



NPCC Reliability Forum

Transmission Enhancements & Reliability Standards Development

Facilitators:

Gerry Dunbar and Faisal Nahian

05/07/2026

Public



Agenda

TOPICS	
9:00 a.m.	Welcome and Safety Message Gerry Dunbar – NPCC – Director, Communications and Stakeholder Outreach
9:05 a.m.	Forum Disclaimer Faisal Nahian – NPCC – Manager, Communications and Solutions
9:10 a.m.	NPCC Reliability Forum Outreach Efforts Gerry Dunbar – NPCC – Director, Communications and Stakeholder Outreach
9:15 a.m.	Standards Development – New and Improved Howard Gugel – NERC – Senior Vice President, Regulatory Oversight
9:50 a.m.	Transmission Reinforcements in Ontario Alessia Dawes – Hydro One – Senior Manager, Transmission System Planning - North
10:30 a.m.	B R E A K
10:40 a.m.	New England Clean Energy Connect Overview Zach Bell – ISO-NE – Operations Shift Supervisor
11:15 a.m.	Hydro-Québec Grid Operations and Interregional Transmission Briefing Kyle Collins – Hydro-Québec – Director of Business Development
11:50 a.m.	Forum Survey and Closing Remarks Gerry Dunbar – NPCC – Director, Communications and Stakeholder Outreach





Safety Message

- Summertime Water Safety

Reliability Forum Disclaimer

Webinar Logistics

- Participants are muted.
- Use the “Q&A” feature to submit questions.
- Questions will be addressed at the end of each presentation.
- The forum will be recorded.
- Presentation materials will be posted on the NPCC website.

Public Advisory

- This is a public webinar.
- Audience may include press and government representatives.
- Speakers should be mindful of the diverse audience.

Content and Reliance

- Information shared is for informational purposes only.
- NPCC is not responsible for the accuracy or use of presented content.
- Views expressed do not necessarily reflect NPCC’s position.

Vendor Information

- Discussions do not imply NPCC endorsement.
- NPCC does not promote specific technologies, products, or vendors.
- Questions about vendor offerings should be directed to the vendors.
- Users of vendor services assume full responsibility.





NPCC Long Term Strategy

2026 Outreach Activities

- **State and Provincial Outreach Topics**
 - NERC and NPCC Seasonal Reliability Assessments
 - NERC Long-Term Reliability Assessment (LTRA) and NPCC Long Range Adequacy Overview (LRAO)
- **Reliability Forums - March, May, Oct.**
 - Various Reliability Topics
 - Regional Transmission, Large Loads, Resource Adequacy
- **Regional Webinars/Workshops**
 - Spring and Fall Compliance and Reliability Conference
 - Physical and Cyber Security
 - Extreme Weather Preparedness
- **Gas-Electric Interdependency**



Standards Development – New and Improved

Howard Gugel
SVP, Regulatory Oversight
May 7, 2026

Transform and Modernize the Process

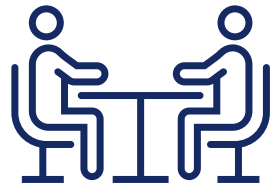
Re-envision a modernized standard development process to address evolving risks

Create Efficiencies

Identify areas of opportunity and recommendations to save time and remove redundant steps in the current process

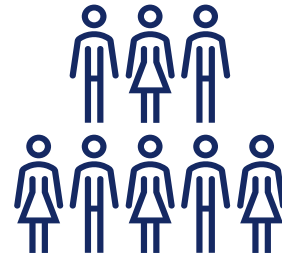
Develop a Trusted Process

Provide clear opportunities for stakeholder input, due process, openness, and balance of interests, remaining consistent with the requirements in Section 215 of the Federal Power Act



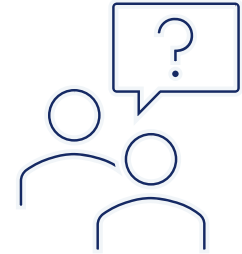
50+ Presentations

during standalone meetings
or as agenda items



5,800+ Attendees

at presentations since May 2025



5 Interactive Sessions with 1,100+ Attendees

to provide stakeholder access to
Task Force members



10+ U.S. and Canadian Trades & Forums

engaged by MSPPTF members



11 Regional Entity-Hosted Events

Including webinars and in-person
presentations



Standard Initiation

Semi-annual review and prioritization process

RSTC technically vets all requests for standard development projects

New RISC subcommittee determines path forward and oversees term sheet development



