

- 1 Q. **Reference: Labrador Expansion Study, p. 11 (p. 19 pdf), Table 3**
- 2
- 3 a) Please confirm that the July 2018 P90 forecast presented here has not been previously
- 4 filed with the Board;
- 5
- 6 b) Is any supporting documentation available with respect to this forecast? If so, please
- 7 provide it;
- 8
- 9 c) Please confirm that, until now, Hydro has generally presented P50 forecasts, and
- 10 describe the quantitative relationship between a P50 forecast and a P90 forecast;
- 11
- 12 d) Please provide a breakdown each of these forecasts (Labrador East and Labrador West)
- 13 into:
- 14
- 15 i) The baseline P50 forecast, excluding all data centre loads (existing and future)
- 16 as well as all industrial loads,
- 17
- 18 ii) Forecast loads, under the P50 baseline forecast, for all existing data centres,
- 19
- 20 iii) Forecast loads, under the P50 baseline forecast, for all existing industrial loads,
- 21
- 22 iv) Forecast future (additional) data centre loads included in the baseline P50
- 23 forecast,
- 24
- 25 v) Forecast future (additional) industrial loads in the baseline P50 forecast, and
- 26
- 27 vi) Additional load added to convert the baseline P50 forecast to a P90 forecast;

- 1 e) For existing data centre customers in Labrador East and in Labrador West, please
2 indicate i) their actual 2018 coincident peak demand and ii) their actual 2018 total
3 energy consumption;
4
- 5 f) Are there any existing or forecast data centre customers in Labrador that are served
6 without directly from the Churchill Falls Generating Station, without relying on either
7 the Labrador East or Labrador West transmission systems? If so, please identify their
8 capacities, distinguishing between existing and forecast loads.
9
10
- 11 A. a) It is confirmed that the July 2018 P90 forecast presented here has not been previously
12 filed with the Board of Commissioners of Public Utilities.
13
- 14 b) Please refer to LAB-NLH-074, Attachment 1 that provides Newfoundland and Labrador
15 Hydro's ("Hydro") report for the 2018 Operating Load Forecast for Hydro Rural Systems.
16 These reports are prepared annually in conjunction with Hydro's medium term load
17 forecast for rural systems. It should be noted that Hydro has redacted any customer
18 identifying information in this document.
19
- 20 c) It is confirmed that, until now, Hydro has generally presented P50 forecasts for the
21 Labrador Interconnected systems. Please refer to Hydro's response to IOC-NLH-014.
22
- 23 d) Please refer to Table 1 and Table 2 that provide the requested load forecast
24 breakdown. Hydro has interpreted "existing data centres" to mean those data centres that
25 submitted service applications that have been approved for service. Hydro has interpreted
26 "existing industrial loads" to mean Iron Ore Company of Canada and Tacora Resources.

Table 1: Labrador East (MW)

Year	i)	ii)	iii)	iv)	v)	vi)
2018	72.4	6.3	0	0	0	3
2019	73.1	7.2	0	0	0	3
2020	73.3	7.2	0	0	0	3
2021	73.6	7.2	0	0	0	3
2022	73.8	7.2	0	0	0	3
2023	74.1	7.2	0	0	0	3
2024	74.7	7.2	0	0	0	3
2025	75.2	7.2	0	0	0	3
2026	75.7	7.2	0	0	0	3
2027	76.2	7.2	0	0	0	3
2028	76.7	7.2	0	0	0	3
2029	77.3	7.2	0	0	0	3
2030	77.8	7.2	0	0	0	3
2031	78.3	7.2	0	0	0	3
2032	78.8	7.2	0	0	0	3
2033	79.4	7.2	0	0	0	3
2034	79.9	7.2	0	0	0	3
2035	80.4	7.2	0	0	0	3
2036	80.9	7.2	0	0	0	3
2037	81.5	7.2	0	0	0	3
2038	82.0	7.2	0	0	0	3
2039	82.5	7.2	0	0	0	3
2040	83.1	7.2	0	0	0	3
2041	83.6	7.2	0	0	0	3
2042	84.1	7.2	0	0	0	3
2043	84.6	7.2	0	0	0	3

Table 2: Labrador West (MW)

Year	i)	ii)	iii)	iv)	v)	vi)
2018	70.5	6.1	261.4	0	0	4.5
2019	70.6	6.1	277.2	0	0	4.5
2020	70.6	6.7	287.1	0	0	4.5
2021	70.8	6.7	295.0	0	0	4.5
2022	71.1	6.7	295.0	0	0	4.5
2023	71.3	6.7	295.0	0	0	4.5
2024	71.6	6.7	295.0	0	0	4.5
2025	71.9	6.7	295.0	0	0	4.5
2026	72.2	6.7	295.0	0	0	4.5
2027	72.6	6.7	295.0	0	0	4.5
2028	72.9	6.7	295.0	0	0	4.5
2029	73.1	6.7	295.0	0	0	4.5
2030	73.4	6.7	295.0	0	0	4.5
2031	73.6	6.7	295.0	0	0	4.5
2032	73.9	6.7	295.0	0	0	4.5
2033	74.2	6.7	295.0	0	0	4.5
2034	74.4	6.7	295.0	0	0	4.5
2035	74.7	6.7	295.0	0	0	4.5
2036	75.0	6.7	295.0	0	0	4.5
2037	75.1	6.7	295.0	0	0	4.5
2038	75.4	6.7	295.0	0	0	4.5
2039	75.7	6.7	295.0	0	0	4.5
2040	75.9	6.7	295.0	0	0	4.5
2041	76.2	6.7	295.0	0	0	4.5
2042	76.4	6.7	295.0	0	0	4.5
2043	76.6	6.7	295.0	0	0	4.5

1 e) Please refer to the responses below:

2

3 i) The demand level by day or by time of day is not recorded by retail customer
4 meters and, therefore, the requested coincident peak demand detail on an actual
5 basis cannot be provided.

