yr.)	4000			Light Level (Lux)		300	500	700	1000	1		Т	Total	İ	
Unocc. Period(Hrs./yr.)	4760			% Distribution		300	300	700	1000	1		F	Total	1	
Usage During Occupied Period	0%			Weighted Average		·	•							1	
Usage During Unoccupied Period	100%					INC	CFL	T12	Т8		MH	HPS	TOTAL	1	
Fixture Cleaning:				System Present (%))	0.7	0.7	0.0	0.0	0.0	0.0	0.0		l	
Incidence of Practice Interval	v	rears		CU LLF		0.7 0.65	0.7 0.65	0.6	0.6	0.6	0.6 0.55	0.6		1	
				Efficacy (L/W)		15	50	72	84	88	65	90		I	
Relamping Strategy & Incidence of Practice	Group	Spot											EUI	kWh/ft².yr	
														MJ/m².yr	
TOTAL LIGHTING										Overall LP	18.72 W/m²	2	EUI TOTAL	kWh/ft².yr MJ/m².yr	7 283
OFFICE EQUIPMENT & PLUG LOA	ADS														
Equipment Type		Computers		Monitors	Pri	nters	Copie	ers	Ser	vers	Plug Loads	3			
						,				-					
Measured Power (W/device) Density (device/occupant)	[F	55 0.22		51 0.22	0.01		200 0.01		217 0.02						
Connected Load		0.5 W/m²		0.4 W/m²		W/m²	0.01 0.1 V	V/m²		W/m²	1.15 W/m²	2			
Diversity Occupied Period		0.0 W/ft² 90%		0.0 W/ft² 90%	90%	W/ft²	0.01 V 90%	V/ft²	0.01	W/ft²	0.11 W/ft²	!			
Diversity Unoccupied Period	-	50%		50%	50%	-	50%		100%		50%				
Operation Occ. Period (hrs./year)		2000		2000	2000		2000		2000		4100				
Operation Unocc. Period (hrs./year)		6760		6760	6760		6760		6760		4660				
Total end-use load (occupied period)		2.1 W/m² 1.2 W/m²		0.2 W/ft ² 0.1 W/ft ²	to see not	es (cells with r	ed indicator	r in upper	right corne	r, type "SHI	IFT @mputer Se	ervers		kWh/ft².yr	0.11
Total end-use load (unocc. period)		1.2 ٧٧/1112		0.1 W/IL							Computer Equip	ment		MJ/m².yr kWh/ft².yr	4.42 0.49
Usage during occupied period		100%										.		MJ/m².yr	19.14
Usage during unoccupied period		59%									Plug L	oads		kWh/ft².yr MJ/m².yr	0.64 24.92
FOOD SERVICE EQUIPMENT												-			
Provide description below:	Fuel Oil / P	ropane Fuel Share	9:	5	Electricity	Fuel Share:	100.0%		Fuel	_ Oil / Propan	e EUI	Γ	All	Electric EUI	ı
						_			EUI	kWh/ft².yr		F	EUI	kWh/ft².yr	
										MJ/m².yr				MJ/m².yr	
REFRIGERATION												-			
Provide description below:					7							Г	EUI	kWh/ft².yr	
					_									MJ/m².yr	
BLOCK HEATERS & MISCELLANE	ous														
											Dis alice	- ۲ م د م		IAA/Is/6+2	
											Block He	aters		kWh/ft².yr MJ/m².yr	
											Miscellan	neous	EUI	kWh/ft².yr	0.3
1														MJ/m².vr	10

NEW BUILDINGS: Small Non-Food Retail SIZE: < 100 kW

90%

Wetting Use Percentage

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

VINTAGE: New REGION: Island Interconnected

0.8

kWh/ft2.yr

0.5

19.0

kWh/ft².yr MJ/m².yr

Baseline SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistanc Packaged A/A HP Total Stan High Rooftop System Present (%) 100% 100% Eff./COP 80% 3.20 3.50 1.00 Performance (1 / Eff.) 1.33 1.25 1.33 0.31 0.29 0.22 1.00 (kW/kW) Peak Heating Load 49.8 W/m² 15.8 Btu/hr.ft² 279 MJ/m².vr Seasonal Heating Load 7.2 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share MJ/m².yr 279 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 279 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Recprocting Chillers | Absorption Chillers Total Standard HE Chillers Open DX CW 100.0% System Present (%) COP 100.0% Performance (1 / COP) 0.21 0.19 0.23 0.27 0.37 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 14.0 °C Supply Air 93 W/m² 29 Btu/hr.ft² 407 ft²/Ton Peak Cooling Load Seasonal Cooling Load 131.3 MJ/m².yr 3.4 kWh/ft².yr (Tertiary Load) 1.00 Sizing Factor 90.0% A/C Saturation (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI kWh/ft2.yr 1.1 MJ/m².yr 43 Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI kWh/ft².vr 1.1 MJ/m².yr 43 DOMESTIC HOT WATER Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW Fossil Elec. Res. System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.900 0.750 0.900 Blended Efficiency 0.55 0.91 Service Hot Water load (MJ/m².yr) 17.3 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI

kWh/ft2.yr

MJ/m2.yı

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: Small Non-Food Retail Baseline SIZE: < 100 kW

System Design Air Flow						Ventilation	and Exhau	st Fan One	eration & Contro	nl	
							ion Fan		ıst Fan	,,	
	1.6 L/s.m²	0.92	CFM/ft ²	Control		Fixed	Variable	Fixed	Variable		
ISVETOR Static Proceure ('AV	750 Pa		wg	CONTROL		i ixou	Flow	1 IACU	Flow		
	750 Pa		wg	Incidence of Use		100%	FIUW	100%	FIOW		
	0%	3.0	_ wg		3		Cabadulad		Cabadulad		
				Operation		Continuous	Scheaulea	Continuous	Scheduled		
	8%										
Sizing Factor 1.	00			Incidence of Use	9	75%	25%	50%	50%		
Fan Design Load CAV	6.6 W/m ²	0.61	W/ft²								
Fan Design Load VAV	6.6 W/m ²	0.61	W/ft²		Comments:						
EXHAUST FANS											
Washroom Exhaust	50 L/s.was	.h	106 CFM/wa								
	0.1 L/s.was	moom	0.02 CFM/ft²	ISTITOOTTI							
	0.1 L/s.m ²		0.02 CFM/ft ²								
).2 L/s.m ²		0.04 CFM/ft ²								
	250 Pa		1.0 wg								
Fan Efficiency 2	5%										
Fan Motor Efficiency 7	5%										
	1.0										
Exhaust Fan Connected Load	0.3 W/m²	0.03	W/ft ²								
		0.00	J,								
AUXILIARY COOLING EQUIPMENT (Conde	nser Pump	and Cooling Tov	ver/Condenser Fans	s)							
	•	_									
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled	Condenser))	0.020 kW/kW 1.86 W/m²		0.07 kW/Ton 0.17 W/ft²						
Condenser Pump											
Pump Design Flow			L/s.KW		U.S. gpm/Ton						
Pump Design Flow per unit floor area			L/s.m²		U.S. gpm/ft ²						
				<u> </u>							
Pump Head Pressure			45 kPa		15 ft						
Pump Efficiency			50%								
Pump Motor Efficiency			80%								
Sizing Factor			1.0								
Pump Connected Load			W/m²		W/ft²						
CIRCULATING PUMP (Heating & Cooling)											
Pump Design Flow @ 5 °C (10 °F) delta T		0.004	L/s.m ²	0.0059 U.S.	gpm/ft ²	2.4 U.S. gpm/	Ton				
Pump Head Pressure		3.00	kPa	ft	Ji						
Pump Efficiency		50%		·							
Pump Motor Efficiency		80%									
Sizing Factor		0.8									
Pump Connected Load		0.8	W/m²	W/ft²	,						
i ump connected Load			AA/III.	vv/ft							
Supply Fan Occ. Period		5500	hrs./year								
Supply Fan Unocc. Period			hrs./year								
Supply Fan Unocc. Period Supply Fan Energy Consumption			nrs./year kWh/m².yr								
Supply Fan Energy Consumption		52.5	KVVIVIII*.YF								
Exhaust Fan Occ. Period		EFOO	hrs./year								
Exhaust Fan Unocc. Period			hrs./year								
		2.0	kWh/m².yr								
Exhaust Fan Energy Consumption			1								
	sumption	0.5	kWh/m².yr kWh/m².yr								
Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Cons			hrs./year								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Cons Circulating Pump Yearly Operation		7000									
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Cons		7000	kWh/m².yr								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Cons Circulating Pump Yearly Operation Circulating Pump Energy Consumption	Annual		kWh/m².yr	Incidence Free	uency						
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Cons Circulating Pump Yearly Operation	Annual	7000 Maintenance Tasl	kWh/m².yr	Incidence Freq							
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Cons Circulating Pump Yearly Operation Circulating Pump Energy Consumption		Maintenance Tasl	kWh/m².yr		uency ears)						
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Cons Circulating Pump Yearly Operation Circulating Pump Energy Consumption	Inspect/	Maintenance Tasl Service Fans & M	kWh/m².yr								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Cons Circulating Pump Yearly Operation Circulating Pump Energy Consumption	Inspect/	Maintenance Tasl Service Fans & M Adjust Belt Tensic	kWh/m².yr							1240 %0	
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Cons Circulating Pump Yearly Operation Circulating Pump Energy Consumption	Inspect/	Maintenance Tasl Service Fans & M	kWh/m².yr						EUI	kWh/ft².yr MJ/m².yr	5.1 198.0

REGION: Island Interconnected

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: Small Non-Food Retail Baseline SIZE: < 100 kW

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		23.5 kWh/ft².yr 910.3 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	6.8	265.0		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	0.5	17.8	SPACE HEATING	7.2	279.3			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	1.0	38.8			
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0	
HVAC FANS & PUMPS	5.1	198.0	FOOD SERVICE EQUIPMENT					
REFRIGERATION								
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.5	19.1						
COMPUTER SERVERS	0.1	4.4						
ELEVATORS/ESCALATORS								
OUTDOOR LIGHTING	0.9	33.9						
Fuel Specific EUIs for Heating Cod	olina & DHW							

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NEW BUILDINGS: SIZE: REGION: VINTAGE: Large Accommodation > 100 kW Island Interconnected Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 40,000 ft² Wall U value (W/m².°C) Typical Building Size 3,717 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 1,500 16,140 ft² 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.30 Defined as Exterior Zone Typical # Stories 0.65 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV FCoils IU 100% O.A System Present (%) 10% 90% 100% Min. Air Flow (%)
(Minimum Throttled Air 60% Occupancy or People Density 538 ft²/person m²/person %OA 9.65% Occupancy Schedule Occ. Period 50% Occupancy Schedule Unocc. Period 80% resh Air Requirements or Outside Air 15 32 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 3.11 L/s.m² 0.61 CFM/ft² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 652.273 Peak Zone Sensible Load 376,026 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 17,493 DDC/Pneumatic Total air circulation or Design air 3.11 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 71.6 °F 55.4 °F 13 °C 22 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

NEW BUILDINGS: Large Accommodation Baseline SIZE: > 100 kW COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

LIGHTING									
GENERAL LIGHTING (SUITES) Light Level	125 Lux	11.6 ft-candles							
Floor Fraction (GLFF) Connected Load	0.75 8.9 W/m²	0.8 W/ft²							
Occ. Period(Hrs./yr.)	2500	Light Level (Lux)	50	100 200	300		Total		
Unocc. Period(Hrs./yr.)	6260	% Distribution		75% 25%			100%		
Usage During Occupied Period Usage During Unoccupied Period	50% 25%	Weighted Average	ING	051 740	T0 100	T5110 150	125		
Fixture Cleaning:		System Present (%)	INC 30%	CFL T12 50%	10%	T5HO LED 0% 10%			
Incidence of Practice Interval	years	CU LLF	0.7	0.7 0.6 0.65 0.75	0.6 0.6 0.80 0.80	0.6 0.6 0.80 0.80	-		
Relamping Strategy & Incidence	Group Spot	Efficacy (L/W)	15	50 72	88 65	95 90			
of Practice								kWh/ft².yr MJ/m².yr	1.7 67
SECONDARY LIGHTING Light Level	300 Lux	27.9 ft-candles							
Floor Fraction (ALFF) Connected Load	0.25 13.9 W/m²	1.3 W/ft²							
				1					
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	3000 5760	Light Level (Lux) % Distribution	300 100%	500 700	1000		Total 100%		
Usage During Occupied Period	85%	Weighted Average	10076				300		
Usage During Unoccupied Period	75%		INC	CFL T12	T8 HID	T5HO LED	TOTAL		
Fixture Cleaning:		System Present (%)	15%	15%	55%	0% 15%	100.0%		
Incidence of Practice Interval	years	CU LLF	0.7 0.65	0.7 0.6 0.65 0.75	0.6 0.6 0.80 0.80	0.6 0.6 0.80 0.80			
Relamping Strategy & Incidence	Group Spot	Efficacy (L/W)	15	50 72	88 65	95 90			
of Practice	Отобр Орог		FI	JI = Load X Hrs. X	SE X GLEE			kWh/ft².yr MJ/m².yr	2.2 86
TERTIARY LIGHTING		ftll	L			00 4.00	_	vi3/iiiyi	
Light Level Floor Fraction (HBLFF)	Lux	ft-candles		Floor fract	tion check: should = 1.	00 1.00	1		
Connected Load	W/m²	W/ft²							
Occ. Period(Hrs./yr.)	4000	Light Level (Lux)					Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	4760 0%	% Distribution Weighted Average							
Usage During Unoccupied Period	100%	vveignied Average							
Fixture Cleaning:		System Present (%)	INC	CFL T12 0%	Т8	MH HPS 100% 0%			
Incidence of Practice		CU	0.7	0.7 0.6	0.6 0.6	0.6 0.6			
Interval	years	LLF Efficacy (L/W)	0.65	0.65 0.75 50 72	0.80 0.80 84 88	0.55 0.55 65 90			
Relamping Strategy & Incidence of Practice	Group Spot		12			33 33		kWh/ft².yr	
or ractice								MJ/m².yr	
TOTAL LIGHTING					Overall LP	10.11 W/m ²	EUI TOTAL	kWh/ft².yr MJ/m².yr	4 153
OFFICE EQUIPMENT & PLUG LOA	ADS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads	1		
Measured Power (W/device)	55 0.3	51	100 0.05	200 0.033	217 0.02				
Density (device/occupant) Connected Load	0.3 W/m²	0.3 0.3 W/m²	0.05 0.1 W/m²	0.033 0.1 W/m²	0.02 0.1 W/m²	1.5 W/m²			
Discounts Occupied Bartod	0.0 W/ft²	0.0 W/ft²	0.01 W/ft²	0.01 W/ft²	0.01 W/ft²	0.14 W/ft²			
Diversity Occupied Period Diversity Unoccupied Period	90% 50%	90% 50%	90% 50%	90% 50%	100%	70% 25%			
Operation Occ. Period (hrs./year)	2000	2000	2000	2000	2500	3000			
Operation Unocc. Period (hrs./year)	6760	6760	6760	6760	6260	5760			
Total end-use load (occupied period)	1.9 W/m²		to see notes (cells with re-	d indicator in upper	right corner, type "SHI	FT @mputer Servers		kWh/ft².yr	0.10
Total end-use load (unocc. period)	0.9 W/m²	0.1 W/ft²				Computer Equipmen		MJ/m².yr kWh/ft².yr	3.68 0.42
Usage during occupied period Usage during unoccupied period	100%					Plug Loads		MJ/m².yr kWh/ft².yr	16.11 0.49
Osage during unoccupied period	48%					Plug Loads		MJ/m².yr	19.12
FOOD SERVICE EQUIPMENT									
Provide description below: Kitchen services	Fuel Oil / Propane Fuel Shar	re: 2.0%	Electricity Fuel Share:	98.0%	Fuel Oil / Propan EUI kWh/ft².yr	1.3		Electric EUI kWh/ft².yr	0.6
TARGET GOT TIGGS					MJ/m².yr	50.0		MJ/m².yr	25.0
REFRIGERATION									
Provide description below: Walk-in coolers/freezers, reach-in coo	olers/freezers, refrigerated buff	et cases					EUI	kWh/ft².yr	0.4
	-							MJ/m².yr	15.0
BLOCK HEATERS & MISCELLANE	ous								
						Block Heaters	EUI	kWh/ft².yr	
							1	MJ/m².yr	
						Miscellaneous	EUI	kWh/ft².yr	0.3

NEW BUILDINGS: SIZE: Large Accommodation > 100 kW

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

VINTAGE: New REGION: Island Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Packaged A/A HP Stan High Unit System Present (%) 100% 100% Eff./COP 80% 3.20 3.00 1.00 Performance (1 / Eff.) 1.33 1.25 1.33 0.31 0.33 0.22 1.00 (kW/kW) Peak Heating Load 15.9 Btu/hr.ft² 50.2 W/m² 273 MJ/m².vr Seasonal Heating Load 7.0 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share MJ/m².yr 273 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 273 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Chillers Open W. H. CW System Present (%) COP 20.0% 100.0% 80.0% Performance (1 / COP) 0.21 0.19 0.2 0.29 0.34 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 13.0 °C 86 °F 55.4 °F Supply Air 44 W/m² 14 Btu/hr.ft² 866 ft²/Ton Peak Cooling Load Seasonal Cooling Load 74.1 MJ/m².yr 1.9 kWh/ft².yr (Tertiary Load) Operation (occ. perio 4000 hrs/year Note value cannot be less than 2,900 hrs/year) 0.85 Sizing Factor 80.0% A/C Saturation (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.7 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.7 kWh/ft².vr MJ/m².yr 28 DOMESTIC HOT WATER Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW Fossil Elec. Res. System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.750 0.900 Blended Efficiency 0.55 0.91 Service Hot Water load (MJ/m².yr) 236.6 (Tertiary Load) All Electric EUI Fuel Oil / Propane EUI Market Composite EUI 6.7 90% 6.7 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr 11.1 kWh/ft2.yr 260 MJ/m².yr 260.0 MJ/m2.yı

NEW BUILDINGS: SIZE: Large Accommodation > 100 kW Baseline VINTAGE: New REGION: Island Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan System Design Air Flow System Static Pressure CAV 0.61 CFM/ft² 3.1 L/s.m² Control Variable Fixed Variable 300 Pa 1.2 Flow Flow wa System Static Pressure VAV 300 Pa wg Incidence of Use 100% 100% Fan Efficiency 45% Operation Continuous Scheduled Continuous Schedule Fan Motor Efficiency 70% 1.00 3.0 W/m² 3.0 W/m² Sizing Factor Incidence of Use 60% 40% 100% Fan Design Load CAV 0.28 W/ft² Fan Design Load VAV 0.28 W/ft² Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 212 CFM/washroom 0.03 CFM/ft² 0.1 L/s.m² Other Exhaust (Smoking/Conference) 0.1 L/s.m² CFM/ft² Total Building Exhaust 0.2 L/s.m² 250 Pa 0.05 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 1.0 0.3 W/m² 0.03 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.022 kW/kW 0.95 W/m² 0.08 kW/Ton 0.09 W/ft² Condenser Pump 0.053 L/s KW 3.0 U.S. gpm/Ton Pump Design Flow Pump Design Flow per unit floor area 0.003 U.S. gpm/ft² 0.002 L/s.m² Pump Head Pressure Pump Efficiency kPa ft 50% Pump Motor Efficiency 80% Sizing Factor 1.0 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) 0.002 L/s.m² 100 kPa Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 2.4 U.S. gpm/Ton 0.0028 U.S. gpm/ft² 33 ft Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 0.8 Pump Connected Load 0.4 W/m² 0.03 W/ft² Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc, Period 5260 hrs./year Supply Fan Energy Consumption 19.7 kWh/m².yr Exhaust Fan Occ. Period 3500 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 5260 hrs./year 2.7 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.5 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 7000 hrs./year kWh/m2.yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr MJ/m².yr 82.5

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New REGION: Island Interconnected NEW BUILDINGS: Large Accommodation Baseline SIZE: > 100 kW

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		23.2 kWh/ft².yr 900.0 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	1.0 MJ/m	ı².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING (SUITES)	1.7	67.3		kWh/ft2.yr	MJ/m ² .yr	kWh/ft².yr	MJ/m².yr	
SECONDARY LIGHTING	2.2	85.8	SPACE HEATING	7.0	272.6			
TERTIARY LIGHTING			SPACE COOLING	0.6	22.7			
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.7	260.0	0.0	0.0	
HVAC FANS & PUMPS	2.1	82.5	FOOD SERVICE EQUIPMENT	0.6	24.5	0.0	1.0	
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.4	16.1						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS	0.1	3.9						
OUTDOOR LIGHTING	0.4	17.0						

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NEW BUILDINGS: SIZE: REGION: VINTAGE: Small Accommodation < 100 kW New Island Interconnected Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 20,000 ft² Wall U value (W/m².°C) Typical Building Size 1,859 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 1,500 16,140 ft² 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.30 Defined as Exterior Zone Typical # Stories 0.65 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV FCoils IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 60% Occupancy or People Density 538 ft²/person %OA 7.63% m²/person Occupancy Schedule Occ. Period 50% Occupancy Schedule Unocc. Period 80% resh Air Requirements or Outside Air 15 32 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor 1.4 Total Air Circulation or Design Air Flow 0.77 CFM/ft² 3.93 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 422.031 Peak Zone Sensible Load 237,866 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 11,066 DDC/Pneumatic Total air circulation or Design air 3.93 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 71.6 °F 55.4 °F 13 °C 22 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

NEW BUILDINGS: Small Accommodation Baseline SIZE: < 100 kW COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

LIGHTING GENERAL LIGHTING (SUITES)											
Light Level Floor Fraction (GLFF)	0.85	ft-candles									
Connected Load		W/ft²								·	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	2500 6260	Light Level (Lux) % Distribution		50 100 75%	200 25%	300			Total 100%		
Usage During Occupied Period Usage During Unoccupied Period	50% 25%	Weighted Average			T10	T 0		TELIO 1 - E	125		
Fixture Cleaning:		System Present (%)		INC CFL 20% 30%	T12	T8 50%	HID 0.6	T5HO LEI 0% 0% 0.6 0.6	100.0%		
Incidence of Practice Interval	years	LLF	(0.7 0.7 0.65 0.65 15 50	0.6 0.75	0.6	0.80	0.80 0.80			
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)		15 50	72	88	65	95 90	EUI	kWh/ft².yr	1.5
SECONDARY LIGHTING Light Level	300 Lux 27.9	ft-candles								MJ/m².yr	60
Floor Fraction (ALFF) Connected Load	0.15	W/ft²									
Occ. Period(Hrs./yr.)	3000	Light Level (Lux)		300 500	700	1000			Total	1	
Unocc. Period(Hrs./yr.) Usage During Occupied Period	5760 85%	% Distribution Weighted Average	1	00%	700	1000			100%		
Usage During Unoccupied Period	75%	vvoignica / voiage		INC CFL	T12	Т8	HID	T5HO LED			
Fixture Cleaning: Incidence of Practice		System Present (%)		20% 15% 0.7 0.7	0.6	55%	0.6	0% 10% 0.6 0.6	100.0%		
Interval	years	LLF Efficacy (L/W)	(0.65 0.65 15 50	0.75	0.80	0.80	0.80 0.80 95 90			
Relamping Strategy & Incidence of Practice	Group Spot	Lineacy (L/VV)		15 30	12	00	03	35 30	EUI	kWh/ft².yr	1.5
TERTIARY LIGHTING						SF X GLFF			<u></u>	MJ/m².yr	58
Light Level Floor Fraction (HBLFF)	Lux	ft-candles			Floor fracti	on check: s	should = 1.00	1.00			
Connected Load	W/m²	W/ft²								1	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4000 4760	Light Level (Lux) % Distribution							Total		
Usage During Occupied Period Usage During Unoccupied Period	0% 100%	Weighted Average									
Fixture Cleaning:		System Present (%)		INC CFL	T12	T8 Mag T8		MH HPS 100% 0%	100.0%		
Incidence of Practice Interval	years	CU LLF	(0.7 0.7 0.65 0.65	0.6 0.75	0.6	0.6	0.6 0.6 0.55 0.55			
Relamping Strategy & Incidence	Group Spot	Efficacy (L/W)		15 50	72	84	88	65 90			
of Practice									EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING						(Overall LP	8.25 W/m ²	EUI TOTAL	kWh/ft².yr MJ/m².yr	3 118
OFFICE EQUIPMENT & PLUG LOA	DS										
Equipment Type	Computers	Monitors	Printers	Сор	iers	Serv	ers	Plug Loads			
Measured Power (W/device)	55	51	100	200		217					
Density (device/occupant) Connected Load	0.3 0.3 W/m²	0.3 0.3 W/m²	0.05 0.1 W/m²		W/m²	0.02		1.5 W/m²			
Diversity Occupied Period	0.0 W/ft² 90%	0.0 W/ft² 90%	0.01 W/ft² 90%	90%	W/ft²	0.01 \	/V/ft²	0.14 W/ft² 70%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year)	50% 2000	50% 2000	50% 2000	50% 2000		100% 2500		25% 3000			
Operation Unocc. Period (hrs./year) Total end-use load (occupied period)	6760	0.2 W/ft²	to see notes (cells	6760	or in upper	6260	type "CUITT	5760	J	kWh/ft².yr	0.10
Total end-use load (unocc. period)	0.9 W/m²	0.1 W/ft²	to see notes (cells	with red indicate	or in upper	ngni comer,		omputer Equipmen		MJ/m².yr kWh/ft².yr	3.68 0.42
Usage during occupied period Usage during unoccupied period	100%						U	Plug Loads		MJ/m².yr kWh/ft².yr	16.11 0.49
osage during unoccupied period	48%							Plug Loads	SEUI	MJ/m².yr	19.12
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Sh	are: 100.0%		Fuel O	il / Propane I	=UI	Al	Electric EUI	
Kitchen services	r doi on / r ropano r doi ondro.			100.070		EUI I	Wh/ft².yr MJ/m².yr	1.3	EUI	kWh/ft².yr MJ/m².yr	0.6 25.0
REFRIGERATION								50.0	1	o/mr.yr	20.0
Provide description below: Walk-in coolers/freezers, reach-in coolers/	olers/freezers, refrigerated buffet case	es .	7						EUI	kWh/ft².yr	0.4
									1-0'	MJ/m².yr	15.0
BLOCK HEATERS & MISCELLANE	ous										
								Block Heaters	EUI	kWh/ft².yr MJ/m².yr	
								Miscellaneous	EUI	kWh/ft².yr MJ/m².yr	0.3
L									1		10

NEW BUILDINGS: SIZE:
Small Accommodation < 100 kW
Baseline

COMMERCIAL SECTOR BUILDING PROFILE

VINTAGE: New REGION: Island Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Packaged A/A HP Stan High Unit System Present (%) 100% 100% Eff./COP 80% 3.20 3.00 1.00 Performance (1 / Eff.) 1.33 1.25 1.33 0.31 0.33 0.22 1.00 (kW/kW) Peak Heating Load 52.3 W/m² 16.6 Btu/hr.ft² 295 MJ/m².yr Seasonal Heating Load 7.6 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share 7.6 MJ/m².yr 295 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 295 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Chillers Open W. H. CW System Present (%) COP 100.0% 100.0% Performance (1 / COP) 0.21 0.19 0.2 0.29 0.34 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 13.0 °C 86 °F 55.4 °F Supply Air 57 W/m² 18 Btu/hr.ft² 669 ft²/Ton Peak Cooling Load Seasonal Cooling Load 67.0 MJ/m².yr 1.7 kWh/ft².yr (Tertiary Load) Operation (occ. perio 4000 hrs/year Note value cannot be less than 2,900 hrs/year) 0.85 Sizing Factor 80.0% A/C Saturation (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.7 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.7 kWh/ft².vr MJ/m².yr 28 DOMESTIC HOT WATER Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW Fossil Elec. Res. System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.750 0.900 Blended Efficiency 0.55 0.91 Service Hot Water load (MJ/m².yr) 236.6 (Tertiary Load) All Electric EUI Fuel Oil / Propane EUI Market Composite EUI 6.7 90% 6.7 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr 11.1 kWh/ft2.yr 260 MJ/m².yr 260.0 MJ/m2.yı

NEW BUILDINGS: Small Accommodation Baseline SIZE: < 100 kW COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

HVAC FANS & PUMPS												
SUPPLY FANS						Ventilation	and Exhau	st Fan Ope	ration & Co	ontrol		
							tion Fan		st Fan			
System Design Air Flow 3.9	L/s.m²	0.77 CFM/ft ²	Control			Fixed	Variable	Fixed	Variable			
System Static Pressure CAV 300		1.2 wg	Control			inou	Flow	i ixeu	Flow			
			to at damen	411		4000/	FIUW	100%	FIOW			
) Pa	1.2 wg	Incidence of	it Use		100%						
Fan Efficiency 45%			Operation			Continuou	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 70%												
Sizing Factor 0.50			Incidence of	of Use		60%	40%	100%				
Fan Design Load CAV 1.9	W/m²	0.17 W/ft ²					•	•				
	W/m²	0.17 W/ft ²		C	mments:							
		5111		-								
EXHAUST FANS												
Washroom Exhaust 100	L/s.washroo	m 212 CFM/wa	shroom									
		0.03 CFM/ft²										
Washroom Exhaust per gross unit area 0.1												
Other Exhaust (Smoking/Conference) 0.1		0.02 CFM/ft ²										
Total Building Exhaust 0.2		0.05 CFM/ft ²										
Exhaust System Static Pressure 250	Pa	1.0 wg										
Fan Efficiency 25%												
Fan Motor Efficiency 75%												
Sizing Factor 0.5		0.04 14/62										
Exhaust Fan Connected Load 0.2	2 W/m ²	0.01 W/ft ²										
AUXILIARY COOLING EQUIPMENT (Condens	er Pump and	Cooling Tower/Condenser Fans	s)									
		_										
Average Condenser Fan Power Draw		0.022 kW/kW		0.08 kV	//Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled C	ondenser)	1.23 W/m ²		0.11 V	//ft²							
Carama Shore rapi condenses, till cooled o			l.	J								
Condenses Duma												
Condenser Pump												
			i									
Pump Design Flow		0.053 L/s.KW		3.0 U.	S. gpm/Ton							
Pump Design Flow per unit floor area		0.003 L/s.m ²		0.004 U.	S. gpm/ft ²							
Pump Head Pressure		kPa		ft	=:							
Pump Efficiency		50%	1									
Pump Motor Efficiency		80%										
Sizing Factor		0.5										
Pump Connected Load		W/m²		V	//ft²							
CIRCULATING PUMP (Heating & Cooling)				-							-	
Pump Design Flow @ 5 °C (10 °F) delta T		0.002 L/s.m ²	0.0036	U.S. gpm/ft ²	2.4	4 U.S. gpm/	Ton					
Pump Head Pressure	<u> </u>	100 kPa	33									
Pump Efficiency	<u> </u>	50%	33									
	<u> </u>											
Pump Motor Efficiency	<u> </u>	80%										
Sizing Factor		0.5										
Pump Connected Load		0.3 W/m²	0.03	W/ft ²								
												
Supply Fan Occ. Period		3500 hrs./year										
Supply Fan Unocc. Period	<u> </u>	5260 hrs./year										
	<u> </u>											
Supply Fan Energy Consumption	L	12.5 kWh/m².yr										
Exhaust Fan Occ. Period		3500 hrs./year										
Exhaust Fan Unocc. Period		5260 hrs./year										
Exhaust Fan Energy Consumption		1.4 kWh/m².yr										
37 - 37	-											
Condenser Pump Energy Consumption		kWh/m².yr										
Cooling Tower /Condenser Fans Energy Consur	nntion	0.4 kWh/m².yr										
Cooling Tower /Condenser Fans Energy Consur	приоті	U.4 KVVIVIM².YI										
	-											
Circulating Pump Yearly Operation		7000 hrs./year										
Circulating Pump Energy Consumption		kWh/m².yr										
_ , , , , , ,												
Fans and Pumps Maintenance	Annual Main	itenance Tasks	Incidence	Frequency								
			(%)	(years)								
	Inon a at /C	ing Fang 9 Mataus	(70)	(years)								
		ice Fans & Motors										
		st Belt Tension on Fan Belts							i			
	Inspect/Serv	ice Pump & Motors								EUI	kWh/ft².yr	1.3
											MJ/m².yr	51.3

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: Small Accommodation Baseline SIZE: < 100 kW REGION: Island Interconnected

EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		22.0 kWh/ft².yr 852.7 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².y	r
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	ricity	Fuel Oil /	Propane	
GENERAL LIGHTING (SUITES)	1.5	59.7		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
SECONDARY LIGHTING	1.5	58.3	SPACE HEATING	7.6	295.1			
TERTIARY LIGHTING			SPACE COOLING	0.6	22.4			
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.7	260.0	0.0	0.0	
HVAC FANS & PUMPS	1.3	51.3	FOOD SERVICE EQUIPMENT	0.6	25.0			
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.4	16.1						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

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COMMERCIAL SECTOR BUILDING PROFILE NEW BUILDINGS: SIZE: REGION: VINTAGE: Health Care Baseline CONSTRUCTION 0.28 W/m².°C Wall U value (W/m².°C) 0.05 Btu/hr.ft² .°F Typical Building Size 8,829 m² 95,000 ft² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 1,400 15,064 ft² Glazing U value (W/m².°C) 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) 0.20 Defined as Exterior Zone Shading Coefficient (SC) Typical # Stories 0.65 Floor to Floor Height (m) 4.3 m 14.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS DDMZ DDMZVV FCoils CAVR IU 100% O.A TOTAL Ventilation System Type CAV VAV System Present (%)
Min. Air Flow (%)
(Minimum Throttled Air 50% 50% 100% 60% Occupancy or People Density 323 ft²/person %OA 30 m²/person 26.49% Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period 75% resh Air Requirements or Outside Air 45 95 CFM/person Fresh Air Control Type 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 5.66 L/s.m² 1.12 CFM/ft² Separate Make-up air unit (100% OA) CFM/ft² 0.14 CFM/ft² Infiltration Rate 0.70 L/s.m² 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Economizer Dry-Bulb Based Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Peak Design Cooling Load Peak Zone Sensible Load Switchover Point KJ/kg. ####### 379,501 28.2 Btu/lbm 23.4 Btu/lbm Room air enthalpy Controls Type System Present (%) HVAC Room Discharge air enthalpy Specific volume of air at 55F & 100% R.H Design CFM quipmen Controls 13.2 ft³/lbm All Pneumatic 17,654 DDC/Pneumatic Total air circulation or Design air fk 5.66 l/s.m² All DDC Total (should add-up to 100%) PI / PID Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 57.2 °F 24 °C 14 °C Summer Humidity (%) 50% 100% Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 75.2 61.7 °F Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 22.8 Btu/lbm 19.6 Btu/lbm KJ/kg. 24 °C 75.2 Winter Unocc. Humidity 30% Enthalpy 50 KJ/kg 21.5 Btu/lbm

> Incidence Frequency (%)

(years)

Air Filter Cleaning	Changes/Year	

Control Arm Adjustment Lubrication Blade Seal Replacement

to at damen	- 4	A	0		l

Damper Maintenance

Annual Maintenance Tasks	Incidence (%)
Calibration of Transmitters	(/6)
Calibration of Panel Gauges	
Inspection of Auxiliary Devices	
Inspection of Control Devices	

Annual Maintenance Tasks	Incidence
	(%)
Inspection/Calibration of Room Thermostat	
Inspection of PE Switches	
Inspection of Auxiliary Devices	
Inspection of Control Devices (Valves,	
(Dampers, VAV Boxes)	

Incidence of Annual Room Controls Maintenance

NEW BUILDINGS: Health Care Baseline SIZE: COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

LIGHTING GENERAL LIGHTING (PATIENT RO	OMS)												
Light Level	300		ft-candles										
Floor Fraction (GLFF) Connected Load	0.40 10.1		W/ft²										
Occ. Period(Hrs./yr.)	8760	1	Light Level (Lux)		50	100	200	300			Total	İ	
Unocc. Period(Hrs./yr.)	8760	1	% Distribution		50	100	200	100%			100%	l	
Usage During Occupied Period Usage During Unoccupied Period	40%	4	Weighted Average								300	1	
Usage During Unoccupied Period		J			INC	CFL	T12	Т8	HID	T5HO LE	ED TOTAL	1	
Fixture Cleaning:		7	System Present (%)		5%	10%	0.0	85%	0.0		0% 100.0%	1	
Incidence of Practice Interval		years	CU LLF		0.7 0.65	0.7	0.6 0.75	0.6	0.6	0.6 0.8	.6 30	1	
			Efficacy (L/W)		15	50	72	88	65	95 9	90	ļ	
Relamping Strategy & Incidence of Practice	Group	Spot									EUI	kWh/ft².yr	1.3
												MJ/m².yr	51
SECONDARY LIGHTING (NURSING Light Level			S, LABORATORIES, ft-candles	ICU, RECOV	ERY)								
Floor Fraction (ALFF)	0.60		-										
Connected Load	13.3	W/m ² 1.2	W/ft²										
Occ. Period(Hrs./yr.)	8760]	Light Level (Lux)		300	500	700	1000			Total	1	
Unocc. Period(Hrs./yr.) Usage During Occupied Period	65%	_	% Distribution Weighted Average			100%					100% 500	1	
Usage During Unoccupied Period	0070	_	vveignica / tverage										
Fixture Cleaning:			System Present (%)		INC	CFL 5%	T12	T8 90%	HID	T5HO LE 0% 5	ED TOTAL 5% 100.0%	1	
Incidence of Practice		1	CU		0.7	0.7	0.6	0.6	0.6		1.6	1	
Interval		years	LLF		0.65	0.65	0.75	0.80	0.80	0.80 0.8		1	
Relamping Strategy & Incidence	Group	Spot	Efficacy (L/W)		15	50	72	88	65	95 9	90		
of Practice					_			05 V 01 55				kWh/ft².yr	4.2
TERTIARY LIGHTING (CORRIDORS	. OTHER)				E	UI = Load	X Hrs. X	SF X GLFF	•			MJ/m².yr	164
Light Level	, ,	Lux	ft-candles			F	Floor fracti	on check:	should = 1.00	1.0	00		
Floor Fraction (HBLFF) Connected Load		W/m²	W/ft²										
			·										
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4000 4760		Light Level (Lux) % Distribution								Total	1	
Usage During Occupied Period	100%		Weighted Average									İ	
Usage During Unoccupied Period	100%]			INC	CEL	T12	To		MH HF	PS TOTAL	1	
Fixture Cleaning:			System Present (%)		INC 5%	CFL 5%	112	T8 90%			0% 100.0%	1	
Incidence of Practice]	CU		0.7	0.7	0.6	0.6	0.6		.6	1	
Interval		years	LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80 88	0.80	0.55 0.5 65 9	90	1	
Relamping Strategy & Incidence	Group	Spot				•					let u	LANG. (612 · · ·	
of Practice												kWh/ft².yr MJ/m².yr	
										40.00.11// 0			
TOTAL LIGHTING									Overall LPD	12.02 W/m ²	EUI TOTAL	MJ/m².yr	6 215
OFFICE FOUNDMENT & DULIO LOAD													
OFFICE EQUIPMENT & PLUG LOAI	บร												
Equipment Type		Computers	Monitors	Print	ers	Copi	ers	Ser	vers	Plug Loads			
Measured Power (W/device) Density (device/occupant)		54.55 0.48	51 0.48	100 0.02		200 0.02		217 0.04					
Connected Load		0.9 W/m²	0.40 0.8 W/m²	0.02 0.1 W	//m²	0.1			W/m²	3.85 W/m ²			
Diversity Occupied Period		0.1 W/ft² 90%	0.1 W/ft² 90%	0.01 W 90%	//ft²	0.01 \ 90%	N/ft²	0.02 100%	W/ft²	0.36 W/ft ²			
Diversity Unoccupied Period		50%	50%	50%		50%		100%	-	25%			
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		2000 6760	2000 6760	2000 6760		2000		2600		4100			
Operation Onocc. Period (fils./year)		6760	6760	6760		6760		6160		4660			
Total end-use load (occupied period)		5.4 W/m²	0.5 W/ft²	to see notes	(cells with red	indicator	in upper ri	ght corner, t	ype "SHIFT I	F2'Computer Serve		kWh/ft².yr	0.21
Total end-use load (unocc. period)		2.2 W/m ²	0.2 W/ft²							Computer Equipme		MJ/m².yr kWh/ft².yr	8.10 0.90
Usage during occupied period		100%										MJ/m².yr	35.00
Usage during unoccupied period		40%								Plug Loa		kWh/ft².yr MJ/m².yr	1.74 67.29
											1		*****
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil /	Propane Fuel Share:		Electricity Fu	iel Share:	100.0%	ĺ	Fuel	Oil / Propane	EUI	All	Electric EUI	
Commercial food services]				EUI	kWh/ft².yr	3.1	EUI	kWh/ft².yr	2.1
									MJ/m².yr	120.0		MJ/m².yr	80.0
REFRIGERATION													
Provide description below: Walk-in coolers/freezers, reach-in cool	lasa/6saassa	va vafrimaratad buffat asaa	•	1							EUI	1-1 A / In / 642	0.4
waik-in coolers/freezers, reacri-in cool	iers/rreezer	is, reingerated burret case:	s	J								kWh/ft².yr MJ/m².yr	15.0
DI COLLIFATEDO O MICOSI I ANEC	2110												
BLOCK HEATERS & MISCELLANEO	JUS										-		
										Block Heate		kWh/ft².yr	
										Miscellaneo		MJ/m².yr kWh/ft².yr	0.3
												MJ/m².yr	10

NEW BUILDINGS: Health Care Baseline

Wetting Use Percentage

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90%

SIZE:

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

REGION: Island Interconnected

SPACE HEATING													
Heating Plant Type					Fuel Oil / Propa	ine		Ele	ectric]	
					Boilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Preser	nt (%)							100%	100%		
		Eff./COP Performance	(1 / Eff.)		33 1.14				4.50 0.22	1.00			
		(kW/kW)											
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	39.0 W/m² 439 MJ/m².yr		12.4 Btu/h 11.3 kWh/l									All Electric EUI	
Electric Fuel Share	100.0% Fuel Oi	il / Propane Fue	el Share		Oil Fuel Shar	e]				kWh/ft².yr	11.3
Boiler Maintenance	Annual Ma	intenance Task	S	Inciden	ce							MJ/m².yr	439
	Fire Side II	nenection		(%)	i%							Fuel Oil / Propane E kWh/ft².yr	UI
	Water Side	e Inspection for		100	1%							MJ/m².yr	
	Inspection	of Controls & S of Burner	Safeties	100								Market Composite E	UI
	Flue Gas A	Analysis & Burr	ner Set-up	90	1%							kWh/ft².yr MJ/m².yr	11.3 439
SPACE COOLING													
A/C Plant Type	•			rifugal Chillers				Absorption		Total			
		System Preser	Stand	dard HE 50.0	Chillers	Open	DX 50.0%	W. H.	CW	100.0%			
		COP		4.7	6.1 4.4		2.7	0.9					
	ļ	Performance (kW/kW)	(1 / COP)	0.21 0.	16 0.23	0.28	0.37	1.11	1.00				
	ļ	Additional Refu											
	ļ	Related Inform	ation										
Control Mode	•	Incidence of III	aa Fiyad	d Doost		•							
Control Mode	ļ	Incidence of U	se Fixed Setpo										
		Chilled Water Condenser Wa	otor										
		Condenser wa	itei										
Setpoint		Chilled Water		7 °C	44.6]°E							
Зефонк		Condenser Wa	ater	30 °C	86	°F							
		Supply Air		14.0 °C	57.2	!°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	36 W/m² 121.3 MJ/m².yr		Btu/hr.ft ² 1 kWh/ft ² .yr	1065 ft²/Ton									
Sizing Factor	0.65		Opera	ration (occ. pe	rio 3000	hrs/year	Note value	e cannot be	less than 2,9	00 hrs/year	·)		
			,	, ,						•			
A/C Saturation (Incidence of A/C)	80.0%												
Electric Fuel Share	100.0% Fuel Oi	il / Propane Fue	el Share										
Chiller Maintenance		intenance Task		Inciden	ce Frequency	7							
Chiller Maintenance				(%)									
		ontrol, Safeties	& Purge Unit ealing and Bearin	nas									
	Megger Me	otors		95									
	Condenser Vibration A	r Tube Cleaning Analysis)	_									
	Eddy Curre	ent Testing											
	Spectroche	emical Oil Analy	ysis									All Electric EUI kWh/ft².yr	0.9
0 " 7 /4: 0 1 10 1		· · · · ·			1-	7						MJ/m².yr	34
Cooling Tower/Air Cooled Condense	: Maintenan(Annual Ma	intenance Task	S	Incidend (%)	ce Frequency (years)							Fuel Oil / Propane E	:UI
		/Clean Spray N ervice Fan/Fan N										kWh/ft².yr MJ/m².yr	
	Megger Me		VIOLOIS									IVIJ/III*.yI	
	Inspect/Ve	erify Operation of	of Controls									Market Composite E kWh/ft².yr	0.9
												MJ/m².yr	34
DOMESTIC HOT WATER													
	Family Fire	I CUM	Ctd Tools DV 3	Tonk Cand 7	nk Ctd Dail	Cod Dall	1			Eoos!!		Elos Pos	
Service Hot Water Plant Type	Fossil Fuel System Pr		Std. Tank PV 1			0.00%		Fuel Share)	Fossil 0%		Elec. Res. 100%	
Sonion Hot Water land (M.1/m2:)	Eff./COP		0.550	0.600 0.9	00 88.000			Blended E	fficiency	0.90		0.91	
Service Hot Water load (MJ/m².yr) (Tertiary Load)	118.3										,		
					All Electric EU	JI]	Fuel	Oil / Propane	EUI		Market Composite E	:UI

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All Electric EUI kWh/ft².yr MJ/m².yr

3.4 130

Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr

3.4

Market Composite EUI kWh/ft².yr MJ/m².yr 13

3.4

130.0

C-60

NEW BUILDINGS: SIZE: Health Care All Baseline VINTAGE:

REGION: Island Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Ventilation Fan Exhaust Fan System Design Air Flow System Static Pressure CAV 1.12 CFM/ft² 5.7 L/s.m² Control xed Variable Fixed Variable 875 Pa 3.5 Flow Flow wa System Static Pressure VAV 875 Pa wg Incidence of Use 80% 100% Fan Efficiency Fan Motor Efficiency 55% Operation Continuou Scheduled Continuous Scheduled 89% 1.00 10.1 10.1 Sizing Factor Incidence of Use 75% 25% 75% 25% Fan Design Load CAV 0.94 W/ft² Comments: Fan Design Load VAV W/m² 0.94 W/ft² EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 0.1 L/s.m² 212 CFM/washroom 0.03 CFM/ft² Other Exhaust (Smoking/Conference) L/s.m² 0.10 CFM/ft² Total Building Exhaust 0.6 250 L/s.m² 0.13 CFM/ft² Exhaust System Static Pressure Pa 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 0.9 0.08 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) 0.017 kW/kW 0.59 W/m² 0.06 kW/Ton 0.05 W/ft² Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) Condenser Pump 0.053 L/s.KW 3.0 U.S. gpm/Ton Pump Design Flow Pump Design Flow per unit floor area 0.003 U.S. gpm/ft² 0.002 L/s.m² Pump Head Pressure Pump Efficiency 100 kPa 60% 33 ft 88% Pump Motor Efficiency Sizing Factor 0.03 W/ft² Pump Connected Load 0.36 W/m² CIRCULATING PUMP (Heating & Cooling) 0.002 L/s.m² 100 kPa Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 0.0023 U.S. gpm/ft² 2.4 U.S. gpm/Ton 33 ft Pump Efficiency Pump Motor Efficiency 60% 88% Sizing Factor 0.8 0.02 W/ft² Pump Connected Load 0.2 W/m² Supply Fan Occ. Period 4000 hrs./year Supply Fan Unocc, Period 4760 hrs./year Supply Fan Energy Consumption 71.1 kWh/m².yr Exhaust Fan Occ. Period 4000 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 4760 hrs./year 6.5 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption 0.4 kWh/m².vr 0.5 kWh/m².yr Circulating Pump Yearly Operation 7000 hrs./year Circulating Pump Energy Consumption kWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 282.7 MJ/m².yr

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: Health Care Baseline

SIZE:

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		34.9 kWh/ft².yr 1,350.6 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ	/m².yr
END USE:	kWh/ft².yr MJ		END USE:	Electricity		Fuel Oil / Propane		
GENERAL LIGHTING (PATIENT RO	1.3	51.0		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
SECONDARY LIGHTING (NURSING	4.2	163.6	SPACE HEATING	11.3	438.5			
TERTIARY LIGHTING (CORRIDORS	3		SPACE COOLING	0.7	26.8			
OTHER PLUG LOADS	1.7	67.3	DOMESTIC HOT WATER	3.4	130.0	0.0	0.0	
HVAC FANS & PUMPS	7.3	282.7	FOOD SERVICE EQUIPMENT	2.1	80.0			
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.9	35.0						
COMPUTER SERVERS	0.2	8.1						
ELEVATORS	0.2	7.7						
OUTDOOR LIGHTING	0.9	34.9						

