

2024 Resource Adequacy Plan

Technical Conference #1: Load Forecast/Reliability Planning Criteria


September 17, 2024



SAFETY MOMENT



Experts Present Today


- **Robert Collett**, Vice President, Engineering & NLSO
 - **Samantha Tobin**, Sr. Manager, Resource & Production Planning
 - **Grant Outerbridge**, Manager, Electrification & Energy Optimization
 - **David Goosney**, Team Lead, Long-Term Resource Planning
 - **Brian Sparkes**, Team Lead, Market Analysis & Load Forecasting
 - **Phil DiDomenico**, Managing Consultant, Daymark
 - **Kathy Kelly**, Vice President and Principal Consultant, Daymark (Virtual)
 - **Jeff Turner**, Director Clean Mobility, Dunsky (Virtual)
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Opening Statement



Desired Conference Outcomes


Newfoundland and Labrador Hydro (“Hydro”) aims to address parties issues and questions and provide adequate information in relation to the 2024 Resource Adequacy Plan to achieve settlement on the following topics:

- i. Obtain alignment on Hydro’s load forecast methodology which demonstrates provincial load growth;
 - ii. Confirm that assumptions underlying Hydro’s system planning criteria and methodology are appropriate; and
 - iii. Confirm that planning for the Island and Labrador should continue to be completed separately.
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ISSUE 1: LOAD FORECAST



Agenda: Load Forecast


- Electricity Rate Assumptions
 - Population Forecast
 - Electric Vehicle (“EV”) Forecast
 - Oil-to-Electric Conversions
 - Industrial Demand
 - Conservation
 - Load Forecast 2023 versus 2024
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Load Forecast – Electricity Rate Assumptions


2024 Resource Adequacy Plan – Issues List:

- *NLH has attempted to capture the impact of changes in electricity rates on demand for electricity in its RAP modeling. Has NLH done so in a reasonable manner, or are additional sensitivities/considerations needed?*

Assessment of 2023 Long-Term Load Forecast:

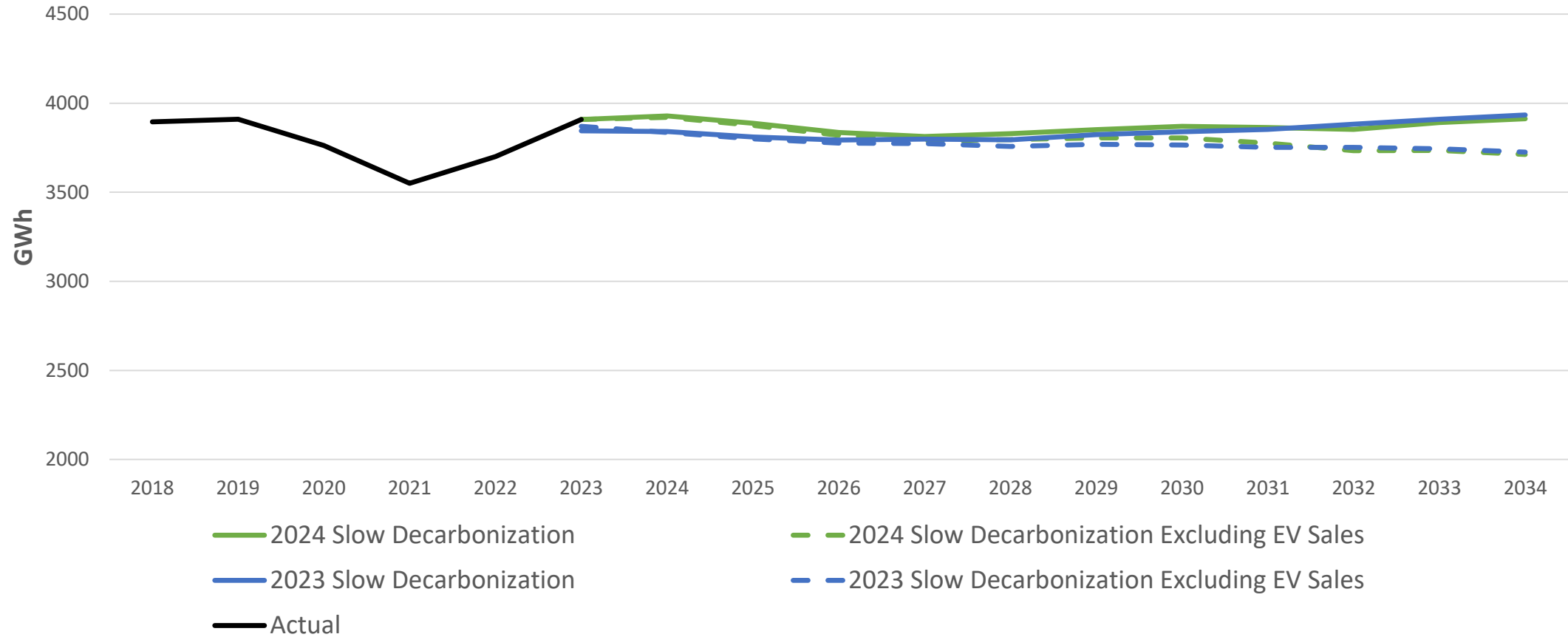
- *With respect to electricity prices, we recommend NLH reconcile and potentially update its load forecast to account for the Government's May 16, 2024 Muskrat Falls rate mitigation plan, which differs from the electricity prices modeled in the load forecast.*
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Electricity Rate Assumptions

- The 2023 Slow Decarbonization forecast included similar electricity rates as the finalized Government rate mitigation plan.
 - The 2024 Slow Decarbonization forecast electricity prices include:
 - The Government's final rate mitigation plan to 2030;
 - Assumes rate mitigation continues post 2030.
 - Increases due to Newfoundland Power costs; and
 - The costs for the Minimum Investment Required Expansion Plan scenario as proposed in the 2024 Resource Adequacy Plan.
 - BDE Unit 8, 150 MW Combustion Turbine, 400 MW of wind and a transmission upgrade.
 - Hydro will continue to work with the Government on the post-2030 rate mitigation plan, providing necessary information to aid the Government in its decision-making process.
 - Electricity rates continue to have an impact on Domestic customer sales.
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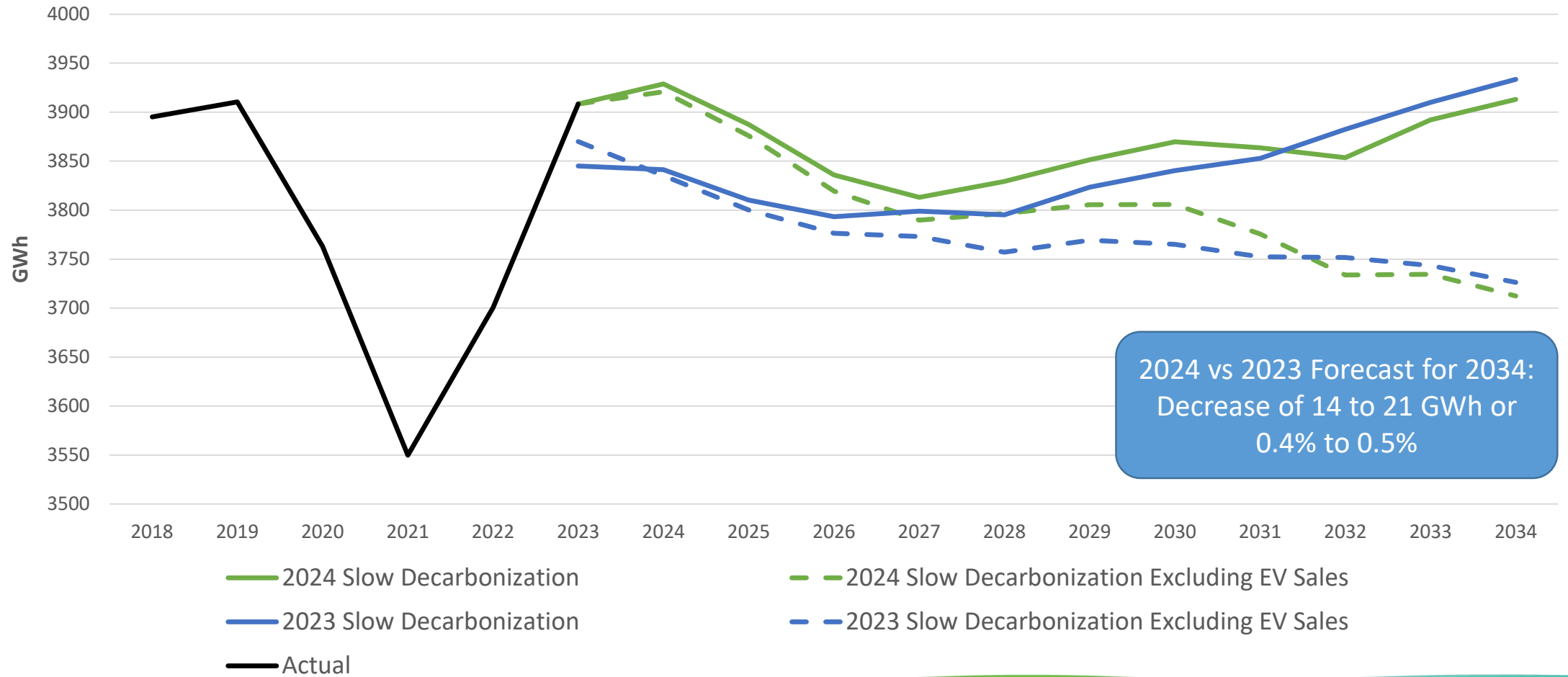
Domestic Sales – Slow Decarb 2023 vs 2024