Standard Drafting

New Stakeholder SME Pool as expert bench to help develop standards

RISC subcommittee oversees drafting standards leveraging SME Pool, NERC staff, and technology tools

Emphasis on public comment process with straw polls, rather than multiple ballots, to drive consensus



Balloting

Individual entity balloting process to confirm consensus

Improved Registered Ballot Body voting rules

Refined Registered Ballot Body segment structure

Key Roles



RSTC

Centralized review of all Standard Initiation Requests

Provides technical vetting and recommended prioritization



RISC

Oversight of RISC Subcommittee

Ultimate approval of path forward for SIRs (based on RISC subcommittee determination)

Visibility and accountability



RISC Subcommittee

Strategic oversight and management of standard development process

Elected sector representatives, appointed at-large seats, and two RISC members as Chair and Vice Chair



Stakeholder SME Pool

Large dedicated technical pool of subject matter experts

Called upon by RISC subcommittee as needed to assist with reviewing and refining draft standards



Project Teams

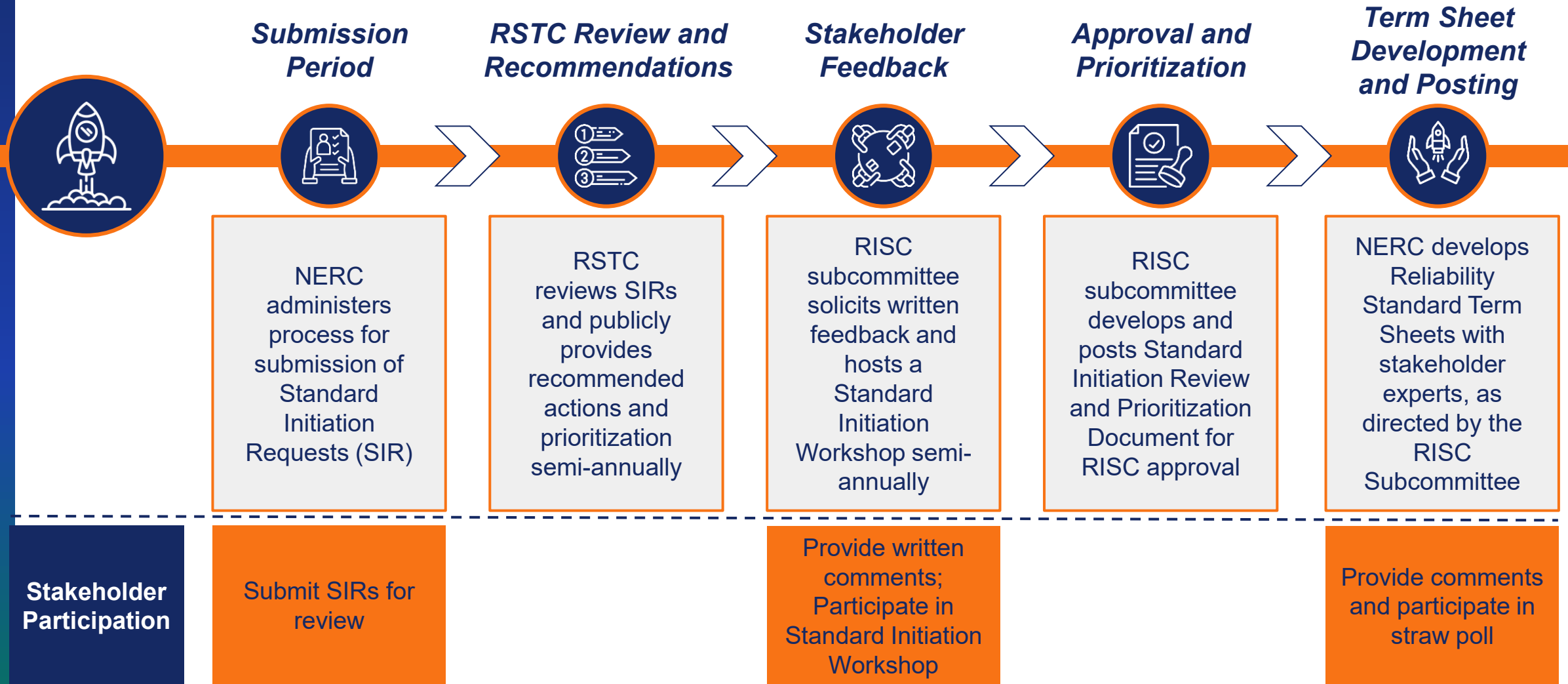
Formed by RISC Subcommittee with a subset from the Stakeholder SME Pool as needed