NEW BUILDINGS: SIZE: REGION: VINTAGE: School Island Interconnected Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 40,000 ft² Wall U value (W/m².°C) Typical Building Size 3,717 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 2,300 24,748 ft² 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 50% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.15 Defined as Exterior Zone Typical # Stories 0.65 Floor to Floor Height (m) 3.7 m 12.2 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 10% 90% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 108 ft²/person 8.81% %OA m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 3 6 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.67 CFM/ft² 3.41 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.42 L/s.m² 0.08 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 418.815 Peak Zone Sensible Load 230,702 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 10,732 DDC/Pneumatic Total air circulation or Design air 3.41 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 55.4 °F 69.8 °F 13 °C 21 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% 53 KJ/kg 19.5 °C Enthalpy Winter Unocc. Temperature 22.8 Btu/lbm 19.6 Btu/lbm 67.1 °F Winter Unocc. Humidity 30% Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

NEW BUILDINGS: School Baseline SIZE: COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

REGION: Island Interconnected

LIGHTING									
GENERAL LIGHTING Light Level	500 Lux	46.5 ft-candles							
Floor Fraction (GLFF)	0.85								
Connected Load	12.9 W/m²	1.2 W/ft ²							
Occ. Period(Hrs./yr.)	2000	Light Level (Lux)	300	500 70	00 1000		Total]	
Unocc. Period(Hrs./yr.)	6760	% Distribution		100%			100%		
Usage During Occupied Period Usage During Unoccupied Period	85% 15%	Weighted Average					500	-	
Osage During Onoccupied Feriod	1376		INC	CFL T	12 T8 HIE	T5HO LED	TOTAL	-	
Fixture Cleaning:		System Present (%))		100%	0% 0%	100.0%		
Incidence of Practice		CU	0.7	0.7 0.					
Interval	years	LLF Efficacy (L/W)	0.65 15	0.65 0.7 50 7	5 0.80 0.80 2 88 65				
Relamping Strategy & Incidence	Group Spot	,	,					J	
of Practice								kWh/ft².yr MJ/m².yr	2.8 107
SECONDARY LIGHTING								IVIJ/IIF.yI	107
Light Level	400 Lux	37.2 ft-candles							
Floor Fraction (ALFF) Connected Load	0.15 14.1 W/m²	1.3 W/ft ²							
Connected Load	14.1 W////	1.3 \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \							
Occ. Period(Hrs./yr.)	2000	Light Level (Lux)	400	500 70	00 1000		Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	6760 90%	% Distribution Weighted Average	100%				100% 400	-	
Usage During Unoccupied Period	15%	vveignied Average					400		
			INC		12 T8 HIE				
Fixture Cleaning: Incidence of Practice		System Present (%)	0.7	20% 0.7 0.	10% 20% 6 0.6 0.6				
Incidence of Practice	years	LLF	0.65	0.7 0. 0.65 0.7					
		Efficacy (L/W)	15		2 88 65]	
Relamping Strategy & Incidence of Practice	Group Spot						EUI	kWh/ft².yr	0.6
of Practice				EUI = Load X Hrs.	X SF X GLFF			MJ/m².yr	21
TERTIARY LIGHTING									
Light Level Floor Fraction (HBLFF)	Lux	ft-candles		Floor fra	action check: should =	1.00 1.00	1		
Connected Load	W/m²	W/ft²							
								ī	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	2500 6260	Light Level (Lux) % Distribution					Total		
Usage During Occupied Period	100%	Weighted Average							
Usage During Unoccupied Period		0	,						
Fixture Cleaning:		System Present (%)	INC	CFL T	12 T8	MH HPS 100% 0%			
Incidence of Practice		CU	0.7	0.7 0.	6 0.6 0.6			-	
Interval	years	LLF	0.65	0.65 0.7	5 0.80 0.80	0.55 0.55			
Relamping Strategy & Incidence	Group Spot	Efficacy (L/W)	15	50 7	2 84 88	65 90			
of Practice	Отоир Орог						EUI	kWh/ft².yr	
								MJ/m².yr	
TOTAL LIGHTING					Overall LI	2 13.09 W/m²	EUI TOTAL	.kWh/ft².yr	3
								MJ/m².yr	129
OFFICE EQUIPMENT & PLUG LOA	ADS								
							_		
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads	_		
Measured Power (W/device) Density (device/occupant)	55 0.05	51 0.05	100 0.02	200 0.02	217 0.01				
Connected Load	0.03 W/m²	0.3 W/m²	0.02 0.2 W/m²	0.02 0.4 W/m²	0.1 W/m²	0.2 W/m²			
	0.0 W/ft ²	0.0 W/ft ²	0.02 W/ft ²	0.04 W/ft ²	0.01 W/ft ²	0.02 W/ft ²			
Diversity Occupied Period Diversity Unoccupied Period	90% 50%	90% 50%	90% 50%	90% 50%	100%	100% 50%			
Operation Occ. Period (hrs./year)	2000	2000	2000	2000	2000	3000			
Operation Unocc. Period (hrs./year)	6760	6760	6760	6760	6760	5760			
Total end-use load (occupied period)	1.3 W/m²	0.1 W/ft ²	to see notes (cells with	ed indicator in upp	er right corner type "Sh	HET (E@bouter Server	EIII	kWh/ft².yr	0.10
Total end-use load (unocc. period)	0.8 W/m²	0.1 W/ft²	to see notes (cells with	ed marcator in app	er right comer, type or	III i deinputer Server		MJ/m².yr	3.68
						Computer Equipmen		kWh/ft².yr	0.54
Usage during occupied period Usage during unoccupied period	100% 59%					Plug Load	FIII	MJ/m².yr kWh/ft².yr	21.0
bodge during unbecapied period	0370					i lag Load		MJ/m².yr	4.23
FOOD OFFINIOR FOLLIDATION									
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share	e:	Electricity Fuel Share:	100.0%	Fuel Oil / Propa	ne EUI	AI	l Electric EUI	
Cafeteria		1 1			EUI kWh/ft².yr	0.2	EUI	kWh/ft².yr	0.1
					MJ/m².yr	8.0		MJ/m².yr	4.0
REFRIGERATION									
Provide description below:							le	1140 //-	
Unknown							EUI	kWh/ft².yr MJ/m².yr	0.1 3.0
									
BLOCK HEATERS & MISCELLANE	ous								
BLOCK HEATERS & MISCELLANE	ous					Block Heaters	EUI	kWh/ft².yr	
BLOCK HEATERS & MISCELLANE	ous					Block Heater		kWh/ft².yr MJ/m².yr kWh/ft².yr	0.1

 NEW BUILDINGS:
 SIZE:
 VINTAGI

 School
 All
 New

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

REGION: Island Interconnected

Baseline SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Packaged A/A HP Stan High Unit System Present (%) 100% 100% Eff./COP 83% 2.60 3.10 1.00 Performance (1 / Eff.) 1.37 1.20 1.33 0.38 0.32 0.22 1.00 (kW/kW) Peak Heating Load 46.7 W/m² 14.8 Btu/hr.ft² 240 MJ/m².yr Seasonal Heating Load 6.2 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share 6.2 MJ/m².yr 240 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% 6.2 MJ/m².yr 240 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Chillers Open W. H. CW System Present (%) COP 100.0% 100.0% Performance (1 / COP) 0.40 0.19 0.2 0.28 0.33 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 13.0 °C 86 °F 55.4 °F Supply Air 33 W/m² 10 Btu/hr.ft² 1146 ft²/Ton Peak Cooling Load Seasonal Cooling Load 97.7 MJ/m².yr 2.5 kWh/ft².y (Tertiary Load) Operation (occ. perio 4000 hrs/year Note value cannot be less than 2,900 hrs/year) 1.00 Sizing Factor 10.0% A/C Saturation (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI kWh/ft2.yr 1.1 MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI kWh/ft².vr 1.1 MJ/m².yr 41 DOMESTIC HOT WATER Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW Fossil Elec. Res. System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.550 0.600 0.750 0.900 Blended Efficiency 0.90 0.91 Service Hot Water load (MJ/m².yr) 17.3 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI 90% 0.5 0.5 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr kWh/ft2.yr MJ/m².yr MJ/m2.yı 19.0

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New REGION: Island Interconnected NEW BUILDINGS: School Baseline SIZE: Ali

HVAC FANS & PUMPS													
SUPPLY FANS							Vantilation	and Fuhau	at Fan One	ration 9 Ca	natura I		
SUPPLY FANS								i and Exnau tion Fan	st Fan Ope	st Fan	ontroi		
System Design Air Flow 3.4	1 L/s.m ²	0.67	CFM/ft ²	Control			Fixed	Variable	Fixed	Variable			
System Static Pressure CAV 30		1.2		COTATO			1 1/100	Flow	1 1/100	Flow			
	0 Pa		wg	Incidence	of Use		100%		100%				
Fan Efficiency 609		1		Operation				Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 889	%												
Sizing Factor 1.00			_	Incidence	of Use		25%	75%	25%	75%			
	9 W/m ²		W/ft²										
Fan Design Load VAV 1.9	W/m²	0.18	W/ft²		Coi	mments:							
EXHAUST FANS													
Washroom Exhaust 100	L/s.wash	nroom	212 CFM/wa	shroom									
Washroom Exhaust per gross unit area 0.			0.02 CFM/ft ²										
Other Exhaust (Smoking/Conference) 0.			0.02 CFM/ft ²										
Total Building Exhaust 0.2			0.04 CFM/ft ²										
Exhaust System Static Pressure 25	0 Pa		1.0 wg										
Fan Efficiency 259													
Fan Motor Efficiency 759	%												
Sizing Factor 1.0			-										l
Exhaust Fan Connected Load 0.	2 W/m ²	0.02	W/ft²										
AUXILIARY COOLING EQUIPMENT (Conden	ser Pump a	and Cooling Tov	ver/Condenser Fans	s)									
Average Condenser Fan Power Draw			0.020 kW/kW		0.07 kW	/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled C	Condenser)		0.66 W/m²		0.06 W/								
Condenser Pump													
Pump Design Flow			0.053 L/s.KW		3.0 U.S	. gpm/Ton							
Pump Design Flow per unit floor area			0.002 L/s.m ²		0.003 U.S	5. gpm/ft²							
Pump Head Pressure			45 kPa		15 ft								
Pump Efficiency			50%										
Pump Motor Efficiency			80%										
Sizing Factor			1.0										
Pump Connected Load			0.20 W/m ²		0.02 W/	ft²							
CIRCULATING PUMP (Heating & Cooling)													
Pump Design Flow @ 5 °C (10 °F) delta T		0.001	L/s.m ²	0.0021	U.S. gpm/ft ²	2.4	U.S. gpm/	Ton					
Pump Head Pressure		100	kPa	33	ft		_						
Pump Efficiency		50%			-								
Pump Motor Efficiency		80%											
Sizing Factor		0.8			1								
Pump Connected Load		0.3	W/m²	0.03	W/ft²								
Sample For Occ. Poriod		2000	hrs 61001	-			-	-	-	-	-		-
Supply Fan Occ. Period			hrs./year										l
Supply Fan Unocc. Period			hrs./year										
Supply Fan Energy Consumption		7.1	kWh/m².yr										
Exhaust Fan Occ. Period		2000	hrs./year										
Exhaust Fan Unocc. Period			hrs./year										
Exhaust Fan Energy Consumption			kWh/m².yr										
-			-										
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consu	mption	0.6	kWh/m².yr kWh/m².yr										
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		3000	hrs./year kWh/m².yr										
		4-1-1	-	I to state.	F								
Fans and Pumps Maintenance	Annual M	faintenance Task	S	Incidence (%)	Frequency (years)								
	Inspect/S	ervice Fans & M	otors	(%)	(years)								
		djust Belt Tensio		_									
		ervice Pump & N		+							EUI	kWh/ft².yr	0.8
												MJ/m².yr	31.3
•													

REGION: Island Interconnected

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: School Baseline SIZE:

EUI SUMMARY							
TOTAL ALL END-USES:	Electricity:		12.4 kWh/ft².yr 478.8 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	2.8	107.3		kWh/ft2.yr	MJ/m².yr	kWh/ft².yr	MJ/m ² .yr
SECONDARY LIGHTING	0.6	21.4	SPACE HEATING	6.2	239.8		
TERTIARY LIGHTING			SPACE COOLING	0.1	4.1		
OTHER PLUG LOADS	0.1	4.2	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0
HVAC FANS & PUMPS	0.8	31.3	FOOD SERVICE EQUIPMENT	0.1	4.0		
REFRIGERATION	0.1	3.0					
MISCELLANEOUS	0.1	3.0					
BLOCK HEATERS							
COMPUTER EQUIPMENT	0.5	21.0					
COMPUTER SERVERS	0.1	3.7					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

NEW BUILDINGS: SIZE: REGION: VINTAGE: University/College Island Interconnected Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 70,000 ft² Wall U value (W/m².°C) Typical Building Size 6,506 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 4,500 48,420 ft² 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 50% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.30 Defined as Exterior Zone Typical # Stories 0.65 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 50% 50% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 14 m²/person 151 ft²/person 14.20% %OA Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 10 L/s.person 21 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor 1.6 Total Air Circulation or Design Air Flow 0.99 CFM/ft² 5.03 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.40 L/s.m² 0.08 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load ####### Peak Zone Sensible Load 931,391 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 43,328 DDC/Pneumatic Total air circulation or Design air 5.03 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 55.4 °F 75.2 °F 13 °C 24 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 71.6 °I 60.8 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: University/College Baseline SIZE: Ali

REGION: Island Interconnected

LIGHTING										
GENERAL LIGHTING Light Level	500 Lux	16.5	ft-candles							
Floor Fraction (GLFF)	0.90	40.3	It-cardies							
Connected Load	11.9 W/m²	1.1	W/ft²							
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)	300	500 70	00 1000		Total	7	
Unocc. Period(Hrs./yr.)	4760		% Distribution	000	100%	1000		100%	,	
Usage During Occupied Period Usage During Unoccupied Period	90%		Weighted Average					500	<u> </u>	
Usage During Unoccupied Period	20%			INC	CFL T	12 T8 HIE	O T5HO LEI	TOTAL		
Fixture Cleaning:			System Present (%)			95% 5%	6 0% 09	6 100.0%		
Incidence of Practice Interval	years		CU LLF	0.7 0.65	0.7 0. 0.65 0.7					
interval	years		Efficacy (L/W)	15	50 7					
Relamping Strategy & Incidence	Group Spot									
of Practice								EUI	kWh/ft².yr MJ/m².yr	4.5 175
SECONDARY LIGHTING									IVI3/III .yi	
Light Level	300 Lux	27.9	ft-candles							
Floor Fraction (ALFF) Connected Load	0.10 8.5 W/m²	0.8	W/ft²							
			_						-	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4000 4760		Light Level (Lux) % Distribution	300 100%	500 70	00 1000		Total 100%	-	
Usage During Occupied Period	100%		Weighted Average	10076				300		
Usage During Unoccupied Period	50%									
Fixture Cleaning:			System Present (%)	INC	CFL T ⁻ 15%	12 T8 HIE 80%	0% LEI		-	
Incidence of Practice			CU CU	0.7	0.7 0.				-	
Interval	years		LLF	0.65	0.65 0.7					
Relamping Strategy & Incidence	Group Spot	7	Efficacy (L/W)	15	50 7	2 88 65	95 90)		
of Practice	Отобр Орос							EUI	kWh/ft².yr	0.5
					EUI = Load X Hrs.	X SF X GLFF			MJ/m².yr	20
TERTIARY LIGHTING Light Level	Lux		ft-candles		Floor fra	ction check: should =	1.00 1.00	1		
Floor Fraction (HBLFF)	Lax		_		1.001.110	onori onooni onodia –	1.00			
Connected Load	W/m²		W/ft²							
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)					Total	7	
Unocc. Period(Hrs./yr.)	4760		% Distribution					- Ottai	1	
Usage During Occupied Period	0%		Weighted Average]	
Usage During Unoccupied Period	100%			INC	CFL T	12 T8	MH HPS	S TOTAL	-	
Fixture Cleaning:			System Present (%)		0%	10	100% 0%			
Incidence of Practice			CU	0.7	0.7 0.				1	
Interval	years		LLF Efficacy (L/W)	0.65 15	0.65 0.7 50 7					
Relamping Strategy & Incidence	Group Spot	7	Lilicacy (L/VV)	13	30 1	2 04 00	5 05 90		_	
of Practice								EUI	kWh/ft².yr	
									MJ/m².yr	
TOTAL LIGHTING						Overall LI	P 11.56 W/m²	EUI TOTAL		5
									MJ/m².yr	195
OFFICE EQUIPMENT & PLUG LOA	ADS									
	1									
Equipment Type	Compu	iters	Monitors	Printers	Copiers	Servers	Plug Loads			
		_			1					
Measured Power (W/device) Density (device/occupant)	54.5 0.3		51 0.31	100 0.02	200 0.02	217 0.01				
Connected Load		2 W/m²	1.1 W/m²	0.1 W/m²	0.3 W/m²	0.1 W/m²	1.3 W/m²			
	0.	1 W/ft²	0.1 W/ft ²	0.01 W/ft ²	0.03 W/ft ²	0.01 W/ft ²	0.12 W/ft ²			
Diversity Use as wind Period	909		90%	90% 50%	90% 50%	100%	100%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year)	200		2000	2000	2000	2600	50% 2000			
Operation Unocc. Period (hrs./year)	676		6760	6760	6760	6160	6760			
Total and use lead (secretarian and secretarian		9 W/m²	0.4 1414.2	to con poten / "	rod indicates !	or right occurs to a PO	JIET (281	CEII!	I/\/\/\/ /412	
Total end-use load (occupied period) Total end-use load (unocc. period)		9 W/m² 2 W/m²	0.4 W/ft ² 0.2 W/ft ²	to see notes (cells with	red indicator in upp	er right corner, type "SF	nırı dezimputer Server	SEUI	kWh/ft².yr MJ/m².yr	0.10 3.68
			0.2				Computer Equipmer	nt EUI	kWh/ft².yr	1.34
Usage during occupied period	1009						5		MJ/m².yr	51.73
Usage during unoccupied period	559	%					Plug Load	s EUI	kWh/ft².yr MJ/m².yr	0.65 25.18
									IVIO/III .yi	20.10
FOOD SERVICE EQUIPMENT	F ! O'!! / P	Fred Observe		Floridate Fool Observ	100.00/	FI O'!! / P	FUI			
Provide description below:	Fuel Oil / Propane	Fuei Snare:		Electricity Fuel Share:	100.0%	Fuel Oil / Propa EUI kWh/ft².yı		EUI	II Electric EUI kWh/ft².yr	0.4
						MJ/m².yr			MJ/m².yr	15.0
DEEDIGED ATION	<u></u>		·	-	·					
REFRIGERATION Provide description below:								-		
Unknown]				EUI	kWh/ft².yr	0.5
				- 					MJ/m².yr	20.0
BLOCK HEATERS & MISCELLANE	OUS									
DECON TEXT END & WINDELLANE										
							Block Heater	s EUI	kWh/ft².yr	
							Miscellaneou	s EUI	MJ/m².yr kWh/ft².yr	0.3
							coolidi lood		MJ/m².yr	10

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: University/College Baseline SIZE: Ali

REGION: Island Interconnected

Baseline	741		New			isianu interconnecteu		
SPACE HEATING								
Heating Plant Type	Г		Fue	el Oil / Propane	Ele	ectric	\neg	
			Boi Stan.	lers Packaged High Unit	A/A HP W. S. HF	PH/R Chiller ResistanceTotal		
		System Present (%) Eff./COP	75%	83% 95%	1.70 3.00	100% 100 4.50 1.00	0%	
	F	Performance (1 / Eff.)	1.33	1.20 1.05				
Peak Heating Load Seasonal Heating Load (Tertiary Load)	37.8 W/m² 192 MJ/m².yr	kW/kW) 12.0 B 5.0 kk	tu/hr.ft² Wh/ft².yr					
Sizing Factor	1.00						All Electric EUI	
Electric Fuel Share	100.0% Fuel Oil	/ Propane Fuel Share		Oil Fuel Share			kWh/ft².yr	5.0
Boiler Maintenance	Annual Mair	ntenance Tasks	Incidence					192
	Fire Side In		(%) 75%				Fuel Oil / Propane EUI kWh/ft².yr	_
	Inspection of	Inspection for Scale Buildup of Controls & Safeties	100%				MJ/m².yr	_
	Inspection of Flue Gas Ar	of Burner nalysis & Burner Set-up	100% 90%				Market Composite EUI kWh/ft².yr	5.0
								192
SPACE COOLING								
A/C Plant Type	-	10	entrifunal CLIII	0	ting Chiller At	o Chillero T-1-1		
		S	tandard HE	Screw Reciproca Chillers Open	ting Chillers Absorptio DX W. H.	CW		
		System Present (%)	25.0% 4.7 5.4	4.4 3.6	75.0% 2.7 0.9	100.0%		
		Performance (1 / COP) kW/kW)	0.21 0.19	0.23 0.28				
	Ī	Additional Refrigerant Related Information						
	ľ	Related Information						
Control Mode	Ī	ncidence of Use F	ixed Reset					
	(Shilled Water	etpoint					
		Condenser Water						
		_						
Setpoint	(Chilled Water Condenser Water Supply Air	7 °C 30 °C 13.0 °C	44.6 °F 86 °F 55.4 °F				
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	105 W/m² 128.2 MJ/m².yr	33 Btu/hr.ft² 3.3 kWh/ft².yr	359 ft²/Ton					
Sizing Factor	1.00	0	peration (occ. perio	4000 hrs/year	Note value cannot be	e less than 2,900 hrs/year)		
A/C Saturation (Incidence of A/C)	70.0%							
Electric Fuel Share	100.0% Fuel Oil	/ Propane Fuel Share						
Chiller Maintenance	Annual Mair	ntenance Tasks		Frequency				
		ntrol, Safeties & Purge Unit	(%)	(years)				
		pling, Shaft Sealing and Be	arings					
	Condenser	Tube Cleaning						
	Vibration Ar Eddy Curre	nt Testing						
	Spectroche	mical Oil Analysis					All Electric EUI kWh/ft².yr	1.5
Cooling Tower/Air Cooled Condense	r Maintenan Annual Mair	ntenance Tasks	Incidence	Frequency			MJ/m².yr	59
Sound Tower, an Ooded Cordense			(%)	(years)			Fuel Oil / Propane EUI	
	Inspect/Ser	Clean Spray Nozzles vice Fan/Fan Motors					kWh/ft².yr MJ/m².yr	
	Megger Mo Inspect/Veri	tors ify Operation of Controls					Market Composite EUI	_
			'				kWh/ft².yr	1.5 59
DOMESTIC HOT WATER							Mont y	
	[ee.	CLINA COLUMN	OV Tool: O 1 T -!	Ord Delle- O 1 5 "	T	I e	Flee De-	
Service Hot Water Plant Type	Fossil Fuel System Pre	sent (%)		Std. Boiler Cnd. Boil. 0.00%			Elec. Res. 100%	
Service Hot Water load (MJ/m².yr)	Eff./COP 22.8	0.550	0.600 0.900	0.750 0.900	Blended B	Efficiency 0.90	0.91	
(Tertiary Load)			Δ	I Electric EUI	Fuel	Oil / Propane EUI	Market Composite EUI	
Wetting Use Percentage	90%			kWh/ft².yr 0.6		kWh/ft².yr 0.7	kWh/ft².yr	0.6
				MJ/m².yr 25		MJ/m².yr 25	MJ/m².yr 2	25.0

NEW BUILDINGS: University/College Baseline

SIZE:

VINTAGE: New REGION: Island Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan 5.0 L/s.m² 750 Pa System Design Air Flow System Static Pressure CAV 0.99 CFM/ft² Control Variable Fixed Variable 3.0 wa Flow Flow System Static Pressure VAV 750 Pa wg Incidence of Use 50% 50% 100% Fan Efficiency 60% Operation Continuous Scheduled Continuous Schedule Fan Motor Efficiency 80% 1.00 7.9 W/m² 7.9 W/m² Sizing Factor Incidence of Use 50% 50% 50% 50% Fan Design Load CAV 0.73 W/ft² 0.73 W/ft² Fan Design Load VAV Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 212 CFM/washroom 0.01 CFM/ft² 0.0 L/s.m² Other Exhaust (Smoking/Conference) 0.1 L/s.m² CFM/ft² Total Building Exhaust 0.1 L/s.m² 0.03 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 1.0 0.2 W/m² 0.02 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.020 kW/kW 2.11 W/m² 0.07 kW/Ton 0.20 W/ft² Condenser Pump 0.053 L/s KW 3.0 U.S. gpm/Ton Pump Design Flow Pump Design Flow per unit floor area 0.008 U.S. gpm/ft² 0.006 L/s.m² Pump Head Pressure Pump Efficiency kPa ft 50% Pump Motor Efficiency 80% Sizing Factor 1.0 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) 0.005 L/s.m² 0.0067 U.S. gpm/ft² Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 2.4 U.S. gpm/Ton 100 kPa 50 ft Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 0.8 Pump Connected Load 0.08 W/ft² 0.9 W/m² Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc, Period 5260 hrs./year Supply Fan Energy Consumption 37.3 kWh/m².yr Exhaust Fan Occ. Period 3500 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 5260 hrs./year 1.2 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.8 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 7000 hrs./year kWh/m2.yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 141.3 MJ/m².yr

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New REGION: Island Interconnected NEW BUILDINGS: University/College Baseline SIZE: Ali

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		19.1 kWh/ft².yr 741.4 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².	yr .
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	ricity	Fuel Oil /	Propane	
GENERAL LIGHTING	4.5	175.5		kWh/ft2.yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
SECONDARY LIGHTING	0.5	19.6	SPACE HEATING	5.0	192.0			
TERTIARY LIGHTING			SPACE COOLING	1.1	41.6			
OTHER PLUG LOADS	0.7	25.2	DOMESTIC HOT WATER	0.6	25.0	0.0	0.0	
HVAC FANS & PUMPS	3.6	141.3	FOOD SERVICE EQUIPMENT	0.4	15.0			
REFRIGERATION	0.5	20.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	1.3	51.7						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS	0.1	3.9						
OUTDOOR LIGHTING	0.4	17.0						

NEW BUILDINGS: SIZE: REGION: VINTAGE: Warehouse/Wholesale Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 35,000 ft² Wall U value (W/m².°C) Typical Building Size 3,253 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 3,253 35,000 ft² 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 40% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.05 Defined as Exterior Zone Typical # Stories 0.80 Floor to Floor Height (m) 6.1 m 19.9 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 1076 ft²/person 14.56% 100 m²/person %OA Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 20 L/s.person 42 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 1.37 L/s.m² 0.27 CFM/ft² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.40 L/s.m² 0.08 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 338.507 Peak Zone Sensible Load 203,450 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 9,464 DDC/Pneumatic Total air circulation or Design air 1.37 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 71.6 °F 55.4 °F 13 °C 22 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 60.8 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

NEW BUILDINGS: Warehouse/Wholesale Baseline SIZE: COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

REGION: Island Interconnected

LIGHTING													
GENERAL LIGHTING	400 1	27.0	tt appelles										
Light Level Floor Fraction (GLFF)	400 Lux 0.95	37.2	ft-candles										
Connected Load	9.7 W/m²	0.9	W/ft²										
Occ. Period(Hrs./yr.)	3500		Light Level (Lux)		300	500	700	1000			Total	1	
Unocc. Period(Hrs./yr.)	5260		% Distribution		50%	50%	700	1000			100%		
Usage During Occupied Period	100%		Weighted Average								400		
Usage During Unoccupied Period	15%				INIC	CFL	T40	To	HID	T5HO LE	D TOTAL	-	
Fixture Cleaning:			System Present (%)		INC	CFL	T12	T8 15%	50%	35%	100.0%		
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.7	0.6	6		
Interval	years	3	LLF		0.65	0.65	0.75	0.80	0.80	0.80 0.80			
Relamping Strategy & Incidence	Group Sp	oot	Efficacy (L/W)		15	50	72	88	65	95 90)	I	
of Practice	J. Cap										EUI	kWh/ft².yr	3.7
OF COMPARY LIQUITING												MJ/m².yr	142
SECONDARY LIGHTING Light Level	300 Lux	27.9	ft-candles										
Floor Fraction (ALFF)	0.05		_										
Connected Load	10.1 W/m²	0.9	W/ft²										
Occ. Period(Hrs./yr.)	3000		Light Level (Lux)		300	500	700	1000			Total	I	
Unocc. Period(Hrs./yr.)	5760		% Distribution		100%	000	7.00	.000			100%		
Usage During Occupied Period	100%		Weighted Average								300		
Usage During Unoccupied Period	15%				INC	CFL	T12	Т8	HID	T5HO LE	D TOTAL	+	
Fixture Cleaning:			System Present (%)		5%	10%	112	85%	TIID	0% 09			
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6 0.6			
Interval	years	3	LLF		0.65	0.65	0.75	0.80	0.80	0.80 0.80 95 90			
Relamping Strategy & Incidence	Group Sp	oot	Efficacy (L/W)		15	50	72	88	65	95 90)	l	
of Practice											EUI	kWh/ft².yr	0.2
TERTIARY LIGHTING					E	UI = Load	X Hrs. X S	F X GLFF				MJ/m².yr	7
Light Level	Lux		ft-candles			FI	oor fraction	n check:	should = 1.0	00 1.00)		
Floor Fraction (HBLFF)			_										
Connected Load	W/m²	2	W/ft²										
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)		300	500	700	1000			Total	I	
Unocc. Period(Hrs./yr.)	4760		% Distribution										
Usage During Occupied Period	0%		Weighted Average										
Usage During Unoccupied Period	100%				INC	CFL	T12	Т8		MH HP	S TOTAL	1	
Fixture Cleaning:			System Present (%)		1140	0%	112	10		09			
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6 0.6			
Interval	years	3	LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80 84	0.80	0.55 0.55 65 90			
Relamping Strategy & Incidence	Group Sp	oot	Emodey (E44)		10	50	,,,	04	00	00 0	,	1	
of Practice											EUI	kWh/ft².yr	
												MJ/m².yr	
TOTAL LIGHTING									Overall LP	9.71 W/m ²	EUI TOTAL		3.9
												MJ/m².yr	149
OFFICE EQUIPMENT & PLUG LOA	ADS												
	1												
Equipment Type	Cor	mputers	Monitors	Prir	nters	Copie	rs	Serv	ers	Plug Loads	_		
				100		000		0.17					
Measured Power (W/device) Density (device/occupant)		0.59	51 0.59	100 0.03		200 0.03		217 0.06					
Connected Load		0.3 W/m²	0.3 W/m²		W/m²	0.03 0.1 W	//m²		W/m²	2 W/m²			
		0.0 W/ft ²	0.0 W/ft ²	0.00	W/ft²	0.01 W	//ft²	0.01	W/ft²	0.19 W/ft ²			
Diversity Occupied Period Diversity Unoccupied Period		90% 50%	90% 50%	90% 50%	-	90% 50%		100% 100%	-	90% 25%			
Operation Occ. Period (hrs./year)		2000	2000	2000	-	2000	-	2000	-	3500			
Operation Unocc. Period (hrs./year)		6760	6760	6760		6760		6760		5260			
Total end-use load (occupied period)		2.6 W/m²	0.2 W/ft²	to coo note	o (collo with re	d indicator	in upper rie	aht oornor	tupo "CLIE	T @mputer Serve	m EIII	kWh/ft².yr	0.11
Total end-use load (occupied period) Total end-use load (unocc. period)		1.0 W/m²	0.1 W/ft²	to see note	s (ceiis with re	eu muicator	iii uppei iig	grit corrier,	, туре эпіг	T Gampuler Server	SEUI	MJ/m².yr	4.42
		<u>_</u>							(Computer Equipme	nt EUI	kWh/ft².yr	0.34
Usage during occupied period		100%								Dhartasa	. =	MJ/m².yr	13.30
Usage during unoccupied period		39%								Plug Load	IS EUI	kWh/ft².yr MJ/m².yr	0.83 32.15
											-		02.10
FOOD SERVICE EQUIPMENT	F10" / P	F! Ob		Electric 1		400.00/		FI O	W / D	en l		ien aan en	
Provide description below:	Fuel Oil / Propa	ane Fuel Snare:		Electricity F	-uei Share:	100.0%	F		il / Propane kWh/ft².yr	EUI	EUI	kWh/ft².yr	
				_					MJ/m².yr		20.	MJ/m².yr	
REFRIGERATION Provide description below:													
Large refrigeration storage				7							EUI	kWh/ft².yr	1.5
				_							1	MJ/m².yr	60.0
BLOCK HEATERS & MISCELLANE	OUS												
DESON HEATERS & MISCELLANE	.000												
										Block Heater	rs EUI	kWh/ft².yr	
										Miscellaneou	ıs FI II	MJ/m².yr kWh/ft².yr	0.3
										iviioCellai 1800	.S LUI	M I/m² vr	10.3

NEW BUILDINGS:

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

New

REGION: Island Interconnected

SIZE: Warehouse/Wholesale Baseline

SPACE HEATING													
Heating Plant Type						Hot Water	System			Electric	$\overline{}$	•	
3 71				Boiler		Packaged		W. S. HPI	H/R Chiller	Resistance	Total	1	
		System Present (%)								100%	100%	•	
		Eff./COP		75%				3.00	4.50	1.00			
		Performance (1 / Eff.) (kW/kW)		1.33	1.33	1.05	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	34.0 W/m² 196 MJ/m².yr		Btu/hr.ft² kWh/ft².yr										
g ·												All Electric EUI	
Electric Fuel Share		Oil / Propane Fuel Share]	Oil Fuel Sha	are		I			Ī	kWh/ft².yr MJ/m².yr	5.0 196
Boiler Maintenance	Annual Ma	aintenance Tasks	l	Incidence									
	Fire Olds			(%)	-							Fuel Oil / Propane B	±UI
		Inspection le Inspection for Scale Build	dun	75% 100%								kWh/ft².yr MJ/m².yr	
		of Controls & Safeties	uup	100%							L	IVIJ/IIIyI	-
		of Burner		100%								Market Composite I	EUI
		Analysis & Burner Set-up		90%							ŀ	kWh/ft².yr	5.0
				1	J							MJ/m².yr	196
SPACE COOLING A/C Plant Type													
A/C Plant Type			Centrifugal	l Chillers	Screw	Reciprocal	ting Chillers	Absorption	Chillers	Total	ſ		
			Standard		Chillers	Open		W. H.	CW	1010.	l		
		System Present (%)	Otaridard		011111010	Орол	100.0%			100.0%	Í		
		COP	4.7	5.4	4.4	3.6		0.9	1		i		
		Performance (1 / COP) (kW/kW)	0.21										
		Additional Refrigerant Related Information											
Control Mode		Incidence of Use	Fixed Setpoint	Reset]								
		Chilled Water Condenser Water			-								
		Condenser vvater			J								

Chilled Water 7 °C 30 °C 13.0 °C Setpoint Condenser Water Supply Air

30 W/m² 43.3 MJ/m².yr 10 Btu/hr.ft² 1.1 kWh/ft².yr 1241 ft²/Ton Peak Cooling Load

(Tertiary Load)

Seasonal Cooling Load

1.00 Operation (occ. perio 4000 hrs/year Note value cannot be less than 2,900 hrs/year) Sizing Factor

A/C Saturation 10.0%

(Incidence of A/C)

Fuel Oil / Propane Fuel Share Electric Fuel Share 100.0%

Chiller Maintenance

Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis

Cooling Tower/Air Cooled Condenser Maintenand Annual Maintenance Tasks Incidence Frequency (%) (years) Inspection/Clean Spray Nozzles

Inspect/Service Fan/Fan Motors Megger Motors Inspect/Verify Operation of Controls All Electric EUI 0.5 kWh/ft2.yr MJ/m².yr

Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr

Market Composite EUI 0.5 kWh/ft².yr MJ/m².yr 18

DOMESTIC HOT WATER

Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW System Present (%) 0.00% 0.900 0.750 0.900

Eff./COP 0.550 0.600 Service Hot Water load (MJ/m².yr) (Tertiary Load) 18.2

Fossil Elec. Res. Fuel Share 0% 100% Blended Efficiency 0.90 0.91

Wetting Use Percentage 90% All Electric EUI 0.5 kWh/ft2.yr MJ/m².yr

Fuel Oil / Propane EUI 0.5 kWh/ft².yr

Market Composite EUI 0.5 kWh/ft².yr MJ/m².yr 20.0

NEW BUILDINGS: Warehouse/Wholesale Baseline

SIZE:

VINTAGE: New

REGION: Island Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan System Design Air Flow System Static Pressure CAV 0.27 CFM/ft² 1.4 L/s.m² Control red Variable Fixed Variable 300 Pa 1.2 Flow Flow wa System Static Pressure VAV 300 Pa wg Incidence of Use 100% 100% Fan Efficiency 60% Operation Continuous Scheduled Continuous Schedule Fan Motor Efficiency 80% Sizing Factor 1.00 Incidence of Use 50% 50% 50% 50% Fan Design Load CAV 0.08 W/ft² Fan Design Load VAV 0.9 W/m² 0.08 W/ft² Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 0.1 L/s.m² 212 CFM/washroom 0.01 CFM/ft² Other Exhaust (Smoking/Conference) 0.1 L/s.m² CFM/ft² Total Building Exhaust 0.2 L/s.m² 250 Pa 0.03 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 1.0 0.2 W/m² 0.02 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.020 kW/kW 0.61 W/m² 0.07 kW/Ton 0.06 W/ft² Condenser Pump 0.053 L/s KW 3.0 U.S. gpm/Ton Pump Design Flow Pump Design Flow per unit floor area 0.002 U.S. gpm/ft² 0.002 L/s.m² Pump Head Pressure Pump Efficiency kPa ft 50% Pump Motor Efficiency 80% Sizing Factor 1.0 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 0.0019 U.S. gpm/ft² 2.4 U.S. gpm/Ton 0.001 L/s.m² kPa Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 8.0 Pump Connected Load W/ft² W/m² Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc, Period 5260 hrs./year Supply Fan Energy Consumption 5.3 kWh/m².yr Exhaust Fan Occ. Period 3500 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 5260 hrs./year 1.3 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.3 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 7000 hrs./year kWh/m2.yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 0.6 MJ/m².yr 24.6 COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: Warehouse/Wholesale Baseline

SIZE:

REGION: Island Interconnected

TOTAL ALL END-USES:	Electricity:		13.6 kWh/ft².yr 527.9 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	ricity	Fuel Oil /	Propane
GENERAL LIGHTING	3.7	142.1		kWh/ft2.yr	MJ/m².yr	kWh/ft².yr	MJ/m ² .yr
SECONDARY LIGHTING	0.2	7.0	SPACE HEATING	5.0	195.5		
TERTIARY LIGHTING			SPACE COOLING	0.0	1.8		
OTHER PLUG LOADS	0.8	32.1	DOMESTIC HOT WATER	0.5	20.0	0.0	0.0
HVAC FANS & PUMPS	0.6	24.6	FOOD SERVICE EQUIPMENT				
REFRIGERATION	1.5	60.0					
MISCELLANEOUS	0.3	10.0					
BLOCK HEATERS							
COMPUTER EQUIPMENT	0.3	13.3					
COMPUTER SERVERS	0.1	4.4					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Restaurant Baseline CONSTRUCTION 0.38 W/m².°C 0.07 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² Glazing U value (W/m².°C) 3.52 W/m².°C 0.62 Btu/hr.ft².°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.36 Defined as Exterior Zone Typical # Stories 0.58 Floor to Floor Height (m) 3.7 r 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 60% 40% 100% Min. Air Flow (%) (Minimum Throttled Ai 60% Occupancy or People Density 215 ft²/person %OA 29.87% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 42 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: CFM/ft² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation I /s m² operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.66 CFM/ft² 3.35 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² 50% Infiltration Rate Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 301.959 Switchover Point KJ/kg. 18 Peak Design Cooling Load Peak Zone Sensible Load 109,020 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipment 13.2 ft³/lbm All Pneumatic 5,072 DDC/Pneumatic Total air circulation or Design air 3.35 l/s.m² All DDC Total (should add-up to 100%) PI / PID Proportional Control mode Control Mode Fixed Discharge Rese Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 14 °C 57.2 °F 24 °C Summer Humidity (%) 50% Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 Winter Unocc. Humidity Enthalpy 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves, Inspection of Control Devices (Dampers, VAV Boxes)

REGION: Island Interconnected

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New EXISTING BUILDINGS: Restaurant Baseline SIZE:

LIGHTING GENERAL LIGHTING												
GENERAL LIGHTING												
			1									
Light Level	400 Lux	37.2	ft-candles									
Floor Fraction (GLFF)	0.50											
Connected Load	10.3 W/m²	1.0	W/ft²									
Occ. Period(Hrs./yr.)	4300		Light Level (Lux)		450	550	650			Total	1	
Unocc. Period(Hrs./yr.)	4460		% Distribution		10%	80%	10%			100%	I	
Usage During Occupied Period	100%		Weighted Average							550	I	
Usage During Unoccupied Period	10%										I	
					INC	CFL	T12 T	T8 HID	T5HO LED	TOTAL	I	
Fixture Cleaning:			System Present (%)				10	00.0%		100.0%	I	
Incidence of Practice			CU		0.7	0.7	0.6	0.6 0.6	0.6	ô	I	
Interval	years		LLF		0.65	0.65		0.80 0.80	0.80 0.80		I	
			Efficacy (L/W)		15	50	72	88 65	95 90	5	1	
Relamping Strategy & Incidence	Group Spot		, ,				I					
of Practice	5.55p Sp5.									EUI	kWh/ft².yr	2.3
011100000		<u></u> !									MJ/m².yr	88
ARCHITECTURAL LIGHTING											IVIO/III .yi	- 00
Light Level	300 Lux	27.0	ft-candles									
Floor Fraction (ALFF)	0.50	21.5	it-cardies									
	21.2 W/m²	2.0	W/ft²									
Connected Load	Z1.Z VV/III ²	2.0	VV/IL-									
O D	4000		Liebt Level (Lev		000	000	400	500		Tatal	İ	
Occ. Period(Hrs./yr.)	4300		Light Level (Lux)		200	300	400	500		Total	I	
Unocc. Period(Hrs./yr.)	4460		% Distribution		10%	40%	40%	10%		100%	I	
Usage During Occupied Period	100%		Weighted Average							350	İ	
Usage During Unoccupied Period	10%										l.	
				ļ	INC	CFL	T12 T	Γ8 HID	T5HO LED	TOTAL	l.	
Fixture Cleaning:			System Present (%)		30%	50%			20%		İ	
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6		l.	
Interval	years		LLF		0.65	0.65		0.80 0.80	0.80 0.80		İ	
	. —		Efficacy (L/W)		15	50	72	84 65	95 90)	l.	
Relamping Strategy & Incidence	Group Spot											
of Practice										EUI	kWh/ft².yr	4.7
					E!	UI = Load	X Hrs. X SF X	(GLFF			MJ/m².yr	181
SPECIAL PURPOSE LIGHTING												
Light Level	Lux		ft-candles			FI	oor fraction ch	heck: should = 1.0	00 1.00	5		
Floor Fraction (HBLFF)										_		
Connected Load	W/m²		W/ft²									
Connected Edda	**/		**/11									
Occ. Period(Hrs./yr.)	2500		Light Level (Lux)		300	500	700	1000		Total	1	
	6260				300	300	700	1000		TOTAL	I	
Unocc. Period(Hrs./yr.)			% Distribution								I	
Usage During Occupied Period	0%		Weighted Average								1	
Usage During Unoccupied Period	100%							- T T			I	
					INC	CFL	T12 T	T8 HID	T5HO LED	TOTAL	I	
Fixture Cleaning:			System Present (%)								I	
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6		I	
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80)	I	
			Efficacy (L/W)		15	50	72	84 65	95 90)	I	
Relamping Strategy & Incidence	Group Spot											
of Practice										EUI	kWh/ft².yr	
											MJ/m².yr	
TOTAL LIGHTING								Overall LP	15.75 W/m ²	EUI TOTAL	kWh/ft².yr	7
											MJ/m².yr	269
OFFICE EQUIPMENT & PLUG LOA	DS											
OFFICE EQUIPMENT & PLUG LOA	NDS											
		ore	Monitors	Prin	itors	Conie	re	Servers	Plum I made			
OFFICE EQUIPMENT & PLUG LOA Equipment Type	ADS Compute	ers	Monitors	Prin	nters	Copie	rs	Servers	Plug Loads]		
		ers	Monitors	Prir	iters	Copie	rs	Servers	Plug Loads	7		
Equipment Type	Compute				nters		rs	Servers	Plug Loads]		
Equipment Type Measured Power (W/device)		[Monitors 51 0.16	100 0.01	nters	Copie	rs		Plug Loads			
Equipment Type Measured Power (W/device) Density (device/occupant)	55 0.16		51 0.16	100 0.01		200		217 0.03				
Equipment Type Measured Power (W/device) Density (device/occupant)	55 0.16 0.4	[51	100 0.01	W/m²	200 W	rs	217	Plug Loads 1.15 W/m² 0.11 W/f²			
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load	55 0.16 0.4 0.0	W/m²	51 0.16 0.4 W/m² 0.0 W/ft²	100 0.01 0.1	W/m²	200 W	//m² //ft²	217 0.03 0.1 W/m² 0.01 W/ft²	1.15 W/m² 0.11 W/ft²			
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period	55 0.16 0.4 0.0 80%	W/m²	51 0.16 0.4 W/m² 0.0 W/ft²	100 0.01 0.1 0.00 80%	W/m²	200 W W 80%	//m² //ft²	217 0.03 0.1 W/m² 0.01 W/ft² 100%	1.15 W/m ² 0.11 W/ft ² 80%			
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period	Compute 55 0.16 0.4 0.0 80% 50%	W/m² W/ft²	51 0.16 0.4 W/m² 0.0 W/ft² 80% 50%	100 0.01 0.1 0.00 80% 50%	W/m²	200 W W 80% 50%	//m² //ft²	217 0.03 0.1 W/m² 0.01 W/ft² 100%	1.15 W/m² 0.11 W/t² 80% 50%			
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year)	Compute 55 0.16 0.4 0.0 80% 50% 2000	W/m² W/ft²	51 0.16 0.4 W/m² 0.0 W/t² 80% 50% 2000	100 0.01 0.1 0.00 80% 50% 2000	W/m²	200 W 80% 50% 2000	//m² //ft²	217 0.03 0.1 W/m² 0.01 W/ft² 100% 100% 2000	1.15 W/m ² 0.11 W/ft ² 80% 50% 2500			
	Compute 55 0.16 0.4 0.0 80% 50%	W/m² W/ft²	51 0.16 0.4 W/m² 0.0 W/ft² 80% 50%	100 0.01 0.1 0.00 80% 50%	W/m²	200 W W 80% 50%	//m² //ft²	217 0.03 0.1 W/m² 0.01 W/ft² 100%	1.15 W/m² 0.11 W/t² 80% 50%			
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	Compute 55 0.16 0.4 0.0 80% 50% 2000 6760	W/m² W/ft²	51 0.16 0.4 W/m² 0.0 W/ft² 80% 50% 2000 6760	100 0.01 0.1 0.00 80% 50% 2000	W/m²	200 W 80% 50% 2000	//m² //ft²	217 0.03 0.1 W/m² 0.01 W/ft² 100% 100% 2000	1.15 W/m² 0.11 W/ft² 80% 50% 2500 6260		IAMIL/Ikg) va	0.44
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	Compute 55 0.16 0.4 0.0 80% 50% 2000 6760	W/m² W/ft²	51 0.16 0.4 W/m² 0.0 W/ft² 80% 50% 2000 6760	100 0.01 0.1 0.00 80% 50% 2000	W/m²	200 W 80% 50% 2000	//m² //ft²	217 0.03 0.1 W/m² 0.01 W/ft² 100% 100% 2000	1.15 W/m ² 0.11 W/ft ² 80% 50% 2500		kWh/ft².yr	0.11
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	Compute 55 0.16 0.4 0.0 80% 50% 2000 6760	W/m² W/ft²	51 0.16 0.4 W/m² 0.0 W/ft² 80% 50% 2000 6760	100 0.01 0.1 0.00 80% 50% 2000	W/m²	200 W 80% 50% 2000	//m² //ft²	217 0.03 0.1 W/m² 0.01 W/ft² 100% 100% 2000	1.15 W/m² 0.11 W/ft² 80% 50% 2500 6260 Computer Server		MJ/m².yr	4.42
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year) Total end-use load (occupied period) Total end-use load (unocc. period)	Compute 55 0.16 0.4 0.0 80% 50% 2000 6760 1.8 1.2	W/m² W/ft²	51 0.16 0.4 W/m² 0.0 W/ft² 80% 50% 2000 6760	100 0.01 0.1 0.00 80% 50% 2000	W/m²	200 W 80% 50% 2000	//m² //ft²	217 0.03 0.1 W/m² 0.01 W/ft² 100% 100% 2000	1.15 W/m² 0.11 W/ft² 80% 50% 2500 6260	nt EUI	MJ/m².yr kWh/ft².yr	4.42 0.41
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year) Total end-use load (occupied period) Total end-use load (unocc. period) Usage during occupied period	Compute 55 0.16 0.4 0.0 80% 50% 2000 6760 1.8 1.2	W/m² W/ft²	51 0.16 0.4 W/m² 0.0 W/ft² 80% 50% 2000 6760	100 0.01 0.1 0.00 80% 50% 2000	W/m²	200 W 80% 50% 2000	//m² //ft²	217 0.03 0.1 W/m² 0.01 W/ft² 100% 100% 2000	1.15 W/m² 0.11 W/ft² 80% 50% 2500 6260 Computer Server	nt EUI	MJ/m².yr kWh/ft².yr MJ/m².yr	4.42 0.41 16.00
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year) Total end-use load (occupied period) Total end-use load (unocc. period)	Compute 55 0.16 0.4 0.0 80% 50% 2000 6760 1.8 1.2	W/m² W/ft²	51 0.16 0.4 W/m² 0.0 W/ft² 80% 50% 2000 6760	100 0.01 0.1 0.00 80% 50% 2000	W/m²	200 W 80% 50% 2000	//m² //ft²	217 0.03 0.1 W/m² 0.01 W/ft² 100% 100% 2000	1.15 W/m² 0.11 W/ft² 80% 50% 2500 6260 Computer Server	nt EUI	MJ/m².yr kWh/ft².yr MJ/m².yr kWh/ft².yr	4.42 0.41 16.00 0.55
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Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year) Total end-use load (occupied period) Total end-use load (unocc. period) Usage during occupied period Usage during unoccupied period FOOD SERVICE EQUIPMENT Provide description below:	Compute 55 0.16 0.4 0.0 80% 50% 2000 6760 1.8 1.2	W/m² W/ft² W/m² W/m²	51 0.16 0.4 W/m² 0.0 W/ft² 80% 50% 2000 6760 0.2 W/ft² 0.1 W/ft²	100 0.01 0.1 0.00 80% 50% 2000	W/m² W/ft²	200 W 80% 50% 2000	///m²	217 0.03 0.1 W/m² 0.01 W/ft² 100% 2000 6760	1.15 W/m² 0.11 W/ft² 80% 50% 2500 6260 Computer Server Computer Equipmer	nt EUI ds EUI	MJ/m².yr kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	4.42 0.41 16.00 0.55 21.24
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Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year) Total end-use load (occupied period) Total end-use load (unocc. period) Usage during occupied period Usage during unoccupied period Usage during unoccupied period Usage during toccupied period Usage during toccupied period Usage during unoccupied period Usage during toccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period	Compute 55 0.16 0.4 0.0 80% 50% 2000 6760 1.8 1.2 100% 65%	W/m² W/ft² W/m² W/m²	51 0.16 0.4 W/m² 0.0 W/ft² 80% 50% 2000 6760 0.2 W/ft² 0.1 W/ft²	100 0.01 0.11 0.00 80% 50% 2000 6760	W/m² W/ft²	200 W W W S0% 50% 2000 6760	///m²	217 0.03 0.1 W/m² 0.01 W/ft² 100% 2000 6760	1.15 W/m² 0.11 W/ft² 80% 50% 2500 6260 Computer Server Computer Equipmen Plug Load	EUI EUI All EUI	MJ/m².yr kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr Electric EUI kWh/ft².yr MJ/m².yr	4.42 0.41 16.00 0.55 21.24 34.3 1330.0
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Occ. Period (hrs./year) Total end-use load (occupied period) Usage during occupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period	Compute 55 0.16 0.4 0.0 80% 50% 2000 6760 1.8 1.2 100% 65%	W/m² W/ft² W/m² W/m²	51 0.16 0.4 W/m² 0.0 W/ft² 80% 50% 2000 6760 0.2 W/ft² 0.1 W/ft²	100 0.01 0.11 0.00 80% 50% 2000 6760	W/m² W/ft²	200 W W W S0% 50% 2000 6760	///m²	217 0.03 0.1 W/m² 0.01 W/ft² 100% 2000 6760	1.15 W/m² 0.11 W/ft² 80% 50% 2500 6260 Computer Server Computer Equipmen Plug Load	EUI All EUI	MJ/m².yr kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr Electric EUI kWh/ft².yr MJ/m².yr	34.3 1330.0
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Occ. Period (hrs./year) Total end-use load (occupied period) Usage during occupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period Usage during unoccupied period	Compute 55 0.16 0.4 0.0 80% 50% 2000 6760 1.8 1.2 100% 65%	W/m² W/ft² W/m² W/m²	51 0.16 0.4 W/m² 0.0 W/ft² 80% 50% 2000 6760 0.2 W/ft² 0.1 W/ft²	100 0.01 0.11 0.00 80% 50% 2000 6760	W/m² W/ft²	200 W W W S0% 50% 2000 6760	///m²	217 0.03 0.1 W/m² 0.01 W/ft² 100% 2000 6760	1.15 W/m² 0.11 W/ft² 80% 50% 2500 6260 Computer Server Computer Equipmen Plug Load	EUI All EUI	MJ/m².yr kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr Electric EUI kWh/ft².yr MJ/m².yr	4.42 0.41 16.00 0.55 21.24 34.3 1330.0
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COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