Total Island Interconnected Residential Sales (GWh)



Domestic Sales – Slow Decarb 2023 vs 2024

Total Island Interconnected Residential Sales (GWh)



Load Forecast – Population Forecast


2024 Resource Adequacy Plan – Issues List:

- *Are assumptions regarding population growth and its impact on load adequately addressed?*

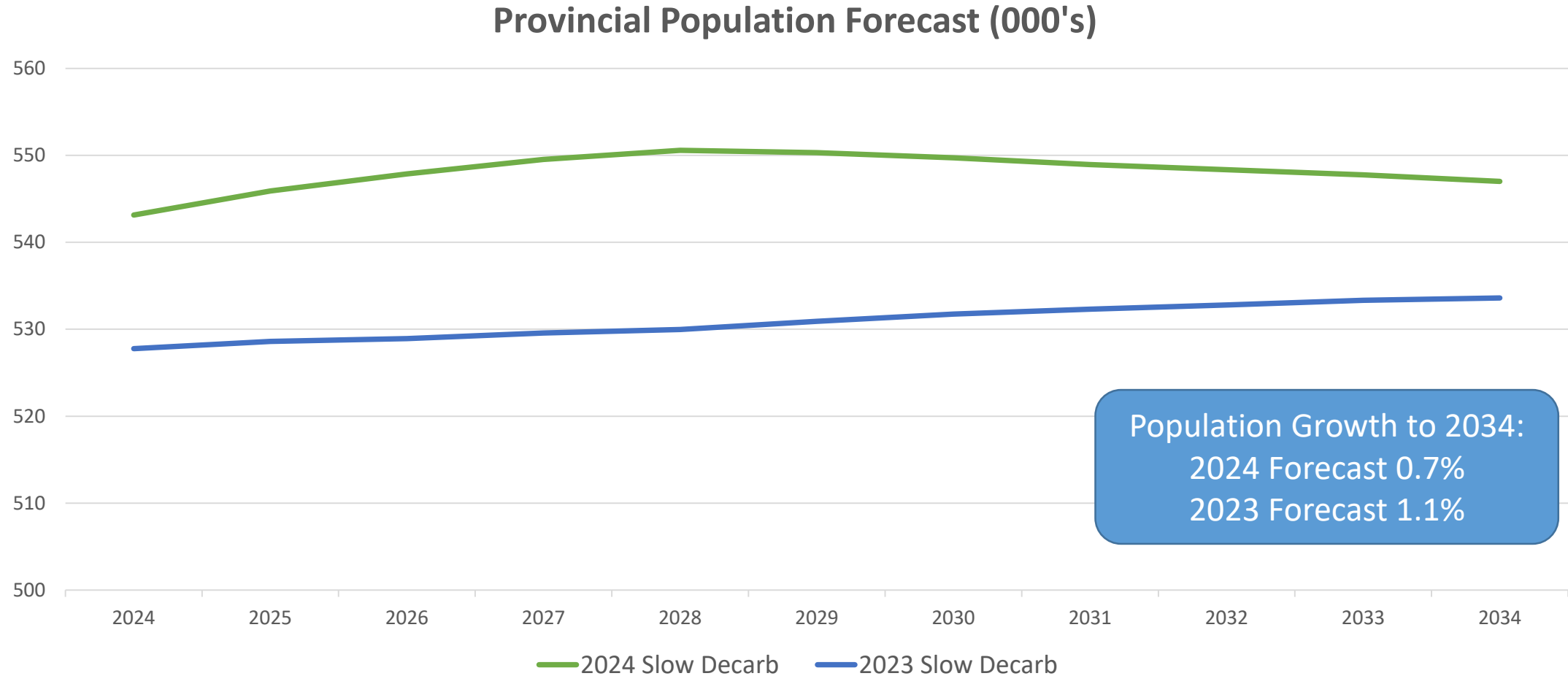
Assessment of 2023 Long-Term Load Forecast:

- *In its forecast update, NLH should assess the impact of flat population growth and the associated impact on customer count, consistent with low population growth scenarios evaluated by Statistics Canada.*

Population Data – Timing of Data

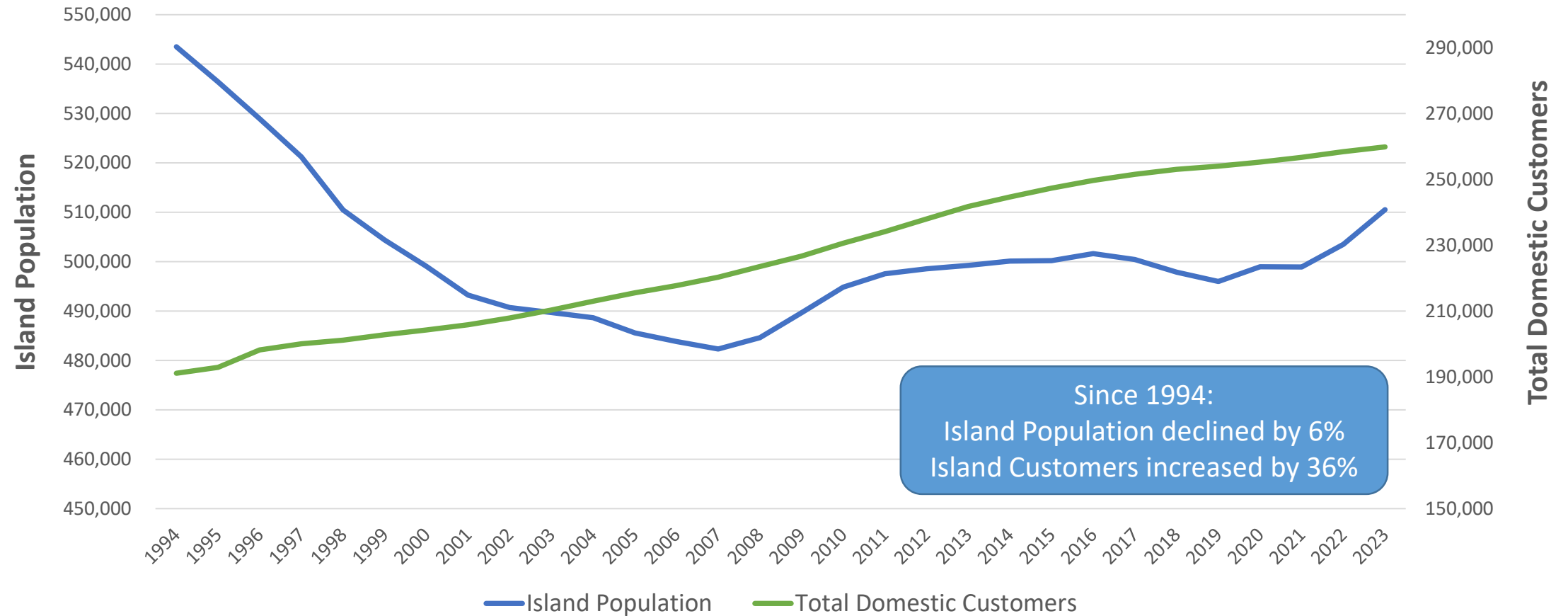
- The 2023 load forecast scenarios were completed in Q2 2023.
 - In September 2023, Statistics Canada updated historical population data.
 - Statistics Canada's official population numbers were revised to reflect the 2021 Census counts. The new population estimates were revised upwards in every year from 2017 to 2022.
 - The updated Statistics Canada historical population data has been incorporated into the 2024 load forecast.
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Population Forecast – Slow Decarb 2023 vs 2024