- 1 ii) The energy consumption in 2018 for the existing data centre customers in Labrador
2 West and Labrador East is 54.5 GWh and 14.6 GWh respectively.
3
- 4 f) There are no existing data centre customers in Labrador that are being served from
5 Churchill Falls town site (e.g., directly from Churchill Falls Generating Station) and no data
6 centre customer loads currently forecast to be served at this location.



Labrador City

2018 OPERATING LOAD FORECAST for HYDRO RURAL SYSTEMS

Market Analysis Section
Rural Planning Department
Transmission Operations

December 2018

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1.0 Introduction

Hydro's primary mandate in the Province's electric power sector rests with its bulk generation, wholesale transmission, and system operation functions. Hydro also has direct distribution and customer service responsibilities for approximately 38,700 domestic and general service customers located in the more rural and remote areas of the Province. These service regions are generally referred to as Hydro Rural Systems and can be grouped into three principal planning entities: Island Interconnected, Labrador Interconnected (Labrador East and Labrador West) and Isolated (Island isolated, Labrador isolated, and L'Anse au Loup). Table 1 provides Hydro's end-use customer distribution by rural area.

Table 1				
Hydro Distribution Customers in 2017 (Year End)				
Service Region	Domestic Customers	General Service Customers	Total Customers	As a % of Customer Base
Interconnected				
Island	19,852	3,094	22,946	59%
Labrador	9,838	1,427	11,265	29%
Isolated				
Island	684	105	789	2%
Labrador	2,918	755	3,673	10%
Total Rural	33,292	5,381	38,673	100%
% of Customer Base	86%	14%	100%	

On the Island interconnected grid, Hydro's distribution responsibilities include about nine percent of Island interconnected customers with Newfoundland Power responsible for the bulk of customers. In Labrador, all electricity distribution comes under Hydro's purview.¹ Hydro operates diesel powered electricity generation plants² in its isolated service regions and

¹ The community of Natuashish is supplied by diesel generation and is operated and maintained by Hydro on behalf of the Mushuau Innu First Nation. Vale Labrador mining operations at Voisey's Bay is supplied by company operated diesel generation.

² On the island of Ramea, Hydro operates a wind-hydrogen generation demonstration facility on behalf of Nalcor Energy. Energy production from the demonstration facility supplements Hydro's primary diesel plant. Hydro also purchases power from Frontier Power Systems Inc. and Hydro Quebec, to supplement the diesel plants in Ramea and L'Anse au Loup respectively.

exclusively provides distribution services. In total, Hydro has distribution and related responsibility for about 14% of the Province's domestic and general service customer base. As part of an ongoing corporate planning process, Hydro undertakes a medium term load forecast for all of its rural systems with a typical forecast horizon of six years. This analysis is generally undertaken through the spring of each year. These load projections facilitate various system planning and operational requirements, such as:

- Rural distribution capital assessment
 - Voltage level evaluation
 - Substation loading level
 - Voltage regulation
- Rural generation capital assessment
 - Adequacy of diesel plant firm capability, fuel storage, diesel plant equipment, evaluation of alternative generation sources, interconnection studies, etc.
- External wheeling services
- Input for reservoir management and operations scheduling (Island Interconnected)
- Emission permitting
- Revenue forecasting
- Preparation of budgets for rural diesel fuel expense, power purchase and wheeled power and energy.

The methodology for the rural systems' load forecast is a combination of analytical judgment and statistical analysis. Generally, the principal rate classes for each individual system are reviewed and projected separately, with larger general service customer accounts individually evaluated. To facilitate distribution and generation planning, the focus is on system peak demand. At an aggregate level, energy and rate class detail are important for budget and regulatory related functions.

2.0 Hydro Rural Distribution Systems

2.1 Island Interconnected

This planning area refers to all Hydro distribution systems on the Island of Newfoundland that are interconnected to the Island's power grid. Geographically, these systems are located primarily on the Northern Peninsula, the Baie Verte Peninsula, Fogo/Change Islands area, and interconnected portions of the south coast. Distribution systems are largely defined by transmission-distribution substation locations. In total, there are 28 distribution points on the Island Interconnected system for which load forecast analyses are prepared on a regular basis. This current report presents the results for 23 of those systems³.

2.1.1 Great Northern Peninsula Systems

St. Anthony: St. Anthony is the largest distribution system on the Northern Peninsula and serves approximately 2400 customers. The largest customers on the system are associated with the fishing industry and include: [REDACTED] with [REDACTED] and related facilities operating with total peak demand requirements of over 1600 kVA, and [REDACTED] facilities with peak demands of 350 kVA to 400 kVA. The largest non-fishing related customer is the [REDACTED] which has a peak demand in excess of 600 kVA.

Other large customers on the distribution system include an arena which has a demand of 400 kVA and a K-12 school with a demand of approximately 500 kVA.

No material growth is currently forecast through the medium term.

Hawke's Bay: This distribution system is the second largest system on the northern peninsula and serves approximately 1300 customers including a [REDACTED] in [REDACTED] owned by [REDACTED]. With recent reductions in shrimp quotas, energy consumption associated with the fishing industry can be expected to experience additional decline as seen in 2016. This may have an impact on system peak demand.

Other large customers on this system include the [REDACTED]

³ Three of the distribution points are sub-systems to larger bulk delivery points and are included within the bulk forecasts provided in the report. Two distribution point's load forecasts, Rocky Harbour and Glenburnie, are not available.

Peak demand on this distribution system has been relatively stable for the past five to six years with no growth expected.

Cow Head: Cow Head is bounded by Gros Morne Park and has accounts attached to the park and tourist industry. There are approximately 460 customers on this distribution system with the largest customers being [REDACTED] both with peak demands of approximately 200 kVA.

No material changes to the area's load are currently forecast.

Daniel's Harbour: This distribution system serves about 290 customers. There is only one significant customer on the system which is [REDACTED] which has a peak demand of about 150 kVA.

At the present time, no material changes to the area's load are expected.

Parson's Pond: This distribution system serves about 300 customers with all peak demands of customers less than 100 kVA.

At the present time no material changes to the area's load are expected across the medium term.