EXISTING BUILDINGS: Restaurant Baseline

SPACE HEATING

SIZE:

REGION: Island Interconnected

SPACE HEATING													
Heating Plant Type				Во		Packaged	A/A HP	Elec W. S. HP		Resistance	Total		
		System Present (%)		Stan.	High	Unit				100%	100%	-	
		Eff./COP Performance (1 / Eff.)		70% 1.43		70% 1.43		3.00 0.33	4.50 0.22	1.00 1.00			
		(kW/kW)			20	0	0.00	0.00	0.22				
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	59.0 W/m² 742 MJ/m².yr		.7 Btu/hr.ft² .1 kWh/ft².yr										
Electric Fuel Share	100.0% Fuel 0	Oil / Propane Fuel Share		I	Oil Fuel Shar	e						All Electric EUI kWh/ft².yr	19.1
Boiler Maintenance	Annual M	aintenance Tasks		Incidence	1							MJ/m².yr	742
	Fire Side Water Sid Inspection Inspection	Inspection de Inspection for Scale Bu n of Controls & Safeties n of Burner Analysis & Burner Set-up	•	(%) 75% 100% 100% 100% 90%								Fuel Oil / Propane kWh/ft².yr MJ/m².yr Market Composite kWh/ft².yr MJ/m².yr	
SPACE COOLING												IVI3/TIF.YI	742
A/C Plant Type		System Present (%) COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifugal Standard 4.7 0.21	HE 7 5.4	3.5	Reciprocat Open 3.5 0.29	DX 100.0% 2.6		Chillers CW 1 1.00	Total 100.0%			
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Setpoint	Reset									
Setpoint		Chilled Water Condenser Water Supply Air		 	44.6 86 57.2	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	95 W/m² 107.4 MJ/m².yr	30 Btu/hr.ft 2.8 kWh/ft².	² 397	ft²/Ton									
Sizing Factor	1.00		Operation (oc	c. period)	3000	hrs/year	Note value	cannot be I	ess than 2,	900 hrs/yea	ar)		
A/C Saturation (Incidence of A/C)	90.0%												
Electric Fuel Share	100.0% Fuel 0	Oil / Propane Fuel Share		I									
Chiller Maintenance	Annual M	aintenance Tasks		Incidence	Frequency								
	Inspect C Megger M Condense Vibration Eddy Cur	er Tube Cleaning		(%)	(years)							All Electric EUI kWh/ft².yr	1.2
Cooling Tower/Air Cooled Condense	Inspection Inspect/S Megger N	n/Clean Spray Nozzles ervice Fan/Fan Motors	ls	Incidence (%)	Frequency (years)							MJ/m².yr Fuel Oil / Propane kWh/ft².yr MJ/m².yr Market Composite kWh/ft².yr MJ/m².yr	
DOMESTIC HOT WATER												•	
Service Hot Water Plant Type	Fossil Fu System F Eff./COP	Present (%)	65			Boiler 0% 0.75		Fuel Share Blended Ef	ficiency	Fossil 0% 0.75		Elec. Res. 100% 0.91	
			JU	1		0.75	ı l	וייסויטפט בו	потепсу	0.73		0.31	
Service Hot Water load (MJ/m².yr) (Tertiary Load)	700.0	, 0.			All Electric EU		, ,		il / Propane			Market Composite	

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New EXISTING BUILDINGS: Restaurant Baseline SIZE: REGION: Island Interconnected

HVAC FANS & PUMPS											
SUPPLY FANS					Ventilation	and Exhau	st Fan Ope	ration & Contr	ol		
						tion Fan		ust Fan	Ī		
System Design Air Flow 3.3	L/s.m ² 0.66	CFM/ft ²	Control		Fixed	Variable	Fixed	Variable			
System Static Pressure CAV 750		wg	1			Flow		Flow			
	Pa 3.0		Incidence of Use		60%		100%	11011			
Fan Efficiency 52%	0.0	" 9	Operation			Scheduled		Scheduled			
Fan Motor Efficiency 85%	1		Operation		Continuot	Scrieduled	Jorilli luous	Scrieduled			
Sizing Factor 1.00			Incidence of Use		90%	10%	90%	10%	J		
	1M/m2 0.E2	101/642	incidence of Use		90%	10%	90%	10%	1		
Fan Design Load CAV 5.7 Fan Design Load VAV 5.7		W/ft²		Comments:							
EXHAUST FANS											
Washroom Exhaust 100	L/s.washroom	212 CFM/washro	nom								
Washroom Exhaust per gross unit area 0.2		0.04 CFM/ft ²	50111								
Other Exhaust (Smoking/Conference) 0.1		0.04 CFM/ft²									
Total Building Exhaust 0.3		0.06 CFM/ft ²									
Exhaust System Static Pressure 250		1.0 wg									
Fan Efficiency 40%											
Fan Motor Efficiency 80%											
Sizing Factor 1.0											
Exhaust Fan Connected Load 0.2	W/m² 0.02	W/ft²									
AUXILIARY COOLING EQUIPMENT (Condens	er Pump and Cooling Tow	er/Condenser Fans)									
[
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser)	0.020 kW/kW 1.87 W/m²	0.07 0.17	kW/Ton W/ft²							
Condenser Pump											
Pump Design Flow	ſ	0.053 L/s.KW	3.0	U.S. gpm/Ton							
Pump Design Flow per unit floor area		0.005 L/s.m²		U.S. gpm/ft ²							
Pump Head Pressure		90 kPa	30								
Pump Efficiency		55% KFa	30								
Pump Motor Efficiency	}	90%									
Sizing Factor		1.0									
			0.00	\A1/f+2							
Pump Connected Load	L	0.92 W/m²	0.09	VV/11 ²							
CIRCULATING PUMP (Heating & Cooling)											
Pump Design Flow @ 5 °C (10 °F) delta T	0.004	I /e m²	0.0060 U.S. gpm/ft ²	2	4 U.S. gpm/	Ton					
Pump Head Pressure		L/s.m² kPa	50 ft	2.	410.5. gpm/	1011					
		NF d	π ос								
Pump Efficiency	55% 90%										
Pump Motor Efficiency											
Sizing Factor	0.5	1/1/22	0.06 W/ft ²								
Pump Connected Load	0.6	W/m²	0.06 W/IT²								
Supply Fan Occ. Period	3500	hrs./year									
Supply Fan Unocc. Period		hrs./year									
Supply Fan Energy Consumption		kWh/m².yr									
Supply Fall Ellergy Consumption	28.1	KVVIVIIIT.YI									
Exhaust For Oss Baris 1	0500	han Arena									
Exhaust Fan Occ. Period		hrs./year									
Exhaust Fan Unocc. Period		hrs./year									
Exhaust Fan Energy Consumption	2.0	kWh/m².yr									
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consun		kWh/m².yr kWh/m².yr									
Circulating Pump Yearly Operation		hrs./year									
Circulating Pump Energy Consumption		kWh/m².yr									
Fans and Pumps Maintenance	Annual Maintenance Tasks		Incidence Frequency								
. and and i umpo manifoliance	,uu muntenane raski	•	(%) (years)								
	Inspect/Service Fans & Mo	tore	(70) (years)								
	Inspect/Adjust Belt Tension		+ + +						F	144/1-/612	
	Inspect/Service Pump & M	otors							EUI	kWh/ft².yr	2.9
									l	MJ/m².yr	111.9

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New EXISTING BUILDINGS: Restaurant Baseline SIZE: REGION: Island Interconnected

EUISUMMARY							
TOTAL ALL END-USES:	Electricity:		102.1 kWh/ft².yr 3,955.9 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.1
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	2.3	88.3		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m ² .yr
ARCHITECTURAL LIGHTING	4.7	180.8	SPACE HEATING	19.1	741.5		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	1.1	42.2		
OTHER PLUG LOADS	0.5	21.2	DOMESTIC HOT WATER	19.9	769.2	0.0	0.0
HVAC FANS & PUMPS	2.9	111.9	FOOD SERVICE EQUIPMENT	33.6	1,303.4	0.0	0.1
REFRIGERATION	16.8	650.0					
MISCELLANEOUS	0.3	10.0					
BLOCK HEATERS							
COMPUTER EQUIPMENT	0.4	16.0					
COMPUTER SERVERS	0.1	4.4					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

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NEW BUILDINGS: SIZE: REGION: VINTAGE: Large Office > 100 kW Baseline CONSTRUCTION 0.42 W/m².°C 0.07 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 465 5,000 ft² Glazing U value (W/m².°C) 2.80 W/m².°C 0.49 Btu/hr.ft².°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.60 Defined as Exterior Zone Typical # Stories 0.58 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A TOTAL Ventilation System Type CAV VAV VAVR System Present (%) 50% 50% 100% Min. Air Flow (%) (Minimum Throttled Ai 60% Occupancy or People Density 274 ft²/person %OA 5.35% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 16 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: CFM/ft² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation I /s m² operation (%) Sizing Factor Total Air Circulation or Design Air Flow 1.08 CFM/ft² 5.50 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.40 L/s.m² 0.08 CFM/ft² 50% Infiltration Rate Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 217.193 Switchover Point KJ/kg. 18 Peak Design Cooling Load Peak Zone Sensible Load 155,218 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipment 13.2 ft³/lbm All Pneumatic 7,221 DDC/Pneumatic Total air circulation or Design air 5.50 l/s.m² All DDC Total (should add-up to 100%) PI / PID Proportional Control mode Control Mode Rese Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 14 °C 57.2 °F 24 °C Summer Humidity (%) 50% Enthalpy Winter Occ. Temperature 23.4 Btu/lbm 65.5 KJ/kg 28.2 Btu/lbm 54.5 73.4 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 19.6 Btu/lbm 23 °C 30% 73.4 °F Winter Unocc. Humidity Enthalpy 50 KJ/ko 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves, Inspection of Control Devices (Dampers, VAV Boxes)

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: Large Office Baseline SIZE: > 100 kW

LIGHTING													
GENERAL LIGHTING Light Level	500 Lux	46.5	ft-candles										
Floor Fraction (GLFF)	0.90		-										
Connected Load	12.9 W/m²	1.2	W/ft²										
Occ. Period(Hrs./yr.)	3300		Light Level (Lux)		300	500	700	1000			Tota	I	
Unocc. Period(Hrs./yr.)	5460		% Distribution			100%						00%	
Usage During Occupied Period Usage During Unoccupied Period	95% 20%		Weighted Average									500	
Usage During Unoccupied Feriod	20%				INC	CFL	T12	Т8	HID	T5HO	LED TO	TAL	
Fixture Cleaning:			System Present (%)					100%		0%	0% 100	.0%	
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6		
Interval	years		LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80	0.80 65	0.80 95	90		
Relamping Strategy & Incidence	Group Spot	I							-				
of Practice		I									EUI	kWh/ft².yr	4.6
ARCHITECTURAL LIGHTING												MJ/m².yr	177
Light Level	350 Lux	32.5	ft-candles										
Floor Fraction (ALFF)	0.10	- 10	1										
Connected Load	12.9 W/m²	1.2	W/ft²										
Occ. Period(Hrs./yr.)	3400		Light Level (Lux)		200	300	400	500			Tota	I	
Unocc. Period(Hrs./yr.)	5360		% Distribution		10%	40%	40%	10%				00%	
Usage During Occupied Period Usage During Unoccupied Period	95% 40%		Weighted Average									350	
coage burning choosapied i choo	4070				INC	CFL	T12	T8	HID	T5HO	LED TO	AL	
Fixture Cleaning:			System Present (%)		5%	30%		40%	5%	15%	5% 100	.0%	
Incidence of Practice Interval	years		CU LLF		0.7	0.7	0.6 0.75	0.6	0.6	0.6	0.6		
ii kei vai	years		Efficacy (L/W)		15	50	72	88	65	95	90		
Relamping Strategy & Incidence	Group Spot]								'			
of Practice		1			F.11	الممطا	/ Llea V C	F X GLFF			EUI	kWh/ft².yr MJ/m².yr	0.6
SPECIAL PURPOSE LIGHTING					EU	I = LOad /	C IIIS. A S	r A GLFF				IVIJ/ITI*.yI	25
Light Level	Lux		ft-candles			Flo	or fraction	n check: sh	ould = 1.0	0	1.00		
Floor Fraction (HBLFF) Connected Load	W/m²		W/ft²										
Connected Load	VV/III-		JVV/112										
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)		300	500	700	1000			Tota	I	
Unocc. Period(Hrs./yr.)	4760		% Distribution										
Usage During Occupied Period Usage During Unoccupied Period	0% 100%		Weighted Average										
coage burning choosapied i choo	10070				INC	CFL	T12	T8		МН	HPS TO	TAL	
Fixture Cleaning:			System Present (%)										
Incidence of Practice Interval	years		CU LLF		0.7	0.7	0.6	0.6	0.6	0.6	0.6		
ii kei vai	years		Efficacy (L/W)		15	50	72	84	88	65	90		
Relamping Strategy & Incidence	Group Spot]				•							
of Practice		1									EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING								0	verall LP	12.92 W/m ²	EUI TO	TAL kWh/ft².yr	5
												MJ/m².yr	202
OFFICE EQUIPMENT & PLUG LOA	DS												
Equipment Type	Compu	ters	Monitors	Printers		Copier	S	Serve	rs	Plug Loads			
		=		100				==1					
Measured Power (W/device) Density (device/occupant)	0.9		51 0.9	100 0.15		200 0.1	-	50 0.26					
Connected Load		W/m²	1.8 W/m²	0.6 W/m²		0.8 W	m²	0.5 W	/m²	1.5 W/m ²			
5		2 W/ft²	0.2 W/ft²	0.05 W/ft²		0.07 W	ft²	0.05 W	/ft²	0.14 W/ft²			
Diversity Occupied Period Diversity Unoccupied Period	80% 50%		80% 50%	80% 50%		80% 50%	-	100% 100%	-	80% 50%			
Operation Occ. Period (hrs./year)	200		2000	2000		2000		2000		2500			
Operation Unocc. Period (hrs./year)	676	D	6760	6760		6760		6760		6260			
Total end-use load (occupied period)	5.5	B W/m²	0.5 W/ft ²							Computer Se	vers FIII	kWh/ft².yr	0.42
Total end-use load (unocc. period)	3.8	B W/m²	0.4 W/ft ²							Computer Co	VCISILOI	MJ/m².yr	16.20
	,	_								Computer Equip	ment EUI	kWh/ft².yr	2.36
Usage during occupied period Usage during unoccupied period	100% 66%									Plug I	pads EUI	MJ/m².yr kWh/ft².yr	91.24 0.72
osage during unoccupied period	007	0								r lug L	Jaus Loi	MJ/m².yr	27.70
												•	
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane F	Fuel Share:		Electricity Fuel S	hare: 1	00.0%		Fuel Oil	/ Propane	EIII		All Electric EUI	ı
Lunch room/cafeteria/restaurant	r del Oil / l Topalle l	dei Oriare.		Liectricity i dei c	nare.	00.078	E		Vh/ft².yr	0.1	EUI	kWh/ft².yr	0.10
									J/m².yr	5.0		MJ/m².yr	4.00
REFRIGERATION													
Provide description below:													
Lunch room/cafeteria/restaurant											EUI	kWh/ft².yr	0.10
												MJ/m².yr	4.00
BLOCK HEATERS & MISCELLANE	ous												
										Block He	aters EUI	kWh/ft².yr MJ/m².yr	0.13 5.00
										Miscellan	eous EUI	kWh/ft².yr	0.13
												MJ/m².yr	5.00

NEW BUILDINGS: Large Office Baseline SIZE: > 100 kW COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

SPACE HEATING											
Heating Plant Type			el Oil / Propa		A /A LID		ctric	D	T-1-1		
	2	Stan.	oilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller		Total		
	System Present (%) Eff./COP	70%	80%	75%		3.00	4.50	100% 1.00	100%		
	Performance (1 / Eff.) (kW/kW)	1.43	1.25	1.33	0.59	0.33	0.22	1.00			
Peak Heating Load 89.6 W/m² Seasonal Heating Load 801 MJ/m².yr (Tertiary Load) 1.00	28.4 Btwhr.ft ² 20.7 kWh/ft ² .yr									All Florido FIII	
Electric Fuel Share 100.0% Fuel C	0il / Propane Fuel Share	I	Oil Fuel Sha	re]				All Electric EUI kWh/ft².yr	20.7
Boiler Maintenance Annual Ma	aintenance Tasks	Incidence	1							MJ/m².yr	801
Fire Side	Inspection	(%) 75%								Fuel Oil / Propane E kWh/ft².yr	UI
	le Inspection for Scale Buildup n of Controls & Safeties	100%								MJ/m².yr	
	n of Burner Analysis & Burner Set-up	100% 90%								Market Composite E kWh/ft².yr MJ/m².yr	UI 20.7 801
SPACE COOLING										ind/iii .yi	
A/C Plant Type	T =		1116:	h ·		Tax ==	01.11	-			
	Centrifugal Standard	HE		Reciprocat Open	DX	Absorptio W. H.	n Chillers CW	Total			
	System Present (%) COP 4.7	20.0%		3.5	80.0%		1	100.0%			
	Performance (1 / COP) 0.21 (kW/kW)					1.11	1.00				
	Additional Refrigerant Related Information										
	Related Information										
Control Mode	Incidence of Use Fixed	Reset	1								
	Setpoint Chilled Water		-								
	Condenser Water		1								
Onto a list	Obillo d Water	Too.	44.0	lo-							
Setpoint	Condenser Water 30	°C °C	44.6 86	°F							
	Supply Air 14.0		57.2]°F							
Peak Cooling Load 68 W/m² Seasonal Cooling Load 92.9 MJ/m².yr (Tertiary Load)	22 Btu/hr.ft² 553 2.4 kWh/ft².yr	ft²/Ton									
Sizing Factor 1.00	Operation (oc	c. period)	3000	hrs/year	Note value	e cannot be	less than 2,	900 hrs/ye	ar)		
A/C Saturation 90.0% (Incidence of A/C)											
	oil / Propane Fuel Share	I									
Chiller Maintenance Annual Ma	aintenance Tasks	Incidence									
Inspect Co	ontrol, Safeties & Purge Unit	(%)	(years)								
	oupling, Shaft Sealing and Bearings										
	er Tube Cleaning										
Eddy Curi	ent Testing										
Spectroch	nemical Oil Analysis									All Electric EUI kWh/ft².yr	0.9
Cooling Tower/Air Cooled Condenser Maintenan Annual Ma	aintenance Tasks	Incidence	Frequency							MJ/m².yr	36
	VClean Spray Nozzles	(%)	(years)							Fuel Oil / Propane E kWh/ft².yr	UI
Inspect/Se	ervice Fan/Fan Motors									MJ/m².yr	
Megger M Inspect/Ve	erify Operation of Controls									Market Composite E	
										kWh/ft².yr MJ/m².yr	0.9 36
DOMESTIC HOT WATER											
Service Hot Water Plant Type Fossil Fue	el SHW Std. Tank PV Tank	Cond. Tnl	Std. Boiler	Cnd. Boil.]			Fossil		Elec. Res.	
	resent (%) 0.550 0.600			0.00%		Fuel Share Blended E		0%		100% 0.94	
Service Hot Water load (MJ/m².yr) 22.8	0.550 0.600	, 0.300	0.730	0.300	J	DICHAGA E	oioiloy	0.00		0.04	
(Tertiary Load)		- /	All Electric EU			Fuel	Oil / Propan			Market Composite E	
Wetting Use Percentage 90%			kWh/ft².yr MJ/m².yr	0.6 24			kWh/ft².yr MJ/m².yr	0.7 25		kWh/ft².yr MJ/m².yr	0.6 24.2

REGION:

Labrador Interconnected

Large Office Baseline

NEW BUILDINGS: SIZE: VINTAGE: > 100 kW New

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Ventilation Fan Exhaust Fan 5.5 L/s.m² 500 Pa Fixed System Design Air Flow System Static Pressure CAV 1.08 CFM/ft² Control ixed Variable Variable 2.0 Flow Flow wg System Static Pressure VAV 500 Pa 2.0 wg Incidence of Use 50% 50% 100% Fan Efficiency Fan Motor Efficiency 52% 85% Operation Continuou Scheduled Continuous Scheduled Sizing Factor Fan Design Load CAV 1.00 6.2 Incidence of Use 75% 25% 75% 25% 0.58 W/ft² Fan Design Load VAV 6.2 W/m² 0.58 W/ft² Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 0.4 L/s.m² 212 CFM/washroom 0.08 CFM/ft² Other Exhaust (Smoking/Conference) 0.1 L/s.m² 0.02 CFM/ft² CFM/ft² Total Building Exhaust 0.5 L/s.m² 250 Pa 0.10 1.0 Exhaust System Static Pressure wg Fan Efficiency 40% Fan Motor Efficiency 80% Sizing Factor Exhaust Fan Connected Load 1.0 0.4 W/m² 0.04 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.018 kW/kW 1.23 W/m² 0.06 kW/Ton 0.11 W/ft² Condenser Pump 3.0 U.S. gpm/Ton 0.005 U.S. gpm/ft² 0.053 L/s.KW Pump Design Flow Pump Design Flow per unit floor area 0.004 L/s.m² Pump Head Pressure Pump Efficiency 100 kPa 55% 33.333333 ft Pump Motor Efficiency Sizing Factor 90% 1.0 0.07 W/ft² Pump Connected Load 0.73 W/m² CIRCULATING PUMP (Heating & Cooling) 0.003 L/s.m² 150 kPa Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 0.0043 U.S. gpm/ft² 2.4 U.S. gpm/Ton 50 ft Pump Efficiency
Pump Motor Efficiency
Sizing Factor 55% 90% 0.5

0.04 W/ft²

Pump Connected Load	0.4	W/m²
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption	5260	hrs./year hrs./year kWh/m².yr

Cupply Fair Energy Consumption	57.7 KWWWW .yr
Exhaust Fan Occ. Period	3500 hrs./year
Exhaust Fan Unocc. Period	5260 hrs./year
Exhaust Fan Energy Consumption	3.1 kWh/m².yr
Condenser Pump Energy Consumption	0.7 kWh/m².yr
Cooling Tower /Condenser Fans Energy Consumption	0.5 kWh/m².yr

Circulating Pump Yearly Operation	5000	hrs./year
Circulating Pump Energy Consumption		kWh/m².y

Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence	Frequency
		(%)	(years)
	Inspect/Service Fans & Motors		
	Inspect/Adjust Belt Tension on Fan Belts		
	Inspect/Service Pump & Motors		

ct/Service Fans & Motors	
ct/Adjust Belt Tension on Fan Belts	
ct/Service Pump & Motors	

REGION:

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: Large Office Baseline SIZE: > 100 kW Labrador Interconnected

EUISUMMARY							
TOTAL ALL END-USES:	Electricity:		35.6 kWh/ft².yr 1,379.9 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	4.6	176.9		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
ARCHITECTURAL LIGHTING	0.6	25.0	SPACE HEATING	20.7	800.5		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.8	32.1		
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	24.2	0.0	0.0
HVAC FANS & PUMPS	3.9	151.0	FOOD SERVICE EQUIPMENT	0.1	4.0		
REFRIGERATION	0.1	4.0					
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.1	5.0					
COMPUTER EQUIPMENT	2.4	91.2					
COMPUTER SERVERS	0.4	16.2					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

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NEW BUILDINGS: SIZE: REGION: VINTAGE: Small Office < 100 kW Baseline CONSTRUCTION 0.42 W/m².°C 0.07 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 465 5,000 ft² Glazing U value (W/m².°C) 2.80 W/m².°C 0.49 Btu/hr.ft².°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.35 Defined as Exterior Zone Typical # Stories 0.58 Floor to Floor Height (m) 3.7 r 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A TOTAL Ventilation System Type CAV VAV VAVR System Present (%) 100% 100% Min. Air Flow (%) (Minimum Throttled Ai 60% Occupancy or People Density 274 ft²/person %OA 12.79% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 16 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: CFM/ft² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation I /s m² operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.45 CFM/ft² 2.30 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.40 L/s.m² 0.08 CFM/ft² 50% Infiltration Rate Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 95.876 Switchover Point KJ/kg. 18 Peak Design Cooling Load Peak Zone Sensible Load 64,888 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipment 13.2 ft³/lbm All Pneumatic 3,019 DDC/Pneumatic Total air circulation or Design air 2.30 l/s.m² All DDC Total (should add-up to 100%) PI / PID Proportional Control mode Control Mode Rese Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 14 °C 57.2 °F 24 °C Summer Humidity (%) 50% Enthalpy Winter Occ. Temperature 23.4 Btu/lbm 65.5 KJ/kg 28.2 Btu/lbm 54.5 73.4 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 19.6 Btu/lbm 23 °C 30% 73.4 °F Winter Unocc. Humidity Enthalpy 50 KJ/ko 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves, Inspection of Control Devices (Dampers, VAV Boxes)

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: Small Office Baseline SIZE: < 100 kW

LIGHTING GENERAL LIGHTING													
Light Level	500 Lux	46.5	ft-candles										
Floor Fraction (GLFF) Connected Load	0.95 12.9 W/n	n² 1.2	W/ft²										
Occ. Period(Hrs./yr.)	2500		Light Level (Lux)		300	500	700	1000			Total	1	
Unocc. Period(Hrs./yr.)	6260		% Distribution			100%					100%		
Usage During Occupied Period Usage During Unoccupied Period	95% 20%		Weighted Average								500	ŀ	
			O		INC	CFL	T12	T8	HID		LED TOTAL		
Fixture Cleaning: Incidence of Practice			System Present (%) CU		0.7	0.7	0.6	100% 0.6	0.6	0%	0% 100.0% 0.6	1	
Interval	yea	rs	LLF		0.65	0.65	0.75	0.80	0.80		0.80		
Relamping Strategy & Incidence	Group S	Spot	Efficacy (L/W)		15	50	72	88	65	95	90	I	
of Practice											EUI	kWh/ft².yr	4.1
ARCHITECTURAL LIGHTING												MJ/m².yr	160
Light Level Floor Fraction (ALFF)	350 Lux 0.05	32.5	ft-candles										
Connected Load	12.9 W/n	n² 1.2	W/ft²										
Occ. Period(Hrs./yr.)	2500		Light Level (Lux)		200	300	400	500			Total	1	
Unocc. Period(Hrs./yr.)	6260		% Distribution		10%	40%	40%	10%			100%	j	
Usage During Occupied Period Usage During Unoccupied Period	95% 40%		Weighted Average								350		
osage burning officeapled relied	4076				INC	CFL	T12	Т8	HID		LED TOTAL	j	
Fixture Cleaning: Incidence of Practice			System Present (%) CU		5% 0.7	30% 0.7	0.6	40% 0.6	5% 0.6	15% 0.6	5% 100.0% 0.6		
Interval	yea	rs	LLF		0.65	0.65	0.75	0.80	0.80		0.80		
Delegacion Otreta e a Otreta e a		N T	Efficacy (L/W)		15	50	72	88	65	95	90]	
Relamping Strategy & Incidence of Practice	Group S	Spot									EUI	kWh/ft².yr	0.3
SPECIAL PURPOSE LIGHTING		<u>.</u>			Е	UI = Load	X Hrs. X S	SF X GLFF				MJ/m².yr	11
Light Level	Lux		ft-candles			FI	loor fraction	on check: sh	ould = 1.00)	1.00		
Floor Fraction (HBLFF)			1.414.2										
Connected Load	W/n	n-	W/ft²										
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)		300	500	700	1000			Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	4760 0%		% Distribution Weighted Average									•	
Usage During Unoccupied Period	100%				11.0	051	T 10						
Fixture Cleaning:			System Present (%)		INC	CFL	T12	T8		MH	HPS TOTAL		
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6		
Interval	yea	rs	LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80 84	0.80	0.55 65	90		
Relamping Strategy & Incidence	Group S	Spot	, ,	<u>_</u>						'		1147 //:0	
of Practice											EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING								0	verall LP	12.92 W/m²	EUI TOTAL	k\N/h/ft² vr	4
101712 210111110									VOIGII 21	12.02 17	20.101712	MJ/m².yr	172
OFFICE EQUIPMENT & PLUG LOA	DS												
Equipment Type	Co	omputers	Monitors	Prir	nters	Copie	rs	Servei	rs	Plug Loads			
1.1 21 .		,											
Measured Power (W/device)		55	51	100		200		50					
Density (device/occupant) Connected Load		0.9 1.9 W/m²	0.9 1.8 W/m²	0.15	W/m²	0.1 0.8 W	//m²	0.26 0.5 W	//m²	1.5 W/m²			
		0.2 W/ft ²	0.2 W/ft ²	0.05		0.07 W		0.05 W		0.14 W/ft ²			
Diversity Occupied Period Diversity Unoccupied Period		80% 50%	80% 50%	80% 50%		80% 50%	H	100% 100%	-	80% 50%			
Operation Occ. Period (hrs./year)		2000	2000	2000		2000		2000		2500			
Operation Unocc. Period (hrs./year)		6760	6760	6760		6760		6760		6260			
Total end-use load (occupied period)		5.8 W/m²	0.5 W/ft ²							Computer Se	rvers EUI	kWh/ft².yr	0.42
Total end-use load (unocc. period)		3.8 W/m²	0.4 W/ft²							Computer Equip	ment FUI	MJ/m².yr kWh/ft².yr	16.20 2.36
Usage during occupied period		100%										MJ/m².yr	91.24
Usage during unoccupied period		66%								Plug L	oads EUI	kWh/ft².yr MJ/m².yr	0.72 27.70
											+		
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Prop	pane Fuel Share:		Electricity I	Fuel Share:	100.0%	Г	Fuel Oil	/ Propane I	EUI	Al	Electric EUI	
•					_		E	EUI kV	Vh/ft².yr		EUI	kWh/ft².yr	
								M.	J/m².yr			MJ/m².yr	
REFRIGERATION													
Provide description below:				7							EUI	kWh/ft².yr	
												MJ/m².yr	
BLOCK HEATERS & MISCELLANEO	ous												
										_	. Eur	1100 /6-7	
										Block He	aters EUI	kWh/ft².yr MJ/m².yr	0.13 5.00
										Miscellan	eous EUI	kWh/ft².yr	0.13
İ												MJ/m².yr	5.00

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: Small Office Baseline SIZE: < 100 kW

SPACE HEATING													
Heating Plant Type					uel Oil / Propa		A /A LID	Elec		Desistana	Total		
				Stan.	High	Packaged Unit	A/A HP	W. S. HP I	1/R Chiller				
		System Present (%) Eff./COP		70%		75%	1.70	3.00	4.50	100%	100%		
		Performance (1 / Eff.) (kW/kW)		1.43	1.25	1.33	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	69.3 W/m² 615 MJ/m².yr		Btu/hr.ft² kWh/ft².yr										
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		T	Oil Fuel Sha	re]					5.9
Boiler Maintenance	Annual Ma	intenance Tasks		Incidence									15
		nspection		(%) 75%								Fuel Oil / Propane EUI kWh/ft².yr	_
		e Inspection for Scale Buil of Controls & Safeties	dup	100%								MJ/m².yr	-
		of Burner Analysis & Burner Set-up		100%									5.9
												MJ/m².yr 6	15
SPACE COOLING													
A/C Plant Type			Centrifugal		WSHP			Absorption		Total			
		System Present (%)	Standard	HE		Open	DX 100.0%	W. H.	CW	100.0%			
		COP Performance (1 / COP)	4.7 0.21			3.5 0.29		0.9 1.11	1.00				
		(kW/kW) Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed	Reset	1	I .							
Control Wode		Chilled Water	Setpoint	TV6361									
		Condenser Water											
			_	T		I							
Setpoint		Chilled Water Condenser Water	30	°C ℃	44.6 86	°F							
		Supply Air	14.0	-	57.2	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	30 W/m² 69.8 MJ/m².yr	10 Btu/hr.ft² 1.8 kWh/ft².yr	1252	ft²/Ton									
Sizing Factor	1.00		Operation (oc	c. period)	3000	hrs/year	Note value	e cannot be	ess than 2	900 hrs/ye	ar)		
A/C Saturation (Incidence of A/C)	90.0%												
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		Ι									
Chiller Maintenance	Annual Ma	intenance Tasks		Incidence (%)	Frequency (years)								
		ontrol, Safeties & Purge Un		(70)	(years)								
	Megger M		bearings										
	Vibration /												
		ent Testing emical Oil Analysis										All Electric EUI	
					-	i							0.7 26
Cooling Tower/Air Cooled Condenser				Incidence (%)	Frequency (years)							Fuel Oil / Propane EUI	
		/Clean Spray Nozzles ervice Fan/Fan Motors										kWh/ft².yr MJ/m².yr	
	Megger M Inspect/Ve	otors erify Operation of Controls										Market Composite EUI	-
												kWh/ft².yr 0).7 26
DOMESTIC HOT WATER													_
Service Hot Water Plant Type	Fossil Fue	I SHW Std. Tank	PV Tank	Cond. Tnl	k Std. Boiler	Cnd. Boil.]			Fossil		Elec. Res.	
		resent (%) 0.550				0.00%		Fuel Share Blended Ef	ficiency	0% 0.90		100% 0.94	
Service Hot Water load (MJ/m².yr) (Tertiary Load)	22.8	, 5.000					•		- J			<u>. </u>	
Wetting Use Percentage	90%			,	All Electric EL kWh/ft².yr MJ/m².yr	0.6 24			il / Propan kWh/ft².yr MJ/m².yr	0.7 25			0.6 4.2
				1	ivio/III=.yI	24	<u> </u>	1	vio/iIIT.yI	20		iviJ/HF.yI 24	r.∠

NEW BUILDINGS: Small Office Baseline

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New SIZE: < 100 kW

HVAC FANS & PUMPS										
SUPPLY FANS				Ventilation	n and Evbau	ist Fan ∩n⁄	eration & Control			
OUT ET LANG					ation Fan		aust Fan			
System Design Air Flow 2.3	√s.m² 0.45	CFM/ft²	Control	Fixed	Variable	Fixed	Variable			
	Pa 2.0				Flow		Flow			
	Pa 2.0		Incidence of Use	100%		100%				
Fan Efficiency 52%		-	Operation	Continuou	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 85%										
Sizing Factor 0.50			Incidence of Use	75%	25%	75%	25%			
Fan Design Load CAV 1.3		W/ft²								
Fan Design Load VAV 1.3	W/m ² 0.12	W/ft²	Comments:							
EXHAUST FANS										
Washroom Exhaust 100	_/s.washroom	212 CFM/washro	oom							
	_/s.m²	0.08 CFM/ft ²								
	_/s.m²	0.02 CFM/ft ²								
	⊥/s.m²	0.10 CFM/ft ²								
	Pa	1.0 wg								
Fan Efficiency 40%										
Fan Motor Efficiency 80%										
Sizing Factor 0.5										
Exhaust Fan Connected Load 0.2	W/m² 0.02	W/ft²								
AUXILIARY COOLING EQUIPMENT (Condenser	Pump and Cooling Tow	er/Condenser Fans)								
Average Condenser Fan Power Draw	ĺ	0.018 kW/kW	0.06 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled Con	denser)	0.54 W/m²	0.05 W/ft²							
Condenser Pump										
	r									
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area		0.002 L/s.m ²	0.002 U.S. gpm/ft ²							
Pump Head Pressure		100 kPa	33.333333 ft							
Pump Efficiency		55%								
Pump Motor Efficiency		90%								
Sizing Factor		0.5	0.02 1/1/42							
Pump Connected Load	Į	0.16 W/m²	0.02 W/ft²							
CIRCULATING PUMP (Heating & Cooling)										
Pump Design Flow @ 5 °C (10 °F) delta T		L/s.m²		2.4 U.S. gpm	/Ton					
Pump Head Pressure		kPa	50 ft							
Pump Efficiency	55%									
Pump Motor Efficiency	90%									
Sizing Factor	0.5	\M/m2	0.02 W/ft²							
Pump Connected Load	0.2	W/m²	0.02 W/IT²							
		. ,								
Supply Fan Occ. Period		hrs./year								
Supply Fan Unocc. Period		hrs./year								
Supply Fan Energy Consumption	9.7	kWh/m².yr								
Exhaust Fan Occ. Period	3500	hrs./year								
Exhaust Fan Unocc. Period		hrs./year								
Exhaust Fan Onocc. Period Exhaust Fan Energy Consumption		kWh/m².yr								
	1.0	,.								
Condenser Pump Energy Consumption	0.1	kWh/m².yr								
Cooling Tower /Condenser Fans Energy Consump	tion 0.3	kWh/m².yr								
Circulating Pump Yearly Operation	5000	hrs./year								
Circulating Pump Energy Consumption	3300	kWh/m².yr								
Fans and Pumps Maintenance	unnual Maintenance Task	9	Incidence Frequency							
n ans and Fumps Manneridate	umuan mannenance rask	•	(%) (years)							
li li	nspect/Service Fans & Mo	otors	, ., , , , , , , , , , , , , , , , , ,							
Į.	nspect/Adjust Belt Tension	n on Fan Belts					_			
<u> </u>	nspect/Service Pump & M	otors					E	UI	kWh/ft².yr	1.1
									MJ/m².yr	42.2

REGION:

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: Small Office Baseline SIZE: < 100 kW Labrador Interconnected

EUISUMMARY							
TOTAL ALL END-USES:	Electricity:		26.8 kWh/ft².yr 1,039.0 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 M
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electi	icity	Fuel Oil /	Propane
GENERAL LIGHTING	4.1	160.2		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
ARCHITECTURAL LIGHTING	0.3	11.3	SPACE HEATING	15.9	615.3		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.6	23.7		
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	24.2	0.0	0.0
HVAC FANS & PUMPS	1.1	42.2	FOOD SERVICE EQUIPMENT				
REFRIGERATION							
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.1	5.0					
COMPUTER EQUIPMENT	2.4	91.2					
COMPUTER SERVERS	0.4	16.2					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

NEW BUILDINGS: SIZE: REGION: VINTAGE: Food Retail Labrador Interconnected Baseline CONSTRUCTION 10,000 ft² 0.28 W/m².°C Wall U value (W/m².°C) 0.05 Btu/hr.ft² .°F Typical Building Size 929 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 m² 10,000 ft² 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 40% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.11 Defined as Exterior Zone Typical # Stories 0.69 Floor to Floor Height (m) 6.0 m 19.7 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A TOTAL Ventilation System Type CAV VAV VAVR System Present (%) 100% Min. Air Flow (%) (Minimum Throttled Ai 50% Occupancy or People Density 484 ft²/person %OA 45 m²/person 5.55% Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period 90% resh Air Requirements or Outside Air 20 L/s.person 42 CFM/person Fresh Air Control Type 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 1.58 CFM/ft² 8.00 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Peak Design Cooling Load Peak Zone Sensible Load Switchover Point KJ/kg. 18 198,673 112,922 64.4 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm Controls Type System Present (%) HVAC Room 23.4 Btu/lbm Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic DDC/Pneumatic All DDC 5,253 Total air circulation or Design air 8.00 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control Mode Control mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Air Summer Temperature 71.6 °F 55.4 °F 22 °C 13 Summer Humidity (%) 50% 100% Enthalpy
Winter Occ. Temperature
Winter Occ. Humidity 65.5 KJ/kg 22 °C 28.2 Btu/lbm 23.4 Btu/lbm 54.5 71.6 60.8 30% 45% Enthalpy Winter Unocc. Temperature 53 K 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 69.8 Winter Unocc. Humidity 30% 21.5 Btu/lbm Enthalpy 50 KJ/kc Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices nspection of Control Devices (Valves, Inspection of Control Devices (Dampers, VAV Boxes)

NEW BUILDINGS: Food Retail Baseline SIZE: Ali COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

LIGHTING GENERAL LIGHTING											
Light Level		6.5 ft-candles									
Floor Fraction (GLFF) Connected Load	0.90 12.0 W/m ²	I.1 W/ft²									
Connected Load	12.0 W/III	1.1 W/IC									
Occ. Period(Hrs./yr.)	4500	Light Level (Lux)	40		600	1000			Total	_	
Unocc. Period(Hrs./yr.) Usage During Occupied Period	4260 100%	% Distribution Weighted Average		100%					1009		
Usage During Unoccupied Period	20%		,								
Fixture Cleaning:		System Present (%)	IN	C CFL 3%	T12	T8 55%	HID 10%	T5HO 30%	LED TOTA 2% 100.09		
Incidence of Practice		CU	0.1		0.6	0.6	0.7		0.6		
Interval	years	LLF	0.6		0.75	0.80	0.80		0.80		
Relamping Strategy & Incidence	Group Spot	Efficacy (L/W)	1	5 50	72	88	65	95	90	_	
of Practice	отогр орг								EUI	kWh/ft².yr	5.4
SECONDARY LIGHTING										MJ/m².yr	208
Light Level	500 Lux 46	6.5 ft-candles									
Floor Fraction (ALFF)	0.10	-									
Connected Load	12.8 W/m²	I.2 W/ft ²									
Occ. Period(Hrs./yr.)	4500	Light Level (Lux)	30		700	1000			Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	4260 100%	% Distribution Weighted Average		100%					1009		
Usage During Unoccupied Period	50%	Weighted Average							30	-	
First was Classica.		Custom December (01)	IN	C CFL	T12	T8	HID		LED TOTAL		
Fixture Cleaning: Incidence of Practice		System Present (%) CU	0.	7 0.7	0.6	80% 0.6	5% 0.6	15% 0.6	0% 100.09	-	
Interval	years	LLF	0.6	5 0.65	0.75	0.80	0.80	0.80	0.80		
Relamping Strategy & Incidence	Group Spot	Efficacy (L/W)	19	5 50	72	88	65	95	90	_	
of Practice	Этопр Зрог								EUI	kWh/ft².yr	0.8
				EUI = Load	d X Hrs. X	SF X GLFF	7			MJ/m².yr	30
TERTIARY LIGHTING Light Level	Lux	ft-candles		li	Floor fracti	ion check:	should = 1.	00 1	.00		
Floor Fraction (HBLFF)											
Connected Load	W/m²	W/ft²									
Occ. Period(Hrs./yr.)	4000	Light Level (Lux)	30	0 500	700	1000			Total	٦	
Unocc. Period(Hrs./yr.)	4760	% Distribution								1	
Usage During Occupied Period Usage During Unoccupied Period	100%	Weighted Average								4	
coage Daining Choosapies I choos	10070		IN	C CFL	T12	Т8		MH I	HPS TOTA	Ē.	
Fixture Cleaning:		System Present (%)	0.1		0.0	0.0	0.0	0.0	0% 0.09	6	
Incidence of Practice Interval	years	CU LLF	0.0		0.6 0.75	0.6	0.6		0.6		
		Efficacy (L/W)	15		72	84	88	65	90		
Relamping Strategy & Incidence of Practice	Group Spot								EUI	kWh/ft².yr	
or radice									Loi	MJ/m².yr	
TOTAL LIGHTING						,	Overall LP	12.07 W/m²	EULTOTA	L kWh/ft².yr	6
TOTAL LIGHTING						,	Overall LP	12.07 W/IIIF	EULTUTA	MJ/m².yr	238
OFFICE EQUIPMENT & PLUG LOA	DS										
Equipment Type	Computers	Monitors	Printers	Copi	iers	Serv	ers	Plug Loads			
Measured Power (W/device)	55	51	100	200		217					
Density (device/occupant) Connected Load	0.65 0.8 W/m²	0.65 0.7 W/m²	0.01 0.0 W/m²	0.01	W/m²	0.03	W/m²	1.5 W/m²			
	0.1 W/ft ²	0.1 W/ft ²	0.00 W/ft ²	0.00		0.01		0.14 W/ft ²			
Diversity Occupied Period	90% 50%	90% 50%	90% 50%	90% 50%		100% 100%		90% 50%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year)	2000	2000	2000	2000		2600	-	4100			
Operation Unocc. Period (hrs./year)	6760	6760	6760	6760		6160		4660			
Total end-use load (occupied period)	2.9 W/m²	0.3 W/ft²	to see notes (cells wi	th red indicato	r in unner	right comer	type "SHII	FT (FØlmnuter Ser	vers FUI	kWh/ft².yr	0.11
Total end-use load (unocc. period)	1.7 W/m²	0.2 W/ft²	10 000 110100 (00110 111	arroa maioato	аррог	ngni comor,		•		MJ/m².yr	4.42
Hoose during a serviced posiced	100%							Computer Equipr	ment EUI	kWh/ft².yr	0.76
Usage during occupied period Usage during unoccupied period	58%							Plug Lo	ads EUI	MJ/m².yr kWh/ft².yr	29.56 0.84
										MJ/m².yr	32.51
FOOD SERVICE EQUIPMENT											
Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share	100.0%			il / Propan			All Electric EU	
							kWh/ft².yr MJ/m².yr	2.6 100.0	EUI	kWh/ft².yr MJ/m².yr	3.1 120.0
							yı	100.0		wio/IIIyI	120.0
REFRIGERATION											
Provide description below: Commercial refrigeration display case	9S		\neg						EUI	kWh/ft².yr	25.8
										MJ/m².yr	1000.0
BLOCK HEATERS & MISCELLANE	OUS										
DESCRIBERS & WISCELLANE											
								Block Hea	aters EUI	kWh/ft².yr	0.1
								Miscellane	eous EUI	MJ/m².yr kWh/ft².yr	5 0.1
										MJ/m².yr	5