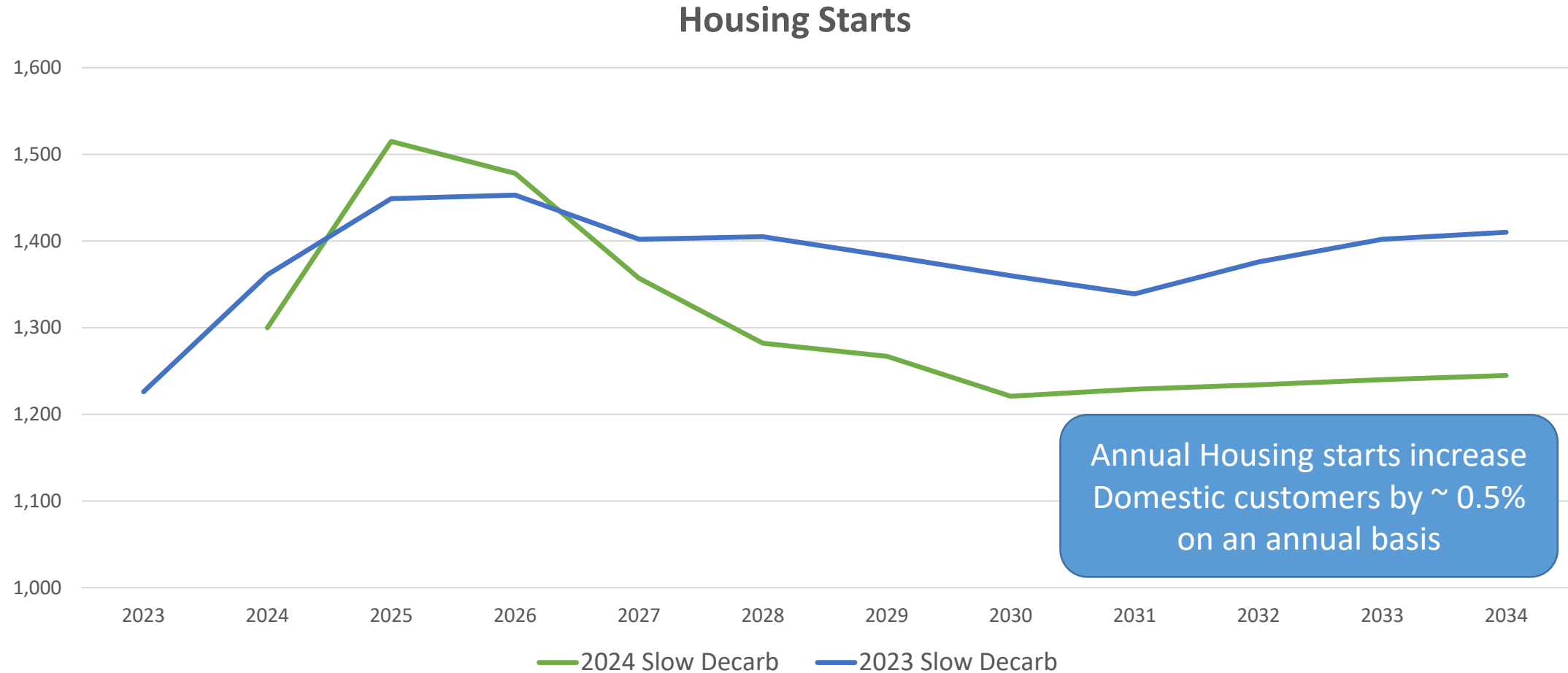


Historical Population and Domestic Customers

Island Population vs Total Domestic Customers



Housing Starts – Slow Decarb 2023 vs 2024




Load Forecast – EV Forecast


2024 Resource Adequacy Plan – Issues List:

- *Were the EV adoption and impact on load shape assumptions reasonable, including addressing the fact that the reference case does not achieve provincial targets, and should they be updated with the expected Posterity Study?*


Assessment of 2023 Long-Term Load Forecast:

- *NLH should detail the assumptions underpinning the EV scenarios it adopts, addressing the fact that projected penetration rates reflected in the load forecast fall short of Newfoundland and Labrador provincial targets, and the timing and extent to which growth in charging infrastructure will be achieved.*
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EV Assumptions

- Assumptions for EVs within the 2023 load forecast were driven by the 2022 update by industry EV forecast expert, Dunsky Climate Advisors (“Dunsky”).
 - The 2023 Slow Decarbonization forecast utilizes Dunsky’s 2022 EV forecasts for:
 - Medium Growth Base Case for Light-Duty Vehicles.
 - Medium Low Sensitivity for Medium- and Heavy-Duty Vehicles.
 - In the 2023 Accelerated Decarbonization forecast, Hydro modified Dunsky’s forecast to achieve the federal target of 100% of new vehicle sales being zero emission.
 - Hydro continues to work with Dunsky for our EV modelling. In 2024, Hydro contracted Dunsky to update the EV Study which is incorporated in the 2024 load forecast.
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EV Forecast – Charging Network

- There are currently 33 utility-owned and operated public EV fast charging stations.
 - In 2021, the first EV charging network, consisting of 14 EV fast-charging stations was completed.
 - In 2022, an additional 19 EV fast-charging stations were installed.
 - In 2023, Hydro received approval from the Board of Commissioners of Public Utilities (“Board”) for an additional seven ultra-fast charging ports.
 - Hydro is working with the Government on finalizing funding details.
 - The 2023 Slow Decarbonization forecast utilizes Dunsky’s Medium Growth Scenario which assumes consistent investment in charging stations with 100 sites and 400 ports in service by 2040.
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EV Forecast – Demand Management

- The 2023 load forecast assumes 50% managed load for light-duty EVs, and that medium- and heavy-duty EVs are already managed to their full extent.

Provincial EV Load Demand in 2034

| Load Forecast | Managed EV Load (MW) | Unmanaged EV Load (MW) | Delta (MW) |
|----------------------------------|----------------------|------------------------|------------|
| 2023 Slow Decarbonization | 65 | 87 | 22 |
| 2023 Reference | 94 | 125 | 31 |
| 2023 Accelerated Decarbonization | 113 | 151 | 38 |


- An increase in EV penetration or reduction in managed load assumptions further supports the Minimum Investment Required Expansion Plan.