May be formally appointed or an informal ad hoc team led by NERC staff depending on project complexity



New Role

Standard Initiation Process Overview



Standard Initiation “Fast Track” Process

What

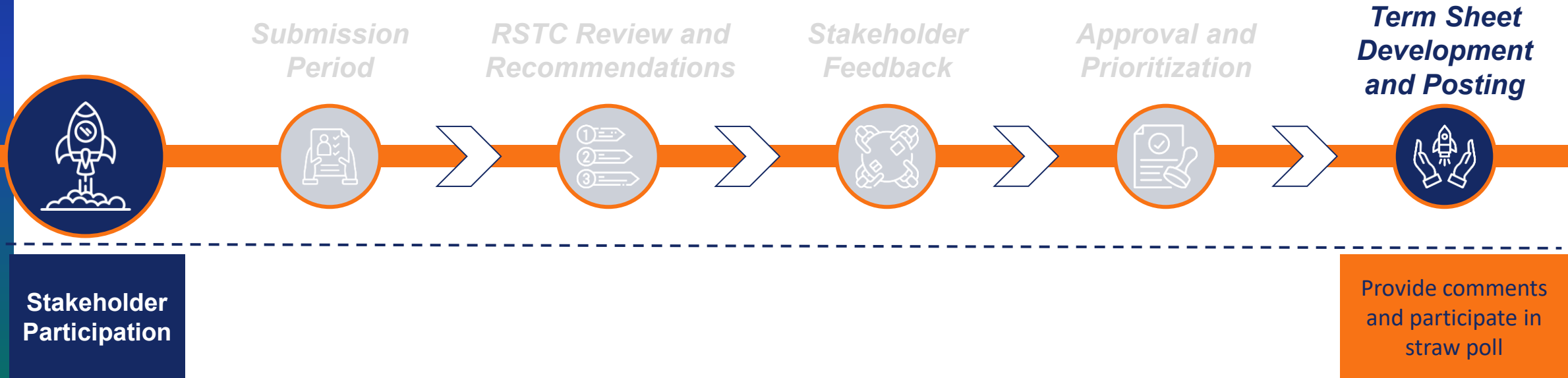
Expedited track for regulatory directives or urgent NERC Board directives