NEW BUILDINGS: SIZE:
Food Retail All

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

REGION: Labrador Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Packaged A/A HP **Boilers** Stan. High Rooftop System Present (%) 100% Eff./COP 88% 4.50 1.00 Performance (1 / Eff.) 1.25 1.14 1.05 0.31 0.33 0.22 1.00 (kW/kW) Peak Heating Load 11.2 Btu/hr.ft² 35.3 W/m² Seasonal Heating Load 306 MJ/m².yr 7.9 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share kWh/ft².yr 7.9 MJ/m².yr 306 Boiler Maintenance Annual Maintenance Tasks Fuel Oil / Propane EUI kWh/ft².yr (%) 75% Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 306 SPACE COOLING A/C Plant Type Centrifugal Chillers
Standard HE Reciprocating Chillers Absorption Chillers Screw Total DX W. H. CW Chillers Open 100.0% System Present (%) 100.0% Performance (1 / COP) 0.21 0.19 0.23 0.31 0.37 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water 44.6 °F Condenser Water 30 °C 86 °F 55.4 °F Supply Air 13.0 °C 63 W/m² 20 Btu/hr.ft² 604 ft²/Ton Peak Cooling Load Seasonal Cooling Load 50.2 MJ/m².yr 1.3 kWh/ft².yr (Tertiary Load) Operation (occ. period 4000 hrs/year Note value cannot be less than 2,900 hrs/year) 1.00 Sizing Factor 90.0% A/C Saturation (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.6 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.6 kWh/ft².vr MJ/m².yr 22 DOMESTIC HOT WATER Service Hot Water Plant Type Fossil Fuel SHW Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Elec. Res. Fossil System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.550 0.600 0.750 0.900 Blended Efficiency 0.90 0.91 ervice Hot Water load (MJ/m².yr) 45.5 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI kWh/ft².yr 90% 1.3 Wetting Use Percentage kWh/ft2.yr 1.3 kWh/ft2.yr 1.3 50.0 MJ/m².y MJ/m².yr

NEW BUILDINGS: Food Retail Baseline SIZE: Ali

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New REGION: Labrador Interconnected

HVAC FANS & PUMPS							
SUPPLY FANS				Ventilation and Exha			
				Ventilation Fan	Exhau	ust Fan	
System Design Air Flow 8.		58 CFM/ft ²	Control	Fixed Variable	Fixed	Variable	
System Static Pressure CAV 3	50 Pa 1.	4 wg		Flow		Flow	
System Static Pressure VAV 3	50 Pa 1.	4 wg	Incidence of Use	100%	100%		
Fan Efficiency 60			Operation	Continuous Schedule	dContinuous	Scheduled	
Fan Motor Efficiency 80							
Sizing Factor 1.0			Incidence of Use	100%	100%		
		54 W/ft ²	includings of coo	10070	10070	'	
Fan Design Load VAV		54 W/ft²	Comments:				
EXHAUST FANS							
Washroom Exhaust 10	00 L/s.washroom	212 CFM/was	hroom				
	.2 L/s.m²	0.04 CFM/ft²					
	.1 L/s.m²	0.02 CFM/ft²					
	.3 L/s.m²	0.06 CFM/ft ²					
	50 Pa	1.0 wg					
Fan Efficiency 25							
Fan Motor Efficiency 75	%						
Sizing Factor 1.							
		04 W/ft²					
AUXILIARY COOLING EQUIPMENT (Conder	nser Pump and Cooling T	ower/Condenser Fans)					
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton				
(Cooling Tower/Evap. Condenser/ Air Cooled	Condenser)	1.25 W/m²	0.07 kW/16f1 0.12 W/ft²				
	,						
Condenser Pump							
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton				
Pump Design Flow per unit floor area		0.003 L/s.m ²	0.005 U.S. gpm/ft ²				
Pump Head Pressure		kPa	ft				
Pump Efficiency		50%					
Pump Motor Efficiency		80%					
Sizing Factor		1.0					
			144/60				
Pump Connected Load		W/m²	W/ft²				
CIRCULATING PUMP (Heating & Cooling)							
				7			
Pump Design Flow @ 5 °C (10 °F) delta T	0.00	03 L/s.m²		U.S. gpm/Ton			
Pump Head Pressure		kPa	50 ft				
Pump Efficiency	50	%					
Pump Motor Efficiency	80'						
Sizing Factor	0.						
Pump Connected Load		W/m²	W/ft²				
Supply Fan Occ. Period	500	0 hrs./year					
Supply Fan Unocc. Period		60 hrs./year					
Supply Fan Energy Consumption		.1 kWh/m².yr					
Exhaust Fan Occ. Period	500	0 hrs./year					
Exhaust Fan Unocc. Period		60 hrs./year					
Exhaust Fan Energy Consumption		i.7 kWh/m².yr					
		· ¬					
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consu	umption	kWh/m².yr .3 kWh/m².yr					
Cooling Tower /Condenser Fails Effergy Const	лприоп 0	KVVIVIIIYI					
Circulating Pump Yearly Operation	700	0 hrs./year					
Circulating Pump Energy Consumption		kWh/m².yr					
Fans and Pumps Maintenance	Annual Maintenance Ta	isks	Incidence Frequency				
			(%) (years)				
	Inspect/Service Fans &						
	Inspect/Adjust Belt Tens					[
	Inspect/Service Pump &	Motors				EUI kWh/ft².y	
						MJ/m².yr	198.3

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: Food Retail Baseline SIZE: Ali REGION: Labrador Interconnected

EUI SUMMARY							
TOTAL ALL END-USES:	Electricity:	:	53.2 kWh/ft².yr 2,059.5 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	5.4	207.9		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
SECONDARY LIGHTING	0.8	30.5	SPACE HEATING	7.9	306.4		
TERTIARY LIGHTING			SPACE COOLING	0.5	19.6		
OTHER PLUG LOADS	0.8	32.5	DOMESTIC HOT WATER	1.3	50.0	0.0	0.0
HVAC FANS & PUMPS	5.1	198.3	FOOD SERVICE EQUIPMENT	3.1	120.0		
REFRIGERATION	25.8	1,000.0					
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.1	5.0					
COMPUTER EQUIPMENT	0.8	29.6					
COMPUTER SERVERS	0.1	4.4					
ELEVATORS							
OUTDOOR LIGHTING	1.3	50.4					

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NEW BUILDINGS: SIZE: REGION: VINTAGE: Large Non-Food Retail > 100 kW New Labrador Interconnected CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space 100% Percent Conditioned Space 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.10 Defined as Exterior Zone Typical # Stories 0.78 Floor to Floor Height (m) 6.0 m 19.7 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 269 ft²/person %OA 7.61% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 15 L/s.person 32 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor 2 7.88 L/s.m² Total Air Circulation or Design Air Flow 1.55 CFM/ft² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² CFM/ft² Infiltration Rate L/s.m² 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 284.710 Switchover Point KJ/kg. Peak Design Cooling Load Peak Zone Sensible Load 166,814 28.2 Btu/lbm 23.4 Btu/lbm Room air enthalpy Controls Type System Present (%) HVAC Discharge air enthalpy Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 7,760 DDC/Pneumatic Total air circulation or Design air 7.88 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 57.2 °F 69.8 °F 21 °C 14 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity 21.5 Btu/lbm Enthalpy 50 KJ/kg Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication
Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

NEW BUILDINGS: Large Non-Food Retail Baseline SIZE: > 100 kW COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

LIGHTING GENERAL LIGHTING												
Light Level Floor Fraction (GLFF)	0.95	6.5 ft-candles										
Connected Load		I.7 W/ft²										
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4500 4260	Light Level (Lux) % Distribution		300	500 100%	700	1000			Total 100	1%	
Usage During Occupied Period Usage During Unoccupied Period	95%	Weighted Average		'							00	
	15%			INC	CFL	T12	Т8	HID	T5HO	LED TOT.		
Fixture Cleaning: Incidence of Practice		System Present (% CU)	10% 0.7	5% 0.7	0.6	55% 0.6	10% 0.7	20% 0.6	0% 100.0 0.6	1%	
Interval	years	LLF		0.65	0.65	0.75	0.80	0.80	0.80	0.80		
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)		15	50	72	88	65	95	90 EUI	kWh/ft².yr	8.0
ARCHITECTURAL LIGHTING											MJ/m².yr	310
Light Level Floor Fraction (ALFF)	500 Lux 46	6.5 ft-candles										
Connected Load		I.9 W/ft²										
Occ. Period(Hrs./yr.)	4500	Light Level (Lux)		300	500	700	1000			Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	4260 95%	% Distribution Weighted Average			100%					100	00	
Usage During Unoccupied Period	50%			""	051	7.0			T=110			
Fixture Cleaning:		System Present (%)	INC 8%	CFL 10%	T12	T8 20%	HID 60%	T5HO 0%	LED TOTA 2% 100.0		
Incidence of Practice		CU		0.7	0.7	0.6	0.6	0.6	0.6	0.6		
Interval	years	LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80 88	0.80 65	0.80 95	90		
Relamping Strategy & Incidence of Practice	Group Spot			<u>.</u>						EUI	kWh/ft².yr	0.6
SPECIAL PURPOSE LIGHTING				E	EUI = Load	X Hrs. X S	SF X GLFF				MJ/m².yr	24
Light Level	Lux	ft-candles			F	loor fraction	on check:	should = 1.0	00	1.00		
Floor Fraction (HBLFF) Connected Load	W/m²	W/ft²										
Occ. Period(Hrs./yr.)	4000	Light Level (Lux)		300	500	700	1000			Total		
Unocc. Period(Hrs./yr.)	4760	% Distribution										
Usage During Occupied Period Usage During Unoccupied Period	100%	Weighted Average										
Fixture Cleaning:		System Present (%	,	INC	CFL	T12	Т8		MH	HPS TOT.	AL	
Incidence of Practice		CU)	0.7	0.7	0.6	0.6	0.6	0.6	0.6		
Interval	years	LLF Efficacy (L/W)		0.65 15	0.65 50	0.75 72	0.80 84	0.80	0.55 65	0.55 90		
Relamping Strategy & Incidence of Practice	Group Spot		· · · · · · · · · · · · · · · · · · ·							EUI	kWh/ft².yr	
or rudice										201	MJ/m².yr	
TOTAL LIGHTING							(Overall LP	18.53 W/m	EUI TOT	AL kWh/ft².yr MJ/m².yr	9 333
OFFICE EQUIPMENT & PLUG LOA	DS											
Equipment Type	Computers	Monitors	Printe	rs	Copie	ers	Serv	ers	Plug Loads	S		
Measured Power (W/device) Density (device/occupant)	55 0.22	51 0.22	100 0.01	-	200 0.01		217 0.02					
Connected Load	0.5 W/m² 0.0 W/ft²	0.4 W/m²	0.0 W		0.1 W			N/m²	1.15 W/m			
Diversity Occupied Period	90%	0.0 W/ft² 90%	0.00 W 90%	/112	0.01 W 90%	V/IL-	0.01 \ 100%	////۱۲-	0.11 W/ft² 90%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year)	50% 2000	50% 2000	50% 2000	-	50% 2000		100% 2000		50% 4100			
Operation Unocc. Period (hrs./year)	6760	6760	6760		6760		6760		4660			
Total end-use load (occupied period)	2.1 W/m²	0.2 W/ft²	to see notes	(cells with r	ed indicator	in upper ri	iaht corner.	tvpe "SHIF	T @mputer Se	ervers EUI	kWh/ft².yr	0.11
Total end-use load (unocc. period)	1.2 W/m²	0.1 W/ft ²					5 ,	•	·		MJ/m².yr	4.42
Usage during occupied period	100%							(Computer Equip	oment EUI	kWh/ft².yr MJ/m².yr	0.49 19.14
Usage during unoccupied period	59%								Plug L	_oads EUI	kWh/ft².yr MJ/m².yr	0.64 24.92
											IVIJ/IIIyI	24.92
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	5	Electricity Fu	el Share:	100.0%	Г	Fuel O	il / Propane	EUI		All Electric EUI	
		" "				E	EUI F	kWh/ft².yr		EUI	kWh/ft².yr	1.0
							'	MJ/m².yr			MJ/m².yr	38.7
REFRIGERATION Provide description below:												-
. To vide description below.										EUI	kWh/ft².yr	1.5
											MJ/m².yr	58.1
BLOCK HEATERS & MISCELLANE	ous											
									Block He	eaters EUI	kWh/ft².yr	0.1
									Miscellar	neous EUI	MJ/m².yr	5 0.1
									iviiscellar	IEUUS EUI	kWh/ft².yr MJ/m².yr	5

NEW BUILDINGS: SIZE: Large Non-Food Retail > 100 kW

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

New

REGION: Labrador Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistanc Packaged A/A HP Total Stan High Rooftop System Present (%) 100% 100% Eff./COP 80% 3.20 3.50 1.00 Performance (1 / Eff.) 1.33 1.25 1.33 0.31 0.29 0.22 1.00 (kW/kW) Peak Heating Load 42.5 W/m² 13.5 Btu/hr.ft² 350 MJ/m².vr Seasonal Heating Load 9.0 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share a n MJ/m².yr 350 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 350 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Recprocting Chillers | Absorption Chillers Total Standard HE DX CW Chillers Open System Present (%) COP 100.0% 100.0% Performance (1 / COP) 0.21 0.19 0.23 0.27 0.37 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 14.0 °C Supply Air 90 W/m² 28 Btu/hr.ft² 421 ft²/Ton Peak Cooling Load Seasonal Cooling Load 84.4 MJ/m².yr 2.2 kWh/ft².yr (Tertiary Load) 1.00 Sizing Factor 90.0% A/C Saturation (Incidence of A/C) Electric Fuel Share Fuel Oil / Propane Fuel Share 100.0% Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.7 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.7 kWh/ft².vr MJ/m².yr 28 DOMESTIC HOT WATER Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW Fossil Elec. Res. System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.550 0.600 0.900 0.750 0.900 Blended Efficiency 0.90 0.91 Service Hot Water load (MJ/m².yr) 17.3 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI 90% 0.5 0.5 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr kWh/ft2.yr MJ/m².yr

MJ/m2.yı

19.0

COMMERCIAL SECTOR BUILDING PROFILE

NEW BUILDINGS: SIZE: Large Non-Food Retail > 100 kW VINTAGE: New

REGION: Labrador Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan System Design Air Flow System Static Pressure CAV 1.55 CFM/ft² 7.9 L/s.m² Control red Variable Fixed Variable 500 Pa 2.0 wa Flow Flow System Static Pressure VAV 500 Pa 2.0 wg Incidence of Use 100% 100% Fan Efficiency 60% Operation Continuous Scheduled Continuous Schedule Fan Motor Efficiency 88% 1.00 7.5 W/m² 7.5 W/m² Sizing Factor Incidence of Use 75% 25% 50% 50% Fan Design Load CAV 0.69 W/ft² Fan Design Load VAV 0.69 W/ft² Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 50 L/s.washroom 106 CFM/washroom 0.02 CFM/ft² 0.1 L/s.m² Other Exhaust (Smoking/Conference) 0.1 L/s.m² 0.02 CFM/ft² Total Building Exhaust 0.2 L/s.m² 0.04 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 1.0 0.3 W/m² 0.03 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) 0.07 kW/Ton 0.17 W/ft² 0.020 kW/kW Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 1.80 W/m² Condenser Pump Pump Design Flow Pump Design Flow per unit floor area I/s KW U.S. gpm/Ton U.S. gpm/ft² L/s.m² 45 kPa 50% Pump Head Pressure 15 ft Pump Efficiency Pump Motor Efficiency 80% Sizing Factor 1.0 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) 0.0057 U.S. gpm/ft² Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 2.4 U.S. gpm/Ton 0.004 L/s.m² kPa Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 8.0 W/ft² Pump Connected Load W/m² Supply Fan Occ. Period 5500 hrs./year Supply Fan Unocc, Period 3260 hrs./year Supply Fan Energy Consumption 59.3 kWh/m².yr Exhaust Fan Occ. Period 5500 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 3260 hrs./year 2.0 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.4 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 7000 hrs./year kWh/m2.yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 5.7 MJ/m².yr 221.8

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: Large Non-Food Retail Baseline SIZE: > 100 kW REGION: Labrador Interconnected

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		29.4 kWh/ft².yr 1,139.1 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 M	/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	8.0	309.7		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	0.6	23.6	SPACE HEATING	9.0	350.5			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.6	25.2			
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0	
HVAC FANS & PUMPS	5.7	221.8	FOOD SERVICE EQUIPMENT	1.0	38.7			
REFRIGERATION	1.5	58.1						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	0.5	19.1						
COMPUTER SERVERS	0.1	4.4						
ELEVATORS/ESCALATORS								
OUTDOOR LIGHTING	0.9	33.9						
Fuel Specific EUIs for Heating Co	oling & DHW							

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COMMERCIAL SECTOR BUILDING PROFILE NEW BUILDINGS: SIZE: REGION: VINTAGE: Small Non-Food Retail < 100 kW New Labrador Interconnected Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² Glazing U value (W/m².°C) 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.10 Defined as Exterior Zone Typical # Stories 0.78 Floor to Floor Height (m) 6.0 m 19.7 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%) (Minimum Throttled Air 50% Occupancy or People Density 269 ft²/person 11.07% m²/person %OA Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 15 L/s.person 32 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 1.07 CFM/ft² 5.42 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.42 L/s.m² 0.08 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Peak Design Cooling Load Peak Zone Sensible Load Switchover Point KJ/kg. 281.834 163,938 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 7,626 DDC/Pneumatic Total air circulation or Design air 5.42 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions

		Room				Supply Air		
Summer Temperature	21	°C	69.8	°F	14	°C	57.2	°F
Summer Humidity (%)	50%				100%			
Enthalpy	65.5	KJ/kg.	28.2	Btu/lbm	54.5	KJ/kg.	23.4	Btu/lbm
Winter Occ. Temperature	21	°C	69.8	°F	15	°C	59	°F
Winter Occ. Humidity	30%				45%			
Enthalpy	53	KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	19.6	Btu/lbm
Winter Unocc. Temperature	21	°C	69.8	°F				
Winter Unocc. Humidity	30%							
Enthalpy	50	KJ/kg.	21.5	Btu/lbm				

Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement

Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance

> Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Control Devices

Annual Maintenance Tasks Incidence (%) Inspection/Calibration of Room Thermosta Inspection of PE Switches
Inspection of Auxiliary Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

NEW BUILDINGS: Small Non-Food Retail Baseline SIZE: < 100 kW

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

LIGHTING										
GENERAL LIGHTING Light Level	500 Lux	46.5	ft-candles							
Floor Fraction (GLFF)	0.95	40.5	11-caricles							
Connected Load	17.6 W/m	n² 1.6	W/ft²							
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)	300	500 700	1000		Total	1	
Unocc. Period(Hrs./yr.)	4760		% Distribution		100%			100%		
Usage During Occupied Period Usage During Unoccupied Period	95% 15%		Weighted Average					500	-	
Usage During Orioccupied Feriod	1376			INC	CFL T12	T8 HID	T5HO LED	TOTAL		
Fixture Cleaning:			System Present (%)	8%	5%	55% 30%	0% 2%]	
Incidence of Practice Interval	year	rs.	CU LLF	0.7 0.65	0.7 0.6 0.65 0.75	0.6 0.7 0.80 0.80	0.6 0.6 0.80 0.80			
			Efficacy (L/W)	15	50 72	88 65	95 90			
Relamping Strategy & Incidence	Group S	pot						EUI	14/A/In/f42	7.0
of Practice									kWh/ft².yr MJ/m².yr	7.0 272
ARCHITECTURAL LIGHTING		.	1					1		
Light Level Floor Fraction (ALFF)	500 Lux 0.05	46.5	ft-candles							
Connected Load	17.1 W/m	n² 1.6	W/ft²							
One Beside (Olera Aug.)	1000	_	Links I am I (I am)	200	500 700	4000		T-1-1	1	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4000 4760		Light Level (Lux) % Distribution	300	500 700 100%	1000		Total 100%	1	
Usage During Occupied Period	95%		Weighted Average					500		
Usage During Unoccupied Period	50%			INIO	OF! T40	T0 1110	T5HO LED	TOTAL]	
Fixture Cleaning:			System Present (%)	INC 5%	CFL T12 15%	T8 HID 20% 20%	T5HO LED 40% 0%		}	
Incidence of Practice			CU	0.7	0.7 0.6	0.6 0.6	0.6 0.6			
Interval	year	'S	LLF	0.65	0.65 0.75	0.80 0.80	0.80 0.80 95 90			
Relamping Strategy & Incidence	Group S	pot	Efficacy (L/W)	15	50 72	88 65	95 90]	
of Practice									kWh/ft².yr	0.5
SPECIAL PURPOSE LIGHTING					EUI = Load X Hrs. X	SF X GLFF		<u> </u>	MJ/m².yr	19
Light Level	Lux		ft-candles		Floor fract	tion check: should = 1.	.00 1.00	Ţ		
Floor Fraction (HBLFF)	14//		المديد							
Connected Load	W/m	12	W/ft²							
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)	300	500 700	1000		Total]	
Unocc. Period(Hrs./yr.)	4760		% Distribution						_	
Usage During Occupied Period Usage During Unoccupied Period	100%		Weighted Average					L	-	
Usage Barring Unoccupied Ferrod	10070			INC	CFL T12	T8	MH HPS	TOTAL		
Fixture Cleaning:			System Present (%)]	
Incidence of Practice Interval	year	re.	CU LLF	0.7 0.65	0.7 0.6 0.65 0.75	0.6 0.6 0.80 0.80	0.6 0.6 0.55 0.55			
morvai	yca		Efficacy (L/W)	15	50 72	84 88	65 90			
Relamping Strategy & Incidence	Group S	pot						le	1140 (60	
of Practice									kWh/ft².yr MJ/m².yr	
									-	
TOTAL LIGHTING						Overall LP	17.58 W/m ²	EUI TOTAL	. kWh/ft².yr MJ/m².yr	8 291
									WO/III .yi	201
OFFICE EQUIPMENT & PLUG LOA	DS									
Equipment Type	Co	omputers	Monitors	Printers	Copiers	Servers	Plug Loads	1		
					55,000	33		1		
Measured Power (W/device)		55	51	100	200	217				
Density (device/occupant)		0.22	0.22	0.01	0.01	0.02				
Connected Load		0.5 W/m²	0.4 W/m² 0.0 W/ft²	0.0 W/m ² 0.00 W/ft ²	0.1 W/m²	0.1 W/m² 0.01 W/ft²	1.15 W/m²			
Diversity Occupied Period		0.0 W/ft² 90%	90%	90%	0.01 W/ft² 90%	100%	0.11 W/ft² 90%			
Diversity Unoccupied Period		50%	50%	50%	50%	100%	50%			
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		2000 6760	2000 6760	2000 6760	2000 6760	2000 6760	4100 4660			
Operation Orlocc. Feriod (fils./year)		6760	6760	6760	6760	6760	4000	J		
Total end-use load (occupied period)		2.1 W/m ²	0.2 W/ft ²	to see notes (cells with	red indicator in upper	right corner, type "SHI	FT @mputer Servers		kWh/ft².yr	0.11
Total end-use load (unocc. period)		1.2 W/m²	0.1 W/ft ²				Computer Equipment		MJ/m².yr	4.42
Usage during occupied period		100%					Computer Equipment		kWh/ft².yr MJ/m².yr	0.49 19.14
Usage during unoccupied period		59%					Plug Loads	EUI	kWh/ft².yr	0.64
								<u> </u>	MJ/m².yr	24.92
FOOD SERVICE EQUIPMENT			5							
Provide description below:	Fuel Oil / Prop	ane Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propan	e EUI		II Electric EUI	
						EUI kWh/ft².yr MJ/m².yr			kWh/ft².yr MJ/m².yr	
						ivio/iiiyi		1	o/111 .y1	
REFRIGERATION										
Provide description below:				1				EUI	kWh/ft².yr	
				J					MJ/m².yr	
BLOCK HEATERS & MISCELLANE	OUS									
							Block Heaters	EUI	kWh/ft².yr	0.1
									MJ/m².yr	5
							Miscellaneous		kWh/ft².yr MJ/m².yr	0.1
I										

NEW BUILDINGS: Small Non-Food Retail Baseline

Service Hot Water load (MJ/m².yr)

(Tertiary Load)

Wetting Use Percentage

17.3

90%

SIZE: < 100 kW

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

VINTAGE: New REGION: Labrador Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistanc Packaged A/A HP Total Stan High Rooftop System Present (%) 100% 100% Eff./COP 80% 3.20 1.00 Performance (1 / Eff.) 1.33 1.25 1.33 0.31 0.29 0.22 1.00 (kW/kW) Peak Heating Load 49.8 W/m² 15.8 Btu/hr.ft² 408 MJ/m².yr Seasonal Heating Load 10.5 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share 10.5 MJ/m².yr 408 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% 10.5 MJ/m².yr 408 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Recprocting Chillers | Absorption Chillers Total Standard HE DX W. H. CW Chillers Open 100.0% System Present (%) COP 100.0% Performance (1 / COP) 0.21 0.19 0.23 0.27 0.37 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 14.0 °C Supply Air 89 W/m² 28 Btu/hr.ft² 426 ft²/Ton Peak Cooling Load Seasonal Cooling Load 81.4 MJ/m².yr 2.1 kWh/ft².yr (Tertiary Load) 1.00 Sizing Factor 90.0% A/C Saturation (Incidence of A/C) Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.7 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.7 kWh/ft².vr MJ/m².yr 27 DOMESTIC HOT WATER Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW Fossil Elec. Res. System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.550 0.600 0.900 0.750 0.900 Blended Efficiency 0.90 0.91

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All Electric EUI

kWh/ft2.yr

MJ/m2.yr

Fuel Oil / Propane EUI

kWh/ft2.yr

0.5

Market Composite EUI

kWh/ft².yr MJ/m².yr 0.5

19.0

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: SIZE: Small Non-Food Retail < 100 kW Baseline

VINTA New

HVAC FANS & PUMPS											
OURRI V SANO					\						
SUPPLY FANS						n and Exhau Ition Fan		ration & Co	ontroi I		
System Design Air Flow 5.4	L/s.m²	1.07	CFM/ft ²	Control	Fixed	Variable	Fixed	Variable			
) Pa	2.0		Control	i ixcu	Flow	Tixcu	Flow			
	Pa		wg	Incidence of Use	100%		100%				
Fan Efficiency 60%				Operation		Scheduled		Scheduled			
Fan Motor Efficiency 88%											
Sizing Factor 1.00			_	Incidence of Use	75%	25%	50%	50%			
Fan Design Load CAV 5.			W/ft²								
Fan Design Load VAV 5.1	W/m²	0.48	W/ft²	Comments:							
EXHAUST FANS											
Washroom Exhaust 50	L/s.washr		106 CFM/was	ahaa a m							
	L/s.wasiii L/s.m²	OOIII	0.02 CFM/ft²	SHOOM							
	L/s.m²		0.02 CFM/ft ²								
Total Building Exhaust 0.2	L/s.m²		0.04 CFM/ft ²								
Exhaust System Static Pressure 250	Pa		1.0 wg								
Fan Efficiency 25%											
Fan Motor Efficiency 75%											
Sizing Factor 1.0											
Exhaust Fan Connected Load 0.3		0.03	W/ft²								
	_		-								
AUXILIARY COOLING EQUIPMENT (Condens	er Pump a	nd Cooling Toy	ver/Condenser Fans	.)							
				<u></u>							
Average Condenser Fan Power Draw			0.020 kW/kW	0.07 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled C	ondenser)		1.78 W/m²	0.17 W/ft²							
Condenser Pump											
Pump Design Flow			L/s.KW	U.S. gpm/Ton							
Pump Design Flow per unit floor area			L/s.m ²	U.S. gpm/ft ²							
Pump Head Pressure			45 kPa	15 ft							
Pump Efficiency			50%								
Pump Motor Efficiency			80%								
Sizing Factor			1.0								
Pump Connected Load			W/m²	W/ft²							
CIRCULATING PUMP (Heating & Cooling)											
Pump Design Flow @ 5 °C (10 °F) delta T		0.004	L/s.m²	0.0056 U.S. gpm/ft ²	2.4 U.S. gpm/	/Ton					
Pump Head Pressure		0.004	kPa	ft gpm/rt	2.4 0.0. gpm	1011					
Pump Efficiency		50%	in a								
Pump Motor Efficiency		80%	1								
Sizing Factor		0.8	1								
Pump Connected Load		3.0	W/m²	W/ft²							
Supply Fan Occ. Period		5500	hrs./year								
Supply Fan Unocc. Period			hrs./year								
Supply Fan Energy Consumption			kWh/m².yr								
		40.0	J								
Exhaust Fan Occ. Period		5500	hrs./year								
Exhaust Fan Unocc, Period			hrs./year								
Exhaust Fan Energy Consumption			kWh/m².yr								
3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3		2.0									
Condenser Pump Energy Consumption			kWh/m².yr								
Cooling Tower /Condenser Fans Energy Consur	nption	0.3	kWh/m².yr								
Circulating Pump Yearly Operation		7000	hrs./year								
Circulating Pump Fearly Operation Circulating Pump Energy Consumption		7000	kWh/m².yr								
			-	,							
Fans and Pumps Maintenance	Annual M	aintenance Task	KS .	Incidence Frequency							
		d F 2 **	-1	(%) (years)							
		ervice Fans & M		+							
		djust Belt Tensio		 					EUI	IAA/Ib/642	4.0
	inspect/Se	ervice Pump & N	/IUIUIS						EUI	kWh/ft².yr MJ/m².yr	4.0 155.2
L									l	.vio/iii .yi	100.2

NEW BUILDINGS: Small Non-Food Retail Baseline

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New SIZE: < 100 kW REGION: Labrador Interconnected

TOTAL ALL END-USES:	Electricity:		25.6 kWh/ft².yr 989.8 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	7.0	271.7		kWh/ft2.yr	MJ/m².yr	kWh/ft².yr	MJ/m ² .yr
ARCHITECTURAL LIGHTING	0.5	19.1	SPACE HEATING	10.5	408.2		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.6	24.2		
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0
HVAC FANS & PUMPS	4.0	155.2	FOOD SERVICE EQUIPMENT				
REFRIGERATION							
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.1	5.0					
COMPUTER EQUIPMENT	0.5	19.1					
COMPUTER SERVERS	0.1	4.4					
ELEVATORS/ESCALATORS							
OUTDOOR LIGHTING	0.9	33.9					

COMMERCIAL SECTOR BUILDING PROFILE

NEW BUILDINGS: SIZE: REGION: VINTAGE: Large Accommodation > 100 kW New Labrador Interconnected Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 15,000 ft² Wall U value (W/m².°C) Typical Building Size 1,394 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 1,500 16,140 ft² 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.30 Defined as Exterior Zone Typical # Stories 0.65 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV FCoils IU 100% O.A System Present (%) 10% 90% 100% Min. Air Flow (%)
(Minimum Throttled Air 60% Occupancy or People Density 538 ft²/person 5.22% m²/person %OA Occupancy Schedule Occ. Period 50% Occupancy Schedule Unocc. Period 80% resh Air Requirements or Outside Air 15 32 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 1.13 CFM/ft² 5.75 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.70 L/s.m² 0.14 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 444.876 Peak Zone Sensible Load 260,711 28.2 Btu/lbm 23.4 Btu/lbm Room air enthalpy Controls Type System Present (%) HVAC Discharge air enthalpy Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 12,128 DDC/Pneumatic Total air circulation or Design air l/s.m² All DDC Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 71.6 °F 55.4 °F 13 °C 22 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

NEW BUILDINGS: Large Accommodation Baseline SIZE: > 100 kW COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

LIGHTING										
GENERAL LIGHTING (SUITES) Light Level	125 Lux	11.6	ft-candles							
Floor Fraction (GLFF)	0.75		_							
Connected Load	7.3 W/m ²	0.7	W/ft²							
Occ. Period(Hrs./yr.)	2500		Light Level (Lux)	50	100 200			Total]	
Unocc. Period(Hrs./yr.) Usage During Occupied Period	6260 50%		% Distribution Weighted Average		75% 25%			100% 125		
Usage During Unoccupied Period	25%		Weignled Average					123	•	
First up Cleaning			Custom Dropout (0()	INC 20%	CFL T12 50%	2 T8 HID 10%	T5HO LED 0% 20%	TOTAL 100.0%		
Fixture Cleaning: Incidence of Practice			System Present (%) CU	0.7	0.7 0.6		0% 20% 0.6 0.6	100.0%		
Interval	years	;	LLF	0.65	0.65 0.75	0.80 0.80	0.80 0.80			
Relamping Strategy & Incidence	Group Sp	not	Efficacy (L/W)	15	50 72	88 65	95 90		J	
of Practice	oraș or							EUI	kWh/ft².yr	1.4
SECONDARY LIGHTING									MJ/m².yr	56
Light Level	300 Lux	27.9	ft-candles							
Floor Fraction (ALFF) Connected Load	0.25 11.4 W/m²	11	W/ft²							
			-						-	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	3000 5760		Light Level (Lux) % Distribution	300 100%	500 700	1000		Total 100%		
Usage During Occupied Period	85%		Weighted Average	10078				300		
Usage During Unoccupied Period	75%			ING	051 740	TO 1110	T5110 1.55	TOTAL		
Fixture Cleaning:			System Present (%)	INC 8%	CFL T12 15%	75% HID	T5HO LED 0% 2%	TOTAL 100.0%	;	
Incidence of Practice			CU	0.7	0.7 0.6	0.6 0.6	0.6 0.6			
Interval	years	5	LLF Efficacy (L/W)	0.65 15	0.65 0.75 50 72	0.80 0.80 88 65	0.80 0.80 95 90			
Relamping Strategy & Incidence	Group Sp	oot	Lineacy (Livv)	10	00 72	00 00	35 30		J	
of Practice					EUI = Load X Hrs. X	/ OF V OLEF			kWh/ft².yr MJ/m².yr	1.8 71
TERTIARY LIGHTING					EUI = LOAU X HIS. X	C SF X GLFF			IVIJ/IIIyI	/ 1
Light Level	Lux		ft-candles		Floor frac	tion check: should = 1	.00 1.00	I		
Floor Fraction (HBLFF) Connected Load	W/m²	2	W/ft²							
					1				7	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4000 4760		Light Level (Lux) % Distribution					Total	-	
Usage During Occupied Period	0%		Weighted Average							
Usage During Unoccupied Period	100%			INC	CEL T42	? T8	MH HPS	TOTAL		
Fixture Cleaning:			System Present (%)	INC	OFL T12	10	100% 0%	100.0%		
Incidence of Practice			CU	0.7	0.7 0.6		0.6 0.6			
Interval	years	5	LLF Efficacy (L/W)	0.65 15	0.65 0.75 50 72	0.80 0.80 84 88	0.55 0.55 65 90	1		
Relamping Strategy & Incidence	Group Sp	oot	Lineacy (Livi)	10	00 12	0.1 00	50 55		J	
of Practice								EUI	kWh/ft².yr MJ/m².yr	
									•	
TOTAL LIGHTING						Overall LP	8.35 W/m ²	EUI TOTAL	. kWh/ft².yr MJ/m².yr	3 126
									WIO/III .yi	120
OFFICE EQUIPMENT & PLUG LOA	NDS									
Equipment Type	Coi	mputers	Monitors	Printers	Copiers	Servers	Plug Loads	1		
							•			
Measured Power (W/device)		55	51	100	200	217				
Density (device/occupant) Connected Load		0.3 0.3 W/m²	0.3 0.3 W/m²	0.05 0.1 W/m²	0.033 0.1 W/m²	0.02 0.1 W/m²	1.5 W/m²			
		0.0 W/ft ²	0.0 W/ft ²	0.01 W/ft²	0.01 W/ft ²	0.01 W/ft ²	0.14 W/ft ²			
Diversity Occupied Period		90% 50%	90% 50%	90% 50%	90% 50%	100%	70% 25%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year)		2000	2000	2000	2000	2500	3000			
Operation Unocc. Period (hrs./year)		6760	6760	6760	6760	6260	5760]		
Total end-use load (occupied period)		1.9 W/m²	0.2 W/ft ²	to see notes (cells with	red indicator in upper	right corner, type "SHI	FT @mputer Servers	EUI	kWh/ft².yr	0.10
Total end-use load (unocc. period)		0.9 W/m²	0.1 W/ft²	to doo noted (done min	roa maroator in appor		·		MJ/m².yr	3.68
Usage during occupied period	4	00%					Computer Equipment		kWh/ft².yr MJ/m².yr	0.42 16.11
Usage during unoccupied period		48%					Plug Loads		kWh/ft².yr	0.49
									MJ/m².yr	19.12
FOOD SERVICE EQUIPMENT										
Provide description below:	Fuel Oil / Propa	ane Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propan			II Electric EUI	
Kitchen services						EUI kWh/ft².yr MJ/m².yr	1.3 50.0	EUI	kWh/ft².yr MJ/m².yr	1.3 50.0
								1		- 5.0
REFRIGERATION Provide description below:										
Walk-in coolers/freezers, reach-in coo	olers/freezers, refr	rigerated buffet cases	S]				EUI	kWh/ft².yr	0.5
								<u> </u>	MJ/m².yr	20.0
BLOCK HEATERS & MISCELLANE	ous									
							Dia -t- Li 1	le	LAA/lb/(42 · · · ·	0.1
							Block Heaters		kWh/ft².yr MJ/m².yr	0.1
							Miscellaneous	EUI	kWh/ft².yr	0.1
								1	MJ/m².yr	5

NEW BUILDINGS: SIZE: Large Accommodation > 100 kW

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

VINTAGE: New REGION: Labrador Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Packaged A/A HP Total Stan High Unit System Present (%) 100% 100% Eff./COP 80% 3.20 3.00 1.00 Performance (1 / Eff.) 1.33 1.25 1.33 0.31 0.33 0.22 1.00 (kW/kW) Peak Heating Load 52.1 W/m² 16.5 Btu/hr.ft² 10.9 kWh/ft².yr 421 MJ/m².vr Seasonal Heating Load (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share 10.9 MJ/m².yr 421 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% 10.9 MJ/m².yr 421 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Chillers Open W. H. CW System Present (%) COP 20.0% 100.0% 80.0% Performance (1 / COP) 0.21 0.19 0.2 0.29 0.34 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 13.0 °C 86 °F 55.4 °F Supply Air 79 W/m² 25 Btu/hr.ft² 476 ft²/Ton Peak Cooling Load Seasonal Cooling Load 49.6 MJ/m².yr 1.3 kWh/ft².yr (Tertiary Load) Operation (occ. perio 4000 hrs/year Note value cannot be less than 2,900 hrs/year) 0.85 Sizing Factor 80.0% A/C Saturation (Incidence of A/C) Electric Fuel Share Fuel Oil / Propane Fuel Share 100.0% Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.6 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.6 kWh/ft².vr MJ/m².yr 21 DOMESTIC HOT WATER Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW Fossil Elec. Res. System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.550 0.600 0.900 0.750 0.900 Blended Efficiency 0.90 0.91 Service Hot Water load (MJ/m².yr) 236.6 (Tertiary Load) All Electric EUI Fuel Oil / Propane EUI Market Composite EUI 6.7 90% 6.8 6.7 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr kWh/ft2.yr 260 MJ/m².yr 260.0 MJ/m2.yı

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: Large Accommodation Baseline SIZE: > 100 kW

HVAC FANS & PUMPS												
SUPPLY FANS					,				eration & Co	ntrol		
0 . 0	٦., ٥		1051470			Ventilati			ust Fan			
	L/s.m²		CFM/ft ²	Control		Fixed	Variable	Fixed	Variable			
	Pa	1.2	wg		F	4000/	Flow	1000	Flow			
System Static Pressure VAV 300		1.2	wg	Incidence of Use		100%		100%				
Fan Efficiency 45%				Operation		Continuous	Scheduled	Continuou	Scheduled			
Fan Motor Efficiency 70%					l l	000/	100/	4000				
Sizing Factor 1.00			1	Incidence of Use		60%	40%	100%				
Fan Design Load CAV 5.5			W/ft²	0								
Fan Design Load VAV 5.5	W/m²	0.51	W/ft²	Comn	ients:							
EXHAUST FANS												
Washroom Exhaust 100	L/s.wash	room	212 CFM/was	shroom								
	L/s.m ²		0.03 CFM/ft ²									
Other Exhaust (Smoking/Conference) 0.1			0.02 CFM/ft ²									
Total Building Exhaust 0.2			0.05 CFM/ft ²									
Exhaust System Static Pressure 250			1.0 wg									
Fan Efficiency 25%												
Fan Motor Efficiency 75%												
Sizing Factor 1.0			1									
Exhaust Fan Connected Load 0.3	W/m²	0.03	W/ft²									
AUXILIARY COOLING EQUIPMENT (Condens	er Pump a	and Cooling Tov	ver/Condenser Fans)								
Average Condenser Fan Power Draw			0.022 kW/kW	0.08 kW/To	n							
(Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser)		1.73 W/m²	0.16 W/ft²								
Condenser Pump												
Pump Design Flow			0.053 L/s.KW	3.0 U.S. g	pm/Ton							
Pump Design Flow per unit floor area			0.004 L/s.m ²	0.006 U.S. g								
Pump Head Pressure			kPa	ft								
Pump Efficiency			50%									
Pump Motor Efficiency			80%									
Sizing Factor			1.0									
Pump Connected Load			W/m²	W/ft ²								
				<u> </u>								
CIRCULATING PUMP (Heating & Cooling)												
Pump Design Flow @ 5 °C (10 °F) delta T		0.003	L/s.m²	0.0050 U.S. gpm/ft ²	24	U.S. gpm/1	Ton .					
Pump Head Pressure		100		33 ft	2.4	c.o. gpill/l						
Pump Efficiency		50%	iu u	30 11								
Pump Motor Efficiency		80%										
Sizing Factor		0.8										
Pump Connected Load			W/m²	0.06 W/ft ²								
			1									
Supply Fan Occ. Period		3500	hrs./year									
Supply Fan Unocc. Period			hrs./year									
Supply Fan Energy Consumption			kWh/m².yr									
		55	1									
Exhaust Fan Occ. Period		3500	hrs./year									
Exhaust Fan Unocc. Period			hrs./year									
Exhaust Fan Energy Consumption			kWh/m².yr									
			-									
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consur	nption	0.3	kWh/m².yr kWh/m².yr									
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		7000	hrs./year kWh/m².yr									
Fans and Pumps Maintenance	Annual M	laintenance Task		Incidence Frequency								
arrpo mantonano	aci IV		-	(%) (years)								
	Inspect/S	ervice Fans & M	otors	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,								
		djust Belt Tensio										
		ervice Pump & N								EUI	kWh/ft².yr	3.7
											MJ/m².yr	142.1

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: Large Accommodation Baseline SIZE: > 100 kW REGION: Labrador Interconnected

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		28.5 kWh/ft².yr 1,102.9 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/r	n².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING (SUITES)	1.4	55.6		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
SECONDARY LIGHTING	1.8	70.8	SPACE HEATING	10.9	421.4			
TERTIARY LIGHTING			SPACE COOLING	0.4	17.1			
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.7	260.0	0.0	0.0	
HVAC FANS & PUMPS	3.7	142.1	FOOD SERVICE EQUIPMENT	1.3	50.0			
REFRIGERATION	0.5	20.0						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	0.4	16.1						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

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COMMERCIAL SECTOR BUILDING PROFILE NEW BUILDINGS: SIZE: REGION: VINTAGE: Small Accommodation < 100 kW New Labrador Interconnected Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 7,500 ft² Wall U value (W/m².°C) Typical Building Size 697 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 697 m² 7,500 ft² Glazing U value (W/m².°C) 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.30 Defined as Exterior Zone Typical # Stories 0.65 Floor to Floor Height (m) 3.7 m 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV IU 100% O.A FCoils TOTAL Ventilation System Type CAV VAV System Present (%) 100% 100% Min. Air Flow (%) (Minimum Throttled Air 60% Occupancy or People Density 538 ft²/person 8.55% 50 m²/person %OA Occupancy Schedule Occ. Period 50% Occupancy Schedule Unocc. Period 80% resh Air Requirements or Outside Air 15 32 CFM/person Fresh Air Control Type 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.69 CFM/ft² 3.51 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.14 CFM/ft² Infiltration Rate 0.70 L/s.m² Operation occupied period 50% (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Peak Design Cooling Load Peak Zone Sensible Load Switchover Point KJ/kg. 122.326 79,537 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 3,700 DDC/Pneumatic Total air circulation or Design air 3.51 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions

S			Room		_		Supply Air			
	Summer Temperature	22	°C	71.6	°F	13	°C	55.4	°F	
	Summer Humidity (%)	50%			_	100%				
	Enthalpy	65.5	KJ/kg.	28.2	Btu/lbm	54.5	KJ/kg.	23.4	Btu/lbm	
	Winter Occ. Temperature	21	°C	69.8	°F	15	°C	59	°F	
	Winter Occ. Humidity	30%				45%				
	Enthalpy	53	KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	19.6	Btu/lbm	
	Winter Unocc. Temperature	21	°C	69.8	°F					
	Winter Unocc. Humidity	30%			=					
	Enthalpy	50	KJ/kg.	21.5	Btu/lbm					

	Appual Maintenance Tasks	Incidence	Appual Maintenance Tasks	Inci
Incidence of Annual HVAC Controls Maintenance	е		Incidence of Annual Room Controls Maintenance	
Air Filter Cleaning	Changes/Year		_	
	Lubrication Blade Seal Replacement			
	Control Arm Adjustment			

Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Control Devices

Incidence Frequency (%)

(years)

Damper Maintenance

ncidence	Annual Maintenance Tasks	Inciden	ice
(%)		(%)	,
	Inspection/Calibration of Room Thermostat		
	Inspection of PE Switches		
	Inspection of Auxiliary Devices		
	Inspection of Control Devices (Valves,		
	(Dampers, VAV Boxes)		

NEW BUILDINGS: Small Accommodation Baseline SIZE: < 100 kW COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