Load Forecast – Oil-to-Electric Conversions


2024 Resource Adequacy Plan – Issues List:

- *Are heating electrification assumptions adequately addressed and justified?*

Assessment of 2023 Long-Term Load Forecast:

- *NLH should provide detail on key assumptions and their effects in its reporting, including details of oil-to-electric conversion programs made available to customers, the ability of customers to retain oil heating systems as backup, and the potential reliance on electric (i.e. resistive heating) backup to electric heat pumps.*
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Electrification Assumptions

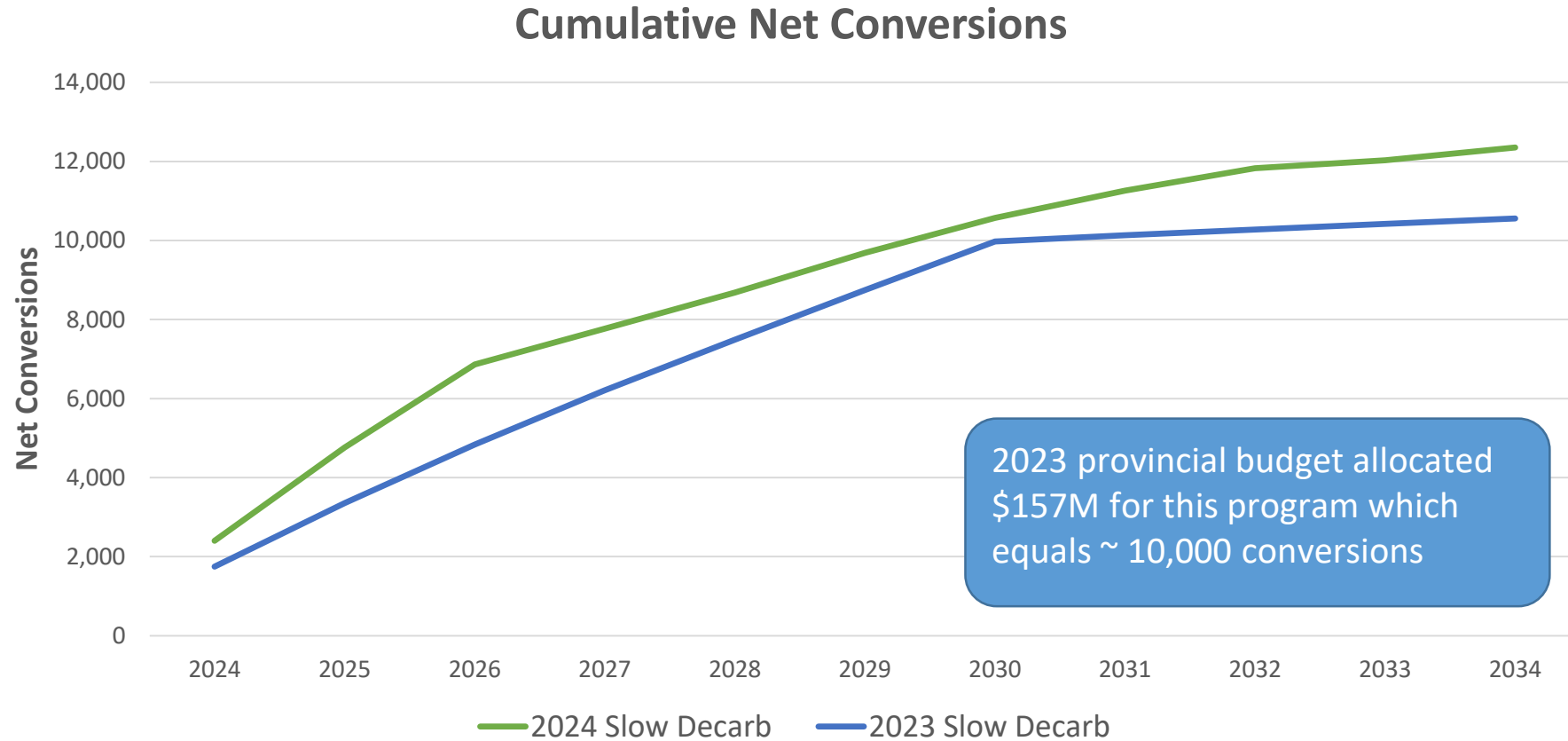
- Oil-to-Electric Conversions:
 - Assumes electric heat is the primary source of heat for any conversions.
 - Assumes the oil furnace is not retained as backup. The provincial government rebate requires the removal of the oil furnace.
 - Conversions are based on current government programs: <https://www.gov.nl.ca/releases/2023/ecc/0629n03/>.
 - Current program runs until March 2027.
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Electrification Assumptions

Incentives by Technology Type and Household Category:

| Technology Type | Income-tested program (low and moderate income) | Non-income |
|-------------------|---|-----------------|
| Electric furnace | Maximum \$10,000 | Maximum \$5,000 |
| Electric boiler | Maximum \$10,000 | Maximum \$5,000 |
| Mini-split* | Maximum \$10,000** | Maximum \$5,000 |
| Multi-split | Maximum \$13,000** | Maximum \$6,500 |
| Central heat pump | Maximum \$17,000** | Maximum \$9,000 |

Oil-to-Electric Conversions – Slow Decarbonization



- 2023 Slow Decarbonization forecast assumes 59% of oil heated homes that have oil tanks expiring will convert to electricity.

Load Forecast – Industrial Demand


2024 Resource Adequacy Plan – Issues List:

- *Is there sufficient consideration of different levels of potential future industrial load growth?*

Assessment of 2023 Long-Term Load Forecast:

- *We recommend that NLH supplement the Slow Decarbonization case with an assessment of how lower or flat industrial load growth would impact demand and energy forecasts.*
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Slower Industrial Growth

- Based on current industrial load and the provincial outlook on industrial growth, Hydro is confident that the Slow Decarbonization Scenario includes a realistic forecast for industrial demand.
 - Current outlook for Industrial customers on the Island:
 - Corner Brook Pulp and Paper Limited
 - Vale Smelter
 - Braya Renewable Fuels
 - Valentine Gold Mine
 - New Industrial (Hydrogen and other)
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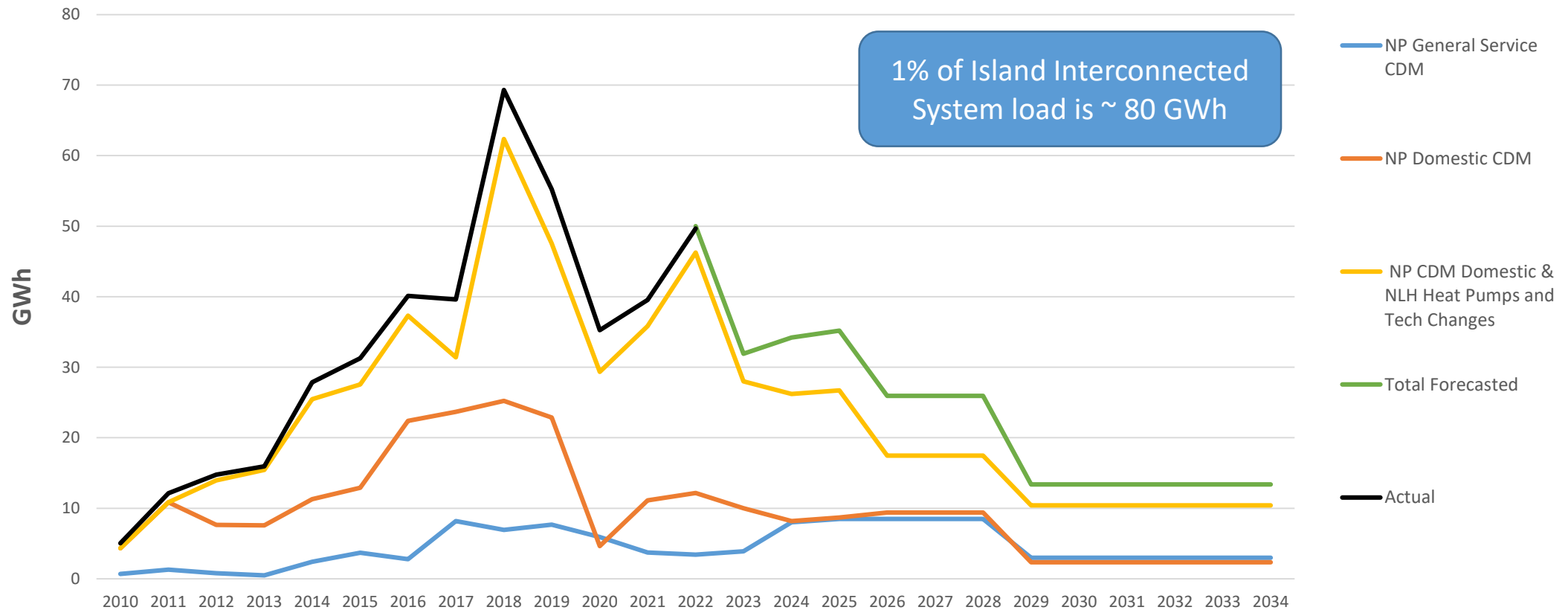
Load Forecast – Conservation