Main Brook: This distribution system serves about 250 customers with the largest customers having peak demands over 100 kVA. A [REDACTED] has a demand of approximately 125 kVA. A [REDACTED] has grown their operation with [REDACTED] and has a total peak demand of approximately 340 kVA.

At the present time there are no material changes to the area's load expected through the medium term.

Wiltondale: This small distribution system located at the base of the peninsula serves about 35 customers including tourism related accounts and a small sawmill operation. There are no large general service customers on this

distribution system.

No material changes to the area's load are forecast.

Sally's Cove:

This small distribution system located in the center of Gros Morne National Park, serves about 34 customers. There are no large general service customers on this distribution system.

The present forecast is based upon metered data recorded from January 10th to 20th 2017 and January 23rd to February 6th 2017. At this time there is no scheduled plan to provide metered peak demand readings on a regular basis.

No material changes to the area's load are expected.

Glenburnie:

This distribution system serves about 800 customers. The largest customers include a [REDACTED] and [REDACTED] located in the communities of Trout River and Woody Point with demands ranging from 110 to 180kVA.

Energy sales on this system have experienced modest growth in recent years however there are no large new loads identified and expected through the medium term. An updated peak demand forecast is presently unavailable for this system due to the unavailability of system demand readings and at this time there is no scheduled plan to provide metered peak demand readings from the terminal station on a regular basis.

Rocky Harbour:

This distribution system serves approximately 1230 customers with many accounts attached to the tourism industry. The largest customers on the system are in the 250-500 kVA range and include [REDACTED] in Rocky Harbour, the [REDACTED] in Norris Point, [REDACTED] and the [REDACTED] in Rocky Harbour which operates during the summer months.

Energy sales on this system have been stable in recent years following a period of growth. An updated peak demand forecast is presently unavailable for this system due to the unavailability of system demand readings. Peak demand readings for this system will become available subsequent to new terminal station meter installations expected in 2019.

2.1.2 Baie Verte Peninsula & South Brook Systems

Bottom Waters: This distribution system serves approximately 1800 customers and has the highest peak demand requirements of all Hydro's distribution systems within this region. Peak demand for the system has generally followed mining and milling developments located on this system with the largest accounts belonging to two mining operations. The combined customer requirements associated with these two mining operations accounts for approximately sixty percent of the total power requirements of the system.

[REDACTED] has been in commercial operation for eight years and has peak demand requirements close to two MVA. Current mineral reserves⁴ indicated by the company suggest gold processing is likely to conclude in 2020, however the company has implemented an exploration program to adjacent properties [REDACTED] with the aim of expanding mineral reserves and extending the commercial operations beyond 2020.

[REDACTED] purchased the previously mined [REDACTED] and had electrical service re-established in mid-2007. In late 2009 [REDACTED]

[REDACTED] Commercial production at the mine officially commenced in November 2012. Subsequent to commercial production, [REDACTED] has focussed on expanding its mineral reserves and expanding production. In March 2018, [REDACTED] which increased production to 1250 million tonnes per day with power requirements for the combined services now reaching close to six MVA. The mining operations currently employ close to 200 persons and has a possible mine life of 19 years.

Electricity demand for this system is forecast to grow before declining post 2020 due to the current mineral reserves.

⁴ Mineral reserves are resources known to be economically feasible for extraction. Reserves are classified as either Probable Reserves or Proved Reserves. A Probable Ore Reserve is the part of indicated, and in some circumstances, measured mineral resources that can be mined in an economically viable fashion. A *Proved Ore Reserve* is the part of measured resources that can be mined in an economically viable fashion.

South Brook: This distribution system serves the largest customer base in the area with approximately 2350 customers. A [REDACTED] is the largest customer on the system and has a peak demand of approximately 2000 kVA. The next largest customers on the system have peak demands in the 100 kVA to 250 kVA range and include [REDACTED]

At the present time there are no material changes to the area's load expected through the medium term.

White Bay: This distribution system serves about 780 customers. The largest customer on this system is [REDACTED] located close to the community of Hampden which is owned and operated by [REDACTED]. This operation expanded its operation and added new equipment in 2012, with plans for further expansion by the end of 2018. Currently the operation has a total non-coincident facility peak of approximately 1250 kVA, and the new equipment will have a total connected load of approximately 250 kVA. The increased load requirements of this [REDACTED] have slowed the decline in load on this system.

Excluding the expansion at [REDACTED] no material changes to the area's load are expected in the medium term.

King's Point: This distribution system serves approximately 660 customers. [REDACTED] with a peak demand of 165 kVA is the largest customer on this system.

Communities on this system may benefit from re-activation of the Hammerdown gold mine, however there is currently no firm commitment on re-activating the mine. Early in 2018, [REDACTED]

This system has experienced modest growth over the past decade and at the current time is expected to stabilize before minor contractions in the short term.

Coachman's Cove: This distribution system serves approximately 250 customers with all customers on the system having peak demands less than 100 kVA. This system reached peak loads in the mid to late 1990's followed by a period of decline. The number of customers on this system has been relatively stable for the past decade.

At the present time there are no material changes to the area's load expected through the medium term.

Little Bay: This distribution system serves approximately 240 customers with all customers having demands less than 100 kVA. This system recently experienced modest growth after experiencing a decade of modest load decline.

Continued contraction to the area's load is expected through the medium term.

Westport: This distribution system serves about 240 customers and there are no customers with demands exceeding 100 kVA. This system was connected to the interconnected system in the mid 1990's and has experienced continual load growth since that time with loads now beginning to stabilize.

No growth is expected in load in the medium term forecast.

2.1.3 Fogo - Change Islands

Farewell Head: This distribution system serves about 1800 customers with the largest accounts attached to the fishing industry. [REDACTED] operates plants at [REDACTED] (1000 kVA), [REDACTED] (1400 kVA), and [REDACTED] (400 kVA). Smaller seafood operations at [REDACTED] and [REDACTED] have plant demands of 90 kVA and 160 kVA respectively. Recent quota reductions in the shellfish industry have had an impact on energy sales.