LIGHTING GENERAL LIGHTING (SUITES)													
Light Level	125 Lux	11.6	ft-candles										
Floor Fraction (GLFF) Connected Load	0.85 7.1 W/m²	0.7	W/ft²										
Occ. Period(Hrs./yr.)	2500		Light Level (Lux)		50	100	200	300			Total	7	
Unocc. Period(Hrs./yr.)	6260		% Distribution		50	75%	25%	000			100%	5	
Usage During Occupied Period Usage During Unoccupied Period	50% 25%		Weighted Average								12	5	
Usage During Unoccupied Feriod	25%				INC	CFL	T12	Т8	HID	T5HO L	.ED TOTA	_	
Fixture Cleaning:			System Present (%)		15%	70%	0.6	10%	0.6		5% 100.0%	5	
Incidence of Practice Interval	years		CU LLF		0.7 0.65	0.7	0.6	0.6	0.6		.80		
Delegación Otrata de Otrata	0		Efficacy (L/W)		15	50	72	88	65	95	90		
Relamping Strategy & Incidence of Practice	Group Spo	ot									EUI	kWh/ft².yr	1.6
SECONDARY LIGHTING												MJ/m².yr	61
Light Level	300 Lux	27.9	ft-candles										
Floor Fraction (ALFF) Connected Load	0.15 13.0 W/m²	1.2	W/ft²										
			=" 									7	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	3000 5760		Light Level (Lux) % Distribution		300 100%	500	700	1000			Total 100%	5	
Usage During Occupied Period	85%		Weighted Average								30		
Usage During Unoccupied Period	75%				INC	CFL	T12	Т8	HID	T5HO L	.ED TOTAL	-	
Fixture Cleaning:			System Present (%)		10%	30%	112	55%	TIID		5% 100.0%		
Incidence of Practice Interval	veore		CU LLF		0.7 0.65	0.7	0.6	0.6	0.6		.80		
mervar	years		Efficacy (L/W)		15	50	72	88	65		90		
Relamping Strategy & Incidence	Group Spo	ot									Eur	1.14/1-/612	4.0
of Practice					Е	UI = Load	X Hrs. X S	SF X GLFF	:		EUI	kWh/ft².yr MJ/m².yr	1.2 48
TERTIARY LIGHTING	[]Lune		t condice			[FI	fractio	n abaala .	abauld 1	00 1	00	•	
Light Level Floor Fraction (HBLFF)	Lux		ft-candles			Г	oor fractio	on check.	should = 1.0	00 1	.00		
Connected Load	W/m²		W/ft²										
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)								Total	7	
Unocc. Period(Hrs./yr.)	4760		% Distribution										
Usage During Occupied Period Usage During Unoccupied Period	100%		Weighted Average									_	
	10070				INC	CFL	T12	Т8			IPS TOTA		
Fixture Cleaning: Incidence of Practice			System Present (%) CU		0.7	0%	0.6	0.6	0.6		0% 100.0% 0.6	5	
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80		.55		
Relamping Strategy & Incidence	Group Spo	\ +	Efficacy (L/W)		15	50	72	84	88	65	90		
of Practice	Отобр Оро	,									EUI	kWh/ft².yr	
												MJ/m².yr	
TOTAL LIGHTING								(Overall LP	7.95 W/m ²	EUI TOTA	_ kWh/ft².yr MJ/m².yr	3 109
OFFICE EQUIPMENT & PLUG LOA	DS												
Equipment Type	Com	nputers	Monitors	Printer	re	Copie	re	Serv	ore	Plug Loads			
Equipment Type	Com	iputers	WOTHOTS	1 milei	13	Copiei	10	Jeiv	613	i iug Loaus			
Measured Power (W/device)		55	51	100		200		217					
Density (device/occupant)		0.3	0.3	0.05		0.033	., . [0.02		d Flord o			
Connected Load		0.3 W/m ² 0.0 W/ft ²	0.3 W/m² 0.0 W/ft²	0.1 W/ 0.01 W/		0.1 W 0.01 W		0.1	W/m² W/ft²	1.5 W/m² 0.14 W/ft²			
Diversity Occupied Period	9	90%	90%	90%		90%		100%		70%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year)		50% 2000	50% 2000	50% 2000	_	50% 2000		100% 2500		25% 3000			
Operation Unocc. Period (hrs./year)		760	6760	6760		6760		6260		5760			
Total end-use load (occupied period)		1.9 W/m²	0.2 W/ft ²	to see notes (cells with re	ed indicator	in upper ri	aht corner.	type "SHIF	FT @ mputer Serv	ers EUI	kWh/ft².yr	0.10
Total end-use load (unocc. period)		0.9 W/m²	0.1 W/ft²	(g,		·		MJ/m².yr	3.68
Usage during occupied period	10	00%							(Computer Equipm	nent EUI	kWh/ft².yr MJ/m².yr	0.42 16.11
Usage during unoccupied period		18%								Plug Lo	ads EUI	kWh/ft².yr	0.49
												MJ/m².yr	19.12
FOOD SERVICE EQUIPMENT													
Provide description below:	Fuel Oil / Propar	ne Fuel Share:		Electricity Fue	el Share:	100.0%	-		il / Propane			Il Electric EUI	0.0
Kitchen services									kWh/ft².yr MJ/m².yr	1.3 50.0	EUI	kWh/ft².yr MJ/m².yr	0.6 25.0
DEEDIGEDATION							"					- 1	
REFRIGERATION Provide description below:											-		
Walk-in coolers/freezers, reach-in coo	lers/freezers, refriç	gerated buffet case	s								EUI	kWh/ft².yr	0.4
												MJ/m².yr	15.0
BLOCK HEATERS & MISCELLANE	ous												
										Block Hea	ters EUI	kWh/ft².yr	0.1
												MJ/m².yr	5
										Miscellane	ous EUI	kWh/ft².yr MJ/m².vr	0.1

NEW BUILDINGS: SIZE:
Small Accommodation < 100 kW
Baseline

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

VINTAGE: New REGION: Labrador Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Packaged A/A HP Total Stan High Unit System Present (%) 100% 100% Eff./COP 80% 3.20 3.00 1.00 Performance (1 / Eff.) 1.33 1.25 1.33 0.31 0.33 0.22 1.00 (kW/kW) Peak Heating Load 72.1 W/m² 22.9 Btu/hr.ft² 16.0 kWh/ft².yr 619 MJ/m².yr Seasonal Heating Load (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share 16.0 MJ/m².yr 619 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% 16.0 MJ/m².yr 619 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Open W. H. CW Chillers System Present (%) COP 100.0% 100.0% Performance (1 / COP) 0.21 0.19 0.2 0.29 0.34 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 13.0 °C 86 °F 55.4 °F Supply Air 44 W/m² 14 Btu/hr.ft² 866 ft²/Ton Peak Cooling Load Seasonal Cooling Load 53.7 MJ/m².yr 1.4 kWh/ft².yr (Tertiary Load) Operation (occ. perio 4000 hrs/year Note value cannot be less than 2,900 hrs/year) 0.85 Sizing Factor 80.0% A/C Saturation (Incidence of A/C) Electric Fuel Share Fuel Oil / Propane Fuel Share 100.0% Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.6 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.6 kWh/ft².vr MJ/m².yr 22 DOMESTIC HOT WATER Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW Fossil Elec. Res. System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.550 0.600 0.900 0.750 0.900 Blended Efficiency 0.90 0.91 Service Hot Water load (MJ/m².yr) 236.6 (Tertiary Load) All Electric EUI Fuel Oil / Propane EUI Market Composite EUI 6.7 90% 6.8 6.7 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr kWh/ft2.yr 260 MJ/m².yr 260.0 MJ/m2.yı

COMMERCIAL SECTOR BUILDING PROFILE

NEW BUILDINGS: SIZE:
Small Accommodation < 100 kW

Baseline

VINTAGE: New REGION: Labrador Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan System Design Air Flow System Static Pressure CAV 3.5 L/s.m² 300 Pa 0.69 CFM/ft² Control Variable Fixed Variable 1.2 Flow Flow wa System Static Pressure VAV 300 Pa wg Incidence of Use 100% 100% Fan Efficiency 45% Operation Continuous Scheduled Continuous Schedule Fan Motor Efficiency 70% Sizing Factor 0.50 Incidence of Use 60% 40% 100% Fan Design Load CAV 0.16 W/ft² 1.7 W/m² 0.16 W/ft² Fan Design Load VAV Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 212 CFM/washroom 0.06 CFM/ft² 0.3 L/s.m² Other Exhaust (Smoking/Conference) 0.1 L/s.m² CFM/ft² Total Building Exhaust 0.4 L/s.m² 0.08 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 0.5 0.02 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) 0.022 kW/kW 0.95 W/m² 0.08 kW/Ton 0.09 W/ft² Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) Condenser Pump 0.053 L/s KW 3.0 U.S. gpm/Ton Pump Design Flow Pump Design Flow per unit floor area 0.003 U.S. gpm/ft² 0.002 L/s.m² Pump Head Pressure Pump Efficiency kPa ft 50% Pump Motor Efficiency 80% Sizing Factor 0.5 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) 0.002 L/s.m² 100 kPa Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 2.4 U.S. gpm/Ton 0.0028 U.S. gpm/ft² 33 ft Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 0.5 Pump Connected Load 0.2 W/m² 0.02 W/ft² Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc, Period 5260 hrs./year Supply Fan Energy Consumption 11.1 kWh/m².yr Exhaust Fan Occ. Period 3500 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 5260 hrs./year 2.3 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.3 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 7000 hrs./year kWh/m2.yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr MJ/m².yr 49.4

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: Small Accommodation Baseline SIZE: < 100 kW REGION: Labrador Interconnected

EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		30.0 kWh/ft².yr 1,160.3 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ	l/m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING (SUITES)	1.6	60.8		kWh/ft2.yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
SECONDARY LIGHTING	1.2	48.1	SPACE HEATING	16.0	618.6			
TERTIARY LIGHTING			SPACE COOLING	0.5	17.5			
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.7	260.0	0.0	0.0	
HVAC FANS & PUMPS	1.3	49.4	FOOD SERVICE EQUIPMENT	0.6	25.0			
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	0.4	16.1						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

COMMERCIAL SECTOR BUILDING PROFILE NEW BUILDINGS: SIZE: REGION: VINTAGE: Health Care Labrador Interconnected Baseline CONSTRUCTION 0.28 W/m².°C 95,000 ft² Wall U value (W/m².°C) 0.05 Btu/hr.ft² .°F Typical Building Size 8,829 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 2,943 31,667 ft² Glazing U value (W/m².°C) 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% 0.20 0.65 Window/Wall Ratio (WIWAR) (%) Defined as Exterior Zone Shading Coefficient (SC) Typical # Stories Floor to Floor Height (m) 4.3 m 14.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS DDMZ DDMZVV FCoils CAVR IU 100% O.A TOTAL Ventilation System Type CAV VAV System Present (%)
Min. Air Flow (%)
(Minimum Throttled Air 50% 50% 100% 60% Occupancy or People Density 323 ft²/person %OA 30 m²/person 13.43% Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period 75% resh Air Requirements or Outside Air 35 74 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: 15% 0.5 L/s.m² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 8.69 L/s.m² 1.71 CFM/ft² Separate Make-up air unit (100% OA) CFM/ft² 0.08 CFM/ft² Infiltration Rate 0.40 L/s.m² 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Economizer Dry-Bulb Based Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Peak Design Cooling Load Peak Zone Sensible Load Switchover Point KJ/kg. ####### 698,518 28.2 Btu/lbm 23.4 Btu/lbm Room air enthalpy Controls Type System Present (%) HVAC Room Discharge air enthalpy Specific volume of air at 55F & 100% R.H Design CFM quipmen Controls 13.2 ft³/lbm All Pneumatic 32,495 DDC/Pneumatic Total air circulation or Design air fk 8.69 l/s.m² All DDC Total (should add-up to 100%) PI / PID Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 57.2 °F 24 °C 14 °C Summer Humidity (%) 50% 100% Enthalpy Winter Occ. Temperature 65.5 KJ/kg 24 °C 28.2 Btu/lbm 23.4 Btu/lbm 54.5 75.2 61.7 °F Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 22.8 Btu/lbm 19.6 Btu/lbm KJ/kg. 22 °C 30% 71.6 °F Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Mainte

enance		Incidence	Frequency
		(%)	(years)
	Control Arm Adjustment		
	Lubrication		
	Blade Seal Replacement		

Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance

Annual Maintenance Tasks	Incidence (%)
Calibration of Transmitters	
Calibration of Panel Gauges	
Inspection of Auxiliary Devices	
Inspection of Control Devices	

Annual Maintenance Tasks	Incidence
	(%)
Inspection/Calibration of Room Thermostat	
Inspection of PE Switches	
Inspection of Auxiliary Devices	
Inspection of Control Devices (Valves,	
(Dampers, VAV Boxes)	

COMMERCIAL SECTOR BUILDING PROFILE NEW BUILDINGS: SIZE: VINTAGE: Health Care New

REGION: Labrador Interconnected

Baseline LIGHTING GENERAL LIGHTING (PATIENT ROOMS) 300 Lux 27.9 ft-candles Light Level Floor Fraction (GLFF) 0.40 0.9 W/ft² Connected Load 9.4 W/m² Occ. Period(Hrs./yr.) 8760 Light Level (Lux) 300 100 200 Unocc. Period(Hrs./vr.) % Distribution 100% 100% Usage During Occupied Period 40% Weighted Average 300 Usage During Unoccupied Period INC CFL T12 T8 HID T5HO LED TOTAL Fixture Cleaning: System Present (%) 10% 85% 0% 100.0% Incidence of Practice 0.7 0.7 0.6 0.6 0.6 0.6 0.6 Interval LLF 0.65 0.65 0.75 0.80 0.80 0.80 0.80 Efficacy (L/W 72 88 65 Group Relamping Strategy & Incidence Spot EUI kWh/ft2.yr of Practice 1.2 MJ/m².yı 47 SECONDARY LIGHTING (NURSING STATIONS, EXAMINATION ROOMS, LABORATORIES, ICU, RECOVERY) Light Level 500 Lux 46.5 ft-candles Floor Fraction (ALFF) 0.60 Connected Load 1.4 W/ft² Occ. Period(Hrs./yr.) 8760 Light Level (Lux) 500 700 1000 Unocc. Period(Hrs./yr.) Usage During Occupied Period % Distribution 100% 100% 65% Weighted Average 500 Usage During Unoccupied Period INC CFL T12 HID T5HC LED TOTAL System Present (%) 2% Fixture Cleaning: 3% 5% 90% 0% 100.0% 0.6 0.6 Incidence of Practice 0.7 0.6 0.6 Efficacy (L/W) 15 50 72 88 65 95 90 Relamping Strategy & Incidence Group Spot EUI kWh/ft².vr of Practice 48 EUI = Load X Hrs. X SF X GLFF MJ/m².y 186 TERTIARY LIGHTING (CORRIDORS, OTHER) ft-candles Floor fraction check: should = 1.00 1.00 Light Level Floor Fraction (HBLFF) W/ft² Connected Load Occ. Period(Hrs./yr.) 4000 Light Level (Lux) Total Unocc. Period(Hrs./yr.) 4760 % Distribution Usage During Occupied Period 100% Weighted Average Usage During Unoccupied Period 100% TOTAL INC CFL T12 Τ8 MH HPS Fixture Cleaning: System Present (%) 5% 0.7 90% 0% 100.0% 5% Incidence of Practice 0.7 0.6 0.6 0.6 0.6 0.6 Interval 0.65 0.65 0.75 0.80 0.80 0.55 0.55 Efficacy (L/W) 50 72 88 88 65 90 Relamping Strategy & Incidence Group Spot of Practice EUI kWh/ft².yı MJ/m².vr EUI TOTAL kWh/ft².yr TOTAL LIGHTING Overall LPD 12.84 W/m² 234 OFFICE EQUIPMENT & PLUG LOADS Equipment Type Computers Monitors Printers Copiers Servers Plug Loads Measured Power (W/device) 54.55 Density (device/occupant) 0.48 0.48 0.02 0.02 0.04 0.3 W/m² Connected Load 0.9 W/m² 0.1 W/m² 3.85 W/m² 0.8 W/m² 0.1 W/m² 0.36 W/ft² 90% 0.1 W/ft² 0.1 W/ft² 0.01 W/ft² 0.01 W/ft² 0.02 W/ft² Diversity Occupied Period 100% Diversity Unoccupied Period 50% 50% 50% 50% 100% 25% Operation Occ. Period (hrs./year) 2000 2000 2000 2000 Operation Unocc. Period (hrs./year) 6760 6760 6760 6760 6160 Total end-use load (occupied period) 5.4 W/m² 0.5 W/ft² to see notes (cells with red indicator in upper right corner, type "SHIFT F2"Computer Servers EUI kWh/ft2.yr 0.21 2.2 W/m² 0.2 W/ft² MJ/m².yr Total end-use load (unocc. period) 8.10 kWh/ft².yr MJ/m².yr Computer Equipmen tEUI 0.90 Usage during occupied period 100% 35.00 Usage during unoccupied period 40% Plug Loads EUI kWh/ft².yr MJ/m².yı 67.29 FOOD SERVICE EQUIPMENT Electricity Fuel Share: 100.0% Fuel Oil / Propane EUI Provide description below: Fuel Oil / Propane Fuel Share: EUI EUI Commercial food services kWh/ft².vr 3.1 kWh/ft2.vr 2.1 MJ/m².yr 120.0 MJ/m².yr 80.0 REFRIGERATION Provide description below Walk-in coolers/freezers, reach-in coolers/freezers, refrigerated buffet cases EUI kWh/ft².yr 0.4 MJ/m².yr 15.0 **BLOCK HEATERS & MISCELLANEOUS** Block Heaters EUI kWh/ft².yı 0.1 MJ/m².yr Miscellaneous EUI kWh/ft².yr 0.1 MJ/m².yr

NEW BUILDINGS:

SIZE:

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

REGION:

Labrador Interconnected

Health Care Baseline SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric A/A HP W. S. HP H/R Chiller Resistance Packaged Boilers Stan High Unit System Present (%) 100% 100% Eff./COP 88% 95% 1.70 3.00 4.50 1.00 Performance (1 / Eff.) 1.33 1.14 1.05 0.59 0.33 0.22 1.00 (kW/kW) Peak Heating Load 8.0 Btu/hr.ft² 25.2 W/m² 5.1 kWh/ft².yr Seasonal Heating Load 198 MJ/m².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share kWh/ft².yr 5.1 MJ/m2.yr 198 Boiler Maintenance Annual Maintenance Tasks ncidence Fuel Oil / Propane EUI kWh/ft².yr (%) 75% Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% 100% MJ/m².yr Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 198 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers

		Centinuga	ii Crillers	Screw	Recipiocal	ing Chillers	Absorption	Chillers	rotai
		Standard	HE	Chillers	Open	DX	W. H.	CW	
	System Present (%)		50.0%			50.0%			100.0%
	COP	4.7	6.1	4.4	3.6	2.7	0.9	1	
	Performance (1 / COP)	0.21	0.16	0.23	0.28	0.37	1.11	1.00	
	(kW/kW)								
	Additional Refrigerant								
	Related Information								
				_					
ontrol Mode	Incidence of Use	Fixed	Reset						
		Setpoint							

Chilled Water Condenser Water

Setpoint Chilled Water Condenser Water Supply Air 30 °C 14.0 °C 86 °F 57.2 °F

Peak Cooling Load 60 W/m² 19 Btu/hr.ft² 629 ft²/Ton Seasonal Cooling Load 64.6 MJ/m².yr 1.7 kWh/ft².yr (Tertiary Load)

0.65 Operation (occ. perio 3000 hrs/year Note value cannot be less than 2,900 hrs/year) Sizing Factor

Incidence

Frequency

80.0% A/C Saturation (Incidence of A/C)

Co

Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share

Chiller Maintenance Annual Maintenance Tasks

(%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis

Cooling Tower/Air Cooled Condenser Maintenan(Annual Maintenance Tasks

ai k	7 tri idai ividiriteriariee 1 doto	HICIACHICC	requeries
		(%)	(years)
	Inspection/Clean Spray Nozzles		
	Inspect/Service Fan/Fan Motors		
	Megger Motors		
	Inspect/Verify Operation of Controls		

All Electric EUI 0.6 kWh/ft2.yr MJ/m².yr

Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr

Market Composite EUI 0.6 kWh/ft².vr MJ/m².yr 24

DOMESTIC HOT WATER

Service Hot Water Plant Type Fossil Fuel SHW Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. System Present (%) 0.00% Eff./COP 0.550 0.600 0.900 88.000 0.900

Fossil Elec. Res. Fuel Share 0% 100% Blended Efficiency 0.90 0.91

Service Hot Water load (MJ/m².yr) 118.3

(Tertiary Load)

Fuel Oil / Propane EUI All Electric EU Market Composite EUI 3.4 Wetting Use Percentage 90% 3.4 3.4 kWh/ft2.yr kWh/ft².yr kWh/ft2.yr 130 MJ/m².yr 130.0 COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

NEW BUILDINGS: SIZE: Health Care All Baseline VINTAGE: New REGION: Labrador Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Ventilation Fan Exhaust Fan System Design Air Flow System Static Pressure CAV 1.71 CFM/ft² 8.7 L/s.m² Control xed Variable Fixed Variable 750 Pa 3.0 Flow Flow wa System Static Pressure VAV 750 Pa 3.0 wg Incidence of Use 80% 100% Fan Efficiency Fan Motor Efficiency 55% Operation Continuous Scheduled Continuous Scheduled 89% 1.00 13.3 13.3 Sizing Factor Incidence of Use 75% 25% 75% 25% Fan Design Load CAV 1.24 W/ft² 1.24 W/ft² Comments: Fan Design Load VAV W/m² EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 0.1 L/s.m² 212 CFM/washroom 0.01 CFM/ft² Other Exhaust (Smoking/Conference) L/s.m² 0.10 CFM/ft² Total Building Exhaust 0.6 250 L/s.m² 0.11 CFM/ft² Exhaust System Static Pressure Pa 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 0.8 0.07 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) 0.017 kW/kW 0.99 W/m² 0.06 kW/Ton 0.09 W/ft² Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) Condenser Pump 0.053 L/s.KW 3.0 U.S. gpm/Ton Pump Design Flow Pump Design Flow per unit floor area 0.005 U.S. gpm/ft² 0.003 L/s.m² Pump Head Pressure Pump Efficiency 100 kPa 60% 33 ft 88% Pump Motor Efficiency Sizing Factor 0.06 W/ft² Pump Connected Load 0.60 W/m² CIRCULATING PUMP (Heating & Cooling) 0.003 L/s.m² 100 kPa Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 0.0038 U.S. gpm/ft² 2.4 U.S. gpm/Ton 33 ft Pump Efficiency Pump Motor Efficiency 60% 88% Sizing Factor 0.8 0.04 W/ft² Pump Connected Load 0.4 W/m² Supply Fan Occ. Period 4000 hrs./year Supply Fan Unocc, Period 4760 hrs./year Supply Fan Energy Consumption 93.3 kWh/m².yr Exhaust Fan Occ. Period 4000 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 4760 hrs./year 5.7 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption 0.7 kWh/m².yr 0.3 kWh/m².yr Circulating Pump Yearly Operation 7000 hrs./year Circulating Pump Energy Consumption kWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 9.3 MJ/m².yr 360.1

NEW BUILDINGS: Health Care Baseline

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New SIZE: REGION: Labrador Interconnected

EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		30.9 kWh/ft².yr 1,195.1 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 MJ/	m².yr
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electri	city	Fuel Oil /	Propane	
GENERAL LIGHTING (PATIENT RC	1.2	47.2		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
SECONDARY LIGHTING (NURSING	4.8	186.3	SPACE HEATING	5.1	198.3			
TERTIARY LIGHTING (CORRIDORS	S		SPACE COOLING	0.5	19.0			
OTHER PLUG LOADS	1.7	67.3	DOMESTIC HOT WATER	3.4	130.0	0.0	0.0	
HVAC FANS & PUMPS	9.3	360.1	FOOD SERVICE EQUIPMENT	2.1	80.0			
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	0.9	35.0						
COMPUTER SERVERS	0.2	8.1						
ELEVATORS	0.1	3.9						
OUTDOOR LIGHTING	0.9	34.9						

COMMERCIAL SECTOR BUILDING PROFILE

NEW BUILDINGS: SIZE: REGION: VINTAGE: School Labrador Interconnected Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 40,000 ft² Wall U value (W/m².°C) Typical Building Size 3,717 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 3,717 40,000 ft² 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 50% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.15 Defined as Exterior Zone Typical # Stories 0.65 Floor to Floor Height (m) 3.7 m 12.2 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 10% 90% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 108 ft²/person 8.74% %OA m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 8 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor 4.58 L/s.m² Total Air Circulation or Design Air Flow 0.90 CFM/ft² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.42 L/s.m² 0.08 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 764.589 Peak Zone Sensible Load 387,634 28.2 Btu/lbm 23.4 Btu/lbm Room air enthalpy Controls Type System Present (%) HVAC Discharge air enthalpy Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 18,033 DDC/Pneumatic Total air circulation or Design air 4.58 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 55.4 °F 69.8 °F 13 °C 21 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 59 Winter Occ. Humidity 30% 45% 53 KJ/kg 19.5 °C Enthalpy Winter Unocc. Temperature 22.8 Btu/lbm 19.6 Btu/lbm 67.1 °F Winter Unocc. Humidity 30% Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

NEW BUILDINGS: School Baseline SIZE: Ali

LIGHTING													
GENERAL LIGHTING Light Level	500 Lux	46.5	ft-candles										
Floor Fraction (GLFF)	0.85	40.5	it-caridies										
Connected Load	12.9 W/m²	1.2	W/ft²										
Occ. Period(Hrs./yr.)	2000		Light Level (Lux)		300	500	700	1000			Total	1	
Unocc. Period(Hrs./yr.)	6760		% Distribution			100%					100%		
Usage During Occupied Period	85%		Weighted Average								500	4	
Usage During Unoccupied Period	15%				INC	CFL	T12	Т8	HID	T5HO LE	D TOTAL	-	
Fixture Cleaning:			System Present (%)					100%		0% 0'	% 100.0%		
Incidence of Practice Interval	years		CU LLF		0.7	0.7	0.6 0.75	0.6	0.6	0.6 0. 0.80 0.8			
niervai	years		Efficacy (L/W)		15	50	72	88	65	95 9			
Relamping Strategy & Incidence	Group Spot									'		J	
of Practice											EUI	kWh/ft².yr MJ/m².yr	2.8 107
SECONDARY LIGHTING												IVIO/III .yi	107
Light Level	400 Lux	37.2	ft-candles										
Floor Fraction (ALFF) Connected Load	0.15 16.5 W/m²	1.5	W/ft²										
			=								· in	-	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	2000 6760		Light Level (Lux) % Distribution		400 100%	500	700	1000			Total 100%	4	
Usage During Occupied Period	90%		Weighted Average		100%						400		
Usage During Unoccupied Period	15%												
First va Classica			Custom Dragont (0()		INC	CFL	T12	T8	HID	T5HO LE		-	
Fixture Cleaning: Incidence of Practice			System Present (%) CU		10% 0.7	20% 0.7	0.6	10% 0.6	20% 0.6	30% 10° 0.6 0.		4	
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.80 0.8	0		
		7	Efficacy (L/W)		15	50	72	88	65	95 9	0		
Relamping Strategy & Incidence of Practice	Group Spot	-									EUI	kWh/ft².yr	0.6
					Е	EUI = Load	X Hrs. X S	SF X GLFF	=		20.	MJ/m².yr	25
TERTIARY LIGHTING	Lung		ft condice			le-	loos frontic		abaulal 1	20 4.0	n I		
Light Level Floor Fraction (HBLFF)	Lux		ft-candles			F	loor fractio	on cneck:	should = 1.	00 1.0	U		
Connected Load	W/m²		W/ft²										
0 5 : 1/11 / 1	0500										T	7	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	2500 6260		Light Level (Lux) % Distribution								Total	-	
Usage During Occupied Period	100%		Weighted Average									-	
Usage During Unoccupied Period				;					,				
Fixture Cleaning:			System Present (%)		INC	CFL 0%	T12	Т8		MH HP 100% 0			
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6 0.		1	
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.55 0.5	5		
Delemning Ctratemy & Incidence	Craum Crast	٦	Efficacy (L/W)		15	50	72	84	88	65 9	0		
Relamping Strategy & Incidence of Practice	Group Spot										EUI	kWh/ft².yr	
												MJ/m².yr	
TOTAL LIGHTING									Overall LP	13.46 W/m²	EUI TOTAL	k\N/h/ft2 vr	3
									0 TOTAL 21	10.10 11,111	201101742	MJ/m².yr	132
OFFICE EQUIPMENT & PLUG LOA	De												
OFFICE EQUIPMENT & PLUG LOA	ND3												
Equipment Type	Comput	ers	Monitors	Printe	ers	Copie	ers	Serv	/ers	Plug Loads			
Measured Power (W/device)	55		51	100		200		217					
Density (device/occupant) Connected Load	0.05	5 3 W/m²	0.05 0.3 W/m²	0.02 0.2 W	I/m²	0.02 0.4 V	11/m2	0.01	W/m²	0.2 W/m²			
Connected Load	0.3		0.0 W/ft ²	0.02 W		0.4 V			W/ft ²	0.2 W/ft²			
Diversity Occupied Period	90%	5	90%	90%		90%		100%		100%			
Diversity Unoccupied Period	50%		50%	50%	-	50%		100%	-	50%			
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	2000 6760		2000 6760	2000 6760	-	2000 6760	_	2000 6760	H	3000 5760			
			0.00										
Total end-use load (occupied period)		W/m²	0.1 W/ft²	to see notes	(cells with re	ed indicator	in upper ri	ight corner	, type "SHII	T @mputer Serve	rs EUI	kWh/ft².yr	0.10
Total end-use load (unocc. period)	0.8	3 W/m²	0.1 W/ft²							Computer Equipme	nt FIII	MJ/m².yr kWh/ft².yr	3.68
Usage during occupied period	100%									Dompater Equipme	111 201	MJ/m².yr	21.0
Usage during unoccupied period	59%	5								Plug Load	ds EUI	kWh/ft².yr	0.1
												MJ/m².yr	4.23
FOOD SERVICE EQUIPMENT													
Provide description below:	Fuel Oil / Propane F	uel Share:		Electricity Fu	iel Share:	100.0%			Oil / Propane			II Electric EUI	
Cafeteria]			ŀ		kWh/ft².yr MJ/m².yr	0.2 8.0	EUI	kWh/ft².yr MJ/m².yr	0.1 4.0
										5.5			7.0
REFRIGERATION				-			-			-			
Provide description below: Unknown				1							EUI	kWh/ft².yr	0.1
5.10.0WII				1								MJ/m².yr	3.0
		_			-	-	-		-		•		
BLOCK HEATERS & MISCELLANE	ous												
										Block Heate	rs EUI	kWh/ft².yr	0.0
												MJ/m².yr	2
										Miscellaneo	ıs EUI	kWh/ft².yr MJ/m².yr	0.0
												ivio/iIIT.yl	

NEW BUILDINGS: SIZE: VINT School All New

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

REGION: Labrador Interconnected

Baseline SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric W. S. HP H/R Chiller Resistance Packaged A/A HP Total Stan High Unit System Present (%) 100% 100% Eff./COP 83% 2.60 3.10 1.00 Performance (1 / Eff.) 1.37 1.20 1.33 0.38 0.32 0.22 1.00 (kW/kW) Peak Heating Load 13.6 Btu/hr.ft² 42.9 W/m² 8.1 kWh/ft².yr 313 MJ/m².vr Seasonal Heating Load (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share 8 1 MJ/m².yr 313 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 313 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Chillers Open W. H. CW System Present (%) COP 100.0% 100.0% Performance (1 / COP) 0.40 0.19 0.2 0.28 0.33 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 13.0 °C 86 °F 55.4 °F Supply Air 60 W/m² 19 Btu/hr.ft² 628 ft²/Ton Peak Cooling Load Seasonal Cooling Load 74.8 MJ/m².yr 1.9 kWh/ft².yr (Tertiary Load) Operation (occ. perio 4000 hrs/year Note value cannot be less than 2,900 hrs/year) 1.00 Sizing Factor 10.0% A/C Saturation (Incidence of A/C) Electric Fuel Share Fuel Oil / Propane Fuel Share 100.0% Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.9 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.9 kWh/ft².vr MJ/m².yr 34 DOMESTIC HOT WATER Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW Fossil Elec. Res. System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.550 0.600 0.900 0.750 0.900 Blended Efficiency 0.90 0.91 Service Hot Water load (MJ/m².yr) 17.3 (Tertiary Load) Fuel Oil / Propane EUI All Electric EUI Market Composite EUI 90% 0.5 0.5 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr kWh/ft2.yr MJ/m².yr MJ/m2.yı 19.0

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: School Baseline SIZE: Ali REGION: Labrador Interconnected

HVAC FANS & PUMPS											
SUPPLY FANS					Ventilation	and Exhau	st Fan Ope	ration & Co	ontrol		
						ion Fan		st Fan			
System Design Air Flow 4.6	6 L/s.m ² 0.90	CFM/ft ²	Control		Fixed	Variable	Fixed	Variable			
System Static Pressure CAV 30						Flow		Flow			
System Static Pressure VAV 300			Incidence of Use	-	100%	1 IOW	100%	1 IOW			
		wg				0-1		0-1			
Fan Efficiency 60%			Operation		Continuous	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 889											
Sizing Factor 1.00		_	Incidence of Use		25%	75%	25%	75%			
Fan Design Load CAV 2.1		4 W/ft ²									
Fan Design Load VAV 2.6	6 W/m² 0.24	4 W/ft ²	Comn	nents:							
EXHAUST FANS											
Washroom Exhaust 100	L/s.washroom	212 CFM/wa	shroom								
Washroom Exhaust per gross unit area 0.1		0.01 CFM/ft ²									
Other Exhaust (Smoking/Conference) 0.1		0.02 CFM/ft²									
Total Building Exhaust 0.2		0.02 CFM/ft²									
Exhaust System Static Pressure 25		1.0 wg									
Fan Efficiency 25%											
Fan Motor Efficiency 75%											
Sizing Factor 1.0		_									
Exhaust Fan Connected Load 0.:	2 W/m ² 0.02	2 W/ft²									
AUXILIARY COOLING EQUIPMENT (Condens	ser Pump and Cooling To	wer/Condenser Fans	3)								
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/To								
(Cooling Tower/Evap. Condenser/ Air Cooled C	ondenser)	1.21 W/m²	0.07 kW/10 0.11 W/ft²	ori							
Condenser Pump											
Donas Davies Flour		0.050	0.0								
Pump Design Flow		0.053 L/s.KW	3.0 U.S. g								
Pump Design Flow per unit floor area		0.003 L/s.m ²	0.005 U.S. g	pm/ft²							
Pump Head Pressure		45 kPa	15 ft								
Pump Efficiency		50%									
Pump Motor Efficiency		80%									
Sizing Factor		1.0									
Pump Connected Load		0.36 W/m²	0.03 W/ft ²								
I ump connected Load		0.50 W/III	0.03								
CIRCULATING PUMP (Heating & Cooling)											
(touring a cooming)											
Pump Design Flow @ 5 °C (10 °F) delta T	0.00	3 L/s.m ²	0.0038 U.S. gpm/ft ²	2.4	U.S. gpm/	Ton					
Pump Head Pressure		kPa	33 ft	2.7	o.o. gpiii	1011					
			33 11								
Pump Efficiency	50%										
Pump Motor Efficiency	80%										
Sizing Factor	0.8										
Pump Connected Load	0.8	W/m²	0.05 W/ft ²								
Supply Fan Occ. Period		hrs./year									
Supply Fan Unocc. Period		hrs./year									
Supply Fan Energy Consumption		6 kWh/m².yr									
		_									
	-										
Exhaust Fan Occ. Period		hrs./year									
Exhaust Fan Occ. Period		hrs./year hrs./year									
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period	6760										
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption	6760	hrs./year kWh/m².yr									
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption	6760 0.8	hrs./year kWh/m².yr kWh/m².yr									
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consu	6760 0.8	hrs./year kWh/m².yr									
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consu	6760 0.8 mption 0.9	hrs./year kWh/m².yr kWh/m².yr kWh/m².yr									
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consun Circulating Pump Yearly Operation	6760 0.8 mption 0.9	hrs./year kWh/m².yr kWh/m².yr kWh/m².yr									
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consur Circulating Pump Yearly Operation Circulating Pump Energy Consumption	676(0.3 mption 0.5	ol hrs./year kWh/m².yr kWh/m².yr kWh/m².yr kWh/m².yr hrs./year kWh/m².yr									
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption	6760 0.8 mption 0.9	ol hrs./year kWh/m².yr kWh/m².yr kWh/m².yr kWh/m².yr hrs./year kWh/m².yr	Incidence Frequency								
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consur Circulating Pump Yearly Operation Circulating Pump Energy Consumption	### 6766 0.8	ohrs./year kWh/m².yr kWh/m².yr kWh/m².yr kWh/m².yr hrs./year kWh/m².yr	Incidence (%) Frequency (years)								
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consur Circulating Pump Yearly Operation Circulating Pump Energy Consumption	### 6766) hrs./year) kWh/m².yr kWh/m².yr) kWh/m².yr hrs./year kWh/m².yr ks									
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consur Circulating Pump Yearly Operation Circulating Pump Energy Consumption	mption 0.8 Annual Maintenance Tas Inspect/Service Fans & N Inspect/Adjust Belt Tension	on Fan Belts						,			
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consur Circulating Pump Yearly Operation Circulating Pump Energy Consumption	### 6766	on Fan Belts						ſ	EUI	kWh/ft².yr MJ/m².yr	1. 39.

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: SIZE: REGION: School Baseline Labrador Interconnected

> 39.0 3.0 1.5 1.5 21.0

3.7

17.0

0.4

MISCELLANEOUS
BLOCK HEATERS
COMPUTER EQUIPMENT
COMPUTER SERVERS
ELEVATORS
OUTDOOR LIGHTING

EUI SUMMARY **14.5** kWh/ft².yr **562.7** MJ/m².yr Fuel Oil / Propane: 0.0 kWh/ft².yr 0.0 MJ/m².yr TOTAL ALL END-USES: Electricity: END USE:
GENERAL LIGHTING
SECONDARY LIGHTING
TERTIARY LIGHTING
OTHER PLUG LOADS
HVAC FANS & PUMPS
REFRIGERATION
MISCELLANEOUS
BLOCK HEATERS Electricity

kWh/ft².yr MJ/m².yr

8.1 312.9

0.1 3.4 Fuel Oil / Propane kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr 2.8 107.3 END USE: SPACE HEATING SPACE COOLING DOMESTIC HOT WATER FOOD SERVICE EQUIPMENT 0.6 25.1 4.2 19.0 0.1 1.0 0.1 0.0 0.0 0.5 0.1 0.5 0.1 0.0 0.0

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CONSTRUCTION													
	_			_					_		_		_
Wall U value (W/m².°C) 0.28	W/m².°C		0.05	Btu/hr.ft ² .	°F		Typical Bu	uilding Size		6,506	m²	70,000	ft ²
Roof U value (W/m².°C) 0.19	W/m².°C		0.03	Btu/hr.ft ² .	°F		Typical Fo	ootprint (m²)		3,253	m²	35,000	ft ²
	W/m².°C			Btu/hr.ft ² .				Aspect Ratio (L:W)		7			1
								onditioned Space		100%			
	_							onditioned Space		50%			
Window/Wall Ratio (WIWAR) (%) 0.30								s Exterior Zone	r		1		
Shading Coefficient (SC) 0.65							Typical # S			2		40.0	1 4
							Floor to Floor Height (m) 3.7 m 12.0 ft						Jit
VENTILATION SYSTEM, BUILDING CONTRO	LS & IND	OOR CONDITIO	NS										
												-	
Ventilation System Type		O	. (0/)	CAV	CAVR	DDMZ	DDMZVV		/R IU	100% O.A			
		System Presen Min. Air Flow (%		50%				50% 50%			100%	0	
		(Minimum Thro		lume as Pe	ercent of Fu	II Flow)	ļ.	0070			ı		
									-				
Occupancy or People Density			m²/persor	1	151	ft²/person			%OA	18.38%			
Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period		90%											
Fresh Air Requirements or Outside Air		10	L/s.persor	n	21	CFM/perso	n						
Trestry in Requirements of Outside 7th		10	23.pc/30/			OI W/pc/sc							
Fresh Air Control Type *(enter a	a 1, 2 or 3)	1	If Fresh Ai	r Control T	ype = "2" er	nter % FA. t	the right:		34%]
(1 = mixed air control, 2 = Fixed fresh air, 3 1009	6 fresh air)		If Fresh Ai	r Control T	ype = "3" er	nter Make-up	Air Ventila	ation and operation		L/s.m²		CFM/ft ²	
Siming Footor									50%	operation ((%)		j
Sizing Factor Total Air Circulation or Design Air Flow		1.6	L/s.m²		0.77	CFM/ft²							
Total III Onouldion of Design All 1 low		5.09	20.111		0.11	J1 141/11		Separate Make-up	air unit (100%	OA)		L/s.m²	CFM/ft ²
Infiltration Rate		0.40	L/s.m ²		0.08	CFM/ft ²			on occupied pe		50%		
(air infiltration is assumed to occur during unoccu	pied							Operation	on unoccupied	period	50%	0	
hours only if the ventilation system shuts down)													
Economizer			Enthaln	y Based	Dry-Rul	b Based	Total	Т					
LCONOMIZE	Incidence	of Use	Littiap	y Daseu	100%	D Daseu	100%	Summa	ry of Design P	arameters			1
	Switchove			KJ/kg.	18	°C			esign Cooling		######	#	
				Btu/lbm	64.4	°F			ne Sensible L	oad	719,746		
0	0 . 0	. (0()		10/40	- 1				ir enthalpy			Btu/lbm	
ontrols Type Syster		resent (%)		HVAC Equipment	Room				ge air enthalpy olume of air at 55			Btu/lbm 2 ft³/lbm	
	All Pneum	atic		Lquipinen	COTILIOIS			Design		DF & 100 /6 K	33,483		
	DDC/Pne								r circulation or	Design air		l/s.m²	
	All DDC							·					•
	Total (sho	uld add-up to 10	0%)										
			Propo	rtional	PI / PID	Total	l						
Control mode	Control M	ode	Порс	rtional	11/110	Total							
			Fixed D	ischarge	Reset								
	Control St	rategy											
Indeed Desire Constitutes				1	D			0	A !			7	
Indoor Design Conditions	Summer T	emperature		24	Room °C	75.2	∘⊏	Supply a	55.4	°E	1		
		lumidity (%)		50%		10.2	1 '	100%	33.4				
	Enthalpy				KJ/kg.		Btu/lbm	54.5 KJ/kg.		Btu/lbm			
		c. Temperature			°C	71.6	°F	16 °C	60.8	°F			
		c. Humidity		30%		22.0	Btu/lbm	45%	10.6	Btu/lbm			
	Enthalpy Winter Un	occ. Temperatur	e		KJ/kg. °C	69.8		45.5 KJ/kg.	13.0	וושוטוטו	J		
	Winter Un	occ. Humidity	-	30%		55.0	1 .						
	Enthalpy				KJ/kg.	21.5	Btu/lbm					1	
Damper Maintenance				Incidence	Frequency								
Damper Maintenance				(%)	(years)								
	Control Ar	rm Adjustment		,,,,,	() = 0.0 /								
	Lubricatio												
	Blade Sea	al Replacement											
Air Filter Cleaning	Changes/	Year			1								
				1	4								
		-				Incidence o	Annual R	oom Controls Maint	enance				
Incidence of Annual HVAC Controls Maintenance	9	_											
	Appual Ma	aintenance Tasks	,	Incidence	1			Annual Maintenanc	o Tacke		Incidence	J	
	Annual IVI	annenance rasks	•	(%)				A II Iuai iviairileriano	C I dono		(%)		
	Calibration	n of Transmitters	3	\ /0 /				Inspection/Calibrat	ion of Room T	hermostat		1	
	Calibration	n of Panel Gauge	es					Inspection of PE S	witches			I	
		of Auxiliary Dev						Inspection of Auxili				4	
	Inspection	of Control Devi	ces					Inspection of Cont		aives,			
								(Dampers, VAV Bo	ixes)		<u> </u>	_	

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: University/College Baseline SIZE: All REGION: Labrador Interconnected

LIGHTING										
GENERAL LIGHTING Light Level	500 L	ux 46.5	ft-candles							
Floor Fraction (GLFF)	0.90	40.0	it caraics							
Connected Load	11.9 W	V/m² 1.1	W/ft²							
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)	300	500 70	0 1000		Total	1	
Unocc. Period(Hrs./yr.)	4760		% Distribution		100%			100%		
Usage During Occupied Period Usage During Unoccupied Period	90% 20%		Weighted Average					500		
				INC	CFL T1:		T5HO LED			
Fixture Cleaning: Incidence of Practice			System Present (%) CU	0.7	0.7 0.6	95% 4% 6 0.6 0.7	1% 0% 0.6 0.6	100.0%	-	
Interval	y	rears	LLF	0.65	0.65 0.75		0.80 0.80			
Delegacion Otrata de S. Ingidana	0	01	Efficacy (L/W)	15	50 72	88 65	95 90]	
Relamping Strategy & Incidence of Practice	Group	Spot						EUI	kWh/ft².yr	4.5
									MJ/m².yr	175
SECONDARY LIGHTING Light Level	300 L	ux 27.9	ft-candles							
Floor Fraction (ALFF)	0.10		_							
Connected Load	9.6 V	V/m ² 0.9	W/ft²							
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)	300	500 70	0 1000		Total		
Unocc. Period(Hrs./yr.)	4760		% Distribution	100%				100%		
Usage During Occupied Period Usage During Unoccupied Period	100% 50%		Weighted Average					300		
	3373			INC	CFL T1:		T5HO LED			
Fixture Cleaning: Incidence of Practice			System Present (%) CU	3% 0.7	15% 0.7 0.6	80% 6 0.6 0.6	0% 2% 0.6 0.6	100.0%	1	
Interval	y	rears	LLF	0.65	0.65 0.75		0.80 0.80			
			Efficacy (L/W)	15	50 72	88 65	95 90]	
Relamping Strategy & Incidence of Practice	Group	Spot						EUI	kWh/ft².yr	0.6
					EUI = Load X Hrs.	X SF X GLFF			MJ/m².yr	22
TERTIARY LIGHTING Light Level		.ux	ft-candles		Floor frag	ction check: should = 1.	00 1.00	ī		
Floor Fraction (HBLFF)			_		i looi iida	SHOTT CHECK. SHOULD = 1	1.00	1		
Connected Load	V	V/m²	W/ft²							
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)					Total	1	
Unocc. Period(Hrs./yr.)	4760		% Distribution							
Usage During Occupied Period Usage During Unoccupied Period	100%		Weighted Average						-	
Usage During Unoccupied Feriod	10078			INC	CFL T1:	2 T8	MH HPS	TOTAL		
Fixture Cleaning:			System Present (%)		0%		100% 0%	100.0%		
Incidence of Practice Interval	v	rears	CU LLF	0.7 0.65	0.7 0.6 0.65 0.75		0.6 0.6 0.55 0.55			
			Efficacy (L/W)	15	50 72		65 90]	
Relamping Strategy & Incidence of Practice	Group	Spot						EUI	kWh/ft².yr	
or radiace									MJ/m².yr	
TOTAL LIGHTING						Overall LP	11.65 W/m²	EUI TOTAL	k\Λ/h/ft2 vr	5
TOTAL LIGHTING						Overall El	11.00 **////	LOTTOTAL	MJ/m².yr	197
OFFICE EQUIPMENT & PLUG LOA	De									
OFFICE EQUIPMENT & FLOG LOA	ND3									
Equipment Type		Computers	Monitors	Printers	Copiers	Servers	Plug Loads]		
Measured Power (W/device) Density (device/occupant)		54.55 0.31	51 0.31	100 0.02	200 0.02	217 0.01				
Connected Load		1.2 W/m²	1.1 W/m²	0.02 0.1 W/m²	0.02 0.3 W/m²	0.1 W/m²	1.3 W/m²			
		0.1 W/ft²	0.1 W/ft²	0.01 W/ft²	0.03 W/ft²	0.01 W/ft²	0.12 W/ft ²			
Diversity Occupied Period Diversity Unoccupied Period	_	90% 50%	90% 50%	90% 50%	90% 50%	100%	100% 50%			
Operation Occ. Period (hrs./year)		2000	2000	2000	2000	2600	2000			
Operation Unocc. Period (hrs./year)		6760	6760	6760	6760	6160	6760]		
Total end-use load (occupied period)		3.9 W/m ²	0.4 W/ft ²	to see notes (cells with r	ed indicator in uppe	r right corner, type "SHI	FT @mputer Servers	EUI	kWh/ft².yr	0.10
Total end-use load (unocc. period)		2.2 W/m²	0.2 W/ft ²				Computer Equipment	E	MJ/m².yr kWh/ft².yr	3.68
Usage during occupied period		100%					Computer Equipment	EUI	MJ/m².yr	1.34 51.73
Usage during unoccupied period		55%					Plug Loads	EUI	kWh/ft².yr	0.65
									MJ/m².yr	25.18
FOOD SERVICE EQUIPMENT										
Provide description below:	Fuel Oil / P	ropane Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propan EUI kWh/ft².yr		EUI	kWh/ft².yr	0.4
				1		MJ/m².yr	20.0	LOI	MJ/m².yr	15.0
DEEDICEDATION	-	·			-	<u> </u>				
REFRIGERATION Provide description below:										
Unknown]				EUI	kWh/ft².yr	0.5
								L	MJ/m².yr	20.0
BLOCK HEATERS & MISCELLANE	ous									
							Die del Leer	le	LAAIIs (6/2 · ···	0.4
							Block Heaters	EUI	kWh/ft².yr MJ/m².yr	0.1
							Miscellaneous	EUI	kWh/ft².yr	0.1
									MJ/m².yr	5