2024 Resource Adequacy Plan – Issues List:

- *Are NLH's assumptions regarding demand-side resources (energy efficiency, demand-side management, conservation) reasonable?*

CDM and Conservation – 2023 Slow Decarb

CDM and Conservation (GWh)



Load Forecast – 2023 vs 2024 Forecast

2024 Resource Adequacy Plan – Issues List:

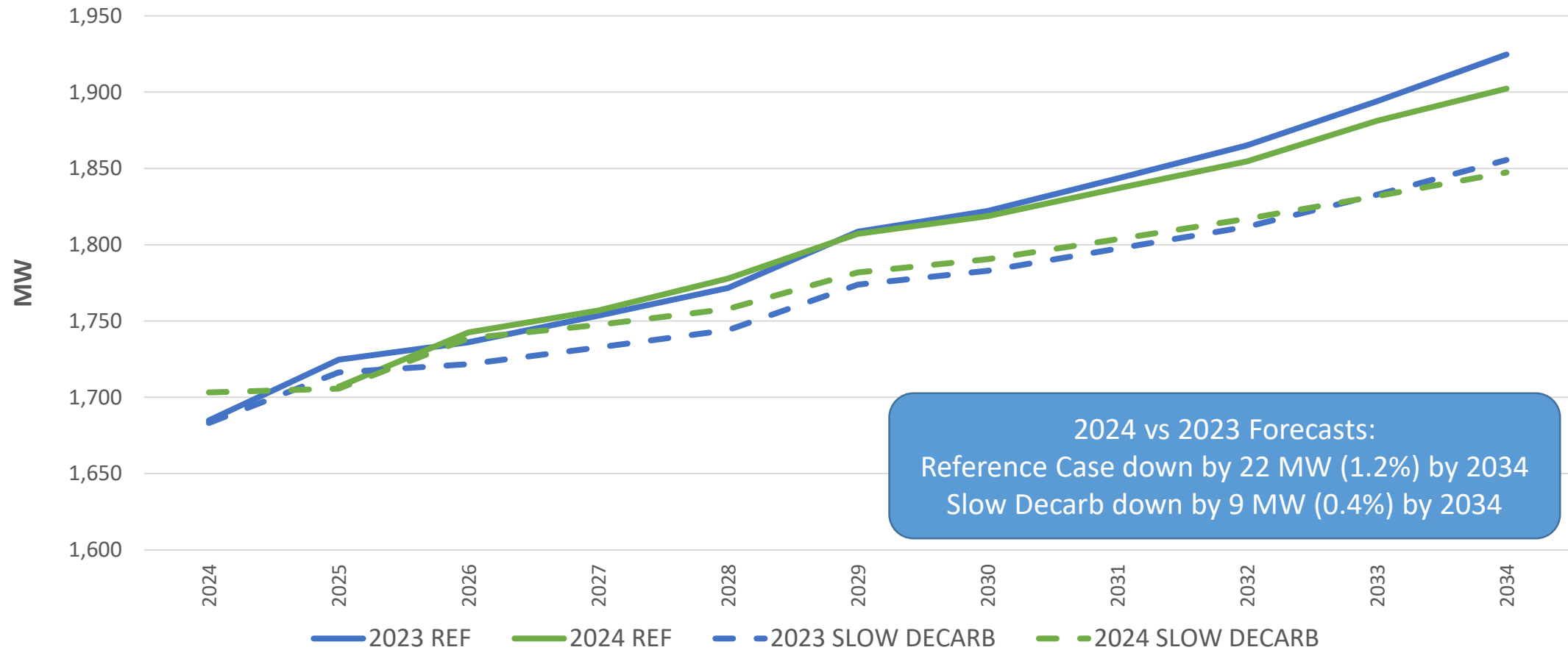
- *The load forecast was prepared in the third quarter of 2023. Does it need to be updated now or at what time during the process should it be revised?*
- *Is NLH's pre-filed load forecast reasonable, or should it be adjusted or re-assessed?*

Assessment of 2023 Long-Term Load Forecast:

- *Given a) the importance of NLH load forecasting to the determination of future resource need; b) the changing drivers of energy demand reflected in the Load Forecast Report; c) the fact that the load forecast was conducted before 2023 actual data were available; and d) there is an ongoing study by a consultant for Hydro and Newfoundland Power to update the load potential study done by Dunsky in 2019, we recommend that NLH review its load forecast and update them for significant changes identified in the review and/or by the consultant study.*

2024 Update to the Long-Term Load Forecast

IIS Coincident Customer Demand (MW)



Load Forecast – Demand Breakout


| | 2025 | 2023 Slow Decarb – 2034 | 2024 Slow Decarb –2034 |
|---------------------------|--------------|----------------------------|---------------------------|
| Newfoundland Power System | 1,458 | 1,517 | 1,525 |
| Rural | 91 | 91 | 87 |
| Industrial | 187 | 211 | 202 |
| Hydrogen | 0 | 10 | 10 |
| EV | 5 | 65 | 61 |
| Total | 1,741 | 1,894 | 1,885 |
| Coincident Peak | 1,706 | 1,856 | 1,847 |

Load Forecast – 2023 vs 2024 Forecast

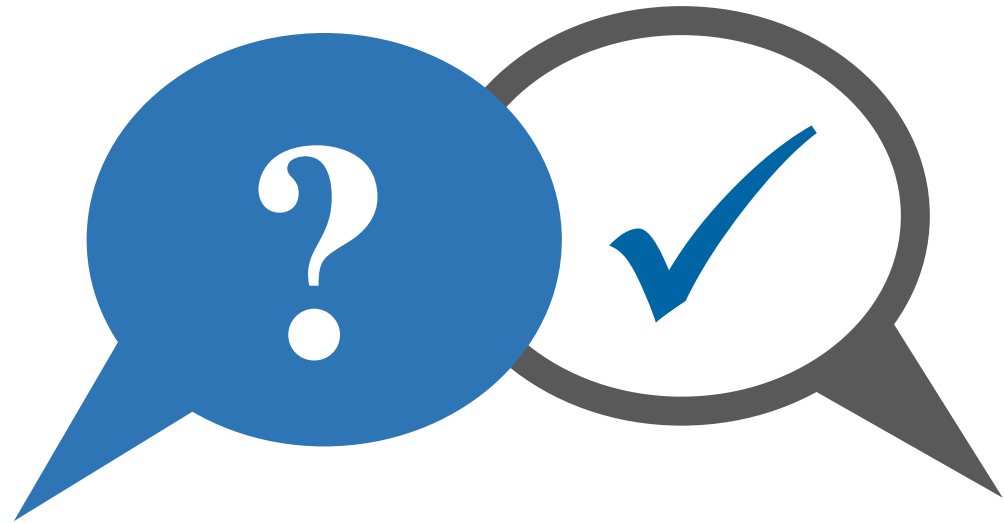
2024 Resource Adequacy Plan – Issues List:

- *Is NLH's decision to base its "Recommended Expansion Plan" on a load forecast scenario that is most conservative reasonable?*

Load Forecast: Hydro's Position

- Hydro believes the 2023 load forecast assumptions are appropriate for the Resource Adequacy Plan and the Minimum Investment Required Expansion Plan included in the 2024 Resource Adequacy Plan.
 - Hydro firmly believes that the Minimum Investment Required Expansion Plan represents the first step to meet the Island Interconnected System reliability needs.
 - It does not preclude Hydro from doing more to meet the Reference Case requirements.
 - Hydro will continue to annually update the load forecast and scenarios with new information, for both the Island Interconnected System and the Labrador Interconnected System to support all planning analysis for the province.
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Questions?