Other large customers on this system include the [REDACTED] which has a peak demand of 480 kVA and the [REDACTED] which has a peak demand of approximately 520 kVA.

A small decline in load is forecast through the medium term.

2.1.4 South Coast Systems

Hermitage: This distribution system consists of three systems, Barachoix, English Harbour West, and Conne River, and serves approximately 2600 customers and is the largest of Hydro's rural distribution systems on the island. There are nine customers on this system with peak demands exceeding 100 kVA.

One of the larger accounts on this system is the [REDACTED] which currently has a peak demand of about 1000 kVA. The owner [REDACTED] completed upgrades [REDACTED] and started a new operation in 2015 [REDACTED]

[REDACTED] purchased [REDACTED] in 2011 and in the spring of 2014 [REDACTED]. Since the summer of 2014, [REDACTED] with a peak demand of 300 kVA.

Other large accounts include the [REDACTED] which operates with a peak demand of 280 kVA and the [REDACTED] which has a peak demand of 220 kVA.

There are five schools on the system that have customer demands ranging from about 125 kVA to 240 kVA. A new school [REDACTED] and to date has demands around 300 kVA. It was planned that two portions of the old school will remain in use by the community, while the older portion of the structure will be demolished.

In addition to the new school, a community group has started fundraising efforts to construct an ice rink in the area and if successful, plan to begin construction over the next few years. As there is no firm commitment or timeline for this load, it is not included in the current forecast.

No material changes are expected through the medium term.

St. Albans:

This distribution system serves about 1300 customers. There are currently seven customers on this system with demand exceeding 100 kVA.

[REDACTED] has [REDACTED] with total peak demand requirements of 300 kVA. Other aquaculture related accounts include a [REDACTED] with a peak demand of 130 kVA and [REDACTED] which has a peak demand of 500 kVA. The [REDACTED] a peak demand of 165 kVA and the [REDACTED] has a demand of 250 kVA.

In January 2017, three buildings were damaged by fires including the Bay d'Espoir Academy School. To date, the provincial government has allotted money for the school with plans for a tender to start construction on the new school to be issued in 2019, and money for construction is set aside until 2022. Adjustments to the forecast have been made to coincide with the rebuilding of the school.

At the present time there continues to be minor growth forecast for this system through the medium term.

Burgeo: This distribution system serves about 900 customers with just six customers on the system having demands exceeding 100 kVA. The largest three customers include [REDACTED] which operates with a peak demand of 550 kVA; [REDACTED] which has a peak demand of 500 kVA; and [REDACTED] school which has a peak demand of 270 kVA.

Mineral exploration continues in this region, with continued interest in the previously mined Hope Brook gold deposit. First Mining Gold Corp. bought Coastal Gold in 2015 and is currently in the process of conducting an environmental assessment for constructing a road to connect the mine site to the Burgeo Highway. The project is still in the early stages, with any production a minimum of 3 years away.

There are no material changes to load in the forecast.

Petite Forte: This distribution system serves about 60 customers with all customers on the system having demands less than 100 kVA.

Current peak demand is comparable to peaks from a decade ago with no material changes to the area's load expected through the medium term.

Monkstown: This distribution system serves approximately 125 customers with all customers on the system having demands less than 100 kVA.

After a period of modest load growth, loads are beginning to stabilize, with no material changes expected through the medium term.

2.2 Labrador Interconnected

This planning area refers to all customer loads interconnected to the Churchill Falls hydroelectric generating station across three distribution systems and includes the community loads of Happy Valley-Goose Bay, North West River, Sheshatshiu, Wabush, and Labrador City. Also included are the non-designated station service loads located in and around Churchill Falls.

Happy Valley – Goose Bay:

This system serves the communities of Happy Valley, Northwest River, Sheshatshui and Mud Lake. The load growth experience of the past decade has included a period of robust growth preceding and following the sanction of the Muskrat Falls project followed by the more recent period of modest load growth. The Department of National Defence's (DND) general service account is the largest customer and accounts for approximately 15 percent of total system sales. Happy Valley – Goose Bay has recently been a location of interest for data center developers that are seeking low cost power provision.

Looking forward, the near term load growth on the system is driven by general service sales growth associated with data center developments that have been approved for service. Residential customer growth is expected to return to average historical levels within the medium term outlook. There are potential loads associated with further data center developments and a by DND who have expressed a desire to replace their oil-fired central heating plant boilers to electric boilers.

Labrador City-Wabush

Historically the retail load growth experience in Labrador west generally correlated with the strength or weakness in the global iron ore industry, however with the expansive growth in demand for global data processing requirements largely associated with data mining, Labrador west has become a location of interest for data center developers seeking low cost power provision. The two largest customers located on the Labrador City distribution system are data center developments with existing power requirements exceeding 7.5 MVA.

The forecast for near term load growth within the region is largely associated with increased energy sales to existing and new data center developments. Residential customer growth and associated electricity

sales are expected to remain dependent on re-establishment of mining operations at Wabush or new mining developments. Through the medium term, forecasted load growth reflects modest residential customer growth and energy sales compared to the longer term historical levels experienced on these two systems. There are potential loads associated with further data center developments for both the Labrador City and Wabush systems.

2.3 Isolated

This planning entity now consists of twenty diesel electric generation plants owned and operated by Hydro and located along the coastal areas of the Island and Labrador. The L'Anse-au-Loup area is supplied primarily through an interconnection with Hydro-Quebec, but the diesel plant is still the firm source of power. Hydro also operates and maintains the power plant at Natuashish on behalf of the Mushuau Innu First Nation. The forecast for Natuashish is not included in this document.

2.3.1 Island Isolated Systems

St. Brendan's: This distribution system serves about 150 customers, and has experienced a slight decline in load over the years.

No material changes in load are anticipated in the medium term.

Little Bay Islands: This distribution system serves about 120 customers and has been experiencing declining load and customers for more than a decade.