NEW BUILDINGS: SIZE: University/College Baseline New

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

REGION: Labrador Interconnected

SPACE HEATING Heating Plant Type Fuel Oil / Propane Electric A/A HP W. S. HPH/R Chiller ResistanceTotal Packaged Stan High Unit System Present (%) 100% 100% Eff./COP 83% 1.70 3.00 1.00 Performance (1 / Eff.) 1.33 1.20 1.05 0.59 0.33 0.22 1.00 (kW/kW) 13.2 Btu/hr.ft² 11.5 kWh/ft².yr Peak Heating Load 41.6 W/m² 445 MJ/m².yr Seasonal Heating Load (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share 11 5 MJ/m².yr 445 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 445 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Chillers Open W. H. CW System Present (%) COP 25.0% 100.0% 75.0% Performance (1 / COP) 0.21 0.19 0.2 0.28 0.37 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 13.0 °C 86 °F 55.4 °F Supply Air 78 W/m² 25 Btu/hr.ft² 483 ft²/Ton Peak Cooling Load Seasonal Cooling Load 85.9 MJ/m².yr 2.2 kWh/ft².yr (Tertiary Load) Operation (occ. perio 4000 hrs/year Note value cannot be less than 2,900 hrs/year) 1.00 Sizing Factor 70.0% A/C Saturation (Incidence of A/C) Electric Fuel Share Fuel Oil / Propane Fuel Share 100.0% Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 1.0 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 1.0 kWh/ft².vr MJ/m².yr 39 DOMESTIC HOT WATER Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW Fossil Elec. Res. System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.550 0.600 0.900 0.750 0.900 Blended Efficiency 0.90 0.91 Service Hot Water load (MJ/m².yr) 22.8 (Tertiary Load) Fuel Oil / Propane EU All Electric EUI Market Composite EUI 90% 0.6 0.7 0.6 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr kWh/ft2.yr MJ/m².yr

MJ/m2.yı

NEW BUILDINGS: University/College Baseline

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New SIZE: All

SUPPLY FANS Vertiliation and Exhaust Fan Operation & Control	
System Design Air Flow 3.9 Us.m² 0.77 CFM/fl²	
System Design Air Flow System Static Pressure CAV 750 Pa 3.0 Vs.m² 0.77 CFM/f² System Static Pressure VAV 750 Pa 3.0 Vs.m² 0.75 CFM/f² Sizing Factor 1.00 Vs.m² 0.56 Vs.m	
System Static Pressure CAV 750 Pa 3.0 wg System Static Pressure VAV 750 Pa 3.0 wg System Static Pressure VAV 750 Pa 3.0 wg Incidence of Use 50% 50% 50% 50% 50% 50% Flow Strength of Continuous Scheduled Continuous	
System Static Pressure VAV 750 Pa 3.0 wg Incidence of Use 50%	
Fan Efficiency 60% 1.00	
Fan Motor Efficiency 80% 1.00 1.57 W/m² 0.02 W/W/Ton 0.020	
Incidence of Use S0% 50%	
Fan Design Load CAV	
Washroom Exhaust 100 Us.washroom 212 CFM/washroom Washroom CFM/ft² O.01 CFM/ft² O.01 CFM/ft² O.01 CFM/ft² O.01 CFM/ft² O.02 CFM/ft² O.03 CFM/ft² O.03 CFM/ft² O.03 CFM/ft² O.03 CFM/ft² O.03 CFM/ft² O.03 CFM/ft² O.03 CFM/ft² O.03 CFM/ft² O.03 CFM/ft² O.03 CFM/ft² O.03 CFM/ft² O.03 CFM/ft² O.03 O.03 CFM/ft² O.03	
Washroom Exhaust 100 L/s.washroom 212 CFM/washroom Washroom Exhaust per gross unit area 0.1 U/s.m² 0.01 CFM/ft² Total Buikting Exhaust 0.2 U/s.m² 0.02 CFM/ft² Total Buikting Exhaust System Static Pressure 250 Pa 1.0 Wg Fan Efficiency 25% Pa 1.0 wg Fan Motor Efficiency 75% Wg Wg Sizing Factor 1.0 W/m² 0.02 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw 0.020 kW/kW 0.07 kW/Ton (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 1.57 W/m² 0.15 W/ft² Condenser Pump Pump Design Flow per unit floor area 0.004 L/s.kW 3.0 U.s. gpm/Ton Pump Heaf Pressure Epi kPa tft Pump Efficiency 50% 80% Sizing Factor 1.0	
Washroom Exhaust 100 L/s.washroom 212 CFM/washroom Washroom Exhaust per gross unit are: 0.1 Us.m² 0.01 CFM/ft² Total Building Exhaust 0.2 L/s.m² 0.02 CFM/ft² Total Building Exhaust System Static Pressure 250 Pa 1.0 Wg Fan Efficiency 25% Pa 1.0 wg Fan Motor Efficiency 75% Wg 0.02 W/ft² Sizing Factor 1.0 W/m² 0.02 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw 0.020 kW/kW 0.07 kW/Ton (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 1.57 W/m² 0.15 W/ft² Condenser Pump 0.063 L/s.kW 3.0 U.s. gpm/Ton Pump Design Flow per unit floor area 0.004 L/s.m² 0.006 U.s. gpm/t² Pump Head Pressure 50% Fa ft 1.0	
Washroom Exhaust per gross unit are: 0.1	
Other Exhaust (Smoking/Conference)	
Total Building Exhaust	
Exhaust System Static Pressure Fan Efficiency Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) Condenser Pump Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency	
Fan Efficiency	
Fan Motor Efficiency 75% 1.0 Exhaust Fan Connected Load 0.2 W/m² 0.02 W/ft² AUXILIARY COCLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.020 W/kW 0.07 W/m² 0.15 W/m² Condenser Pump 0.053 L/s.KW 0.054 W/m² 0.15 W/ft² Condenser Pump 0.063 L/s.KW 0.064 W/ft² Condenser Pump 0.064 W/ft² 0.066 W/ft² Condenser Pump 0.065 L/s.KW 0.066 W/ft² Condenser Pump 0.066 W/ft² 0.066 W/ft² Fan W/ft² 0.066 Fan	
Sizing Factor 1.0 Exhaust Fan Connected Load 0.02 W/m² 0.020 W/kW 0.07 Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.020 kW/kW (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.053 L/s.KW 0.053 U/s.KW 0.064 Pump Design Flow per unit floor area 0.004 Pump Head Pressure kPa Pump Efficiency 50% Pump Motor Efficiency 50% Sizing Factor 1.0	
Exhaust Fan Connected Load	
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) Condenser Pump Pump Design Flow Pump Design Flow per unit floor area Pump Berssure Pump Had Pressure Pump Efficiency Pump Motor Efficiency Pump Motor Efficiency Sizing Factor 0.020 kW/kW 0.07 kW/Ton W/rt² 0.15 W/rt² 0.15 W/rt² 0.053 L/s.KW 3.0 U.S. gpm/Ton U.S. gpm/Ton Fa ft ft	
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) Condenser Pump Pump Design Flow Pump Design Flow per unit floor area Pump Berssure Pump Had Pressure Pump Efficiency Pump Motor Efficiency Pump Motor Efficiency Sizing Factor 0.020 kW/kW 0.07 kW/Ton W/rt² 0.15 W/rt² 0.15 W/rt² 0.053 L/s.KW 3.0 U.S. gpm/Ton U.S. gpm/Ton Fa ft ft	
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser) 0.020 kW/kW 0.07 kW/Ton 0.15 W/m² 0.15 W/tr²	
(Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 1.57 W/m² 0.15 W/tt² Condenser Pump Vis. KW 3.0 U.S. gpm/Ton Pump Design Flow per unit floor area 0.004 U.S. m² 0.006 U.S. gpm/Ton Pump Head Pressure KPa tf tf tf Pump Befficiency 50% tf tf Pump Motor Efficiency 80% tf tf Sizing Factor 1.0 1.0 th th	
Condenser Pump Condenser Pump	
Pump Design Flow 0.053	
Pump Design Flow per unit floor area 0.004	
Pump Design Flow per unit floor area 0.004	
Pump Head Pressure kPa ft Pump Efficiency 50% Pump Motor Efficiency 80% Sizing Factor 1.0	
Pump Efficiency 50% Pump Motor Efficiency 80% Sizing Factor 1.0	
Pump Motor Efficiency 80% Sizing Factor 1.0	
Pump Connected Load W/m² W/ft²	
CIRCULATING PUMP (Heating & Cooling)	
Pump Design Flow @ 5 °C (10 °F) delta T 0.003 L/s.m² 0.0050 U.S. gpm/ft² 2.4 U.S. gpm/Ton	
Pump Head Pressure 100 kPa 50 ft	
Pump Efficiency 50%	
Pump Motor Efficiency 80%	
Sizing Factor 0.8	
Pump Connected Load 0.7 W/m² 0.06 W/t²	
Supply Fan Occ. Period 3500 hrs./year	
Supply Fan Unocc. Period 5260 hrs./year	
Supply Fan Energy Consumption 28.6 kWh/m².yr	
Exhaust Fan Occ. Period 3500 hrs./year	
Exhaust an Unocc. Period 3500 Ins./year	
Exhaust Fan Energy Consumption 1.3 kWh/m².yr	
Condenser Pump Energy Consumption	
Company Construction and Energy Construction Company Construction Cons	
Circulating Pump Yearly Operation 7000 hrs./year	
Circulating Pump Energy Consumption KWH/m².yr	
Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency	
(%) (years)	
Inspect/Service Fans & Motors	
Inspect/Adjust Belt Tension on Fan Belts	
Inspect/Service Pump & Motors EUI	JAMIL MAZ
	kWh/ft².yr 2.8 MJ/m².yr 109.8

REGION: Labrador Interconnected

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: University/College Baseline SIZE: All

EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		24.5 kWh/ft².yr 947.2 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	ricity	Fuel Oil /	Propane	
GENERAL LIGHTING	4.5	175.2		kWh/ft2.yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
SECONDARY LIGHTING	0.6	22.1	SPACE HEATING	11.5	445.1			
TERTIARY LIGHTING			SPACE COOLING	0.7	27.6			
OTHER PLUG LOADS	0.7	25.2	DOMESTIC HOT WATER	0.6	25.0	0.0	0.0	
HVAC FANS & PUMPS	2.8	109.8	FOOD SERVICE EQUIPMENT	0.4	15.0			
REFRIGERATION	0.5	20.0						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	1.3	51.7						
COMPUTER SERVERS	0.1	3.7						
LEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

COMMERCIAL SECTOR BUILDING PROFILE

NEW BUILDINGS: SIZE: REGION: VINTAGE: Warehouse/Wholesale Labrador Interconnected Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 20,000 ft² Wall U value (W/m².°C) Typical Building Size 1,859 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 1,859 20,000 ft² 2.80 W/m².°C 0.49 Btu/hr.ft² .°F Footprint Aspect Ratio (L:W) Glazing U value (W/m².°C) Percent Conditioned Space Percent Conditioned Space 100% 40% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.05 Defined as Exterior Zone Typical # Stories 0.80 Floor to Floor Height (m) 6.1 m 19.9 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 100% 100% Min. Air Flow (%)
(Minimum Throttled Air 50% Occupancy or People Density 1076 ft²/person 10.74% 100 m²/person %OA Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 20 L/s.person 42 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m² 0.10 CFM/ft² 50% operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.37 CFM/ft² 1.86 L/s.m² Separate Make-up air unit (100% OA) L/s.m² CFM/ft² 0.40 L/s.m² 0.08 CFM/ft² Infiltration Rate 50% Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% Switchover Point KJ/kg. Peak Design Cooling Load 234.761 Peak Zone Sensible Load 157,585 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipmer 13.2 ft³/lbm All Pneumatic 7,331 DDC/Pneumatic Total air circulation or Design air 1.86 l/s.m² Total (should add-up to 100%) PI / PID Total Proportional Control mode Control Mode Fixed Discharge Reset Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 71.6 °F 55.4 °F 13 °C 22 °C Summer Humidity (%) Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 °I 60.8 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 °F Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermosta Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices Inspection of Control Devices nspection of Control Devices (Valves (Dampers, VAV Boxes)

COMMERCIAL SECTOR BUILDING PROFILE

NEW BUILDINGS:
Warehouse/Wholesale
Baseline

LIGHTING
GENERAL LIGHTING
Light Level
Floor Fraction (GLFF)
0.95

COMMERCIAL SECTOR BUILDING PROFILE
VINTAGE:
New
37.2 ft-candles

LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	0.95	ft-candles W/ft²										
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3500 5260 100% 15%	Light Level (Lux) % Distribution Weighted Average	300 50%	500 50%	700 T12	1000 T8	HID	T5HO	LED	Total 100% 400		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	0.7 0.65 50	0.6 0.75 72	15% 0.6 0.80 88	15% 0.7 0.80 65	70% 0.6 0.80 95	0.6 0.80 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot						·			EUI	kWh/ft².yr	3.5
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	0.05	ft-candles W/ft²									MJ/m².yr	134
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period	3000 5760 100%	Light Level (Lux) % Distribution Weighted Average	300 100%	500	700	1000				Total 100% 300		
Usage During Unoccupied Period Fixture Cleaning: Incidence of Practice Interval	15% years	System Present (%) CU LLF	INC 3% 0.7 0.65	CFL 10% 0.7 0.65	0.6 0.75	T8 85% 0.6 0.80	0.6 0.80	T5HO 0% 0.6 0.80	2% 0.6 0.80	100.0%	-	
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)	15	50	72	88	65	95	90	EUI	kWh/ft².yr	0.2
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	EUI = Load X Hrs. X SF X GLFF Lux									<u> </u>	MJ/m².yr	7
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500	700	1000				Total	-	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	0% 0.7 0.65 50	0.6 0.75 72	0.6 0.80 84	0.6 0.80 88	0.6 0.55 65	HPS 0% 0.6 0.55 90	0.0%		
Relamping Strategy & Incidence of Practice	Group Spot									EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING						0	verall LP	9.13	W/m²	EUI TOTAL	_ kWh/ft².yr MJ/m².yr	3.6 140
OFFICE EQUIPMENT & PLUG LOAD	DS											
Equipment Type	Computers	Monitors	Printers	Copie	rs	Serve	rs	Plug L	oads			
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period	54.55 0.59 0.3 W/m² 0.0 W/ft² 90%	51 0.59 0.3 W/m² 0.0 W/ft² 90%	100 0.03 0.0 W/m² 0.00 W/ft² 90%	200 0.03 0.1 W 0.01 W 90%		217 0.06 0.1 W 0.01 W 100%		2 0.19 90%	W/m² W/ft²			
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 2000 6760	50% 2000 6760	50% 2000 6760	50% 2000 6760		100% 2000 6760		25% 3500 5260				
Total end-use load (occupied period) Total end-use load (unocc. period)	2.6 W/m² 1.0 W/m²	0.2 W/ft² 0.1 W/ft²	to see notes (cells with r	ed indicator	in upper rig	ght corner, t		T @a mput			kWh/ft².yr MJ/m².yr kWh/ft².yr	0.11 4.42 0.34
Usage during occupied period Usage during unoccupied period	100% 39%							-	lug Loads		MJ/m².yr kWh/ft².yr MJ/m².yr	13.30 0.83 32.15
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%	E	UI k\	/ Propane Vh/ft².yr J/m².yr	EUI		A EUI	Il Electric EUI kWh/ft².yr MJ/m².yr	
REFRIGERATION Provide description below: Large refrigeration storage			 1							EUI	kWh/ft².yr	1.5
			J								MJ/m².yr	60.0
BLOCK HEATERS & MISCELLANEO	ous								ck Heaters		kWh/ft².yr MJ/m².yr kWh/ft².yr	0.1 5 0.1

NEW BUILDINGS: Warehouse/Wholesale SIZE:

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE:

REGION:

MJ/m².yr

20.0

New Labrador Interconnected Baseline SPACE HEATING Heating Plant Type Hot Water System Electric A/A HP W. S. HPH/R Chiller ResistanceTotal Packaged Boiler Unit Heate Rooftop System Present (%) 100% 100% Eff./COP 1.70 3.00 1.00 Performance (1 / Eff.) 1.33 1.33 1.05 0.59 0.33 0.22 1.00 (kW/kW) Peak Heating Load 11.8 Btu/hr.ft² 37.3 W/m² 310 MJ/m².vr Seasonal Heating Load 8.0 kWh/ft².yr (Tertiary Load) Sizing Factor 1.00 All Electric EUI kWh/ft².yr Electric Fuel Share 100.0% Fuel Oil / Propane Fuel Share Oil Fuel Share 8.0 MJ/m².yr 310 Boiler Maintenance Annual Maintenance Tasks (%) 75% Fuel Oil / Propane EUI kWh/ft².yr Fire Side Inspection Water Side Inspection for Scale Buildup Inspection of Controls & Safeties 100% MJ/m².yr 100% Inspection of Burner Flue Gas Analysis & Burner Set-up Market Composite EUI kWh/ft².yr 100% 90% MJ/m².yr 310 SPACE COOLING A/C Plant Type Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers Total Standard HE Open W. H. CW Chillers System Present (%) COP 100.0% 100.0% Performance (1 / COP) 0.21 0.19 0.2 0.28 0.34 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Control Mode Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water Setpoint Chilled Water Condenser Water 30 °C 13.0 °C 86 °F 55.4 °F Supply Air 37 W/m² 12 Btu/hr.ft² 1022 ft²/Ton Peak Cooling Load Seasonal Cooling Load 29.4 MJ/m².yr 0.8 kWh/ft².y (Tertiary Load) Operation (occ. perio 4000 hrs/year Note value cannot be less than 2,900 hrs/year) 1.00 Sizing Factor 10.0% A/C Saturation (Incidence of A/C) Electric Fuel Share Fuel Oil / Propane Fuel Share 100.0% Annual Maintenance Tasks Chiller Maintenance Incidence Frequency (%) (years) Inspect Control, Safeties & Purge Unit Inspect Coupling, Shaft Sealing and Bearings Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Analysis All Electric EUI 0.3 kWh/ft2.yr MJ/m².yr Cooling Tower/Air Cooled Condenser Maintenan Annual Maintenance Tasks Incidence Frequency Fuel Oil / Propane EUI kWh/ft².yr (%) (years) Inspection/Clean Spray Nozzles Inspect/Service Fan/Fan Motors MJ/m².yr Megger Motors Inspect/Verify Operation of Controls Market Composite EUI 0.3 kWh/ft².vr MJ/m².yr 12 DOMESTIC HOT WATER Service Hot Water Plant Type Std. Tank PV Tank Cond. Tnk Std. Boiler Cnd. Boil. Fossil Fuel SHW Fossil Elec. Res. System Present (%) 0.00% Fuel Share 0% 100% Eff./COP 0.550 0.600 0.900 0.750 0.900 Blended Efficiency 0.90 0.91 Service Hot Water load (MJ/m².yr) 18.2 (Tertiary Load) Fuel Oil / Propane EU All Electric EUI Market Composite EUI 90% 0.5 0.5 Wetting Use Percentage kWh/ft2.yr kWh/ft2.yr kWh/ft2.yr

MJ/m2.yı

COMMERCIAL SECTOR BUILDING PROFILE

NEW BUILDINGS: SIZE: Warehouse/Wholesale All

Baseline

VINTAGE: New REGION: Labrador Interconnected

HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control Exhaust Fan Ventilation Fan System Design Air Flow System Static Pressure CAV 0.37 CFM/ft² 1.9 L/s.m² Control red Variable Fixed Variable 300 Pa 1.2 Flow Flow wa System Static Pressure VAV 300 Pa wg Incidence of Use 100% 100% Fan Efficiency 60% Operation Continuous Scheduled Continuous Schedule Fan Motor Efficiency 80% Sizing Factor 1.00 Incidence of Use 50% 50% 50% 50% Fan Design Load CAV 0.11 W/ft² 1.2 W/m² 1.2 W/m² Fan Design Load VAV 0.11 W/ft² Comments: EXHAUST FANS Washroom Exhaust Washroom Exhaust per gross unit area 100 L/s.washroom 212 CFM/washroom 0.02 CFM/ft² 0.1 L/s.m² Other Exhaust (Smoking/Conference) 0.1 L/s.m² 0.02 CFM/ft² Total Building Exhaust 0.2 L/s.m² 250 Pa 0.04 CFM/ft² Exhaust System Static Pressure 1.0 wg 25% 75% Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load 1.0 0.3 W/m² 0.03 W/ft² AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.020 kW/kW 0.74 W/m² 0.07 kW/Ton 0.07 W/ft² Condenser Pump 0.053 L/s KW 3.0 U.S. gpm/Ton Pump Design Flow Pump Design Flow per unit floor area 0.003 U.S. gpm/ft² 0.002 L/s.m² Pump Head Pressure Pump Efficiency kPa ft 50% Pump Motor Efficiency 80% Sizing Factor 1.0 Pump Connected Load W/m² W/ft² CIRCULATING PUMP (Heating & Cooling) Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure 0.0023 U.S. gpm/ft² 2.4 U.S. gpm/Ton 0.002 L/s.m² kPa Pump Efficiency Pump Motor Efficiency 50% 80% Sizing Factor 8.0 Pump Connected Load W/ft² W/m² Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc, Period 5260 hrs./year Supply Fan Energy Consumption 7.1 kWh/m².yr Exhaust Fan Occ. Period 3500 hrs./year Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption 5260 hrs./year 1.7 kWh/m².yr Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consumption kWh/m².vr 0.2 kWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 7000 hrs./year kWh/m2.yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 0.8 MJ/m².yr 32.4

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New NEW BUILDINGS: Warehouse/Wholesale Baseline SIZE: Ali REGION: Labrador Interconnected

EUISUMMARY							
TOTAL ALL END-USES:	Electricity:		16.5 kWh/ft².yr 641.0 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 N
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane
GENERAL LIGHTING	3.5	133.8		kWh/ft2.yr	MJ/m².yr	kWh/ft².yr	MJ/m ² .yr
SECONDARY LIGHTING	0.2	6.5	SPACE HEATING	8.0	310.2		
TERTIARY LIGHTING			SPACE COOLING	0.0	1.2		
OTHER PLUG LOADS	0.8	32.1	DOMESTIC HOT WATER	0.5	20.0	0.0	0.0
HVAC FANS & PUMPS	0.8	32.4	FOOD SERVICE EQUIPMENT				
REFRIGERATION	1.5	60.0					
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.1	5.0					
COMPUTER EQUIPMENT	0.3	13.3					
COMPUTER SERVERS	0.1	4.4					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

COMMERCIAL SECTOR BUILDING PROFILE

EXISTING BUILDINGS: SIZE: REGION: VINTAGE: Restaurant Baseline CONSTRUCTION 0.28 W/m².°C 0.05 Btu/hr.ft² .°F 10,000 ft² Wall U value (W/m².°C) Typical Building Size 929 m² Roof U value (W/m².°C) 0.19 W/m².°C 0.03 Btu/hr.ft² .°F Typical Footprint (m²) 929 10,000 ft² Glazing U value (W/m².°C) 2.80 W/m².°C 0.49 Btu/hr.ft².°F Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space 100% 45% Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC) 0.36 Defined as Exterior Zone Typical # Stories 0.58 Floor to Floor Height (m) 3.7 r 12.0 ft VENTILATION SYSTEM, BUILDING CONTROLS & INDOOR CONDITIONS CAVR DDMZ DDMZVV TOTAL Ventilation System Type CAV VAV VAVR IU 100% O.A System Present (%) 60% 40% 100% Min. Air Flow (%) (Minimum Throttled Ai 60% Occupancy or People Density 215 ft²/person %OA 10.83% m²/person Occupancy Schedule Occ. Period 90% Occupancy Schedule Unocc. Period resh Air Requirements or Outside Air 16 CFM/person 1 If Fresh Air Control Type = "2" enter % FA. to the right: CFM/ft² (1 = mixed air control, 2 = Fixed fresh air, 3 100% fresh air) If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation I /s m² operation (%) Sizing Factor Total Air Circulation or Design Air Flow 0.68 CFM/ft² 3.46 L/s.m² Separate Make-up air unit (100% OA) CFM/ft² 0.40 L/s.m² 0.08 CFM/ft² 50% Infiltration Rate Operation occupied period (air infiltration is assumed to occur during unoccupied Operation unoccupied period hours only if the ventilation system shuts down) Dry-Bulb Based Economizer Enthalpy Based Total Incidence of Use Summary of Design Parameters 100% 100% 191.742 Switchover Point KJ/kg. 18 Peak Design Cooling Load Peak Zone Sensible Load 112,725 Room air enthalpy Discharge air enthalpy 28.2 Btu/lbm 23.4 Btu/lbm Controls Type System Present (%) HVAC Room Specific volume of air at 55F & 100% R
Design CFM Equipment 13.2 ft³/lbm All Pneumatic 5,244 DDC/Pneumatic Total air circulation or Design air 3.46 l/s.m² All DDC Total (should add-up to 100%) Proportional PI / PID Control mode Control Mode Fixed Discharge Rese Control Strategy Indoor Design Conditions Supply Ai Summer Temperature 75.2 °F 14 °C 57.2 °F 24 °C Summer Humidity (%) 50% Enthalpy Winter Occ. Temperature 28.2 Btu/lbm 23.4 Btu/lbm 65.5 KJ/kg 54.5 69.8 59 Winter Occ. Humidity 30% 45% Enthalpy Winter Unocc. Temperature 53 KJ/kg. 22.8 Btu/lbm 19.6 Btu/lbm 21 °C 30% 69.8 Winter Unocc. Humidity Enthalpy 50 KJ/kg 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication
Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of PE Switches
Inspection of Auxiliary Devices
Inspection of Control Devices (Valves,

(Dampers, VAV Boxes)

Inspection of Control Devices

EXISTING BUILDINGS: Restaurant Baseline SIZE: COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

REGION: Labrador Interconnected

LIGHTING													
GENERAL LIGHTING	400 1	07.0	4										
Light Level Floor Fraction (GLFF)	400 Lux 0.50	37.2	ft-candles										
Connected Load	10.3 W/m²	1.0	W/ft²										
Connected Load	10.5	1.0	VV/IC										
Occ. Period(Hrs./yr.)	4300		Light Level (Lux)		400	550	650				Total	İ	
Unocc. Period(Hrs./yr.)	4460		% Distribution		100%	000	500				100%	İ	
Usage During Occupied Period	100%		Weighted Average								400	İ	
Usage During Unoccupied Period	10%											İ	
					INC	CFL	T12	T8	HID	T5HO LED	TOTAL	İ	
Fixture Cleaning:			System Present (%)					100.0%		10.12	100.0%	ii	
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6 0.6		İ	
Interval	years	i	LLF		0.65	0.65	0.75	0.80	0.80	0.80 0.80		ii	
			Efficacy (L/W)		15	50	72	88	65	95 90		İ	
Relamping Strategy & Incidence	Group Sp								1				
of Practice											EUI	kWh/ft².yr	2.3
or radios												MJ/m².yr	88
ARCHITECTURAL LIGHTING												,	
Light Level	300 Lux	27.9	ft-candles										
Floor Fraction (ALFF)	0.50		11. 0										
Connected Load	21.2 W/m²	2.0	W/ft²										
00111.00.00 2022		1	1**/										
Occ. Period(Hrs./yr.)	4300		Light Level (Lux)		200	300	400	500			Total	i	
Unocc. Period(Hrs./yr.)	4460		% Distribution				100%				100%	1	
Usage During Occupied Period	100%		Weighted Average		ı.						400	1	
Usage During Unoccupied Period	10%											1	
3					INC	CFL	T12	T8	HID	T5HO LED	TOTAL	1	
Fixture Cleaning:			System Present (%)		30%	50%				209		1	
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6 0.6		1	
Interval	years	•	LLF	-	0.65	0.65	0.75	0.80	0.80	0.80 0.80		ii	
I I I I I I I I I I I I I I I I I I I			Efficacy (L/W)		15	50	72	84	65	95 90		ii	
Relamping Strategy & Incidence	Group Sp		EIIICacy (L/VV)	1		55	,41	0-1	00	30 00	'		
of Practice	Gloup Sp	OI -									EUI	kWh/ft².yr	4.7
OI FIdence					FI	II – Load	X Hrs. X S	E Y GLFF				MJ/m².yr	181
SPECIAL PURPOSE LIGHTING						JI - LUGG	1 / 1110. / 2	DF A CLI .			-1	IVIO/III .yı	10.
Light Level	Lux		ft-candles			Œ	loor fractio	n check: sl	hould = 1.0	0 1.00	a		
Floor Fraction (HBLFF)	Lux	<u> </u>	It-Caraico			Ľ	1001 ITAGE	III UIICUN. U	IDuiu - 1.5				
Connected Load	W/m²	,	W/ft²										
Connected Load	VV/111	L	Jvv/n~										
O Davia d/Lleo Are \	4000		1:-bilaral/lin/		300	500	700	1000			Total	ı	
Occ. Period(Hrs./yr.)	4000		Light Level (Lux)		300	500	700	1000			Total	ii	
Unocc. Period(Hrs./yr.)	4760		% Distribution					1_				ı	
Usage During Occupied Period	0%		Weighted Average									ii.	
Usage During Unoccupied Period	100%											ı	
					INC	CFL	T12	T8		MH HP:	TOTAL	ı	
Fixture Cleaning:			System Present (%)									ii	
Incidence of Practice			CU		0.7	0.7	0.6	0.6	0.6	0.6 0.6		ii	
Interval	years		LLF		0.65	0.65	0.75	0.80	0.80	0.55 0.55		ii	
			Efficacy (L/W)		15	50	72	84	88	65 90		ii	
Relamping Strategy & Incidence	Group Sp	ot											
of Practice												kWh/ft².yr	
												MJ/m².yr	
TOTAL LIGHTING								0	verall LP	15.75 W/m ²	EUI TOTAL	kWh/ft².yr	7
												MJ/m².yr	269
OFFICE EQUIPMENT & PLUG LOA	DS												
											_		
Equipment Type	Cor	mputers	Monitors	Prir	nters	Copie	ers	Serve	rs	Plug Loads			
M (M/d)		55		400		000		047					
Measured Power (W/device)		55	51	100		200	-	217					
Density (device/occupant)		0.16	0.16	0.01	101/2		A1/2	0.06	1/2	4.45 14//2			
Connected Load		0.4 W/m²	0.4 W/m²		W/m²		N/m²	0.1 W		1.15 W/m²			
Discounts Commission I Design		0.0 W/ft ²	0.0 W/ft²	0.00	VV/ft²		N/ft²	0.01 W	//tt²	0.11 W/ft²			
Diversity Occupied Period		80%	80%	80%		80%		100%	_	80%			
Diversity Unoccupied Period		50%	50%	50%		50%		100%	_	50%			
Operation Occ. Period (hrs./year)		2000	2000	2000	-	2000	_	2000	_	4100			
Operation Unocc. Period (hrs./year)		6760	6760	6760		6760		6760		4660			
		4 0 14// 0	0.00144740								le	1140 (6:0	
Total end-use load (occupied period)		1.8 W/m²	0.2 W/ft²							Computer Server		kWh/ft².yr	0.11
Total end-use load (unocc. period)		1.2 W/m ²	0.1 W/ft ²							O		MJ/m².yr	4.42
										Computer Equipmer		kWh/ft².yr	0.41
Usage during occupied period		00%								5		MJ/m².yr	16.00
Usage during unoccupied period		65%								Plug Load		kWh/ft².yr	0.60
												MJ/m².yr	23.23
5000 0501/05 501/IDM51/5													
FOOD SERVICE EQUIPMENT	E 1011/D	E 101				100.00/	_			I			
Provide description below:	Fuel Oil / Propa	ine Fuel Share:		Electricity F	uel Share:	100.0%	_		/ Propane			Electric EUI	
Lunch room/cafeteria/restaurant							E		Wh/ft².yr	0.1		kWh/ft².yr	34.3
								IV	IJ/m².yr	5.0		MJ/m².yr	1330.0
REFRIGERATION													
Provide description below:													
Lunch room/cafeteria/restaurant												kWh/ft².yr	16.8
												MJ/m².yr	650.0
BLOCK HEATERS & MISCELLANE	ous												
										Block Heater		kWh/ft².yr	0.1
												MJ/m².yr	5
										Miscellaneou	sEUI	kWh/ft².yr	0.1
												841/2	

EXISTING BUILDINGS: Restaurant Baseline

SPACE HEATING

SIZE:

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New

REGION: Labrador Interconnected

Eff J Perf	Stem Present (%) //COP	70% 1.43	High 80%	Packaged Unit 70% 1.43	1.70 0.59	3.00 0.33	4.50 0.22	100% 1.00 1.00	Total 100%	
Eff J Perf	//COP formance (1 / Eff.) ///KW) 16.3 Btu/hr.ft² 11.0 kWh/ft².yr	70%	80%	70%				1.00	100%	
Perf	formance (1 / Eff.) //kW) 16.3 Btu/hr.ft² 11.0 kWh/ft².yr									
Peak Heating Load	16.3 Btu/hr.ft² 11.0 kWh/ft².yr									
Electric Fuel Share 100.0% Fuel Oil / Pr Boiler Maintenance Annual Mainten	Propane Fuel Share									I
	· · · · · · · · · · · · · · · · · · ·	ī	Oil Fuel Shar	e e						All Electric EUI kWh/ft².yr 1°
	nance Tasks	Incidence]	'						MJ/m².yr 4
Inspection of C Inspection of B	ection spection for Scale Buildup Controls & Safeties	(%) 75% 100% 100% 100% 90%								Fuel Oil / Propane EUI kWh/ft²-yr MJ/m²-yr Market Composite EUI kWh/ft²-yr 1 MJ/m²-yr 4
SPACE COOLING										. ,
A/C Plant Type										
Syst COF Perf (kW/, Addi	Centrifuga Standard stem Present (%) P 4. formance (1 / COP) 0.2 //kW) 0.2 itional Refrigerant ated Information	HE 7 5.4	3.5	Open 3.5 0.29	ing Chillers DX 100.0% 2.6 0.38	Absorption W. H. 0.9 1.11	Chillers CW 1 1.00	Total 100.0%		
Chill	dence of Use Fixed Setpoint lled Water Indenser Water	Reset								
Con	ndenser Water 30	°C ○°C	44.6 86 57.2	°F						
Peak Cooling Load 60 W/m² Seasonal Cooling Load 65.7 MJ/m².yr (Tertiary Load)	19 Btu/hr.ft² 626 1.7 kWh/ft².yr	ft²/Ton								
Sizing Factor 1.00	Operation (or	c. period)	3000	hrs/year	Note value	cannot be	less than 2	900 hrs/ye	ar)	
A/C Saturation 90.0% (Incidence of A/C)										
Electric Fuel Share 100.0% Fuel Oil / Pr	Propane Fuel Share	I								
Chiller Maintenance Annual Mainten	nance Tasks		Frequency							
	be Cleaning ysis Festing	(%)	(years)							All Electric EUI kWh/ft².yr (
Cooling Tower/Air Cooled Condenser Maintenan Annual Mainten	nance Tasks		Frequency							MJ/m².yr
Inspect/Service Megger Motors	an Spray Nozzles e Fan/Fan Motors s Operation of Controls	(%)	(years)							Fuel Oil / Propane EUI kWh/tt².yr MJ/m².yr Market Composite EUI kWh/tt².yr MJ/m².yr
DOMESTIC HOT WATER										
Service Hot Water Plant Type Fossil Fuel SH System Presen				Boiler 0%	F	Fuel Share		Fossil 0%		Elec. Res. 100%
Service Hot Water load (MJ/m².yr) 700.0 (Tertiary Load)	0.65			0.75		Blended Ef	ficiency	0.75		0.91
Wetting Use Percentage 90%			M Electric EU kWh/ft².yr MJ/m².yr	19.9 769			oil / Propan kWh/ft².yr MJ/m².yr	24.1 933		Market Composite EUI kWh/ft².yr 19 MJ/m².yr 769

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New EXISTING BUILDINGS: Restaurant Baseline SIZE: REGION: Labrador Interconnected

HVAC FANS & PUMPS											
SUPPLY FANS					Ventilation	n and Evhai	st Fan One	eration & Contr	rol		
OUT ET TARO						ation Fan		aust Fan	1		
System Design Air Flow 3.5	L/s.m²	0.68	CFM/ft ²	Control	Fixed	Variable	Fixed	Variable			
System Static Pressure CAV 350			wg	00101	i inca	Flow	1 1/100	Flow			
System Static Pressure VAV 350		1.4	wa	Incidence of Use	60%		100%		İ		
Fan Efficiency 52%			9	Operation		Scheduled		Scheduled			
Fan Motor Efficiency 85%						1					
Sizing Factor 1.00				Incidence of Use	75%	25%	75%	25%	1		
Fan Design Load CAV 2.1		0.25	W/ft²						1		
Fan Design Load VAV 2.7	W/m²	0.25		Comments:							
EXHAUST FANS											
Washroom Exhaust 100	L/s.wash	room	212 CFM/washr	room							
Washroom Exhaust per gross unit area 0.2			0.04 CFM/ft²								
Other Exhaust (Smoking/Conference) 0.1		The state of the s	0.02 CFM/ft ²								
Total Building Exhaust 0.3			0.06 CFM/ft ²								
Exhaust System Static Pressure 250			1.0 wg								
Fan Efficiency 40%		L.									
Fan Motor Efficiency 80%											
Sizing Factor 1.0											
Exhaust Fan Connected Load 0.3		0.02	W/ft²								
AUXILIARY COOLING EQUIPMENT (Condens	er Pump a	nd Cooling Tow	er/Condenser Fans)								
		_									
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled C	ondenser)		0.020 kW/kW 1.19 W/m²	0.07 kW/Ton 0.11 W/ft²							
Condenser Pump											
Pump Design Flow		Г	0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area			0.003 L/s.m ²	0.005 U.S. gpm/ft ²							
Pump Head Pressure			90 kPa	30 ft							
Pump Efficiency			55%								
Pump Motor Efficiency			90%								
Sizing Factor			1.0								
Pump Connected Load			0.58 W/m²	0.05 W/ft²							
CIRCULATING PUMP (Heating & Cooling)											
					_						
Pump Design Flow @ 5 °C (10 °F) delta T		0.003			4 U.S. gpm.	/Ton					
Pump Head Pressure		150	kPa	50 ft							
Pump Efficiency		55%									
Pump Motor Efficiency		90%									
Sizing Factor		0.5		0.04 14470							
Pump Connected Load		0.4	W/m²	0.04 W/ft²							
Supply Fan Occ. Period		3500	hrs./year								
Supply Fan Unocc. Period			hrs./year								
Supply Fan Energy Consumption			kWh/m².yr								
Supply Fair Energy Consumption		12.2	yı								
Exhaust Fan Occ. Period		3500	hrs./year								
Exhaust Fan Unocc. Period			hrs./year								
Exhaust Fan Energy Consumption			kWh/m².yr								
Extract Car Energy Condumption		1.0	yı								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consur	nption		kWh/m².yr kWh/m².yr								
Circulating Pump Yearly Operation Circulating Pump Energy Consumption			hrs./year kWh/m².yr								
Oriodialing Furrip Energy Consumption			NTTIVIII . yi								
Fans and Pumps Maintenance	Annual M	laintenance Tasks	<u> </u>	Incidence Frequency							
				(%) (years)							
	Inspect/S	ervice Fans & Mo	tors	()							
		djust Belt Tensior									
		ervice Pump & M							EUI	kWh/ft².yr	1.4
										MJ/m².yr	53.0

COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: New EXISTING BUILDINGS: Restaurant Baseline SIZE: REGION: Labrador Interconnected

EUI SUMMARY							
TOTAL ALL END-USES:	Electricity:		92.8 kWh/ft².yr 3,594.3 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 M
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electri	city	Fuel Oil /	Propane
GENERAL LIGHTING	2.3	88.3		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr
ARCHITECTURAL LIGHTING	4.7	180.8	SPACE HEATING	11.0	426.7		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.7	25.7		
OTHER PLUG LOADS	0.6	23.2	DOMESTIC HOT WATER	19.9	769.2	0.0	0.0
HVAC FANS & PUMPS	1.4	53.0	FOOD SERVICE EQUIPMENT	34.3	1,330.0		
REFRIGERATION	16.8	650.0					
MISCELLANEOUS	0.1	5.0					
BLOCK HEATERS	0.1	5.0					
COMPUTER EQUIPMENT	0.4	16.0					
COMPUTER SERVERS	0.1	4.4					
ELEVATORS							
OUTDOOR LIGHTING	0.4	17.0					

Terms Used in Building Profile Summaries

Profile Term	Explanation
Building envelope	Defines the thermal characteristics of a building's
	exterior components
U-value	The rate of heat loss, in Btu per hour per square foot per
	degree Fahrenheit (BTU/hr. f ² °F) through walls, roofs
	and windows. The U-value is the reciprocal of the R-
	value
Shading coefficient (SC)	Is a measure of the total amount of heat passing through
	the glazing compared with that through a single clear
100	glass
Window-to-wall ratio	Defines the ratio of window to insulated exterior wall area
General lighting	Defines the lighting types that are used within the main
	areas of a building, e.g., for a School, the area is
	classrooms and the lighting type is fluorescent; for a
LDD	Food Retail store, the main area is the retail floor.
LPD	Lighting power density expressed in terms of W/ft ²
Lux	The amount of visible light per square meter incident on
Inc	a surface (lumen/m²)
Inc	Incandescent lamps Compact fluorescent lamps
CFL T12	T12 fluorescent lamps with magnetic ballasts
T8	
MH	T8 fluorescent lamps with electronic ballasts Metal halide lamps
HPS	High-pressure sodium lamps
HID	High-intensity discharge lighting includes both MH and
nib	HPS
T5HO	T5 High Output fluorescent lamps
LED	Light Emitting Diode lamps
Secondary lighting	Defines the lighting types that are used within the
	secondary areas of a building, e.g., for a School, the
	secondary areas are corridors, lobbies, foyers, etc.
Outdoor lighting	Defines the outdoor lighting including parking lot and
	façade
Overall LPD	The total floor weighted LPD that includes general,
	secondary, and outdoor
Fans	Defines the mix of air handling systems
CAV	Constant air volume
VAV	Variable air volume
Space heating	Defines the mix of heating equipment types found within
ASHP	the stock of buildings
WSHP	Air-source heat pump
	Water-source heat pump
Resistance	Electric resistance heating equipment including boilers and baseboard heaters
Fuel Oil / Propane	Fossil fuel fired equipment, including space heating,
ruer Oil / Fropatie	domestic hot water heating, and cooking equipment
Space cooling	Defines the mix of cooling equipment types found within
Space cooming	the stock of buildings
Centrifugal	Standard centrifugal chillers with a full load performance
	of 0.75 kW/ton
Centri HE	High-efficiency centrifugal chillers assumed to have a
	performance of <0.65 kW/ton
Recip open	Semi-hermetic reciprocating chillers
DX	Direct expansion cooling equipment that use small
	tonnage hermetic compressors

Appendix D Background-Section 6: Reference Case Peak Load

Introduction

The following exhibits show the Reference Case peak load profiles for each region.