When

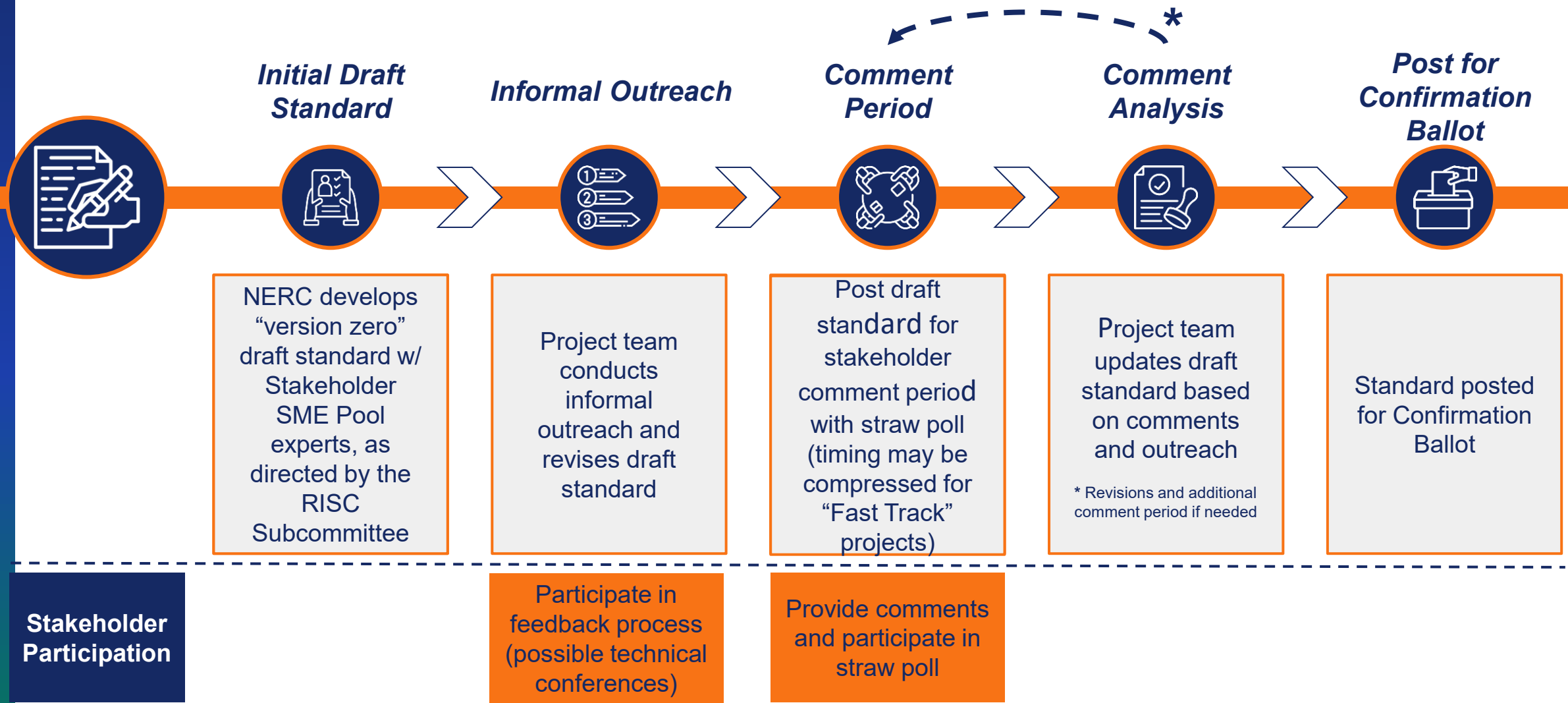
Following issuance of a regulatory or NERC Board directive to develop a standard