In November 2015, 89% of the residents voted in favor of relocation, just shy of the 90% requirement mandated by the provincial government for relocation assistance. The government updated the program in December 2016, so that only permanent residents, defined as those with year-round residency, are eligible to vote. In the spring of 2018, the government determined the eligibility of residents in Little Bay Islands, and the town is now waiting to complete the next steps of the relocation program.

Presently, no material changes to load are forecast.

Ramea: This distribution system serves about 320 customers. In late 2006 the [REDACTED] was purchased by [REDACTED] and there has been sporadic processing at the facility since that time. In May 2015, [REDACTED] and has a peak demand of 60 kVA.

The customer base in Ramea has been declining over the last several years, with modest decline expected to continue through the medium term.

- Grey River: This distribution system serves about 60 customers. There has been a modest decline in customer load since the early 2000's.
- Grey River is considered a prospective community for relocation in the longer term.
- Francois: This distribution system serves about 70 customers. The community load is forecast to remain stable through the medium term.
- Francois is considered a prospective community for relocation in the longer term.
- McCallum: This distribution system serves about 60 customers. The customer base has remained relatively stable with a decline in sales occurring in the last several years.
- No material changes in load are forecast through the medium term. McCallum is considered a prospective community for relocation in the longer term.

2.3.2 Labrador Isolated Systems

- L'Anse au Loup: This distribution system serves approximately 1025 customers.
- This system has continued to experience strong sales growth since its interconnection to Hydro Quebec's Lac Robertson system⁵ and subsequent PUB direction to charge customers Island Interconnected rates. Electric heat has been increasing its market share in both domestic and general service accounts and it is estimated that close to one half of the homes on the L'Anse au Loup System now use electricity as the main heating source.
- 
operations are expected to be maintained across the medium term.

⁵The Lac Robertson Surplus Energy Contract extends to December 31, 2020.

Continued load growth is forecast through the medium term.

Charlottetown: This distribution system serves about 230 customers from the communities of Charlottetown and Pinsent's Arm. [REDACTED] has a peak load of 1200 kVA and typically operates for four to five months each year. The announcement of recent cuts to fish quotas may have an impact on current operations, but as the regional processing impacts are unknown, it is not included in the current forecast.

No material load changes are expected to occur on the system through the medium term.

Mary's Harbour: This distribution system serves about 260 customers. [REDACTED] since 2013 and has a peak demand of 600 kVA.

A new fish plant for groundfish is in the talks of being built with hopes that the facility will be fully developed over the next three to four years. To date, no firm commitments for the building have been made.

No material load changes are forecast for this system through the medium term; however potential for load growth is possible with further investments in the fishery sector.

Norman Bay: This small distribution system continues to serve about 20 customers. Load on this system has remained stable in recent years, with no material change in load anticipated through the medium term.

Port Hope Simpson: This distribution system serves about 220 customers and is the central service center for the region. Load on this system has remained stable in recent years, with no material change in load anticipated through the medium term.

- St. Lewis: This distribution system serves about 130 customers. In 2012 the local crab plant, the main employer in the community, permanently closed, resulting in the community becoming a winter peaking system.
- ██████████ is continuing to do exploration in the area, and is moving forward with the environmental assessment process. As there is no certainty for this development, there is currently no additional material changes in load anticipated through the medium term.
- Black Tickle: This distribution system serves about 95 customers. A crab processing plant was the main employer in the community but was permanently closed. As a result of the closure of the crab plant, this system is now a winter peaking system and is forecast to enter a period of slow decline. Black Tickle is considered a prospective community for relocation in the longer term.
- Cartwright: This distribution system serves about 330 customers. ██████████ are producing with a peak load of approximately 485 kVA. Operations are subject to market and/or resource constraints however at this time no material change in load is forecast.
- Hopedale: This distribution system serves about 280 customers and has experienced continued load growth over the last decade.
- ██████████ was connected in January 2015, with a connected load of 435 kW, including 135 kW for electric heat. To date, demand at the facility has been around 150 kVA. The Nunatsiavut Government plan also called for the addition of an arena with an estimated load of 350 kW. However, as there is no decision on this or any timeframe given, it is not included in this forecast.
- The Nunatsiavut Government is also currently in the process of site selection to build a new, 1400 square meter, office building that will accommodate the Department of Health and Social Development in Hopedale. Although there has been no request for service provided, additional growth has been factored into the forecast to account for this

new service.

[REDACTED] in the community also has a service request in to upgrade [REDACTED] to electric heat, with a connected load of 125 kW. This request is currently being processed and is not captured in the load forecast.

Continued load growth is forecasted through the medium term, with continued funding by the Nunatsiavut Government and electrification of residential and general service buildings having the potential to increase loads at a higher growth rate.

Makkovik:

This distribution system serves approximately 230 customers.

[REDACTED]
with a combined peak load of 550 kVA. Although energy consumption from these services has experienced modest decline in recent years, no impact on peak load is anticipated.

[REDACTED]
[REDACTED]
[REDACTED] with a total connected load of 130 kW including 83 kW of electric heat. To date, peak demands have reached 50 kW.

[REDACTED]
[REDACTED]
[REDACTED] The total building is approximately 2500 square meters with a total connected load of 365 kW including 45 kW of electric heat. To date, demand at the facility has reached approximately 200 kVA.

Continued load growth is forecasted through the medium term, with continued funding by the Nunatsiavut Government and electrification of residential and general service buildings having the potential to increase loads at a higher growth rate.

Nain:

This distribution system currently serves around 500 customers and has experienced continued growth over the past decade. [REDACTED]

[REDACTED] and have experienced a slight increase in energy consumption over recent years, with peak demand

meter fire hall was also constructed recently and has a demand of 35kW.

Two general service customers have also increased demand on the system.

A [REDACTED] has installed 45kW of electric heaters, and a [REDACTED] was converted to electric heat, increasing their demand approximately 20 kW.

With no new large customers anticipated, only modest growth is forecasted in the medium term.