ISSUE 2: RELIABILITY PLANNING CRITERIA



Agenda

- Regional and Sub-Regional Planning
 - Probabilistic Capacity Criterion
 - Load Shape
 - Firm Energy Requirements
 - Operational Capacity Requirements
 - Labrador-Island Link (“LIL”) Shortfall Criteria
 - Planning Reserve Margin Results
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Regional and Sub-Regional Planning


2024 Resource Adequacy Plan – Issues List:

- *NLH recommends continuing to plan for the IIS and the LIS separately at this time. Is this reasonable?*

Assessment of 2024 Resource Adequacy Plan:

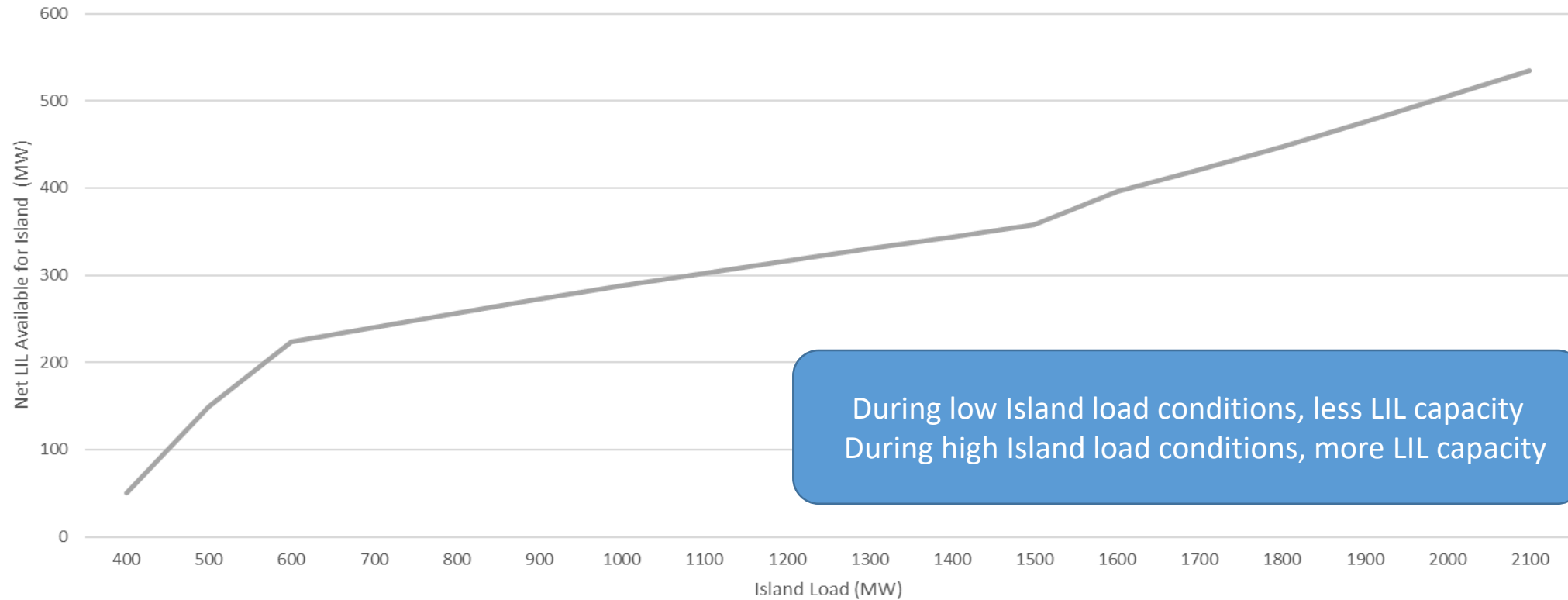
- *Provide additional detail on modeling results, including energy deliveries over the LIL (#1).*
 - Additional detail on modeling results to be discussed in Technical Conferences 3 and 4.

Regional and Sub-Regional Planning

- There is merit in planning for the Labrador and the Island separately.
 - Load growth in Labrador does not affect Island reliability – load in Labrador must be met by generation in Labrador.
 - Additional generation in Labrador has minimal benefit for the Island due to transmission constraints.
 - Load growth on the Island does not affect Labrador reliability.
 - Muskrat Falls is needed to serve the Island Interconnected System.
 - Hydro continues to plan for the Labrador Interconnected System outside of the 2024 Resource Adequacy Plan process – industrial growth is the single largest influence on the requirement for additional generation.
 - Hydro is working directly with Industrial customers in Labrador to determine the economic level of industrial growth in Labrador.
 - System impact studies are ongoing with Industrial customers in Labrador to assess the magnitude and impact of industrial load requests.
 - Hydro's Network Additions Policy is in place for the Labrador Interconnected System.
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Regional and Sub-Regional Planning

Available LIL Capacity for Island use vs. Island Load (ML Flow > 150 MW)



Probabilistic Capacity Criterion

2024 Resource Adequacy Plan – Issues List:

- *NLH recommends continuing with the 2.8 hours per year LOLH criteria at this time and not the 0.1 LOLE previously recommended. Is this reasonable for planning at this time?*

Assessment of 2024 Resource Adequacy Plan:

- *Include Board and other stakeholders in the consideration of reliability and cost tradeoffs (#2).*
- *Perform additional model runs with a 0.1 LOLE standard (#3).*
 - Hydro will include an additional model run comparing a LIL EqFOR of 1% with a planning criteria of 0.1 LOLE for comparison purposes and inform the result at a later Technical Conference.


Probabilistic Capacity Criterion

- Hydro is balancing cost and reliability for customers by continuing to use the 2.8 LOLH criteria in its 2024 Resource Adequacy Plan.
- The Net Present Value (“NPV”) to increasing the level of reliability on the Island Interconnected System is estimated to have a NPV of \$6.4 billion; an additional \$2.3 billion compared to an expansion plan that meets 2.8 LOLH criteria.
 - See comparison of Scenario 7AEF and Scenario 3AEF in Appendix C.
- Hydro is committed to continuing to assess the economic feasibility of migrating to 0.1 LOLE within future Resource Adequacy Plans to inform the Board and parties.


| | Planning Criteria | LIL Bipole EqFOR (%) | Reserve Margin (MW) | Delta (MW) | NPV (\$ Billion) |
|---------------|-------------------|----------------------|---------------------|------------|------------------|
| Scenario 7AEF | 0.1 LOLE | 5 | 635 | - | - |
| Scenario 3AEF | 2.8 LOLH | 5 | 500 | 135 | 2.3 |

Load Shape

2024 Resource Adequacy Plan – Issues List:


- *NLH's assumed load shape for the IIS is based on a base hourly load profile from a representative year with average weather conditions, which is then scaled to meet peak and energy forecasts. Is this a reasonable approach and has it been sufficiently supported in the filing?*
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Load Shape


- Hydro has used this approach since the 2018 Reliability and Resource Adequacy Study, and was reviewed by current and previous experts of Hydro and the Board.
 - Beginning in 2022, Hydro has layered on new assumptions from consultant Dunsky related to EV profiles.
 - As a result of EV assumptions, the base load shape changes through the study period as a result of increased EV penetration in the province.
 - Hydro consistently compares load shape to historical peaks.
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Firm Energy Requirements