How

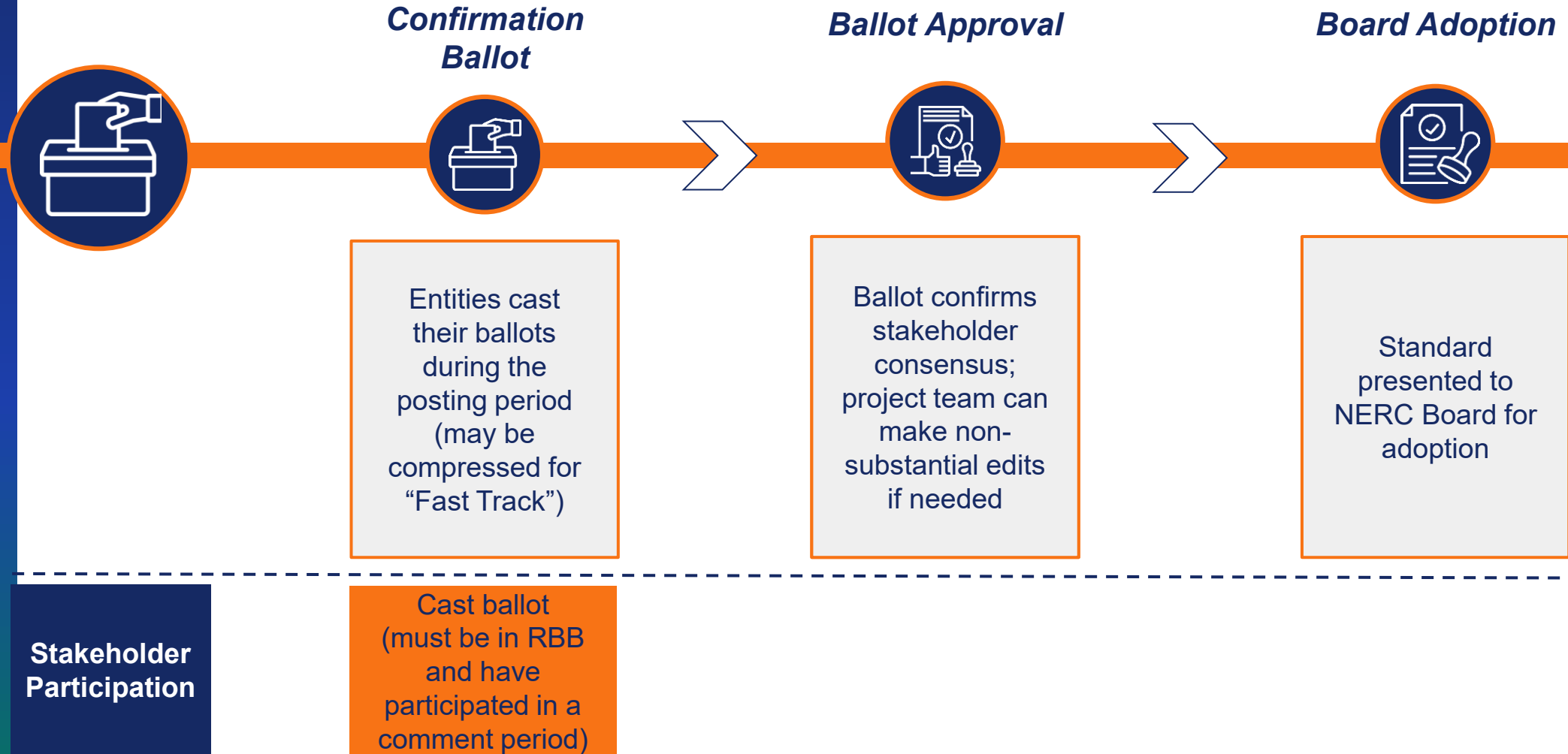
Begin with Term Sheet development, bypassing general intake and review process



Standard Drafting Process Overview



Process Overview (with Standard Balloting Passing Ballot)



Confirmation Ballot Does Not Pass

If the confirmation ballot does not pass, the project team shall review the ballot statements and present recommendations to the RISC Subcommittee, which will choose one of the following actions:



Option 1

Ask project team to revise the standard and post for extraordinary ballot



Option 2

Determine alternative action (e.g., refer back to RSTC, refer to Board for consideration of further action)



Option 3

End work on the standard

1

Relax Ballot Pool Rules

Entity is eligible to cast a ballot if they have participated in a comment period

2

Ease Participation Burdens

One voter could represent multiple segments, rather than requiring a distinct voter for each segment

3

Flexibility for Voting Representatives

Corporate entities would have improved flexibility to replace ballot body voters

Registered Ballot Body Structure

1

Segment 2 Weighting*

Ensure ISO/RTOs (including FRCC) have full and proportional segment weight to reflect their critical role in BPS reliability

2

Combine Segments 7 and 8*

Combine large electricity end users and small electricity users into one segment and remove participation thresholds to improve representation and engagement

3

Consolidate Segments 5 and 6

Eliminate Segment 6 (Electricity Brokers, Aggregators, and Marketers) and consolidate members into Segment 5 (Electric Generators) to streamline participation while preserving all distinct voting interests

4

Revisit Segment 9 Criteria*

Update the government segment criteria to clarify eligibility, exclude oversight authorities, and include NYSRC and other qualified public-interest organizations

5

Retire Segment 10*

Remove Regional Reliability Organizations and remove Regional Entities from the RBB