3.0 Summary Tables for the Hydro Rural Load Forecast – Spring 2018

Load Forecast Summaries:

- Island Interconnected Distribution Systems
- Labrador Interconnected
- Island Isolated
- Labrador Isolated

Island Interconnected Distribution Systems Peak Forecast (kW) - Spring 2018						
All Peaks Are Winter Peaks						
	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Great Northern Peninsula						
St. Anthony	10,949	11,080	11,213	11,213	11,213	11,213
Hawkes Bay	6,668	6,693	6,719	6,719	6,719	6,719
Roddickton	3,098	3,114	3,129	3,129	3,129	3,129
Bear Cove	5,745	5,814	5,884	5,884	5,884	5,884
Rocky Harbour	n/a	n/a	n/a	n/a	n/a	n/a
Plum Point	4,271	4,271	4,271	4,271	4,271	4,271
Glenburnie	n/a	n/a	n/a	n/a	n/a	n/a
Cow Head	2,043	2,048	2,048	2,048	2,048	2,048
Daniel's Harbour	1,243	1,250	1,257	1,257	1,257	1,257
Parsons Pond	1,462	1,467	1,472	1,477	1,477	1,477
Main Brook	832	846	860	860	860	860
Wiltondale	70	70	70	70	70	70
Sally's Cove	85	85	85	85	85	85
Baie Verte Peninsula						
Bottom Waters ^{1,2}	12,795	13,127	13,359	13,291	12,017	11,348
South Brook	7,531	7,593	7,656	7,687	7,687	7,687
White Bay	2,897	3,035	3,040	3,040	3,040	3,040
King's Point	2,124	2,124	2,124	2,103	2,082	2,062
Coachman's Cove	644	641	637	628	619	610
Little Bay	600	597	594	585	576	568
Westport	552	554	557	552	547	542
Fogo/Change Islands						
Farewell Head	7,111	7,111	7,111	7,006	6,902	6,800
South Coast						
Hermitage	14,018	14,044	14,071	14,098	14,098	14,098
St. Alban's	7,128	7,210	7,390	7,575	7,575	7,575
Burgeo	4,802	4,855	4,882	4,882	4,882	4,882
Monkstown	316	318	320	320	320	320
Petite Forte	150	150	150	150	150	150
Notes:						
	1. Includes local generation.					
	2. Bottom Waters forecast reflects mining operations proven resource estimates.					
	3. N/A : Forecasts for these systems are not available at this time.					
Source: Market Analysis Section, Rural Planning						
Spring 2018						
						1 of 1

Labrador Interconnected Load Forecast - Spring 2018						
	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Happy Valley - Goose Bay ³						
Gross Peak (kW)	78,744	80,254	80,479	80,772	81,044	81,313
Gross Energy (MWh)	312,339	344,802	345,700	346,869	347,955	349,028
Total Sales (MWh)	297,162	328,176	329,034	330,094	331,131	332,157
Company Use (MWh)	1,297	1,297	1,297	1,297	1,297	1,297
Muskrat Falls						
Customer Peak ⁴ (kW)	10,753	8,065	3,274	0	0	0
System Peak (kW)	9,437	3,191	0	0	0	0
Total Sales (MWh)	50,530	33,304	9,062	0	0	0
Gross Energy (MWh)	51,288	33,803	9,485	0	0	0
Labrador City						
Gross Peak (kW)	60,429	60,583	61,206	61,342	61,478	61,614
Gross Energy (MWh)	278,770	283,145	295,039	295,597	296,154	296,711
Total Sales (MWh)	264,524	268,675	279,962	280,491	281,019	281,548
Company Use (MWh)	0	0	0	0	0	0
Wabush						
Gross Peak (kW)	22,069	22,085	22,149	22,264	22,377	22,491
Gross Energy (MWh)	88,568	88,633	88,697	88,962	89,219	89,477
Total Sales (MWh)	84,203	84,265	84,326	84,579	84,825	85,070
Company Use (MWh)	321	321	321	321	321	321
Labrador West Sub-Total						
Gross Peak (kW)	82,498	82,668	83,355	83,606	83,855	84,105
Gross Energy (MWh)	367,338	371,777	383,736	384,559	385,373	386,188
Total Sales (MWh)	348,727	352,940	364,288	365,070	365,844	366,619
Company Use (MWh)	321	321	321	321	321	321
Labrador Interconnected ³						
Gross Peak (kW)	161,242	162,922	163,833	164,378	164,899	165,418
Gross Energy (MWh)	679,677	716,579	729,436	731,428	733,328	735,216
Total Sales (MWh)	645,889	681,116	693,322	695,164	696,975	698,775
Company Use (MWh)	1,617	1,617	1,617	1,617	1,617	1,617
Notes:	1. Gross peak and energy equates to bulk deliveries on interconnected systems. 2. Gross peak and system peaks are reported on winter peak basis. 3. Forecast excludes Muskrat Falls construction power and energy requirements. 4. Customer peak reported on an annual peak basis.					
Source: Market Analysis Section, Rural Planning						
Spring 2018						
						1 of 1

Island Isolated Systems Load Forecast Spring 2018						
	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Francois						
Gross Peak (kW)	206	204	203	202	201	199
Net Peak (kW)	193	192	191	190	188	187
Gross Energy (MWh)	663	659	655	651	647	643
Net Energy (MWh)	610	606	603	599	595	591
Total Sales (MWh)	586	582	579	575	571	568
Company Use (MWh)	0	0	0	0	0	0
Grey River						
Gross Peak (kW)	182	181	179	178	177	175
Net Peak (kW)	160	158	157	156	154	153
Gross Energy (MWh)	600	595	591	587	582	578
Net Energy (MWh)	478	474	471	467	464	460
Total Sales (MWh)	449	446	442	439	436	432
Company Use (MWh)	7	7	7	7	7	7
Little Bay Islands						
Gross Peak (kW)	146	145	144	143	142	141
Net Peak (kW)	139	138	137	136	135	134
Gross Energy (MWh)	516	513	509	506	502	498
Net Energy (MWh)	476	473	470	466	463	460
Total Sales (MWh)	444	440	437	434	431	428
Company Use (MWh)	15	15	15	15	15	15
McCallum						
Gross Peak (kW)	142	140	139	138	137	136
Net Peak (kW)	132	131	129	128	127	126
Gross Energy (MWh)	494	490	486	482	478	473
Net Energy (MWh)	434	430	427	423	420	416
Total Sales (MWh)	407	403	400	397	393	390
Company Use (MWh)	0	0	0	0	0	0
Ramea						
Gross Peak (kW)	1,078	1,073	1,067	1,061	1,054	1,048
Net Peak (kW)	1,047	1,042	1,035	1,029	1,023	1,017
Gross Energy (MWh)	4,429	4,408	4,384	4,360	4,336	4,312
Net Energy (MWh)	4,270	4,249	4,226	4,203	4,180	4,157
Total Sales (MWh)	4,096	4,076	4,054	4,032	4,010	3,987
Company Use (MWh)	0	0	0	0	0	0