Exhibit 126 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Island Interconnected Region (MW)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	-	3.7	0.7	2.3	0.2	0.4	9.3	7.0	0.4	1.1	0.6	0.1	2.4	3.8	30.2	-	62.3
	2017	-	3.9	0.7	2.3	0.2	0.4	9.4	7.3	0.4	1.2	0.6	0.1	2.4	3.9	30.9	-	63.8
Large Office	2020	-	4.1	0.7	2.4	0.2	0.4	9.5	7.7	0.4	1.2	0.6	0.1	2.4	4.1	31.9	-	65.9
90 000	2023	-	4.4	0.8	2.6	0.2	0.4	9.8	8.2	0.5	1.3	0.6	0.1	2.4	4.3	33.2	-	68.8
	2026	-	4.6	0.8	2.6	0.2	0.5	9.9	8.6	0.5	1.4	0.6	0.1	2.4	4.5	34.2	-	70.8
	2029	-	4.8	0.9	2.7	0.2	0.5	10.0	9.0	0.5	1.5	0.6	0.2	2.4	4.6	35.3	-	73.2
	2014	-	3.0	0.5	1.9	-	-	6.9	3.0	0.3	0.9	0.5	0.1	0.9	3.0	23.8	-	45.0
	2017	-	3.1	0.6	2.0	-	-	6.9	3.2	0.3	1.0	0.5	0.1	0.9	3.0	24.2	-	45.8
Small Office	2020	-	3.4	0.6	2.1	-	-	7.1	3.5	0.4	1.0	0.5	0.1	0.9	3.2	25.3	-	47.9
	2023	-	3.6	0.6	2.2	-	-	7.2	3.7	0.4	1.1	0.5	0.1	0.9	3.3	26.2	-	49.8
	2026	-	3.7	0.7	2.3	-	-	7.3	3.9	0.4	1.1	0.5	0.1	0.9	3.4	26.8	-	51.1
	2029	-	3.9	0.7	2.3	-	-	7.4	4.2	0.4	1.2	0.5	0.1	0.9	3.5	27.5	-	52.6
	2014	-	0.3	0.1	0.6	-	1.4	5.9	4.3	0.2	0.4	0.5	0.7	0.6	1.2	10.9	-	26.9
	2017	-	0.3	0.1	0.7	-	1.5	5.9	4.4	0.2	0.4	0.5	0.7	0.6	1.2	11.1	-	27.3
Large Non-food Retail	2020	-	0.3	0.1	0.7	-	1.6	6.1	4.6	0.2	0.4	0.5	0.7	0.6	1.3	11.5	-	28.5
9	2023	-	0.4	0.1	0.7	-	1.6	6.2	4.8	0.2	0.5	0.5	0.8	0.6	1.3	11.9	-	29.5
	2026	-	0.4	0.1	0.8	-	1.7	6.2	4.9	0.2	0.5	0.5	0.8	0.6	1.4	12.2	-	30.2
	2029	-	0.4	0.1	0.8	-	1.8	6.3	5.1	0.2	0.5	0.5	0.8	0.6	1.4	12.5	-	31.0
	2014	-	0.4	0.1	1.0	-	-	7.1	4.5	0.2	0.6	0.7	-	0.8	1.8	15.6	-	32.7
	2017	-	0.4	0.1	1.0	-	-	7.1	4.5	0.2	0.6	0.7	-	0.7	1.8	15.8	-	33.0
Small Non-food Retail	2020	-	0.5	0.1	1.0	-	-	7.2	4.7	0.2	0.6	0.7	-	0.7	1.9	16.5	-	34.2
	2023	-	0.5	0.1	1.1	-	-	7.3	4.9	0.2	0.6	0.7	-	0.8	2.0	17.2	-	35.4
	2026	-	0.5	0.1	1.1	-	-	7.4	5.1	0.3	0.7	0.7	-	0.8	2.0	17.7	-	36.3
	2029	-	0.5	0.1	1.1	-	-	7.5	5.2	0.3	0.7	0.7	-	0.7	2.1	18.3	-	37.3
	2014	-	0.3	0.1	1.2	-	3.3	2.9	1.8	0.1	0.4	0.3	10.0	0.5	0.6	7.5	-	28.9
	2017	-	0.4	0.1	1.3	-	3.3	2.9	1.8	0.1	0.4	0.3	10.1	0.5	0.6	7.5	-	29.2
Food Retail	2020	-	0.4	0.1	1.3	-	3.5	2.9	1.9	0.1	0.4	0.3	10.5	0.5	0.6	7.8	-	30.3
	2023	-	0.4	0.1	1.4	-	3.6	3.0	1.9	0.1	0.4	0.4	10.9	0.5	0.6	8.0	-	31.4
	2026	-	0.4	0.1	1.4	-	3.7	3.0	2.0	0.1	0.4	0.4	11.2	0.5	0.7	8.2	-	32.1
	2029	-	0.4	0.1	1.5	-	3.8	3.1	2.0	0.1	0.5	0.4	11.5	0.5	0.7	8.3	-	32.9

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Exhibit 126 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Island Interconnected Region (MW) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	-	0.2	0.0	5.6	0.0	1.2	1.0	0.9	0.1	0.2	0.1	0.2	1.1	0.4	5.2	-	16.3
	2017	-	0.2	0.0	5.7	0.0	1.2	1.0	0.9	0.1	0.2	0.1	0.2	1.1	0.4	5.3	-	16.6
Large Accomodation	2020	-	0.2	0.0	6.0	0.0	1.2	1.1	0.9	0.1	0.2	0.1	0.2	1.1	0.5	5.6	-	17.4
Lai go 7 locomodalion	2023	-	0.2	0.0	6.3	0.0	1.2	1.1	1.0	0.1	0.2	0.2	0.2	1.2	0.5	5.9	-	18.1
	2026	-	0.2	0.0	6.5	0.0	1.3	1.1	1.0	0.1	0.2	0.1	0.2	1.2	0.5	6.0	-	18.6
	2029	-	0.2	0.0	6.8	0.0	1.3	1.1	1.0	0.1	0.2	0.1	0.2	1.2	0.5	6.3	-	19.2
	2014	-	0.1	0.0	2.6	-	0.3	0.6	0.2	0.0	0.1	0.1	0.1	0.3	0.2	2.8	-	7.3
	2017	-	0.1	0.0	2.7	-	0.3	0.6	0.2	0.0	0.1	0.1	0.1	0.3	0.2	2.8	-	7.4
Small Accomodation	2020	-	0.1	0.0	2.8	-	0.3	0.6	0.2	0.0	0.1	0.1	0.1	0.3	0.2	2.9	-	7.7
oman Accomodation	2023	-	0.1	0.0	2.9	-	0.3	0.6	0.2	0.1	0.1	0.1	0.1	0.3	0.2	3.0	-	8.0
	2026	-	0.1	0.0	3.0	-	0.3	0.6	0.2	0.1	0.1	0.1	0.1	0.3	0.2	3.1	-	8.2
	2029	-	0.1	0.0	3.1	-	0.3	0.6	0.3	0.1	0.1	0.1	0.1	0.3	0.2	3.2	-	8.4
	2014	-	0.5	0.1	3.1	0.1	3.1	0.7	3.6	0.1	0.9	0.5	0.2	2.9	0.9	16.2	-	32.9
	2017	-	0.5	0.1	3.1	0.1	3.2	0.7	3.6	0.1	1.0	0.5	0.2	2.9	0.9	16.3	-	33.1
Healthcare	2020	-	0.5	0.1	3.2	0.1	3.3	0.7	3.8	0.1	1.0	0.5	0.2	2.9	0.9	16.7	-	33.9
Ticaltiloare	2023	-	0.5	0.1	3.4	0.1	3.3	0.7	3.9	0.1	1.1	0.5	0.2	2.9	0.9	17.1	-	34.9
	2026	-	0.6	0.1	3.5	0.1	3.4	0.7	4.0	0.2	1.1	0.5	0.2	2.9	0.9	17.4	-	35.6
	2029	-	0.6	0.1	3.7	0.1	3.5	0.7	4.1	0.2	1.1	0.5	0.2	2.9	1.0	17.8	-	36.3
	2014	-	1.1	0.2	2.0	-	0.5	9.3	1.3	0.2	0.2	0.8	0.1	1.5	0.1	25.7	-	43.1
	2017	-	1.2	0.2	2.1	-	0.5	9.3	1.3	0.2	0.2	0.8	0.1	1.5	0.1	26.1	-	43.6
Schools	2020	-	1.2	0.2	2.2	-	0.6	9.5	1.4	0.2	0.2	0.8	0.1	1.5	0.1	27.4	-	45.5
CONTOOLS	2023	-	1.3	0.2	2.3	-	0.6	9.7	1.5	0.2	0.3	0.8	0.1	1.5	0.2	28.7	-	47.4
	2026	-	1.4	0.2	2.4	-	0.6	9.8	1.5	0.2	0.3	0.8	0.1	1.5	0.2	29.7	-	48.7
	2029	-	1.4	0.3	2.5	-	0.6	9.9	1.6	0.2	0.3	0.8	0.1	1.5	0.2	30.9	-	50.3
	2014	-	1.5	0.1	0.4	0.1	1.1	6.4	5.4	0.3	0.7	0.5	0.4	0.8	0.5	3.8	-	22.0
	2017	-	1.6	0.1	0.5	0.1	1.1	6.4	5.4	0.3	0.8	0.4	0.4	0.8	0.5	3.9	-	22.2
Universities and	2020	-	1.6	0.1	0.5	0.1	1.1	6.3	5.5	0.3	0.8	0.4	0.4	0.7	0.6	4.2	-	22.7
Colleges	2023	-	1.7	0.1	0.5	0.1	1.1	6.3	5.6	0.3	0.8	0.4	0.4	0.7	0.6	4.4	-	23.1
	2026	-	1.7	0.1	0.6	0.1	1.1	6.2	5.7	0.3	0.8	0.4	0.4	0.7	0.7	4.5	-	23.5
	2029	-	1.8	0.1	0.6	0.1	1.2	6.2	5.7	0.3	0.9	0.4	0.4	0.7	0.7	4.7	-	23.8
	2014	-	0.2	0.1	0.7	-	-	3.6	0.6	0.2	0.6	0.3	1.0	0.5	0.0	7.8	-	15.6
	2017	-	0.2	0.1	0.8	-	-	3.6	0.6	0.2	0.6	0.3	1.0	0.5	0.0	8.0	-	15.8
Warehouse/Wholesale	2020	-	0.3	0.1	0.8	-	-	3.7	0.6	0.2	0.6	0.3	1.1	0.5	0.0	8.4	-	16.5
Trui cilouse/Triloicsale	2023	-	0.3	0.1	0.9	-	-	3.7	0.6	0.2	0.7	0.3	1.1	0.5	0.0	8.7	-	17.1
	2026	-	0.3	0.1	0.9	-	-	3.8	0.6	0.2	0.7	0.3	1.2	0.5	0.1	9.0	-	17.5
	2029	-	0.3	0.1	0.9	-	-	3.8	0.7	0.2	0.7	0.3	1.2	0.5	0.1	9.3	-	18.0

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Exhibit 126 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Island Interconnected Region (MW) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	-	0.1	0.0	7.1	-	12.6	0.3	0.5	0.0	0.1	0.1	2.0	1.2	0.4	3.6	-	27.9
	2017	-	0.1	0.0	7.2	-	12.8	0.3	0.5	0.0	0.1	0.1	2.0	1.2	0.4	3.7	-	28.4
Restaurants	2020	-	0.1	0.0	7.6	-	13.5	0.3	0.6	0.0	0.1	0.1	2.1	1.2	0.4	4.0	-	29.9
nostaurumo	2023	-	0.1	0.0	7.9	-	14.0	0.3	0.6	0.0	0.1	0.1	2.2	1.2	0.4	4.3	-	31.2
	2026	-	0.1	0.0	8.1	-	14.4	0.3	0.6	0.0	0.1	0.1	2.2	1.2	0.4	4.5	-	32.1
	2029	-	0.1	0.0	8.4	-	14.9	0.3	0.6	0.0	0.1	0.1	2.3	1.2	0.4	4.7	-	33.2
	2014	-	1.0	0.2	2.9	0.1	3.0	4.9	3.2	0.2	0.6	0.5	1.9	1.5	1.0	13.6	-	34.5
	2017	-	1.1	0.2	3.0	0.1	3.0	4.9	3.3	0.2	0.6	0.5	1.9	1.5	1.0	13.8	-	35.0
Large Other Buildings	2020	-	1.1	0.2	3.1	0.1	3.2	4.9	3.5	0.2	0.7	0.5	2.0	1.5	1.1	14.5	-	36.5
Large Other Banange	2023	-	1.2	0.2	3.3	0.1	3.3	5.0	3.6	0.2	0.7	0.5	2.1	1.5	1.1	15.0	-	37.8
	2026	-	1.2	0.2	3.4	0.1	3.4	5.1	3.7	0.2	0.7	0.5	2.1	1.5	1.2	15.4	-	38.7
	2029	-	1.3	0.2	3.5	0.1	3.5	5.1	3.8	0.2	0.8	0.5	2.2	1.5	1.2	15.9	-	39.8
	2014	-	0.9	0.2	2.6	0.0	2.7	4.7	2.7	0.2	0.6	0.5	1.8	1.2	0.9	13.0	-	31.9
	2017	-	0.9	0.2	2.5	0.0	2.6	4.6	2.7	0.2	0.6	0.5	1.8	1.2	0.9	12.9	-	31.7
Small Other Buildings	2020	-	1.0	0.2	2.6	0.0	2.7	4.6	2.8	0.2	0.6	0.4	1.8	1.2	1.0	13.2	-	32.3
Small Strict Ballangs	2023	-	1.0	0.2	2.7	0.0	2.8	4.6	2.9	0.2	0.7	0.4	1.9	1.2	1.0	13.7	-	33.3
	2026	-	1.1	0.2	2.8	0.0	2.9	4.6	2.9	0.2	0.7	0.4	1.9	1.2	1.0	14.1	-	34.1
	2029	-	1.1	0.2	2.9	0.0	2.9	4.7	3.0	0.2	0.7	0.4	2.0	1.2	1.1	14.4	-	34.9
	2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Institutional	2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2029	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2014	-	-	-	-	-	-	-	-	30.5	-	-	-	-	-	-	-	30.5
	2017	-	-	-	-	-	-	-	-	30.9	-	-	-	-	-	-	-	30.9
Non-Buildings	2020	-	-	-	-	-	-	-	-	32.0	-	-	-	-	-	-	-	32.0
g-	2023	-	-	-	-	-	-	-	-	32.9	-	-	-	-	-	-	-	32.9
	2026	-	-	-	-	-	-	-	-	33.6	-	-	-	-	-	-	-	33.6
	2029	-	-	-	-	-	-	-	-	34.3	-	-	-	-	-	-	-	34.3
	2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.9	4.9
	2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	4.8
Street Lighting	2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	4.8
oootgg	2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	4.8
	2026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	4.8
	2029	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	4.8
	2014	0.0	13.4	2.3	34.0	0.5	29.6	63.6	39.0	33.0	7.4		18.5	16.1	14.9	179.6	4.9	462.7
	2017	0.0	13.9	2.4	34.6	0.5	30.0	63.3	39.7	33.5	7.6		18.7	16.0	15.1	182.5	4.8	468.5
Grand Total	2020	0.0	14.7	2.5	36.4	0.5	31.2	64.4	41.5	34.7	8.1	5.9	19.5	16.0	15.8	189.7	4.8	485.9
	2023	0.0	15.6	2.7	38.1	0.5	32.4	65.5	43.3	35.8	8.5		20.2	16.1	16.6	197.3	4.8	503.4
	2026	0.0	16.3	2.8	39.4	0.6	33.3	66.0	44.7	36.5	8.9		20.8	16.1	17.1	202.8	4.8	515.9
	2029	0.0	17.0	2.9	40.9	0.6	34.3	66.7	46.2	37.3	9.3	5.8	21.4	16.2	17.7	209.1	4.8	530.3

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Exhibit 127 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Labrador Interconnected Region (MW)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0.0	0.1	0.0	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.5	-	0.8
	2017	0.0	0.1	0.0	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.5	-	0.8
Small Office	2020	0.0	0.1	0.0	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.5	-	0.9
Oman Omoc	2023	0.0	0.1	0.0	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.5	-	0.9
	2026	0.0	0.1	0.0	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.5	-	0.9
	2029	0.0	0.1	0.0	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.5	-	0.9
	2014	0.0	0.0	0.0	0.1	-	0.1	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.9	-	1.8
	2017	0.0	0.0	0.0	0.1	-	0.1	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.9	-	1.8
Large Non-food Retail	2020	0.0	0.0	0.0	0.1	-	0.1	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.9	-	1.8
Large Non-100a Netali	2023	0.0	0.0	0.0	0.1	-	0.1	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.9	-	1.8
	2026	0.0	0.0	0.0	0.1	-	0.1	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.9	-	1.8
	2029	0.0	0.0	0.0	0.1	-	0.1	0.4	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.9	-	1.9
	2014	0.0	0.0	0.0	0.1	-	-	0.7	0.2	0.0	0.1	0.1	-	0.1	0.0	2.2	-	3.6
	2017	0.0	0.0	0.0	0.1	-	-	0.7	0.2	0.0	0.1	0.1	-	0.1	0.0	2.2	-	3.6
Small Non-food Retail	2020	0.0	0.0	0.0	0.1	-	-	0.7	0.2	0.0	0.1	0.1	-	0.1	0.0	2.3	-	3.7
Omaii Nor-1000 Netali	2023	0.0	0.0	0.0	0.1	-	-	0.7	0.2	0.0	0.1	0.1	-	0.1	0.1	2.4	-	3.7
	2026	0.0	0.0	0.0	0.1	-	-	0.7	0.2	0.0	0.1	0.1	-	0.1	0.1	2.4	-	3.8
	2029	0.0	0.0	0.0	0.1	-	-	0.7	0.2	0.0	0.1	0.1	-	0.1	0.1	2.5	-	3.9
	2014	0.0	0.0	0.0	0.1	-	0.2	0.2	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.6	-	2.6
	2017	0.0	0.0	0.0	0.1	-	0.2	0.1	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.6	-	2.6
Food Retail	2020	0.0	0.0	0.0	0.1	-	0.2	0.1	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.6	-	2.6
1 ood Netali	2023	0.0	0.0	0.0	0.1	-	0.2	0.1	0.1	0.0	0.0	0.0	0.5	0.0	0.0	1.6	-	2.6
	2026	0.0	0.0	0.0	0.1	-	0.2	0.1	0.1	0.0	0.0	0.0	0.5	0.0	0.0	1.6	-	2.6
	2029	0.0	0.0	0.0	0.1	-	0.2	0.1	0.1	0.0	0.0	0.0	0.5	0.0	0.0	1.6	-	2.6
	2014	0.0	0.0	0.0	0.6	-	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.7	-	1.8
	2017	0.0	0.0	0.0	0.6	-	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.7	-	1.8
Large Accomodation	2020	0.0	0.0	0.0	0.6	-	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.7	-	1.8
Large Accomodation	2023	0.0	0.0	0.0	0.6	-	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.7	-	1.8
	2026	0.0	0.0	0.0	0.6	-	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.7	-	1.8
	2029	0.0	0.0	0.0	0.6	-	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.7	-	1.8
	2014	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.2
	2017	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.2
Small Accomodation	2020	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.2
Oman Accomodation	2023	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.2
	2026	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.3
	2029	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0.3
	2014	0.1	0.1	0.0	0.7	0.0	0.4	0.1	0.5	0.0	0.1	0.1	0.0	0.4	0.0	0.8	-	3.4
	2017	0.1	0.1	0.0	0.6	0.0	0.3	0.1	0.4	0.0	0.1	0.1	0.0	0.3	0.0	0.6	-	2.6
Healthcare	2020	0.1	0.1	0.0	0.6	0.0	0.3	0.1	0.4	0.0	0.1	0.1	0.0	0.3	0.0	0.6	-	2.6
i louisiloui 6	2023	0.1	0.1	0.0	0.6	0.0	0.3	0.1	0.4	0.0	0.1	0.0	0.0	0.3	0.0	0.6	-	2.6
	2026	0.1	0.1	0.0	0.6	0.0	0.3	0.1	0.4	0.0	0.1	0.0	0.0	0.3	0.0	0.6	-	2.6
	2029	0.1	0.1	0.0	0.6	0.0	0.4	0.1	0.4	0.0	0.1	0.0	0.0	0.3	0.0	0.6	-	2.6

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Exhibit 127 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Labrador Interconnected Region (MW) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	-	2.8
	2017	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	-	2.8
Schools	2020	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	-	2.9
Octions	2023	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	-	2.9
	2026	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.9	-	2.9
	2029	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.9	-	2.9
	2014	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.7
	2017	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.7
Universities and	2020	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.7
Colleges	2023	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.7
	2026	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.7
	2029	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.7
	2014	0.0	0.0	0.0	0.1	-	-	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	1.7
	2017	0.0	0.0	0.0	0.1	-	-	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	1.7
Warehouse/Wholesale	2020	0.0	0.0	0.0	0.1	-	-	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	1.7
Trai criodoc, Triiologaio	2023	0.0	0.0	0.0	0.1	-	-	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	1.7
	2026	0.0	0.0	0.0	0.1	-	-	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	1.8
	2029	0.0	0.0	0.0	0.1	-	-	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	1.8
	2014	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2.5
	2017	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2.5
Restaurants	2020	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2.5
reotau unto	2023	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2.5
	2026	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2.6
	2029	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2.6
	2014	0.1	0.2	0.0	2.0	0.0	1.8	1.4	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.1	-	14.8
	2017	0.1	0.2	0.0	2.1	0.0	1.8	1.3	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.1	-	14.8
Large Other Buildings	2020	0.1	0.2	0.0	2.1	0.0	1.8	1.3	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.2	-	14.8
_a.go ooaago	2023	0.1	0.2	0.0	2.1	0.0	1.8	1.3	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.2	-	14.8
	2026	0.1	0.2	0.0	2.1	0.0	1.8	1.3	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.2	-	14.8
	2029	0.1	0.2	0.0	2.1	0.0	1.8	1.3	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.2	-	14.8
	2014	0.1	0.2	0.0	1.0	0.0	1.0	1.1	0.6	0.0	0.2	0.1	0.4	0.4	0.1	4.3	-	9.6
	2017	0.1	0.2	0.0	1.0	0.0	1.0	1.1	0.6	0.0	0.2	0.1	0.4	0.4	0.1	4.3	-	9.6
Small Other Buildings	2020	0.1	0.2	0.0	1.1	0.0	1.0	1.1	0.6	0.0	0.2	0.1	0.4	0.4	0.1	4.4	-	9.8
go	2023	0.1	0.2	0.0	1.1	0.0	1.1	1.1	0.6	0.0	0.2	0.1	0.4	0.4	0.1	4.5	-	10.0
	2026	0.1	0.2	0.0	1.1	0.0	1.1	1.1	0.7	0.0	0.2	0.1	0.4	0.4	0.1	4.6	-	10.2
	2029	0.1	0.2	0.0	1.1	0.0	1.1	1.1	0.7	0.0	0.2	0.1	0.5	0.4	0.1	4.7	-	10.4

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Exhibit 127 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Labrador Interconnected Region (MW) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0.2	0.2	-	0.9	-	0.2	2.2	1.3	0.1	0.3	0.2	0.2	0.7	0.1	2.7	-	9.2
	2017	0.2	0.2	-	0.9	-	0.2	2.2	1.3	0.1	0.3	0.2	0.2	0.7	0.1	9.0	-	15.5
Other Institutional	2020	0.2	0.2	-	0.9	-	0.2	2.1	1.3	0.1	0.3	0.2	0.2	0.7	0.1	13.5	-	20.0
Other institutional	2023	0.2	0.2	-	0.9	-	0.2	2.1	1.3	0.1	0.3	0.2	0.2	0.7	0.1	13.5	-	20.0
	2026	0.2	0.2	-	0.9	-	0.2	2.1	1.3	0.1	0.4	0.2	0.2	0.7	0.1	13.5	-	20.0
	2029	0.2	0.2	-	0.9	-	0.2	2.1	1.3	0.1	0.4	0.2	0.2	0.6	0.1	13.6	-	20.0
	2014	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.8
	2017	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.8
Non-Buildings	2020	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.8
Hon Ballanigo	2023	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.8
	2026	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.8
	2029	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.8
	2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2
	2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
Street Lighting	2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
3 . 3	2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
	2026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
	2029	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
	2014	0.6	0.9	0.1	6.6	0.0	5.0	7.2	4.1	0.9	1.1	0.8	2.2	2.8	0.5	23.4	0.2	56.4
	2017	0.6	0.9	0.1	6.4	0.0	5.0	7.0	4.1	0.9	1.1	0.8	2.2	2.6	0.4	29.6	0.3	62.0
Grand Total	2020	0.6	0.9	0.1	6.5	0.0	5.0	7.0	4.1	1.0	1.1	0.8	2.2	2.6	0.5	34.4	0.3	67.0
	2023	0.6	1.0	0.1	6.5	0.0	5.1	6.9	4.2	1.0	1.2	0.7	2.2	2.6	0.5	34.6	0.3	67.4
	2026	0.6	1.0	0.2	6.6	0.0	5.1	6.8	4.2	1.0	1.2	0.7	2.2	2.5	0.5	34.8	0.3	67.8
	2029	0.6	1.0	0.2	6.7	0.0	5.2	6.8	4.3	1.0	1.2	0.7	2.3	2.5	0.5	35.1	0.3	68.2

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Exhibit 128 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Isolated Region (MW)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0.1	0.2	-	0.1	-	0.2	1.2	0.2	-	0.1	0.1	0.4	0.2	-	0.2	-	3.0
	2017	0.1	0.2	-	0.1	-	0.2	1.2	0.2	-	0.1	0.1	0.4	0.2	-	0.2	-	2.9
Labrador Isolated C/I	2020	0.1	0.2	-	0.1	-	0.2	1.3	0.2	-	0.1	0.1	0.5	0.3	-	0.2	-	3.3
Buildings	2023	0.1	0.2	-	0.1	-	0.2	1.3	0.2	-	0.1	0.1	0.5	0.3	-	0.3	-	3.4
	2026	0.1	0.2	-	0.1	-	0.2	1.4	0.2	-	0.1	0.1	0.5	0.3	-	0.3	-	3.6
	2029	0.1	0.2	-	0.1	-	0.2	1.4	0.3	-	0.1	0.1	0.5	0.3	-	0.3	-	3.7
	2014	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.2
	2017	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.2
Island Isolated C/I	2020	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.3
Buildings	2023	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.3
	2026	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.3
	2029	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.1	0.0	-	-	-	0.3
	2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
	2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
Street Lighting	2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
January — gg	2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
	2026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
	2029	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
	2014	0.1	0.2	-	0.1	-	0.2	1.3	0.2	-	0.1	0.1	0.4	0.3	-	0.2	0.1	3.3
	2017	0.1	0.2	-	0.1	-	0.2	1.3	0.2	-	0.1	0.1	0.4	0.3	-	0.2	0.1	3.2
Grand Total	2020	0.1	0.2	-	0.1	-	0.2	1.4	0.2	-	0.1	0.1	0.5	0.3	-	0.2	0.1	3.7
	2023	0.1	0.2	-	0.1	-	0.2	1.5	0.3	-	0.1	0.1	0.5	0.3	-	0.3	0.1	3.8
	2026	0.1	0.2	-	0.1	-	0.3	1.5	0.3	-	0.2	0.1	0.6	0.3	-	0.3	0.1	3.9
	2029	0.1	0.2	-	0.1	-	0.3	1.5	0.3	-	0.2	0.1	0.6	0.3	-	0.3	0.1	4.1

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Appendix E Background-Section 7: Technology Assessment: Energy Efficiency Measures

Introduction

The following exhibits show the full list of energy efficiency and peak demand measures that were considered for analysis, with comments for the measures not included in this study.

Exhibit 129 Full List of Potential Energy Efficiency Measures for the Commercial Sector

Energy Efficiency Measures	Include	Comments
LIGHTING		General comment: ensure resolution of technology aligns with baseline; need to group
LED Screw-In Lamps	х	
LED High Bay Fixtures	х	MH baseline
LED Tubular Lamps	х	T8 baseline since T12 are being phased out
LED Troffers	х	
LED Outdoor Fixtures	х	To include representative lighting fixture for outdoor applications
LED Exit Signs	х	
LED Downlight Fixture or Retrofit Kit		Potential to be captured by LED Screw-In Lamps measure
Lighting Controls		More descriptive measures included below
High Performance T8 Fixtures	х	T8 baseline since T12 are being phased out
Low Ballast-Factor T8 systems		Removed since this is now the baseline (i.e. T12 being phased out)
T5HO Fixtures	х	For high bay (>16 ft) applications
Occupancy Sensors (Lighting)	х	
Dimming Control (Daylighting)	х	
Lighting Controls (Outdoor)	х	
Billboard lighting		Exclude since this is very specific
CFLs		To exclude since this is a transition technology (i.e. LEDs capture opportunity)
HVAC		
High-Efficiency Air Source Heat Pumps	x	
Ductless Mini-Split Heat Pumps	x	
Ground Source Heat Pumps	х	Institutional sector is presently main market due to long payback
Hotel Occupancy Sensors	x	Consider only for hotels and expand to include lighting. Originally HVAC Occupancy Sensors.
Demand Control Ventilation (DCV)	x	
High Efficiency HVAC Air Filters		Very specific measure beyond resolution of baseline
VFDs on HVAC Motors	x	
Ventilation Heat Recovery	х	
Air Curtains		Included under building envelope category
Radiant Infrared Heaters	х	
High Efficiency Chillers	х	
High Efficiency RTUs	х	
Adjustable Speed Drives		Same as VFDs measure included above
Premium Efficiency Motors	х	
Advanced Building Automation Systems	Х	
Building Recommissioning	х	

Exhibit 129 Full List of Potential Energy Efficiency Measures for the Commercial Sector (cont'd...)

Energy Efficiency Measures	Include	Comments
Programmable Thermostats	х	
Demand Control Kitchen Ventilation (DCKV)	x	Specific to sub sectors with commercial kitchens
REFRIGERATION		General Comment: There is a lot of very specific measures that are beyond resolution of baseline
LED Refrigerated Display Case Lighting	х	Moved from Lighting end use
Air Curtains		Included under building envelope category
Variable Speed Drives		Generally not added to existing compressor motors
Cooler Night Covers	х	
Refrigerated Cases with Doors	х	Original measure was focused on adding doors to existing display cases, which is not common
ECM Motors and Evaporator Fan Motor Controllers	х	Included ECM motors as well
Freezer Defrost Controllers	х	
Outside Air Economizers for Walk-In Coolers		Not a mature or commonly implemented measure
Refrigerated Vending Machine Controllers	x	Vending Miser
High Efficiency Compressors	х	Usually not practical as a retrofit
ECM Evaporator Fan Motor		Merged with evaporator fan motor controllers measure
Automatic Door Closers (Walk-In Coolers)	x	
Door Gaskets		Excluded since there is a very wide range of savings
VSD Screw Compressors		Covered by high efficiency compressors measure
Refrigeration Heat Recovery	х	Focus on arenas
Refrigeration Controls	х	To be represented by floating head pressure controls
Refrigeration Free Cooling		Not a mature or commonly implemented measure
CEE-Rated Refrigerators and Freezers	х	May be difficult to get cost data
High efficiency supermarket refrigeration		Covered by other measures
DOMESTIC HOT WATER		
On-Demand Water Heaters	х	To consider only for hotels
High-Efficiency Water Heaters		Not available ENERGY STAR electric water heaters are actually HPWHs
Heat Pump Water Heaters	х	
Efficient CIP Systems (Clean In Place)		Excluded since this is an industrial measure
Low-Flow Pre-Rinse Spray Valves	х	To consider only for sub sector with commercial kitchens
Low-Flow Faucet Aerators	х	
Low-Flow Showerheads	х	To consider only for hotels
Drainwater Heat Recovery	х	To consider only for hotels
Tankless Water Heaters		Excluded since this is identical to on-demand water heaters
PROCESS		
Compressed Air - air entraining nozzles		Excluded since this is an industrial measure
APPLIANCES (ENERGY STAR)		
ENERGY STAR Dishwashers	х	To consider only for sub sector with commercial kitchens

Exhibit 129 Full List of Potential Energy Efficiency Measures for the Commercial Sector (cont'd...)

Energy Efficiency Measures	Include	Comments
Hot Food Holding Cabinets		Excluded since this is a very specific application
Commercial Clothes Washers		To be considered by residential sector
High-Efficiency Cooking Equipment	х	Measure added to capture other specific measures
Fryers		Too specific general measure added above
Griddles		Too specific general measure added above
Steam Cookers		Too specific general measure added above
Convection Ovens		Too specific general measure added above
High-Efficiency Ice makers		Exclude since there is no incremental cost for ENERGY STAR ice makers
Combination Oven		Too specific general measure added above
Induction Ranges		Too specific general measure added above
Clothes Dryers		Excluded since there is no ENERGY STAR category for clothes dryer. Better technology (e.g. microwave and heat pumps) is still many years away.
Vending Machines		Excluded since this is covered by VendingMiser measure
BUILDING ENVELOPE		
Roof Insulation	х	
Wall Insulation	х	
ENERGY STAR Windows		Covered below
High Performance Glazing Systems	х	
Door Systems		Too specific and covered by measures immediately above and below
Air Curtains	х	Focus on sub sectors with loading docks and/or doors that are opening and closing often
Skylights		Excluded since this is too specific and not very common
Slab/Floor Insulation		Included in new construction measures
COMPUTER EQUIPMENT (ENERGY STAR)		
ENERGY STAR Computers	x	
ENERGY STAR Office Equipment	X	
Energy-Efficient Server Technologies	Х	To consider enterprise servers, since these are more wide-spread throughout building stock
NEW CONSTRUCTION		
New Construction (25% More Efficient)	х	
New Construction (40% More Efficient)	x	
STREET LIGHTING		
Electrodeless Induction Lighting		Considering LED street lighting instead
Dimming Controls		Considering LED street lighting instead
LED Street Lighting	х	Not including controls

Exhibit 130 Full List of Potential Peak Demand Measures for the Commercial Sector

Peak Demand Measures	Include	Comments
HVAC		
Building Automated Controls		Demand impacts covered by EE measures
Electric Thermal Storage	х	
Space Heating Controls	х	To consider utility controlled load switch
Load Shifting (Preheating)		See electric thermal storage measure
VFDs		Demand impacts covered by EE measure
HVAC Fans and Pumps	х	
DOMESTIC HOT WATER		
Electric DHW Controls	х	To consider utility controlled load switch
LIGHTING		
Street Lighting and Parking Lot Lighting Controls		Demand impacts covered by EE measures
Lighting Controls	х	Control of non-critical loads
REFRIGERATION		
Refrigeration Controls	х	Control of non-critical loads
OTHER		
Soft Starters		Industrial measure (i.e. for large motors)
Plug Load Controls		Not relevant to commercial sector
Kitchen and Laundry Load Controls		Demand impacts covered by EE measures
Fuel Switching		Outside of study scope
Curtailment		Outside of study scope

Appendix F Background-Section 8: Economic Potential: Electric Energy Forecast

Introduction

The following three exhibits provide the economic potential energy efficiency results for the island Interconnected, Labrador Interconnected, and Isolated regions, respectively. The three exhibits following those provide the economic potential load reduction results for the Island Interconnected, Labrador Interconnected and Isolated regions respectively. The latter three exhibits do not include the load reduction associated with energy efficiency measures, which were already presented by region in Exhibit 52.

Exhibit 131 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year, Island Interconnected (MWh/yr.)

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Refrigeration	Domestic Hot Water	Computer Equipment	Secondary Lighting	Outdoor Lighting	Street Lighting	Space Cooling	Other Plug Loads	Food Service Equipment	Computer Servers	TOTAL
	2017	35,396	21,111	14,702	112	2,009	7,233	4,890	1,856	-	2,385	2,000	-	643	92,337
	2020	40,728	20,671	15,130	118	2,047	9,231	4,640	2,251	-	2,430	2,048	-	1,093	100,389
Large Office	2023	47,060	20,538	15,984	132	2,129	9,532	4,441	2,669	-	2,563	2,101	-	1,114	108,262
	2026	51,318	25,502	16,999	148	2,227	9,797	4,260	2,988	-	2,728	2,149	-	1,135	119,251
	2029	58,110	25,654	18,382	170	2,363	10,076	4,119	2,902	-	2,967	2,199	-	1,156	128,099
	2017	43,695	15,509	6,925	-	1,486	5,876	1,806	1,509	-	2,370	211	-	523	79,910
	2020	44,071	15,207	7,141	-	1,618	7,533	1,710	1,830	-	2,393	226	-	889	82,619
Small Office	2023	45,395	15,168	7,670	-	1,794	7,766	1,634	2,175	-	2,497	240	-	907	85,245
	2026	45,364	18,334	8,223	-	1,973	7,974	1,560	2,432	-	2,606	251	-	924	89,642
	2029	47,874	19,050	8,975	-	2,145	8,191	1,497	2,357	-	2,767	263	-	941	94,060
	2017	9,064	16,499	9,307	2,188	453	561	1,346	1,372	-	936	774	-	-	42,500
	2020	10,503	16,111	9,430	2,213	466	721	1,282	1,667	-	942	789	-	-	44,124
Large Non-food Retail	2023	12,172	15,965	9,764	2,294	496	744	1,236	1,988	-	981	804	-	-	46,444
	2026	13,875	15,841	10,122	2,380	529	765	1,192	2,230	-	1,024	819	-	-	48,778
	2029	15,705	15,864	10,614	2,502	573	787	1,158	2,174	-	1,087	835	-	-	51,299
	2017	16,763	14,887	7,117	-	690	809	1,812	1,984	-	1,078	-	-	-	45,139
	2020	17,976	14,504	7,281	-	705	1,034	1,723	2,405	-	1,090	-	-	-	46,719
Small Non-food Retail	2023	19,461	14,304	7,585	-	734	1,066	1,648	2,843	-	1,130	-	-	-	48,770
	2026	20,405	17,157	7,962	-	769	1,094	1,579	3,176	-	1,185	-	-	-	53,328
	2029	22,336	17,218	8,479	-	818	1,124	1,523	3,070	-	1,267	-	-	-	55,836
	2017	6,396	9,878	3,832	32,765	855	651	927	1,014	-	466	746	163	-	57,693
Food Botoli	2020	7,290	9,650	3,872	32,955	872	833	894	1,232	-	467	761	326	-	59,151
Food Retail	2023 2026	8,394	9,545	3,992	33,738	915	857	878	1,472	-	480	776	488	-	61,536
	2026	9,494	9,451	4,122	34,589	961	880	864	1,654	-	494	790	543	-	63,843
	2029	10,667	9,433	4,303	35,824	1,024	903	860	1,618	-	517	805	543	-	66,497
	2017	8,938	4,578	1,930	360	6,323	327	2,200	438	-	342	356	58	-	25,850
Large Accomodation	2023	9,283 9,799	4,444 4,344	1,954 2,022	363 374	6,725 7,268	419 432	2,096	531 632	-	344 358	363 370	58 58	-	26,579
Large Accomodation	2026	10,331	4,344	2,022	386	7,828	432	2,036 1,981	707	-	373	370	58	-	27,692 28,824
	2029	10,955	4,167	2,199	403	8,478	456	1,951	686		397	384	58	-	30,135
	2017	4,595	2,328	331	403	3,245	155	627	208	-	89	169	-	_	11,749
	2020	4,707	2,320	338	2	3,443	198	596	252	-	90	173	_	-	12,050
Small Accomodation	2023	4,896	2,185	355	7	3,696	204	577	298	_	96	176	_	_	12,491
	2026	5,095	2,121	375	13	3,959	204	560	333	-	103	179	-	-	12,946
	2029	5,336	2,064	401	20	4,258	215	550	321	-	113	183	_	_	13,461
	2017	36,357	1,653	13,606	162	2,216	1,076	3,668	1,446	_	685	136	155	126	61,285
	2020	36,898	1,616	13,706	168	2,427	1,372	3,533	1,747	-	683	139	310	213	62,811
Healthcare	2023	37,698	1,598	13,914	179	2,688	1,410	3,461	2,056	-	691	141	465	218	64,521
	2026	38,491	1,800	14,172	193	2,972	1,444	3,418	2,286	-	705	144	517	222	66,364
	2029	39,517	1,856	14,532	212	3,248	1,480	3,429	2,192	-	728	147	517	226	68,083

Exhibit 131 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year, Island Interconnected (MWh/yr.) (cont'd...)

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Refrigeration	Domestic Hot Water	Computer Equipment	Secondary Lighting	Outdoor Lighting	Street Lighting	Space Cooling	Other Plug Loads	Food Service Equipment	Computer Servers	TOTAL
	2017	42,862	16,399	2,197	110	2,092	2,184	2,885	2,440	-	60	291	-	-	71,520
	2020	43,806	16,176	2,234	115	2,124	2,796	2,752	2,954	-	66	297	-	-	73,319
Schools	2023	45,191	16,074	2,307	123	2,177	2,883	2,647	3,480	-	76	302	-	-	75,262
	2026	46,690	16,023	2,395	133	2,240	2,961	2,555	3,871	-	89	308	-	-	77,266
	2029	48,389	16,166	2,520	147	2,325	3,043	2,636	3,718	-	106	314	-	-	79,363
	2017	2,543	19,772	16,991	774	461	2,919	1,381	1,325	-	390	940	-	105	47,602
Universities and	2020	2,909	19,335	17,037	777	471	3,711	1,319	1,596	-	400	959	-	178	48,693
Colleges	2023	3,555	18,937	17,113	784	486	3,798	1,262	1,867	-	419	977	-	181	49,379
00110900	2026	4,380	18,677	17,315	808	524	3,883	1,221	2,073	-	475	996	-	185	50,537
	2029	5,381	18,416	17,514	832	561	3,968	1,182	1,972	-	530	1,014	-	188	51,559
	2017	8,606	11,033	658	852	526	517	423	911	-	16	-	-	-	23,543
	2020	10,286	10,757	677	862	533	662	392	1,098	-	17	-	-	-	25,284
Warehouse/Wholesale	2023	12,266	10,620	720	930	560	682	370	1,300	-	19	-	-	-	27,467
	2026	14,067	10,669	759	989	584	700	347	1,445	-	21	-	-	-	29,581
	2029	15,992	10,567	808	1,071	616	719	489	1,387	-	24	-	-	-	31,673
	2017	6,203	971	815	1,675	6,327	122	3,637	178	-	218	-	623	-	20,767
	2020	6,567	955	835	1,770	6,457	156	3,484	217	-	222	-	1,245	-	21,907
Restaurants	2023	7,121	950	868	1,946	6,683	161	3,351	256	-	230	-	1,868	-	23,433
	2026	7,840	949	908	2,157	6,950	165	3,224	286	-	241	-	2,075	-	24,796
	2029	8,530	957	962	2,451	7,315	169	3,116	277	-	258	-	2,075	-	26,109
	2017	17,479	12,612	7,954	338	3,232	1,966	2,796	1,386	-	786	1,172	-	-	49,721
	2020	19,417	12,323	8,060	410	3,271	2,515	2,663	1,678	-	794	1,195	-	-	52,326
Large Other Buildings	2023	21,647	12,101	8,224	521	3,336	2,589	2,548	1,976	-	813	1,218	-	-	54,974
	2026	24,822	12,093	8,604	783	3,494	2,657	2,493	2,222	-	872	1,241	-	-	59,281
	2029	27,617	12,087	8,985	1,044	3,652	2,726	2,440	2,149	-	932	1,264	-	-	62,897
	2017	17,883	8,799	4,372	-	1,648	1,795	2,288	1,387	-	547	-	-	-	38,719
	2020	18,884	8,508	4,417	30	1,666	2,287	2,165	1,671	-	546	-	-	-	40,174
Small Other Buildings	2023	20,163	8,294	4,521	104	1,710	2,351	2,060	1,962	-	557	-	-	-	41,722
	2026	21,613	9,848	4,750	270	2,235	2,411	1,989	2,192	-	593	-	-	-	45,901
	2029	23,378	9,778	5,003	455	2,439	2,472	1,927	2,104	-	635	-	-	-	48,192
	2017	-	-	-	-	-	-	-	-	17,083	-	-	-	-	17,083
	2020	-	-	-	-	-	-	-	-	16,530	-	-	-	-	16,530
Street Lighting	2023	-	-	-	-	-	-	-	-	15,941	-	-	-	-	15,941
	2026	-	-	-	-	-	-	-	-	15,311	-	-	-	-	15,311
	2029	-	-	-	-	-	-	-	-	14,638	-	-	-	-	14,638
	2017	256,779	156,029	90,735	39,336	31,564	26,192	30,686	17,455	17,083	10,367	6,796	998	1,397	685,417
	2020	273,325	152,508	92,111	39,782	32,827	33,467	29,250	21,127	16,530	10,483	6,950	1,938	2,373	712,673
Grand Total	2023	294,817	150,623	95,040	41,131	34,672	34,476	28,149	24,974	15,941	10,911	7,105	2,879	2,419	743,138
	2026	313,786	162,711	98,802	42,849	37,244	35,383	27,243	27,896	15,311	11,510	7,255	3,192	2,464	785,647
	2029	339,787	163,279	103,678	45,132	39,815	36,329	26,880	26,929	14,638	12,328	7,406	3,192	2,510	821,902

Exhibit 132 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year, Labrador Interconnected (MWh/yr.)

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Domestic Hot Water	Outdoor Lighting	Secondary Lighting	Computer Equipment	Refrigeration	Other Plug Loads	Space Cooling	Food Service Equipment	Computer Servers	TOTAL
	2017	380	130	45	29	30	36	119	-	4	14	-	11	798
	2020	437	187	45	29	37	34	153	-	4	14	-	18	958
Small Office	2023	456	186	45	36	43	33	156	-	5	14	-	19	992
	2026	479	185	46	39	47	31	160	-	5	14	-	19	1,025
	2029	506	186	47	41	45	29	164	-	5	15	-	19	1,056
	2017	639	705	289	36	99	65	41	69	56	12	-	-	2,011
	2020	802	706	290	36	119	62	52	87	57	12	-	-	2,223
Large Non-food Retail	2023	970	688	293	37	138	58	53	111	58	12	-	-	2,419
	2026	1,351	672	296	37	152	55	54	112	59	13	-	-	2,800
	2029	1,501	656	300	37	144	53	55	112	60	13	-	-	2,931
	2017	1,507	1,186	291	70	190	125	79	-	-	27	-	-	3,474
	2020	2,254	1,375	297	70	229	119	100	-	-	27	-	-	4,472
Small Non-food Retail	2023	2,387	1,400	306	71	268	113	103	-	-	28	-	-	4,678
	2026	2,679	1,391	320	73	297	109	106	-	-	30	-	-	5,005
	2029	3,704	1,381	338	75	284	105	108	-	-	32	-	-	6,027
	2017	1,773	312	77	54	58	24	37	737	42	6	-	-	3,120
	2020	2,245	378	106	54	69	30	48	918	43	7	19	-	3,918
Food Retail	2023	2,455	369	107	54	81	36	49	1,192	44	7	28	-	4,423
	2026	2,671	361	108	55	89	35	50	1,194	45	7	32	-	4,646
	2029	2,891	354	109	55	84	34	51	1,198	46	7	32	-	4,860
	2017	816	356	121	665	42	196	27	0	34	13	-	-	2,270
	2020	868	343	121	730	51	185	34	0	35	12	-	-	2,380
Large Accomodation	2023	923	349	123	770	59	174	35	15	36	12	-	-	2,497
	2026	978	336	124	804	65	164	36	15	36	12	-	-	2,572
	2029	1,570	324	126	838	61	154	36	15	37	12	-	-	3,173
	2017	129	60	9	92	6	16	4	0	5	2	-	-	321
	2020	132	58	9	102	7	15	5	0	5	2	-	-	334
Small Accomodation	2023	137	58	9	108	8	14	5	0	5	2	-	-	345
	2026	237	56	10	113	9	13	5	0	5	2	-	-	450
	2029	243	55	10	120	8	13	5	0	5	2	-	-	460
	2017	334	17	916	371	160	181	121	-	15	7	18	14	2,153
	2020	870	107	1,240	431	192	174	153	0	15	18	35	24	3,259
Healthcare	2023	1,036	105	1,245	469	223	168	156	0	16	18	53	24	3,513
	2026	1,196	102	1,252	500	246	162	160	0	16	18	58	25	3,735
	2029	1,350	130	1,261	522	232	158	163	1	16	18	58	25	3,933

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Exhibit 132 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year, Labrador Interconnected (MWh/yr.) (cont'd...)

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Domestic Hot Water	Outdoor Lighting	Secondary Lighting	Computer Equipment	Refrigeration	Other Plug Loads	Space Cooling	Food Service Equipment	Computer Servers	TOTAL
	2017	1,463	359	220	139	134	40	122	-	16	3	-	-	2,496
	2020	1,535	354	220	139	161	38	155	0	16	3	-	-	2,621
Schools	2023	2,132	413	219	144	188	83	158	0	17	3	-	-	3,357
	2026	2,206	839	242	145	207	78	161	0	17	3	-	-	3,898
	2029	2,283	828	242	146	196	74	165	0	17	3	-	-	3,955
	2017	379	225	152	29	21	10	48	0	15	6	-	2	886
Universities and	2020	499	241	153	29	26	10	60	0	15	6	-	3	1,041
Colleges	2023	669	236	154	30	30	10	62	7	16	6	-	3	1,220
	2026	738	231	154	30	33	9	63	7	16	6	-	3	1,289
	2029	809	227	155	30	31	9	64	7	16	6	-	3	1,356
	2017 2020	886	205	69	48	67	20	38	- 4	-	1	-	-	1,334
Warehouse/Wholesale	2020	1,162	655 639	70 74	48 49	80 94	18 25	49 50	56	-	1	-	-	2,084
Wai ellouse/Wilolesale	2026	1,446 2,292	625	76	49	103	23	50	57	_	1	-	-	2,433 3,278
	2029	2,584	612	78	50	98	23	52	59		1		-	3,557
	2017	190	42	33	366	16	294	11	35	-	4	59	_	1,050
	2020	505	57	33	368	19	281	14	37	-	4	118	-	1,436
Restaurants	2023	526	56	34	612	23	268	15	126	-	4	177	_	1,841
	2026	597	56	34	619	25	256	15	131	-	4	197	-	1,934
	2029	731	55	35	629	24	244	15	138	-	5	197	-	2,071
	2017	5,808	1,595	1,856	1,330	562	990	419	1	500	59	-	-	13,119
	2020	7,843	1,900	1,877	1,853	674	938	532	3	510	59	-	-	16,189
Large Other Buildings	2023	10,863	2,307	1,886	1,857	785	887	543	8	520	58	-	-	19,714
	2026	12,039	2,247	1,898	1,862	862	839	553	13	530	58	-	-	20,902
	2029	13,660	2,189	1,913	1,869	814	792	564	21	539	58	-	-	22,419
	2017	3,604	1,249	976	625	394	583	332	0	-	46	-	-	7,810
	2020	3,881	1,479	997	631	475	556	425	8	-	47	-	-	8,499
Small Other Buildings	2023	5,790	1,831	1,019	641	556	534	435	21	-	48	-	-	10,875
	2026	8,295	1,808	1,050	656	615	515	446	40	-	50	-	-	13,476
	2029	9,032	1,794	1,090	947	586	501	457	65	-	53	-	-	14,527
	2017	9,842	-	1,179	546	547	22	258	-	-	19	-	-	12,412
Other Institutions!	2020	17,828	-	1,208	546	631	19	350	-	-	18	-	-	20,600
Other Institutional	2023 2026	23,123	29	1,239	550	716	24	357	4	-	18	-	-	26,061
	2026	28,089	2,627	2,411	554	798	27	364	7	-	47	-	-	34,924
	2029	30,009 27,750	2,600 6,441	2,439 6,232	559 4,398	847 2,327	32 2,602	371 1,655	11 842	- 687	47 218	- 76	- 27	36,916 53,255
	2017	40,861	7,841	6,665	4,398 5,067	2,327	2,602	2,130	1,054	700	230	172	45	70,014
Grand Total	2023	52,913	8,667	6,754	5,429	3,212	2,475	2,177	1,540	700	232	258	45	84,367
Grana rotar	2026	63.845	11,537	8,022	5,537	3,548	2,425	2,177	1,577	714	265	286	46	99,933
	2029	70,873	11,391	8.143	5,918	3,453	2,220	2,223	1,627	741	272	286	48	107,242

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Exhibit 133 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year, Isolated (MWh/yr.)

Subsector	Milestone Years	General Lighting	Refrigeration	Outdoor Lighting	Secondary Lighting	Computer Equipment	HVAC Fans & Pumps	Other Plug Loads	Domestic Hot Water	TOTAL
	2017	2,812	647	542	431	306	277	157	49	5,223
Labrador Isolated C/I	2020	2,864	1,034	529	428	405	310	160	53	5,783
Buildings	2023	2,895	1,427	516	423	418	343	164	56	6,241
Dullulligs	2026	2,951	1,610	507	425	431	384	167	59	6,534
	2029	3,013	1,702	502	434	443	436	170	64	6,763
	2017	263	61	51	42	29	26	15	-	486
Island Isolated C/I	2020	270	98	50	42	38	30	15	-	542
Buildings	2023	274	135	49	42	39	33	15	-	587
Buildings	2026	280	153	48	42	41	37	16	-	616
	2029	287	162	48	43	42	42	16	-	641
	2017	3,075	708	593	473	334	303	172	49	5,709
	2020	3,134	1,131	579	470	443	340	176	53	6,325
Grand Total	2023	3,169	1,562	565	465	457	375	179	56	6,828
	2026	3,231	1,763	555	468	471	421	182	59	7,150
	2029	3,300	1,864	549	477	485	478	186	64	7,403

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Exhibit 134 Economic Potential Load Reduction by End Use, Sub sector and Milestone Year, Island Interconnected (MW)

Sub sector	Milestone Year	Domestic Hot Water	HVAC Fans & Pumps	Refrigeration	Secondary Lighting	Space Heating	Grand Total
	2017	0	0	0	1	0	1
	2020	0	3	0	1	2	5
Large Office	2023	0	3	0	1	2	5
	2026	0	3	0	1	2	5
	2029	0	3	0	1	2	5
	2017	0	0	0	0	0	0
	2020	0	0	0	0	1	1
Small Office	2023	0	0	0	0	1	1
	2026	0	0	0	0	1	1
	2029	0	0	0	0	1	1
	2017	0	0	0	0	0	0
	2020	0	2	0	0	1	2
Large Non-food Retail	2023	0	2	0	0	1	2
	2026	0	2	0	0	1	2
	2029	0	2	0	0	1	2
	2017	0	0	0	0	0	0
	2020	0	0	0	0	1	1
Small Non-food Retail	2023	0	0	0	0	1	1
	2026	0	0	0	0	1	1
	2029	0	0	0	0	1	1
	2017	0	0	0	0	0	0
	2020	0	1	1	0	0	2
Food Retail	2023	0	1	1	0	0	2
	2026	0	1	1	0	0	2
	2029	0	1	1	0	0	2
	2017	0	0	0	0	0	0
	2020	2	0	0	0	1	3
Large Accomodation	2023	2	0	0	0	1	4
	2026	2	0	0	0	1	4
	2029	2	0	0	0	1	4
	2017	0	0	0	0	0	0
	2020	1	0	0	0	0	1
Small Accomodation	2023	1	0	0	0	0	1
	2026	1	0	0	0	0	1
	2029	1	0	0	0	0	1

Exhibit 134 Economic Potential Load Reduction by End Use, Sub sector and Milestone Year, Island Interconnected (MW) (cont'd...)