*Recommendations adopted (all or in part) from 2024 RBB Task Force Report

1

NCR Number Requirement*

Require the NCR number in the RBB for members who are NERC registered entities

2

Stakeholder Outreach and Training*

Expand stakeholder outreach and training

3

Review Segment Definitions

Review segment definitions to improve clarity of qualifications

4

Two-Year Review

Review segment criteria after two years of implementation (consider new development in regulatory framework, changes in voter participation patterns, potential for mutually exclusive segment representation)

*Recommendations adopted (all or in part) from 2024 RBB Task Force Report

Registered Ballot Body Structure Current vs. Recommendation NERC

CURRENT RBB STRUCTURE

1. Transmission Owner
2. RTOs & ISOs
3. Load-Serving Entities
4. Transmission Dependent Utilities
5. Electric Generators
6. Electricity Brokers, Aggregators, & Marketers
7. Large Electricity End Users
8. Small Electricity Users
9. Federal, State, & Provincial Regulatory or Other Government Entities
10. Regional Reliability Organizations & Regional Entities

RECOMMENDED RBB STRUCTURE

1. Transmission Owner
2. RTOs & ISOs
3. Load-Serving Entities
4. Transmission Dependent Utilities
5. Electric Generators (including Brokers, Aggregators, and Marketers)
6. Reserved
7. Electricity End Users
8. Reserved
9. Governmental and Nonprofit Public Interest Entities
10. Reserved

Standard Initiation

- Time from SIR submission to term sheet development
- SIR submissions (e.g., number of SIRs, time to process, RSTC recommendations)

Balloting

- Time from confirmation ballot posting to completion
- Number of projects with extraordinary ballots or other actions
- Participation comparison from comment periods and straw polls to ballot voting

Standard Drafting

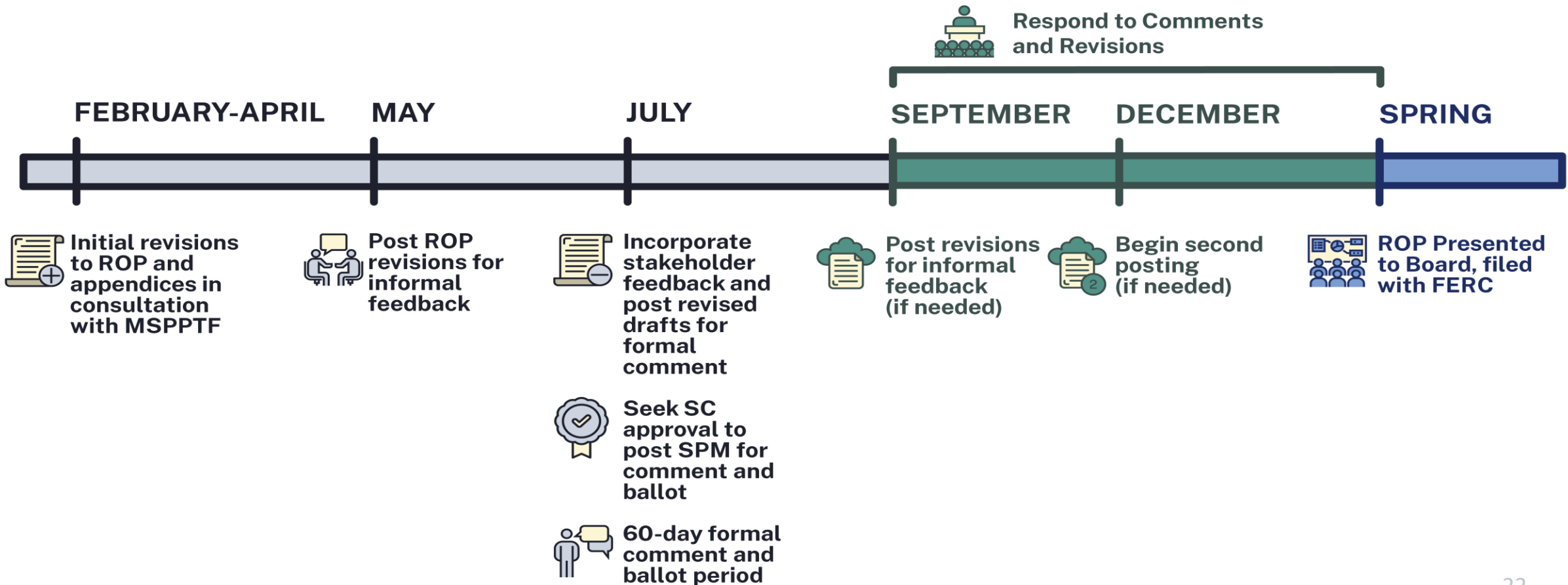
- Time from finalized term sheet to Standard ready for ballot
- Number of revisions required to the draft-zero version of a standard
- Participation (e.g., straw polls, SME Pool)