Island Isolated Systems Load Forecast Spring 2018						
	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
St. Brendans						
Gross Peak (kW)	342	343	344	345	346	346
Net Peak (kW)	329	330	331	332	333	333
Gross Energy (MWh)	1,115	1,119	1,122	1,125	1,129	1,129
Net Energy (MWh)	1,018	1,021	1,024	1,027	1,030	1,030
Total Sales (MWh)	914	917	920	923	925	925
Company Use (MWh)	21	21	21	21	21	21
Total Island Isolated						
Gross Peak (kW)	2,096	2,086	2,076	2,067	2,057	2,046
Net Peak (kW)	2,000	1,991	1,981	1,971	1,961	1,950
Gross Energy (MWh)	7,818	7,784	7,747	7,710	7,673	7,633
Net Energy (MWh)	7,286	7,254	7,220	7,186	7,151	7,114
Total Sales (MWh)	6,895	6,865	6,832	6,799	6,766	6,730
Company Use (MWh)	44	44	44	44	44	44
Source: Market Analysis Section, Rural Planning Spring 2018						2 of 2

Labrador Isolated Load Forecast Spring 2018						
	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Black Tickle						
Gross Peak (kW)	291	290	289	286	284	281
Net Peak (kW)	274	273	272	269	267	264
Gross Energy (MWh)	1,207	1,202	1,196	1,185	1,173	1,162
Net Energy (MWh)	1,153	1,148	1,143	1,132	1,121	1,110
Total Sales (MWh)	1,016	1,012	1,007	997	987	977
Company Use (MWh)	41	41	41	41	41	41
Cartwright ¹						
Gross Peak (kW)	1,016	1,021	1,025	1,026	1,027	1,027
Net Peak (kW)	986	992	996	996	997	998
Gross Energy (MWh)	4,622	4,647	4,665	4,668	4,670	4,673
Net Energy (MWh)	4,428	4,453	4,470	4,472	4,475	4,477
Total Sales (MWh)	4,272	4,296	4,312	4,315	4,317	4,319
Company Use (MWh)	0	0	0	0	0	0
Charlottetown ¹						
Gross Peak (kW)	1,645	1,655	1,665	1,674	1,684	1,694
Net Peak (kW)	1,600	1,610	1,619	1,629	1,639	1,648
Gross Energy (MWh)	5,543	5,576	5,609	5,642	5,674	5,707
Net Energy (MWh)	5,297	5,328	5,359	5,390	5,422	5,453
Total Sales (MWh)	5,041	5,070	5,100	5,130	5,160	5,190
Company Use (MWh)	0	0	0	0	0	0
Hopedale						
Gross Peak (kW)	1,210	1,259	1,304	1,334	1,342	1,350
Net Peak (kW)	1,147	1,196	1,241	1,271	1,279	1,287
Gross Energy (MWh)	5,493	5,713	5,919	6,055	6,090	6,126
Net Energy (MWh)	5,304	5,516	5,715	5,847	5,881	5,915
Total Sales (MWh)	5,050	5,252	5,441	5,567	5,599	5,632
Company Use (MWh)	0	0	0	0	0	0
Makkovik						
Gross Peak (kW)	988	1,003	1,015	1,024	1,030	1,034
Net Peak (kW)	953	969	980	990	996	1,000
Gross Energy (MWh)	4,766	4,833	4,883	4,924	4,949	4,969
Net Energy (MWh)	4,593	4,658	4,707	4,746	4,770	4,790
Total Sales (MWh)	4,353	4,415	4,461	4,499	4,522	4,540
Company Use (MWh)	14	14	14	14	14	14

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Labrador Isolated Load Forecast Spring 2018						
	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Mary's Harbour ¹						
Gross Peak (kW)	1,088	1,090	1,092	1,094	1,095	1,097
Net Peak (kW)	1,032	1,034	1,036	1,038	1,039	1,041
Gross Energy (MWh)	4,676	4,683	4,690	4,697	4,704	4,712
Net Energy (MWh)	4,365	4,371	4,378	4,385	4,392	4,398
Total Sales (MWh)	4,097	4,103	4,109	4,116	4,122	4,128
Company Use (MWh)	0	0	0	0	0	0
Nain						
Gross Peak (kW)	2,263	2,281	2,299	2,318	2,361	2,405
Net Peak (kW)	2,200	2,217	2,235	2,254	2,298	2,342
Gross Energy (MWh)	10,126	10,310	10,396	10,482	10,686	10,891
Net Energy (MWh)	9,778	9,956	10,038	10,122	10,319	10,516
Total Sales (MWh)	9,272	9,440	9,519	9,598	9,785	9,972
Company Use (MWh)	2	2	2	2	2	2
Norman Bay						
Gross Peak (kW)	54	54	54	54	54	54
Net Peak (kW)	51	51	51	51	51	51
Gross Energy (MWh)	216	216	216	216	216	216
Net Energy (MWh)	195	195	195	195	195	195
Total Sales (MWh)	140	140	140	140	140	140
Company Use (MWh)	16	16	16	16	16	16
Paradise River						
Gross Peak (kW)	78	78	78	78	78	78
Net Peak (kW)	68	68	68	68	68	68
Gross Energy (MWh)	218	218	218	218	218	218
Net Energy (MWh)	186	186	186	186	186	186
Total Sales (MWh)	156	156	156	156	156	156
Company Use (MWh)	0	0	0	0	0	0
Port Hope Simpson						
Gross Peak (kW)	779	782	803	806	809	813
Net Peak (kW)	742	745	767	772	777	781
Gross Energy (MWh)	3,397	3,412	3,503	3,518	3,532	3,547
Net Energy (MWh)	3,148	3,162	3,246	3,260	3,273	3,287
Total Sales (MWh)	2,959	2,971	3,051	3,063	3,076	3,089
Company Use (MWh)	0	0	0	0	0	0