2024 Resource Adequacy Plan - Issues List:

- *The energy planning criteria is that the IIS should have sufficient generating capability to supply all its firm energy requirements with firm system capability. Is this planning criteria reasonable?*
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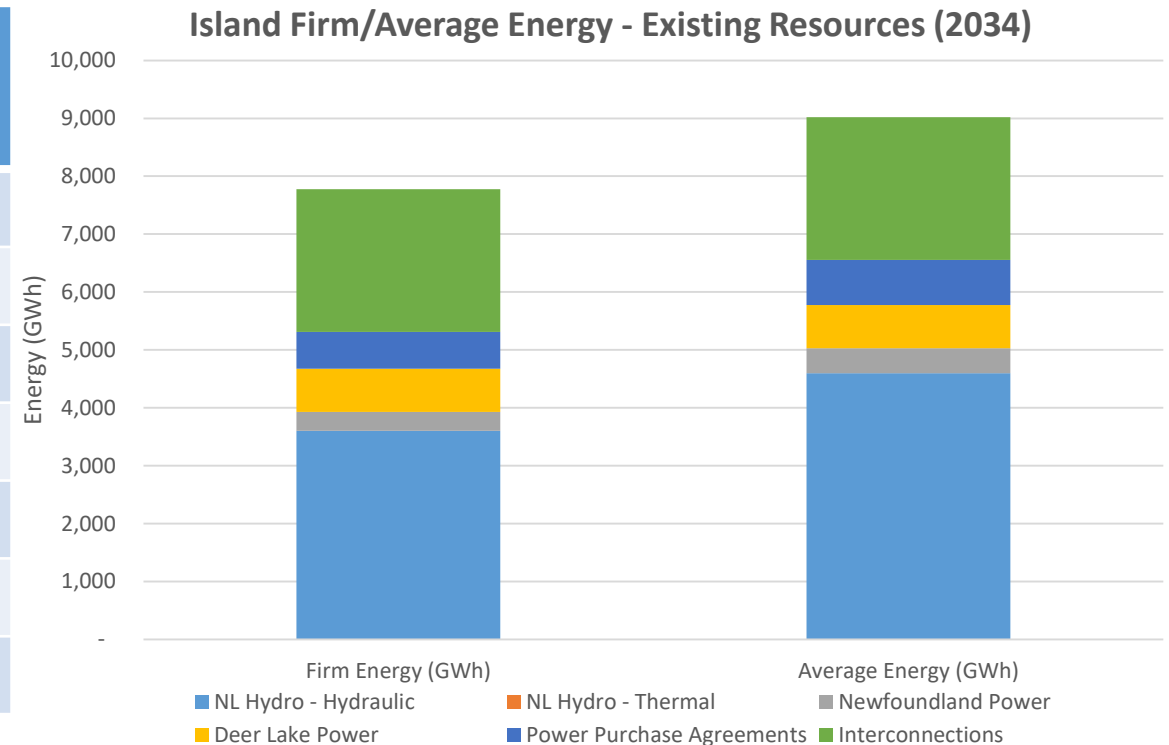
Firm Energy Requirements

- Requirement to have sufficient generating capability to supply all firm energy requirements with firm system capability.
 - Hydro's generation supply is hydro-dominant.
 - Firm energy capability of Island hydroelectric resources is the firm energy capability of those resources under the most adverse three-year sequence of reservoir inflows occurring within the historical record.
 - Critical dry sequence that occurred between 1959 and 1962.
 - Plexos solves for the average hydrology, not firm.
 - Amount of energy that can flow over the LIL to the Island is determined by the interdependencies with the Maritime Link and Island Load.
 - The firm versus average energy difference for Island resources is approx. 1.24 TWh.
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Firm Energy Requirements


- Island Interconnected System firm and average energy from existing resources

| | Firm Energy (GWh) | Average Energy (GWh) | Delta (GWh) |
|---|-------------------|----------------------|--------------|
| Hydro Hydraulic | 3,602 | 4,596 | 994 |
| Hydro Thermal | - | - | - |
| Newfoundland Power | 324 | 430 | 106 |
| Deer Lake Power | 750 | 750 | - |
| Power Purchase Agreements | 634 | 778 | 144 |
| LIL less Firm Maritime Link Exports | 2,464 | 2,464 | - |
| Total Island Interconnected System | 7,774 | 9,018 | 1,244 |



Firm Energy Requirements

Firm Import Potential: Transmission and Market Access


- The Island Interconnected System has access to three potential markets via the Maritime Link:
 1. Nova Scotia;
 2. New Brunswick; and
 3. New England.
 - Firm transmission is still a constraint.
 - Firm imports could be supplied from Nova Scotia, if available.
 - Hydro contacts Nova Scotia Power and New Brunswick Power annually to assess long-term firm energy potential and to date, both utilities confirm that acquiring a firm import contract during the winter period is not feasible in the near term. Updates are provided in the annual Near-Term Generation Adequacy reports.
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Operational Capacity Requirements

2024 Resource Adequacy Plan - Issues List:

- *For the purpose of its operational reserves NLH considers the first contingency loss to be the loss of a generating unit at Muskrat Falls and the second contingency to be the loss of a second Muskrat Falls unit. Daymark said that the loss of the LIL as the largest single contingency merits further review. What is the reasonable first and second loss contingency to use for planning purposes?*

Assessment of 2024 Resource Adequacy Plan:

- *Provide additional context and support for the "economic feasibility" of meeting NPCC operational reliability standards (#4).*
 - *Further examine the implications of a LIL bipole outage as the largest single contingency, rather than just a single Muskrat Falls unit (#5).*
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Operational Capacity Requirements

Muskrat Falls as the First Contingency (Current):

- Planning Reserve Margin of 500 MW (25.8% of peak).
- Operating Reserves:
 - 1st Contingency: Loss of generating unit at Muskrat Falls.
 - 2nd Contingency: Loss of generating unit at Muskrat Falls.

| Reserve | Operational Reserve Required (MW) |
|---------|-----------------------------------|
| 10-Min | 206 |
| 30-Min | 103 |
| Total | 309 |

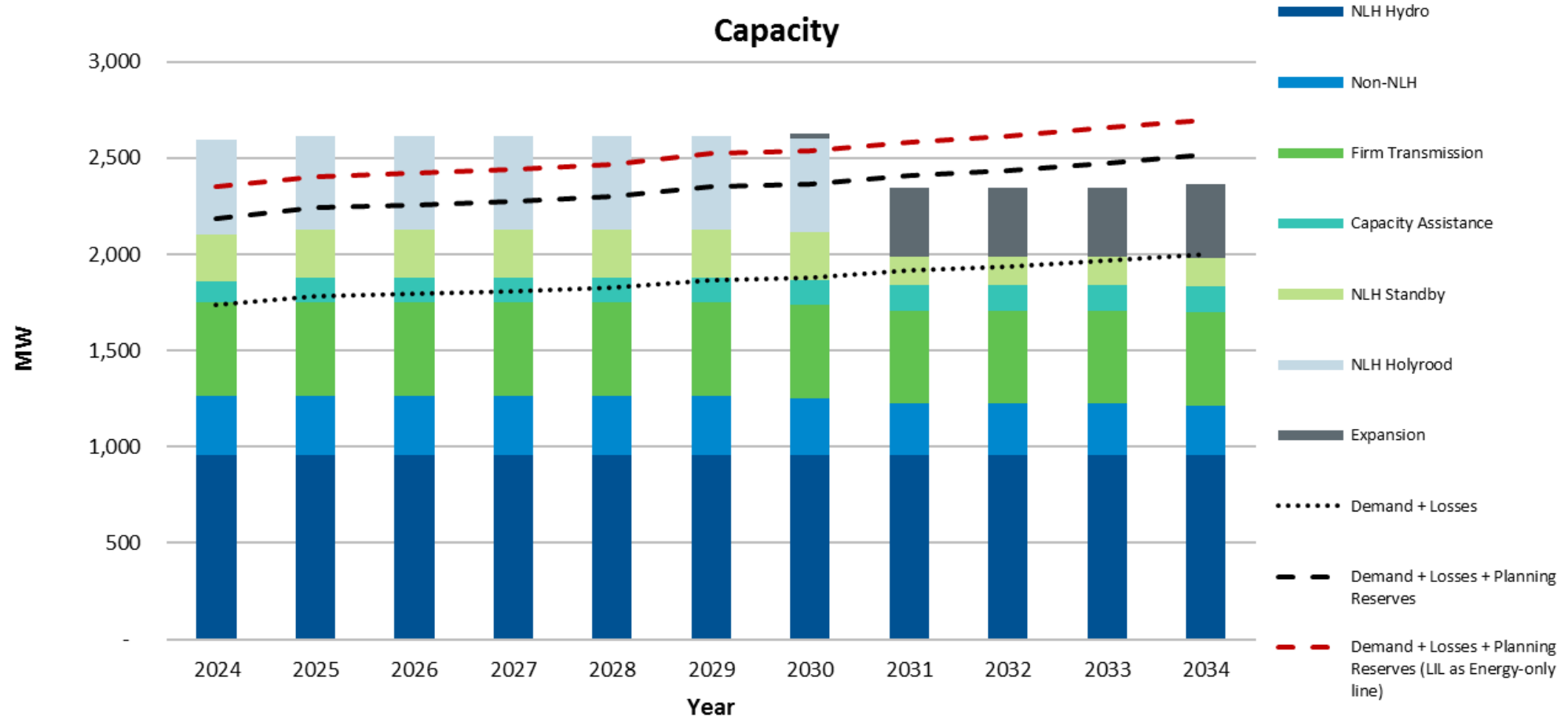
LIL as Energy-Only Line:

- Planning Reserve Margin of 675 MW (35.0% of peak).
- Operating Reserves:
 - 1st Contingency: Loss of generating unit at Bay d'Espoir.
 - 2nd Contingency: Loss of generating unit at Bay d'Espoir.

| Reserve | Operational Reserve Required (MW) |
|---------|-----------------------------------|
| 10-Min | 154 |
| 30-Min | 77 |
| Total | 231 |

- Planning for the LIL as the first contingency would result in an additional 175 MW of reserve requirement, resulting in a total estimated NPV of \$8.2 billion, an additional NPV of \$2.4 billion, compared to the Reference Case Expansion Plan.
- Would require an additional 315 MW of reserve requirement, resulting in an additional NPV of \$5.4 billion, compared to the proposed Minimum Investment Required Expansion Plan.

Operational Capacity Requirements



Operational Capacity Requirements

Muskrat Falls as the First Contingency (Current):

- Planning Reserve Margin of 500 MW (25.8% of peak).
- Operating Reserves:
 - 1st Contingency: Loss of generating unit at Muskrat Falls.
 - 2nd Contingency: Loss of generating unit at Muskrat Falls.

| Reserve | Operational Reserve Required (MW) |
|---------|-----------------------------------|
| 10-Min | 206 |
| 30-Min | 103 |
| Total | 309 |

LIL as First Contingency:

- Planning Reserve Margin of 500 MW (25.8% of peak).
- Operating Reserves:
 - 1st Contingency: Loss of LIL measured at Soldier's Pond.
 - 2nd Contingency: Loss of generating unit at Bay d'Espoir.

| Reserve | Operational Reserve Required (MW) |
|---------|-----------------------------------|
| 10-Min | 484 |
| 30-Min | 77 |
| Total | 561 |


- An increase operational reserve requirement of approximately 250 MW would result in:
 - An increase in standby generation.
 - A decrease in export opportunity.

LIL Shortfall Criteria


2024 Resource Adequacy Plan - Issues List:

- *NLH's "LIL Shortfall Analysis" considered the reliability impact of a "prolonged" outage of the LIL. It included certain assumptions regarding the timing (winter) and length (six weeks) of the outage, CBPP capacity assistance, Vale customer generation, and minimum regulating reserve. Were these reasonable assumptions, and were all assumptions in the analysis made clear (e.g., load shedding/curtailable load assumptions)?*
- *The results LIL Shortfall Analysis appear to show a tradeoff between cost and reliability. Do the results support NLH's Recommended Expansion Plan, as best contained in "Combination 3"? Should the reliability basis for the tradeoff analysis be based on the cost of an outage using a standard metric, such as the value of lost load?*

Assessment of 2024 Resource Adequacy Plan:

- *Further consider the extent to which the LIL shortfall analysis - peak winter, six weeks in outage duration - appropriately captures LIL bipole outage risk (#6).*
 - *Vet all assumptions included in the LIL shortfall analysis, including modeled and yet-to-be-identified mitigants for accuracy and likelihood (#7).*
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LIL Shortfall Criteria

- LIL Shortfall Analysis is considered to be Hydro's "worst case scenario" (Six-week outage in coldest months of winter).
 - Emergency Response & Restoration Plan – concluded three to six weeks possible
 - Prudent to plan for the worst case scenario and Hydro ensuring it is ready, should it occur.
 - Regardless of the length of the outage, the Minimum Investment Required Expansion Plan remains unchanged as the same amount of new generation is required.
 - Current LIL remedial work is not expected to *improve* the level of LIL reliability beyond a LIL EqFOR of 1%, rather it is expected *maintain* the anticipated level of LIL reliability.
 - From a planning perspective, the loss of a 900 MW line feeding an 1800 MW system has the potential to pose a risk to reliability, depending on the time of year such an event may occur.
 - Hydro's assumptions around capacity assistance, customer curtailment and regulating reserve are reasonable and based on Hydro's existing contracts and operating requirements.
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LIL Shortfall Criteria

- The LIL Shortfall Assessment was completed using the Plexos Reliability Model, with some modifications to the assumptions.
- For clarity and discussion, the modifications are summarized below:


| Assumption | Reliability Model (MW) | Shortfall Analysis (MW) |
|--------------------------|------------------------|-------------------------|
| LIL Capacity | 700 | 0 |
| Firm Exports (NS Block) | 170 | 0 |
| CBPP CA | 90 | 50 |
| Vale CA | 7.5 | 5.5 |
| Newfoundland Power Hydro | 60 | 58 |

- Hydro regularly has discussions with Island Industrial Customers who continue to express their willingness to work with Hydro.

LIL Shortfall Criteria

- Hydro does not consider the Shortfall Analysis to be a tradeoff of cost and reliability, rather believes it is the *maximum* level of customer interruption that can be tolerated.
 - Considers the potential highest level of load shed during a loss of load event to be less than the maximum 100 MW of load shed that has been rotated.
 - Hydro considers this to be a worst case scenario and, consistent with good utility practice, is prudently planning so that the Island Interconnected System is prepared.
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LIL Shortfall Criteria

- Hydro does not currently place a specific value on unsupplied energy in its planning studies.
 - It is difficult to quantify the non-economic losses to residential customers.
 - It is difficult to quantify customers willingness to pay for a significant disruption.
 - The probability of an extended disruption is unknown at this time.
 - With this in mind, Hydro has put forward a minimum investment approach that is tangible and can mitigate most of the impact to customers.
 - The Minimum Investment Required Expansion Plan provides a balance between the impact on rates and reliability of the Island Interconnected System.
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Planning Reserve Margin Results


2024 Resource Adequacy Plan - Issues List:

- *NLH's "Recommended Expansion Plan" is based on planning reserve margin of 17.1 percent, as contained in Expansion Plan Scenario 4. Is this a reasonable planning reserve margin for purposes of the RAP filing? Other planning reserve margins reviewed in the RAP filing reach as high as 35.1 percent.*
- *Expansion Plan Scenario 4 relies on a 2.8 LOLH, a 1% LIL bipole equivalent forced outage rate, and the Slow Decarbonization IIS load forecast scenario. Each is the most conservative value reviewed (in terms of impact on forecasted capacity and energy system needs). Are these reasonable assumptions?*
- *Are there any other planning criteria considerations that should be addressed by NLH, beyond those considered in the RAP filing?*

Assessment of 2024 Resource Adequacy Plan:

- *Specification of the reliability criteria is a crucial exercise, as it directly (and materially) impacts the amount of capacity needed to meet the resultant planning reserve margin requirements. For reference, most North American utilities set planning reserve margins between 10% and 25%, including the NPCC entities. NLH, in its Recommended Portfolio, has set a planning reserve margin of 17.1%. This, along with the reliability assumptions above, should be well vetted in this proceeding (#8).*

Reliability Criteria: Hydro's Position

- The Minimum Investment Required Expansion Plan represents the lowest planning reserve margin that was calculated in the 2024 Resource Adequacy Plan of 17.1%. Hydro feels this is a reasonable first step for the Island Interconnected System.
 - The Reference Case Expansion Plan, with a planning reserve margin of 25.8% remains what Hydro feels is likely to occur.
 - Because the resource options identified in the Minimum Investment Required Expansion Plan are common for all expansion scenarios analyzed, Hydro feels confident moving forward with these resource options as a first, but significant step, to meet the reliability needs of the Island Interconnected System.
 - Hydro believes the assumptions underlying the system planning criteria are appropriate as we continue to plan to meet the additional requirements of the Reference Case.
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Questions?



nlhydro.com