Sub sector	Milestone Year	Domestic Hot Water	HVAC Fans & Pumps	Refrigeration	Secondary Lighting	Space Heating	Grand Total
	2017	0	0	0	0	0	0
	2020	1	1	0	0	1	4
Healthcare	2023	2	1	0	0	1	4
	2026	2	1	0	0	1	4
	2029	2	1	0	0	1	4
	2017	0	0	0	0	0	0
	2020	0	1	0	0	1	2
Schools	2023	0	1	0	0	1	2
	2026	0	1	0	0	1	2
	2029	0	1	0	0	1	2
	2017	0	0	0	0	0	0
Universities and	2020	0	1	0	0	0	2
Colleges	2023	0	1	0	0	0	2
Colleges	2026	0	2	0	0	0	2
	2029	0	2	0	0	0	2
	2017	0	0	0	0	0	0
	2020	0	0	0	0	1	1
Warehouse/Wholesale	2023	0	0	0	0	0	1
	2026	0	0	0	0	0	1
	2029	0	0	0	0	0	1
	2020	3	0	0	0	0	4
Destaurants	2023	3	0	0	0	0	4
Restaurants	2026	4	0	0	0	0	4
	2029	4	0	0	0	0	4
	2017	0	0	0	0	0	0
	2020	1	1	0	0	1	3
Large Other Buildings	2023	1	1	0	0	1	4
	2026	1	1	0	0	1	4
	2029	1	1	0	0	1	4
	2017	0	0	0	0	0	0
	2020	1	0	0	0	1	2
Small Other Buildings	2023	1	0	0	0	1	2
	2026	1	0	0	0	1	2
	2029	1	0	0	0	1	2
	2017	0	0	0	3	0	3
	2020	10	9	1	3	11	34
Grand Total	2023	11	10	1	3	11	35
	2026	11	10	1	3	11	36
	2029	11	10	1	3	11	36

Exhibit 135 Economic Potential Load Reduction by End Use, Sub sector and Milestone Year, Labrador Interconnected (MW)

Sub sector	Milestone Year	Domestic Hot Water	HVAC Fans & Pumps	Refrigeration	Secondary Lighting	Space Heating	Grand Total
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Small Office	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Large Non-food Retail	2023	0		0	0	0	
	2026	0		0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Small Non-food Retail	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	
	2020	0	0	0	0	0	0
Food Retail	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Large Accomodation	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Small Accomodation	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	-
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Healthcare	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Schools	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0

Exhibit 135 Economic Potential Load Reduction by End Use, Sub sector and Milestone Year, Labrador Interconnected (MW) (cont'd...)

Sub sector	Milestone Year	Domestic Hot Water	HVAC Fans & Pumps	Refrigeration	Secondary Lighting	Space Heating	Grand Total
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Universities and Colleges	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Warehouse/Wholesale	2023	0	-	0	0	0	0
	2026	0	-	0	0	0	0
	2029	0		0	0	0	0
	2020	0	0	0	0	0	0
Restaurants	2023	0	0	0	0	0	0
ne saurants	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	1	0	0	0	0	2
Large Other Buildings	2023	1	0	0	0	0	2
	2026	1	0	0	0	0	2
	2029	1	0	0	0	0	2
	2017	0	0	0	0	0	0
	2020	1	0	0	0	0	1
Small Other Buildings	2023	1	0	0	0	0	1
	2026	1	0	0	0	0	1
	2029	1	0	0	0	0	1
	2017	0	0	0	0	0	0
	2020	0	1	0	0	1	2
Other Institutional	2023	0	1	0	0	1	1
	2026	0	0	0	0	1	1
	2029	0	0	0	0	1	1
	2017	0	0	0	1	0	1
	2020	2	1	0	1	2	7
Grand Total	2023	2	1	0	1	2	6
	2026	2	1	0	1	2	6
	2029	2	1	0	1	2	6

Exhibit 136 Economic Potential Load Reduction by End Use, Sub sector and Milestone Year, Isolated (MW)

Building Category	Milestone Year	Domestic Hot Water	HVAC Fans & Pumps	Secondary Lighting	Space Heating	Grand Total
	2017	0.0	0.0	0.1	0.0	0.1
Labrador Isolated C/I	2020	0.0	0.0	0.1	0.0	0.1
Buildings	2023	0.0	0.0	0.1	0.0	0.1
Buildings	2026	0.0	0.0	0.1	0.0	0.1
	2029	0.0	0.0	0.1	0.0	0.1
	2017	0.0	0.0	0.0	0.0	0.0
Island Isolated C/I	2020	0.0	0.0	0.0	0.0	0.0
Buildings	2023	0.0	0.0	0.0	0.0	0.0
Buildings	2026	0.0	0.0	0.0	0.0	0.0
	2029	0.0	0.0	0.0	0.0	0.0
	2017	0.0	0.0	0.1	0.0	0.1
	2020	0.0	0.0	0.1	0.0	0.1
Grand Total	2023	0.0	0.0	0.1	0.0	0.2
	2026	0.0	0.0	0.1	0.0	0.2
	2029	0.0	0.0	0.1	0.0	0.2

Appendix G Background-Section 10: Achievable Workshop Action Profile Slides

Opportunities for Today's Workshop

	Primary End Use	Percent of 2029 Economic Potential Savings
LED Tubes	Lighting	3%
High-Efficiency Air Source Heat Pumps	Space Heating	15%
Evaporator Fan Upgrades	Refrigeration	1%
VFDs on HVAC Motors	HVAC Fans and Pumps	3%
Advanced BAS	Multiple	4%
High Performance New Construction	Multiple	7%
PC Power Management	Computer Equipment	1%
Glazing	Space Heating	3%
Electric Thermal Storage Systems	Space Heating - Demand	0%

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Commercial Opportunity 1:

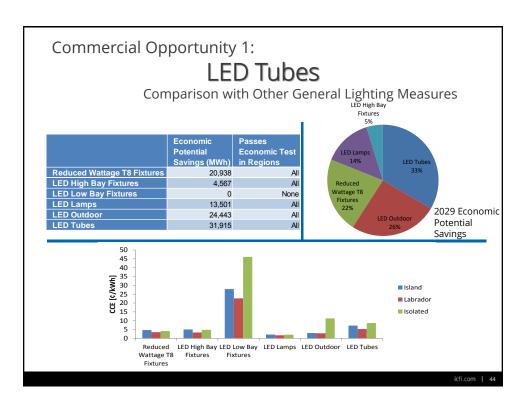
LED Tubes

Solid state lighting using light emitting diodes as a source of illumination.

Relamping existing T8 fixtures with LED tubes that can operate using the existing ballast.

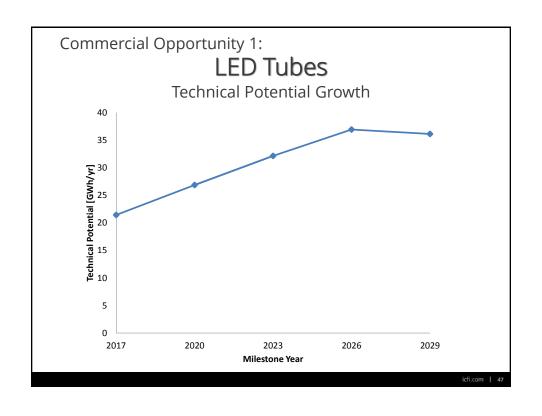


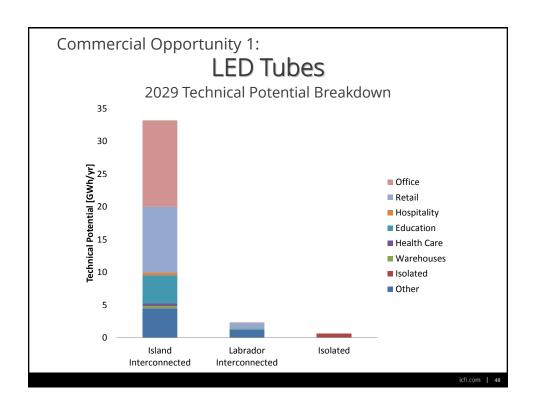
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Commercial Opportunity 1: LED Tubes Assumptions	
Focus Building Type	Office
Focus Region	Island
Typical Application:	
Cost	\$23.81
Useful Life	11.8 years
Savings:	
General lighting	31%
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Commercial Opportunity 1: LED Tubes Economic Indicators	;
Simple Payback (L. Office - Island)	5.0 years
Average CCE (¢/kWh):	
Island	7.23
Labrador	5.30
Isolated	8.65
Basis	Incremental
Eligibility Timeline	At replacement
Eligible participants:	
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 230
Principal region	Island
	icfi.com





Commercial Opportunity 2:

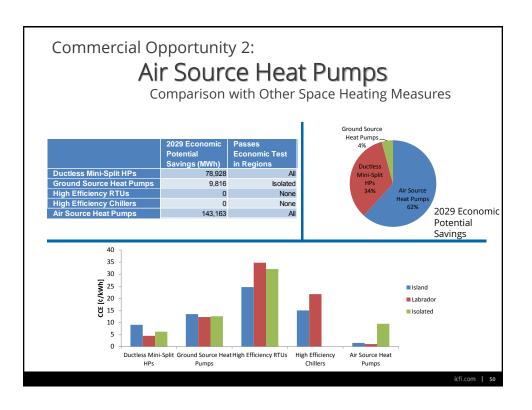
Air Source Heat Pumps

Cold climate air source heat pumps (ASHPs) utilise the vapour compression cycle to transfer heat from the outside air to the interior during the heating season.

Replace RTUs equipped with electric resistance heat with models equipped with CEE qualified ASHPs.

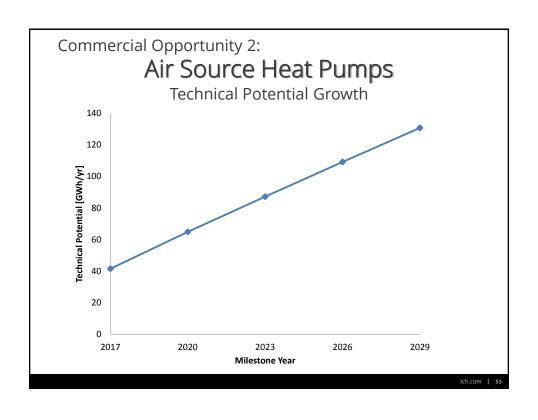


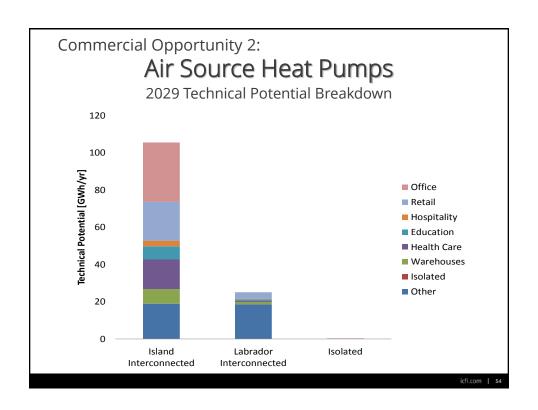
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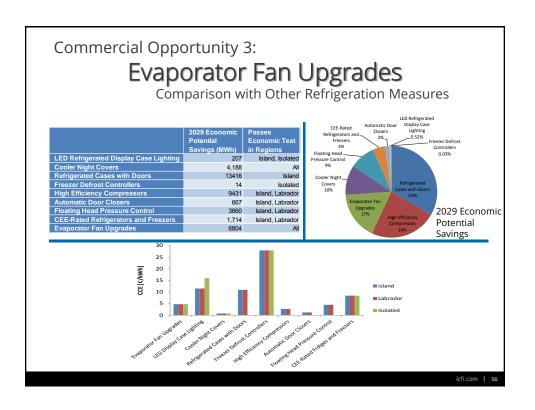
Commercial Opportunity 2: Air Source Heat Pumps Assumptions	
Focus Building Type	L. Office
Focus Region	Island
Typical Application:	
Cost	\$1,500
Useful Life	15 years
Savings:	
Space heating	45%
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Commercial Opportunity 2: Air Source Heat Pumps Economic Indicators	
Simple Payback (L. Office - Island)	0.8 years
Average CCE (¢/kWh):	
Island	1.47
Labrador	1.02
Isolated	9.41
Basis	Incremental
Eligibility Timeline	At replacement
Eligible participants:	
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 240
Principal region	Island
	icfi.com 52



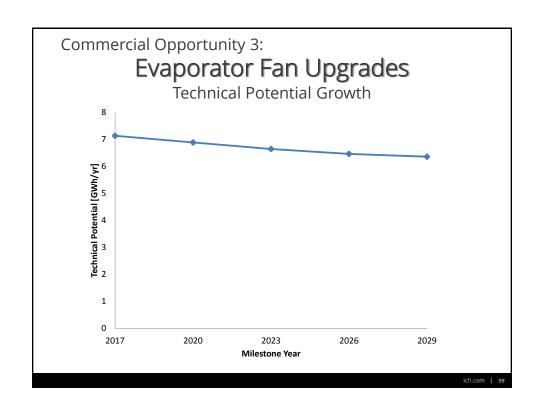


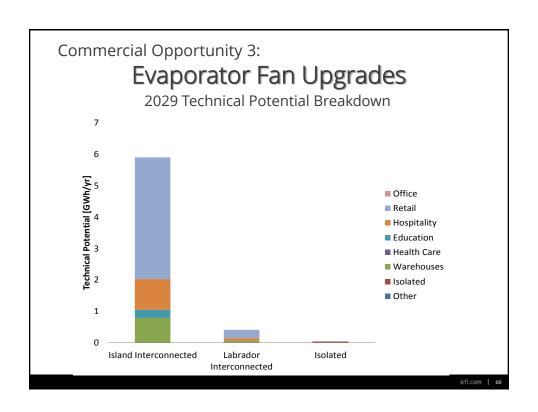




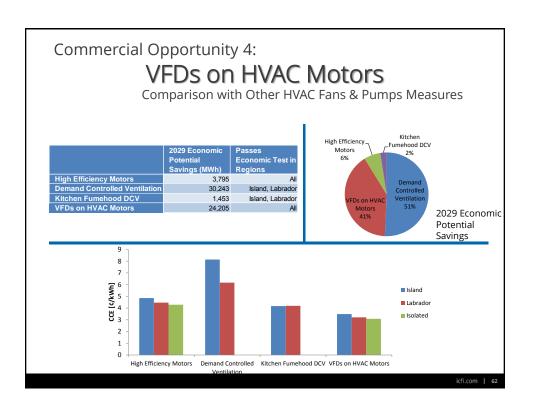
Commercial Opportunity 3: Evaporater Fan Upgrades Assumptions	
Focus Building Type	Food Retail
Focus Region	Island
Typical Application:	
Cost	\$460
Useful Life	16 years
Savings:	
Refrigeration	6%
	icti.com 57

Commercial Opportunity 3: Evaporator Fan Upgrades Economic Indicators	
Simple Payback (Food Retail - Island)	4.7 years
Average CCE (¢/kWh):	
Island	4.73
Labrador	4.73
Isolated	4.73
Basis	Full
Eligibility Timeline	Immediate
Eligible participants:	
Floor Area / # of Facilities by 2029	3,400,000 ft ² / 540
Principal region	Island
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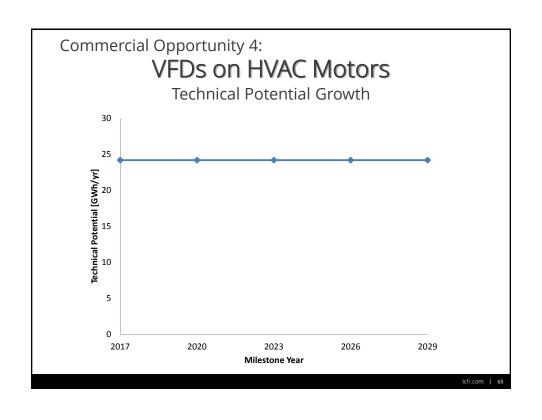


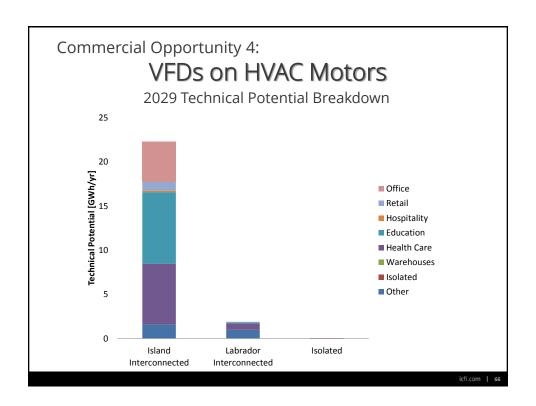




Commercial Opportunity 4: VFDs on HVAC Motors Assumptions	
Focus Building Type	L. Office
Focus Region	Island
Typical Application:	
Cost	\$4,820
Useful Life	15 years
Savings:	
HVAC fans & pumps	11%
	icfl.com 63

VFDs on HVAC Motors Economic Indicators	
Simple Payback (L. Office - Island)	3.2 years
Average CCE (¢/kWh):	
Island	3.49
Labrador	3.21
Isolated	3.09
Basis	Full
Eligibility Timeline	Immediate
Eligible participants:	
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 70
Principal region	Island





Commercial Opportunity 5:

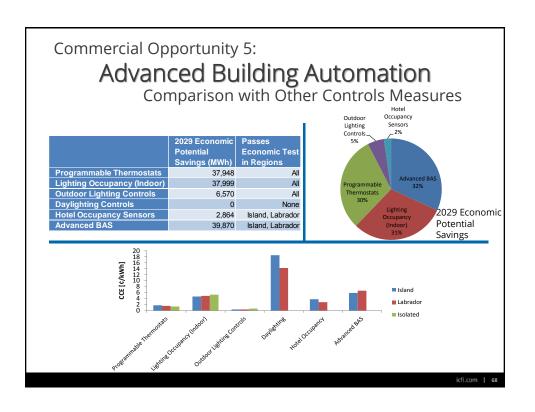
Advanced Building Automation

Advanced Building Automation Systems (BAS) incorporate diagnostic tools and self tuning controls into existing BAS functions, and expand control to additional systems such as lighting and VAV boxes.



Most applicable to large, complex facilities such as office buildings, hotels, and healthcare.

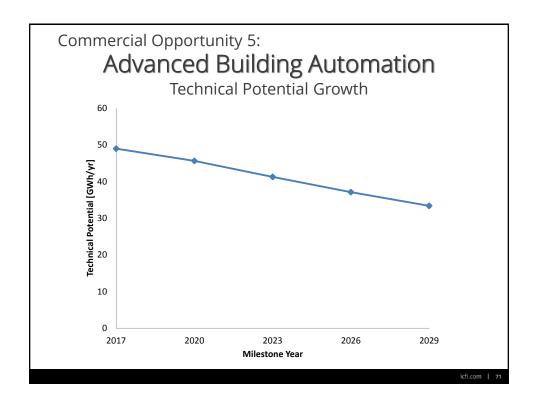
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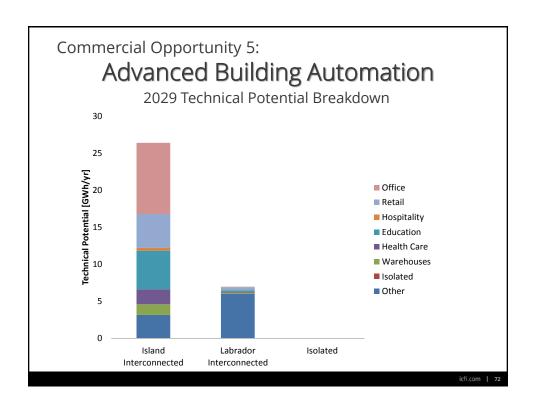


Assumptions	
Focus Building Type	L. Office
Focus Region	Island
Typical Application:	
Cost	\$0.90/ft ²
Useful Life	15 years
Savings:	
Space heating, space cooling, general lighting, and HVAC fans & pumps	10%

Commercial Opportunity 5: Advanced Building Automation Economic Indicators	
Simple Payback (L. Office - Island)	3.8 years
Average CCE (¢/kWh):	
Island	5.90
Labrador	6.64
Isolated	N/A
Basis	Full
Eligibility Timeline	Immediate
Eligible participants:	
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 250
Principal region	Island

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Commercial Opportunity 6:

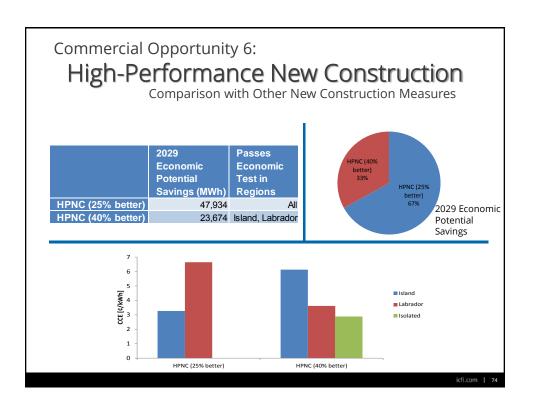
High-Performance New Construction

Constructing a new building using an integrated design approach to lower overall energy use.

Two measures are considered: 25% and 40% better than baseline (code) construction.



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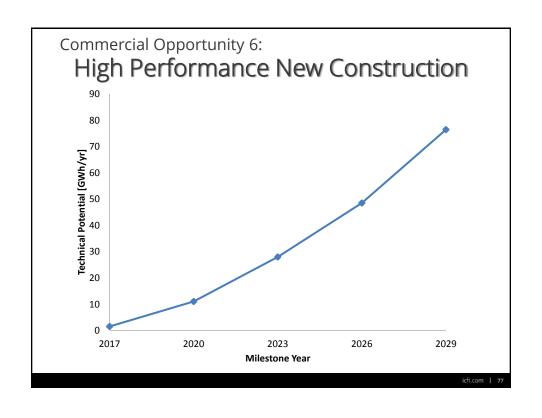


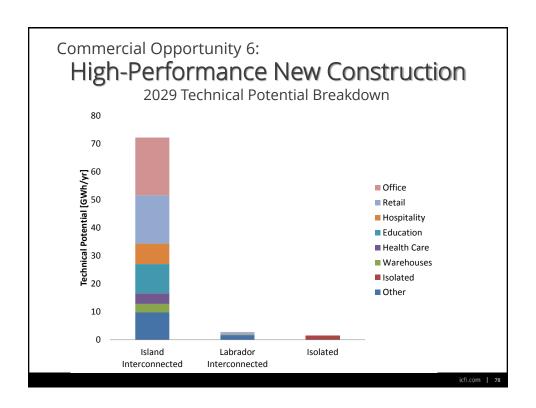
Commercial Opportunity 6: High-Performance New Construction Assumptions	
Focus Building Type	Office
Focus Region	Island
Typical Application:	
Cost	\$23.81
Useful Life	11.8 years
Savings:	
General lighting	31%
	icfi.com 75

Commercial Opportunity 6: High-Performance New Construction Economic Indicators

Simple Payback (L. Office - Island)	5.0 years
Average CCE (¢/kWh):	
Island	7.23
Labrador	5.30
Isolated	8.65
Basis	Incremental
Eligibility Timeline	At replacement
Eligible participants:	
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 230
Principal region	Island

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Commercial Opportunity 7:

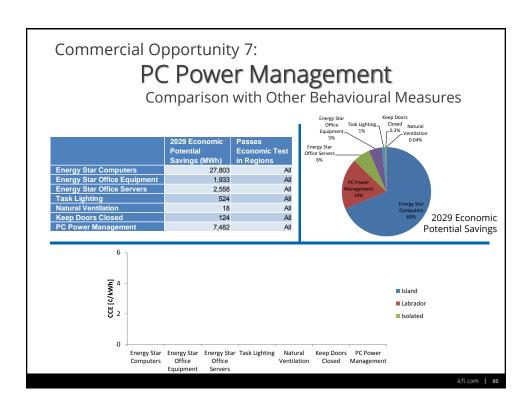
PC Power Management

Personal computers (PCs) have integrated power management systems that can shut off components when the PC is not in use but quickly return it to an active state when required.

This measure involves fully utilising existing power management systems on PCs.

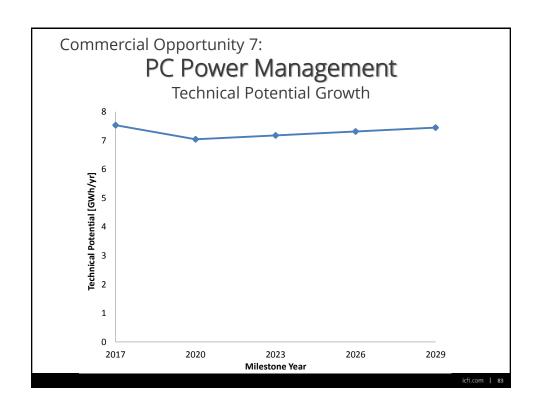


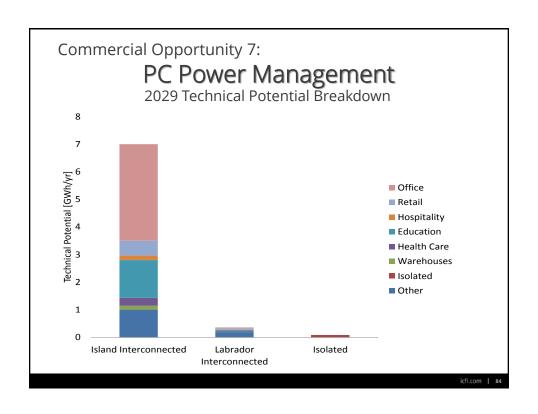
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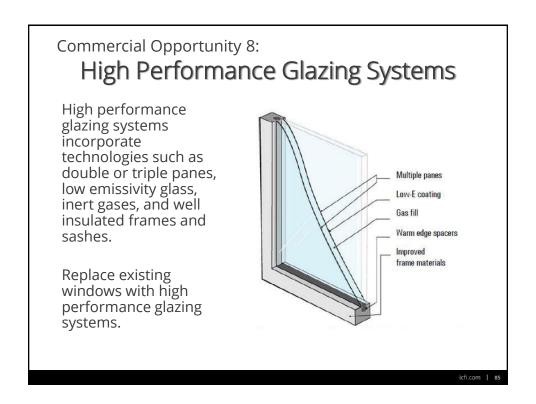


Commercial Opportunity 7: PC Power Management Assumptions	
Focus Building Type	L. Office
Focus Region	Island
Typical Application:	
Cost	\$0
Useful Life	1 year
Savings:	
Computer Equipment	45%
	icfi.com 81

Commercial Opportunity 7: PC Power Management Economic Indicators	
Simple Payback (L. Office - Island)	Immediate
Average CCE (¢/kWh):	
Island	0.00
Labrador	0.00
Isolated	0.00
Basis	Full
Eligibility Timeline	Immediate
Eligible participants:	
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 270
Principal region	Island
	icfi.com



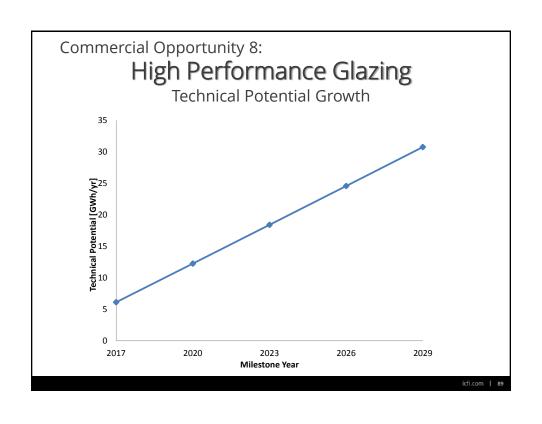


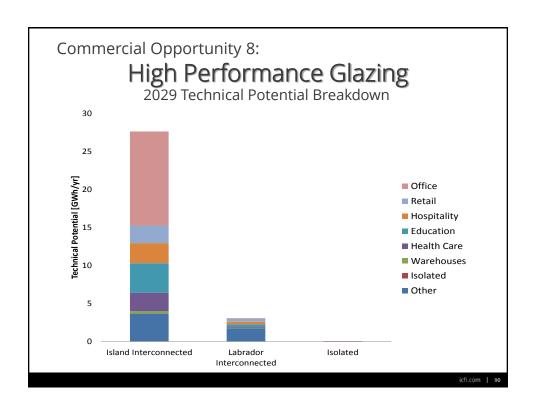




Commercial Opportunity 8: High Performance Commercial Opportunity 8: Assumptions	Glazing
Focus Building Type	L. Office
Focus Region	Island
Typical Application:	
Cost	\$0.50/ft ²
Useful Life	20 years
Savings:	
Space heating	15%
	icfi.com 87

Commercial Opportunity 8: High Performance G Economic Indicators	
Simple Payback (L. Office - Island)	2.8 years
Average CCE (¢/kWh):	
Island	5.58
Labrador	4.92
Isolated	3.20
Basis	Incremental
Eligibility Timeline	At replacement
Eligible participants:	
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 240
Principal region	Island





Appendix H Background-Section 10: Achievable Workshop Measure Worksheets

C1: LED Tubular Lamps

			COMMENTS
Focus Region	Island In	terconnected	
Focus Sub-Sector	Larg	ge Office	
MEASURE INFORMATION			
CCE (¢/kWh)		6.2	
Simple Payback (years)	1	5.0	
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		12,400,000	
Total Number of Sites		280	
% Eligible		80%	
# Eligible Sites Per Year	1	230	
# Eligible Sites By 2029		230	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	70%	В	
Aggressive Marketing	80%	С	
ACHIEVABLE POTENTIAL			
BAU Marketing		161	
Aggressive Marketing		184	
RELATIVE PARTICIPATION RATE	S (H=Higher; L=Lower;	S=Same; N/A=Not App	licable)
Other Sub-Sectors:			
Small Offices	L	Healthcare	Н
Non-Food Retail	S	Schools	Н
Food Retail	S	Universities	Н
Large Hotels/Motels	Н	Warehouses	L
Small Hotels/Motels	L	Restaurants	L
Other Regions:			
Labrador	L	Isolated	L
Related Measures:			
LED Lamps	Н	LED Outdoor	Н
LED Low Bay Fixtures	S	RW T8 Fixtures	L
LED High Bay Fixtures	Н		
OTHER PARAMETERS			
Sensitivity to Incentives (High,	Med, Low)		High
	, Channel Member, Bot	th)	Both
Primary Incentive Target (User			
Primary Incentive Target (User Sensitivity to Direct Program S	upport (High, Med, Lov	v)	Low

GENERAL NOTES:

- Technology is changing very rapidly and the cost is coming down quite quickly
- Province tends to use a "wait-and-see" approach to implementing EE
- Likely very limited investments in fluorescent technology in the future

BARRIERS:

- Cost is currently the primary barrier
- The lamps are quite avaialble and starting to be popular (workshop participant's firm has sold about 18-20K of them in the last quarter)
- Not very popular in NL since there are no incentives currently
- Customer awareness is a barrier (i.e. not aware that it's currently an option)
- Government in the province tends to adopt technologies like this more quickly but private sector lags
- Public tendering act limits the technology that will be implemented in some facilities (i.e. lowest cost technology must be selected)
- Some fo the lower cost products may have performance issues
- Technology hasn't been around too long. Some people may be waiting for the technology to mature.

- Difficult for utilities to get in touch with the right contacts at the commercial facilities

- LED tubes may not work as well in some fixtures
- current economic crunch is limiting uptake at the moment

- Equipment typically goes through lighting distributors
- Implementers help spread the word
- Nobody is going to the marketplace to make the case for this technology currently
- Incentives are key to the overall strategy and there is a high sensitivity to this
- Some facilities may be overlitalready, which allows for a deeper savings opportunity
- Can use non-energy benefits to help sell the technology
- Government agencies are much more developed than they were 20 years ago and they can be an important partner

C2: High-Efficiency Air Source Heat Pumps

			COMMENTS
Focus Region	Island In	terconnected	
Focus Sub-Sector	Foo	d Retail	
MEASURE INFORMATION			
CCE (¢/kWh)		1.0	
Simple Payback (years)		0.8	Incr. basis
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		12,400,000	
Total Number of Sites		280	
% Eligible		86%	
# Eligible Sites Per Year		20	Incr. basis
# Eligible Sites By 2029		240	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	20%	В	
Aggressive Marketing	60%	В	
ACHIEVABLE POTENTIAL			
BAU Marketing		48	
Aggressive Marketing		144	
RELATIVE PARTICIPATION RATES	(H=Higher; L=Lower;	S=Same; N/A=Not App	licable)
Other Sub-Sectors:			
Small Offices	Н	Healthcare	L
Non-Food Retail	S	Schools	S
Large Offices	L	Universities	L
Large Hotels/Motels	Н	Warehouses	L
Small Hotels/Motels	L	Restaurants	S-H
Other Regions:			
Labrador	L	Isolated	L
Related Measures:			
Ductless Mini-Split HPs	Н	High-Eff, RTUs	L
GSHP	L	High-Eff. Chillers	L
OTHER PARAMETERS			
Sensitivity to Incentives (High, N	1ed, Low)		Low
Primary Incentive Target (User,	Channel Member, Bot	th)	User
Sensitivity to Direct Program Su	pport (High, Med, Lov	v)	Med
Most Critical Program Support T Certification, Technical Worksh		y Training,	Contractor training, ca

GENERAL NOTES:

- Technolgy is fairly mature but existing infrastructure is fairly old - Not many RTUs in large offices
- Savings may be too high in retail applications since lighting and internal loads
- create guite a bit of heat
- Variable refrigerant tehnology may make more sense in certain applications About 15% penetration currently, although this may be limited to smaller RTUs

- Existing infrastructure may limit the opportunity in offices
- Customers see more maintenance costs with the hours of operation for the compressors
- Not practical for many offices since RTUs aren't too common and since zoning would be required
- Awareness may be a barrier in the commercial sector
- HVAC contractors may not be pushing ASHPs
- A lost of the space is leased and landlords are putting in lowest cost equipment
- Chains from other jurisdictions have natural gas space heating and may not be aware that there is an opportunity in electric space heating

- $\hbox{-} Restaurants are adopting the technology \\$
- Technology is being adopted to some degree without utility support (i.e. about 1 in 20 currently)
- Schools not allowed to be air conditioned

C3: ECM Motors and Evaporator Fan Motor Controllers

			COMMENTS
Focus Region	Island Ir	nterconnected	
Focus Sub-Sector	Foo	od Retail	
MEASURE INFORMATION			
CCE (¢/kWh)		4.7	
Simple Payback (years)		4.7	
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		3,300,000	
Total Number of Sites		780	
% Eligible		70%	Very small not eligible
# Eligible Sites Per Year		540	
# Eligible Sites By 2029		540	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	25%	В	
Aggressive Marketing	80%	В	
ACHIEVABLE POTENTIAL			
BAU Marketing		135	
Aggressive Marketing		432	
RELATIVE PARTICIPATION RATES	(H=Higher; L=Lower	; S=Same; N/A=Not Appl	licable)
Other Sub-Sectors:			
Large Offices	N/A	Healthcare	N/A
Small Offices	N/A	Schools	N/A
Non-Food Retail	L	Universities	S
Large Hotels/Motels	S	Warehouses	Н
Small Hotels/Motels	N/A	Restaurants	L
Other Regions:		•	
Labrador	L	Isolated	Much L
Related Measures:			
Refrigerated Display Cases		Floating Head	
with Doors	L	Pressure Control	L
LED Refrig. Lighting	Н	Defrost Controllers	L
High Eff. Compressors	S	Door Closers	L
CEE Rated Equipment	Н	Night Covers	L
OTHER PARAMETERS			
Sensitivity to Incentives (High, N	1ed, Low)		High
Primary Incentive Target (User, 0	Channel Member, Bo	th)	Both
Sensitivity to Direct Program Sup	port (High, Med, Lo	w)	High
Most Critical Program Support T	ype(s) (e.g. Trade Al ops, etc.)	ly Training,	Awareness, direct-instal

GENERAL NOTES:

- Larger facilities will have pretty sophisticated equipment in place already andlots of support
- Smaller communities in Isolated regions have a lot of residential-style equipment
- Load for each evaporator fan is small but there are a lot of units and they run 24/7
- $\hbox{-} Measure is n't being implemented very of tern in many more mature units}\\$

BARRIERS:

- Awareness is one of the primary barriers Cost is a barrier in smaller facilities
- $\hbox{- Payback period is long for retail facilities}\\$
- Potential landlord-tenant issues with smaller facilities as well
 Service contracts that are in place may restrict retrofits
- Technology may not be as prevelant or accessible as necessary
- There may be a perceived risk with food spoiling

STRATEGIES/PARTNERS:

- Likely going to need two different strategies; one for larger facilities and one for smaller "mom-and-pop" stores

C4: VFDs on HVAC Motors

			COMMENTS
Focus Region	Island In	terconnected	
Focus Sub-Sector	Larg	ge Office	
MEASURE INFORMATION			
CCE (¢/kWh)		3.4	
Simple Payback (years)		3.2	
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		12,400,000	
Total Number of Sites		280	
% Eligible		24%	
# Eligible Sites Per Year		70	
# Eligible Sites By 2029		70	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	5%	В	
Aggressive Marketing	70%	В	
ACHIEVABLE POTENTIAL			
BAU Marketing		4	
Aggressive Marketing		49	
RELATIVE PARTICIPATION RATES (H=Higher; L=Lower;	S=Same; N/A=Not App	licable)
Other Sub-Sectors:			
Small Offices	L	Healthcare	Н
Non-Food Retail	S	Schools	Н
Food Retail	S	Universities	Н
Large Hotels/Motels	н	Warehouses	N/A
Small Hotels/Motels	N/A	Restaurants	N/A
Other Regions:			
Labrador	L	Isolated	L
Related Measures:			
High Eff. Motors	н	Kitchen DCV	L
Demand Control Ventilation	L		
OTHER PARAMETERS			
Sensitivity to Incentives (High, M	led, Low)		High
Primary Incentive Target (User, C	channel Member, Bo	th)	Both
Sensitivity to Direct Program Sup	pport (High, Med, Lov	v)	High
Most Critical Program Support T Certification, Technical Worksho		y Training,	Case studies, awareness partnerships, whole building retrofits based on energy audits

GENERAL NOTES:

- Opportunity with both fans and pumps
- Awareness of the measure is quite high and it's commonly implemented
- Can be applied in constant volume systems as well in some cases

- $Applies\ easily\ in\ a\ portion\ of\ facilities\ but\ significant\ additional\ retrofits\ are$ required in some cases
- Additional costs to implement in some applications
 No issue with availability on the Island
- $\hbox{-} Incentives are only currently available under the custom program, which some \\$ contractors may not be aware of
- Potential landlord-tenant issues, especially in large offices

- A prescriptive incentives would help make incentives more accessible but there are potential issues with savings being quite variable
- Bundled approach with additional retrofits would be useful in some application - Working with controls contractors to help drum up sales and awareness
- Opportunity would likely be identified by energy audits

C5: Advanced BAS

			COMMENTS
Focus Region	Island Inte	erconnected	
Focus Sub-Sector	Large	Office	
MEASURE INFORMATION			
CCE (¢/kWh)		3.0	
Simple Payback (years)		2.5	
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		12,400,000	
Total Number of Sites		280	
% Eligible		90%	
# Eligible Sites Per Year		250	
# Eligible Sites By 2029		250	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	20%	В	
Aggressive Marketing	70%	В	
ACHIEVABLE POTENTIAL			
BAU Marketing		50	
Aggressive Marketing		175	
RELATIVE PARTICIPATION RATES (H=Higher; L=Lower; S	=Same; N/A=Not App	licable)
Other Sub-Sectors:			
Small Offices	L	Healthcare	Н
Non-Food Retail	S	Schools	S-H
Food Retail	S	Universities	L
Large Hotels/Motels	S	Warehouses	Much L
Small Hotels/Motels	N/A	Restaurants	N/A
Other Regions:			
Labrador	S	Isolated	L
Related Measures:			•
Programmable Tstats	н	Daylighting	S
Lighting Occupancy (Indoor)	Н	Hotel Occupancy	L
Lighting Occupancy (Outdoor	н		
OTHER PARAMETERS			
Sensitivity to Incentives (High, M	led, Low)		High
Primary Incentive Target (User, C	Channel Member, Both)	Both
Sensitivity to Direct Program Sup	port (High, Med, Low)		High
Most Critical Program Support T	ype(s) (e.g. Trade Ally	Training,	Education, case studies bundling

GENERAL NOTES:

- Cost is likely too high. Should be closer to \$600 per control point on average.
- Savings are likely too conservative. Would expect 25% savings on average.

BARRIERS

- Similar to VFDs, this isn't something that's done on its own (i.e. done as part of a more holistic retrofit)
- Doesn't require much O&M if equipment and controls are installed and commissioned properly
- Equipment can easily be flipped to manual mode rather than being tuned
 Operators do not receive enough training to be able to operate sophisticated control systems
- Potential fear of the technology for building operators
- Potential issues with negative perception due to some systems not being operated properly
- $\operatorname{Building}$ owners may not want sign up to a service contract
- A lot of education required to ensure that systems are being operated properly

- Ensure that equipment is being maintained and that there is a service contract in place
- Education for both operators and contractors
- Ensure that equipment is properly commissioned and that M&V is being done
- Continuous optimization may be an option (as per BC Hydro approach)
- Can be bundled with a recommissioning program

C6: High Performance New Construction

			COMMENTS
Focus Region	Island In	terconnected	
Focus Sub-Sector	Larg	e Office	
MEASURE INFORMATION			
CCE (¢/kWh)		2.6	
Simple Payback (years)		2.5	HPNC (25% Better)
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		1,800,000	
Total Number of Sites		40	
% Eligible		90%	
# Eligible Sites Per Year		3	Incr. basis
#Eligible Sites By 2029		40	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	50%	А	
Aggressive Marketing	80%	С	
ACHIEVABLE POTENTIAL			
BAU Marketing		20	
Aggressive Marketing		32	
RELATIVE PARTICIPATION RATES	(H=Higher; L=Lower;	S=Same; N/A=Not App	licable)
Other Sub-Sectors:			
Small Offices	L	Healthcare	S
Non-Food Retail	L	Schools	Н
Food Retail	L	Universities	Н
Large Hotels/Motels	L	Warehouses	L
Small Hotels/Motels	L	Restaurants	L
Other Regions:			
Labrador	S	Isolated	L
Related Measures:			
HPNC (40% Better)	Much L		
OTHER PARAMETERS			
Sensitivity to Incentives (High, N	led, Low)		Med-Low
Primary Incentive Target (User, 0		•	Both
Sensitivity to Direct Program Sup	port (High, Med, Lov	v)	Med
Most Critical Program Support T Certification, Technical Worksh		y Training,	Training for design communit and new building owners

GENERAL NOTES:

- Much of the new construction recently has been government and they already build to a high efficiency standard
- This has pushed the local industry to a higher standard

BARRIERS:

- Cost is the primary barrier to implementation
- $Building \, rating \, systems \, like \, LEED \, include \, a \, lot \, of \, measures \, that \, don't \, help \, with \, energy \, efficiency$
- Major lost opportunity if it is missed at the time of new construction
- Free ridrship is a potential issue

- Non-energy benefits help the business case
- Buildings can be rented at a premium
- Engineering consultants are key in terms of delivery
- Workshops to deal with administrative burden and/or best way to implement without a rating system

C7: PC Power Management

			COMMENTS
Focus Region	Island In	terconnected	
Focus Sub-Sector	Larg	e Office	
MEASURE INFORMATION			
CCE (¢/kWh)		N/A	0.1
Simple Payback (years)		N/A	Behavioural measure
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		12,400,000	
Total Number of Sites		280	
% Eligible		95%	
# Eligible Sites Per Year		270	
# Eligible Sites By 2029		270	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	10%	В	
Aggressive Marketing	50%	В	
ACHIEVABLE POTENTIAL			
BAU Marketing		27	
Aggressive Marketing		135	
RELATIVE PARTICIPATION RATES	(H=Higher; L=Lower;	S=Same; N/A=Not Appl	icable)
Other Sub-Sectors:			
Small Offices	S	Healthcare	L
Non-Food Retail	L	Schools	S-H
Food Retail	L	Universities	S-H
Large Hotels/Motels	L	Warehouses	L
Small Hotels/Motels	L	Restaurants	L
Other Regions:			
Labrador	S	Isolated	S
Related Measures:			
ESTAR Computers	S	Task Lighting	L
ESTAR Office Equipment	S	Natural Ventilation	L
ESTAR Servers	S	Keep Doors Closed	L
OTHER PARAMETERS			
Sensitivity to Incentives (High, N	Лed, Low)		Low
Primary Incentive Target (User,	Channel Member, Bo	th)	User
Sensitivity to Direct Program Su	pport (High, Med, Lov	v)	High
Most Critical Program Support Certification, Technical Worksh		y Training,	Education and marketing to IT departments and executive buy-in, lobby

GENERAL NOTES:

- Technology exists to implement power management settings

BARRIERS:

- $\hbox{- IT department may need to push through updates during off hours}\\$
- Individuals may override power management settings that have been pushed down on them
- Remote use of work computers limits the proportion of computers that can be shut down

- Most effective to convince an IT department to implement and push down power management settings
- Education component is important to ensure persistence
- Competition (e.g. floor-by-floor) can be helpful

C8: Glazing

			COMMENTS
Focus Region	Island In	terconnected	
Focus Sub-Sector	Larg	e Office	
MEASURE INFORMATION			
CCE (¢/kWh)		2.9	
Simple Payback (years)		2.8	Incr. measure
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		12,400,000	
Total Number of Sites		280	
% Eligible		85%	
# Eligible Sites Per Year		10	Incr. measure
# Eligible Sites By 2029		240	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	10%	В	
Aggressive Marketing	80%	С	
ACHIEVABLE POTENTIAL			
BAU Marketing		24	
Aggressive Marketing		192	
RELATIVE PARTICIPATION RATE	S (H=Higher; L=Lower;	S=Same; N/A=Not App	licable)
RELATIVE PARTICIPATION RATES Other Sub-Sectors:	S (H=Higher; L=Lower;	S=Same; N/A=Not App	licable)
	(H=Higher; L=Lower;	S=Same; N/A=Not App	licable)
Other Sub-Sectors:			
Other Sub-Sectors: Small Offices	L	Healthcare	н
Other Sub-Sectors: Small Offices Non-Food Retail	L	Healthcare Schools	H H
Other Sub-Sectors: Small Offices Non-Food Retail Food Retail	L L	Healthcare Schools Universities	н н н
Other Sub-Sectors: Small Offices Non-Food Retail Food Retail Large Hotels/Motels	L L L	Healthcare Schools Universities Warehouses	H H H
Other Sub-Sectors: Small Offices Non-Food Retail Food Retail Large Hotels/Motels Small Hotels/Motels	L L L	Healthcare Schools Universities Warehouses	H H H
Other Sub-Sectors: Small Offices Non-Food Retail Food Retail Large Hotels/Motels Small Hotels/Motels Other Regions:	L L L S	Healthcare Schools Universities Warehouses Restaurants	H H H L
Other Sub-Sectors: Small Offices Non-Food Retail Food Retail Large Hotels/Motels Small Hotels/Motels Other Regions: Labrador	L L L S	Healthcare Schools Universities Warehouses Restaurants	H H H L
Other Sub-Sectors: Small Offices Non-Food Retail Food Retail Large Hotels/Motels Small Hotels/Motels Other Regions: Labrador Related Measures:	L L L S L	Healthcare Schools Universities Warehouses Restaurants Isolated	H H H L L L
Other Sub-Sectors: Small Offices Non-Food Retail Food Retail Large Hotels/Motels Small Hotels/Motels Other Regions: Labrador Related Measures: Wall Insulation	L L L S L	Healthcare Schools Universities Warehouses Restaurants Isolated	H H H L L L
Other Sub-Sectors: Small Offices Non-Food Retail Food Retail Large Hotels/Motels Small Hotels/Motels Other Regions: Labrador Related Measures: Wall Insulation Roof Insulation OTHER PARAMETERS	L L L S L	Healthcare Schools Universities Warehouses Restaurants Isolated	H H H L L L
Other Sub-Sectors: Small Offices Non-Food Retail Food Retail Large Hotels/Motels Small Hotels/Motels Other Regions: Labrador Related Measures: Wall Insulation Roof Insulation OTHER PARAMETERS	L L L S L H S S S Med, Low)	Healthcare Schools Universities Warehouses Restaurants Isolated Recommissioning	H H L L L H
Other Sub-Sectors: Small Offices Non-Food Retail Food Retail Large Hotels/Motels Small Hotels/Motels Other Regions: Labrador Related Measures: Wall Insulation Roof Insulation OTHER PARAMETERS Sensitivity to Incentives (High,	L L L S L S L H S S S Med, Low) Channel Member, Bot	Healthcare Schools Universities Warehouses Restaurants Isolated Recommissioning	H H L L H H

GENERAL NOTES:

BARRIERS:

- Argon gas may leak out of some low quality windows
 Awareness of low cost may be an issue
 Commercial customers are looking for lowest cost options
 Landlord-tenant issues (i.e. split incentive)
- Only currently covered by custom program, which has seen no uptake

- Architects and contractors would be important partners
- Need to ensure that high efficiency glazings are included in specs
- Promote non-energy benefits



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