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Labrador Isolated Load Forecast Spring 2018						
	2018	2019	2020	2021	2022	2023
Postville						
Gross Peak (kW)	453	453	455	455	455	455
Net Peak (kW)	434	434	436	436	436	436
Gross Energy (MWh)	1,955	1,955	1,964	1,964	1,964	1,964
Net Energy (MWh)	1,868	1,868	1,876	1,876	1,876	1,876
Total Sales (MWh)	1,748	1,748	1,755	1,755	1,755	1,755
Company Use (MWh)	7	7	7	7	7	7
Rigolet						
Gross Peak (kW)	744	752	756	764	769	774
Net Peak (kW)	723	731	735	743	748	753
Gross Energy (MWh)	3,175	3,208	3,229	3,262	3,283	3,304
Net Energy (MWh)	3,065	3,097	3,117	3,149	3,170	3,190
Total Sales (MWh)	2,881	2,911	2,930	2,961	2,980	3,000
Company Use (MWh)	40	40	40	40	40	40
St. Lewis						
Gross Peak (kW)	416	416	416	416	416	416
Net Peak (kW)	396	396	396	396	396	396
Gross Energy (MWh)	1,675	1,675	1,675	1,675	1,675	1,675
Net Energy (MWh)	1,559	1,559	1,559	1,559	1,559	1,559
Total Sales (MWh)	1,463	1,463	1,463	1,463	1,463	1,463
Company Use (MWh)	0	0	0	0	0	0
L'Anse au Loup						
Gross Peak (kW)	5,905	6,040	6,080	6,125	6,155	6,180
Net Peak (kW)	5,791	5,926	5,966	6,011	6,041	6,066
Gross Energy (MWh)	27,169	27,776	27,949	28,149	28,284	28,383
Net Energy (MWh)	26,587	27,180	27,349	27,546	27,677	27,774
Total Sales (MWh)	24,771	25,326	25,483	25,667	25,790	25,880
Company Use (MWh)	59	59	59	59	59	59
Total Labrador Isolated excluding L'Anse au Loup						
Gross Peak (kW)	10,072	10,164	10,270	10,339	10,408	10,477
Net Peak (kW)	9,654	9,747	9,853	9,924	9,994	10,065
Gross Energy (MWh)	47,068	47,647	48,162	48,505	48,836	49,163
Net Energy (MWh)	44,937	45,496	45,988	46,318	46,637	46,952
Total Sales (MWh)	42,446	42,977	43,444	43,759	44,061	44,360
Company Use (MWh)	120	120	120	120	120	120
Notes: 1. Denotes Summer Peak						
Source: Market Analysis Section, Rural Planning						
Spring 2018						
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Appendix A

Population Statistics for NL Hydro Distribution Systems					
	1996	2001	2006	2011	2016
Island Interconnected					
Bear Cove	864	797	712	766	706
Burgeo - Grandy Brook	2,098	1,782	1,607	1,464	1,307
Coachman's Cove - Fleur de Lys	557	474	413	357	349
Conne River	751	837	867	920	956
Cow Head	1,049	841	802	733	666
Daniel's Harbour	544	430	371	327	306
English Harbour West	1,847	1,599	1,444	1,350	1,294
Fogo	4,033	3,378	3,006	2,652	2,452
Hampden	651	544	489	457	429
Hawkes Bay	2,843	2,541	2,282	2,102	1,993
Hermitage - Barachois	3,819	3,369	2,956	2,603	2,434
King's Point	845	771	670	675	659
Little Bay	389	309	299	258	147
Main Brook	424	357	293	265	243
Ming's Bight - Bottom Waters	3,763	3,309	2,964	2,745	2,580
Parsons Pond	530	427	387	383	345
Plum Point	4,046	3,556	3,138	2,911	2,708
Roddickton	2,545	2,234	1,946	1,821	1,696
South Brook	3,043	2,744	2,462	2,288	2,171
St. Albans - Bay D'Espoir	2,881	2,407	2,271	2,139	2,036
St. Anthony	4,766	4,369	3,814	3,667	3,336
Westport	412	311	246	220	195
White Bay - Jackson's Arm	470	420	374	323	284
Labrador Interconnected					
Happy Valley	9,222	8,520	9,118	9,419	9,679
Labrador City	8,455	7,744	7,240	7,367	7,220
Wabush	2,018	1,894	1,739	1,861	1,906
Labrador Diesel					
Black Tickle	260	245	210	170	150
Cartwright	628	629	552	504	427
Charlottetown	330	346	366	308	290
Hopedale	591	559	530	556	574
Makkovik	367	384	362	361	377
Mary's Harbour	474	450	417	383	341
Nain	996	1,159	1,034	1,188	1,125
Port Hope Simpson	577	509	529	441	412
Postville	223	215	219	206	177
Rigolet	259	317	269	306	305
St. Lewis	312	290	252	207	194

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Population Statistics for NL Hydro Distribution Systems					
	1996	2001	2006	2011	2016
L'Anse au Loup	1,979	1,932	1,748	1,592	1,551
Island Diesel					
Francois	175	162	134	114	89
Grey River	188	165	155	124	104
Little Bay Islands	244	176	152	97	71
McCallum	135	140	115	92	73
Ramea	1,080	754	618	526	447
St. Brendan's	321	251	203	147	145
Note: Population data is not available for all systems.					
Source: Statistics Canada - Canadian Census data					2 of 2