Full Process

- Time to develop a standard in the new process vs. current process
- Track SIRs that did not move forward to a standard, but eventually became a standard through directives

2026-2027 Implementation Timeline

2026-2027 GOVERNANCE AND REGULATORY TIMELINE





NERC

Discussion

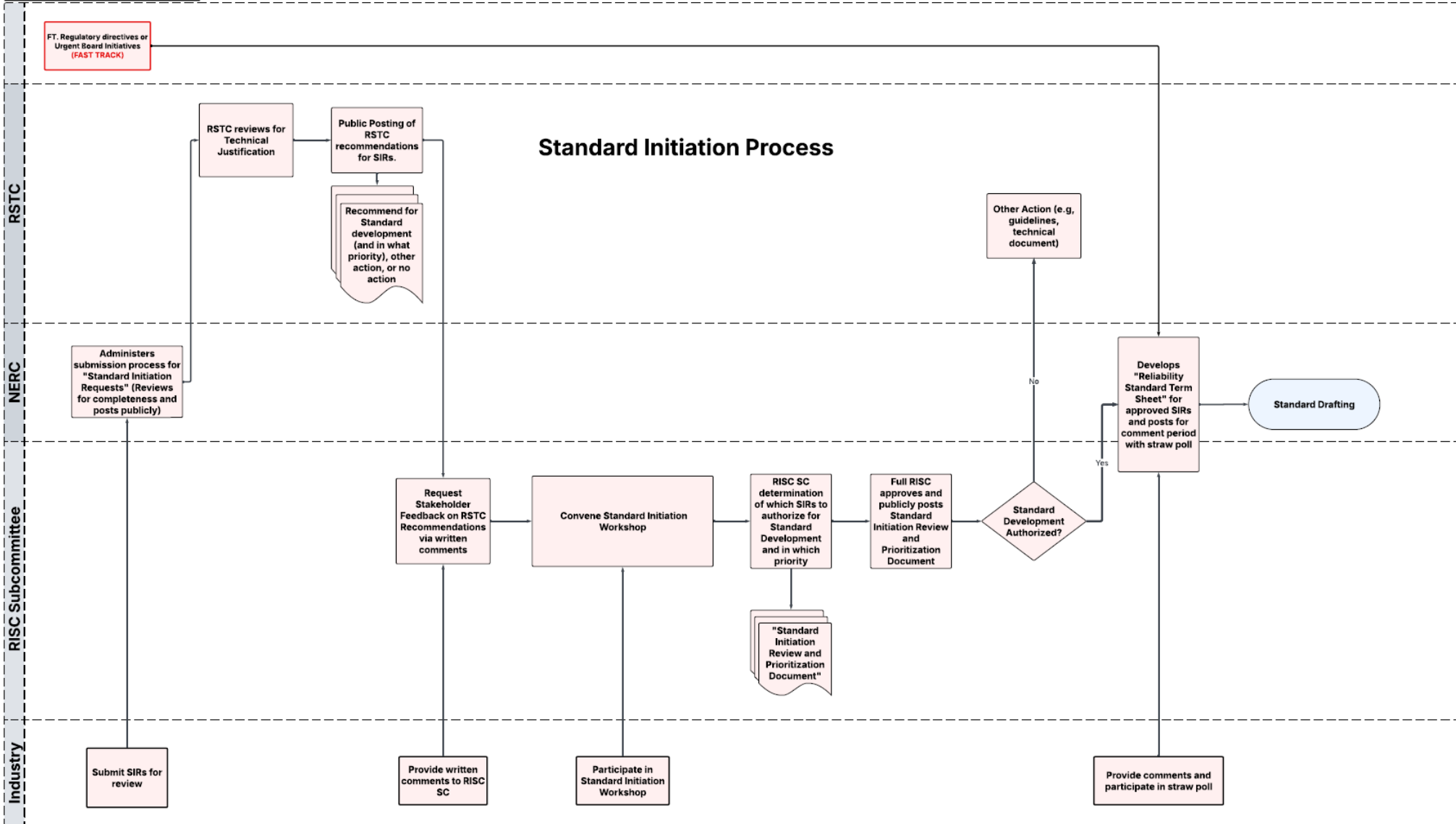
NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

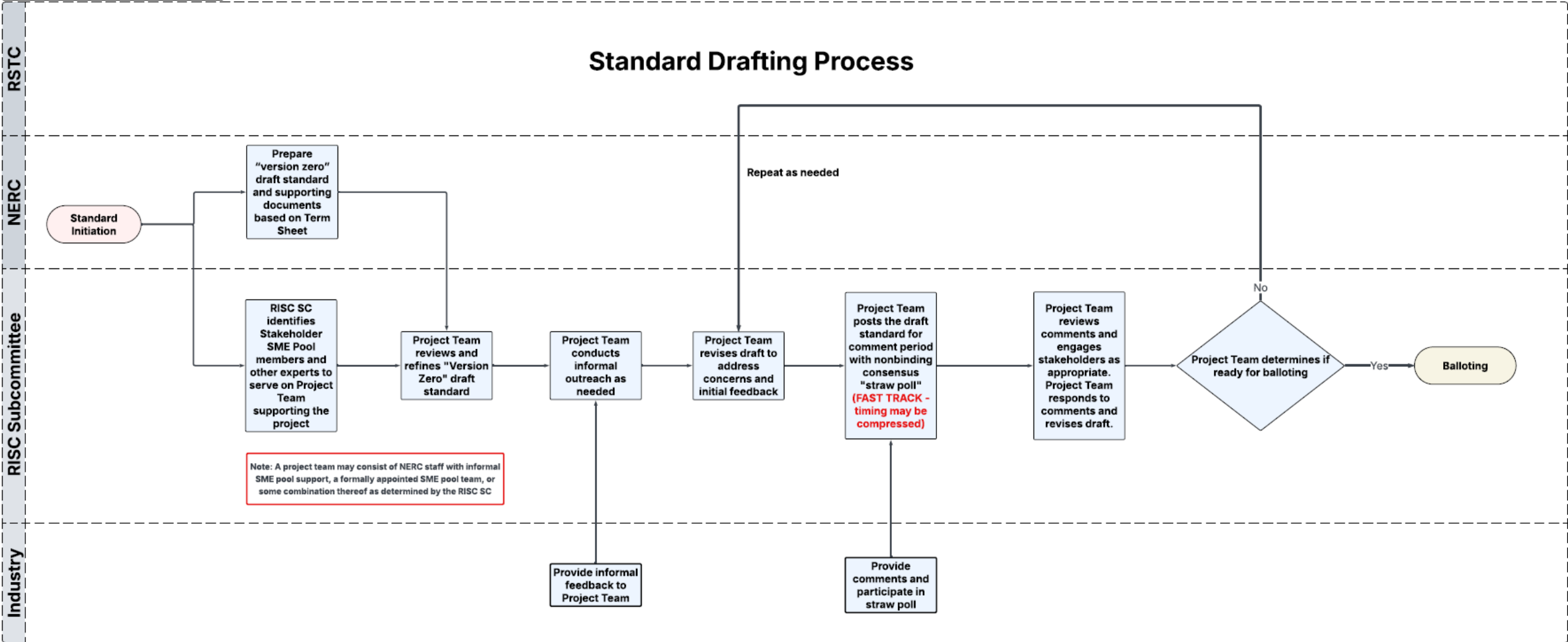


Appendix – Process Maps

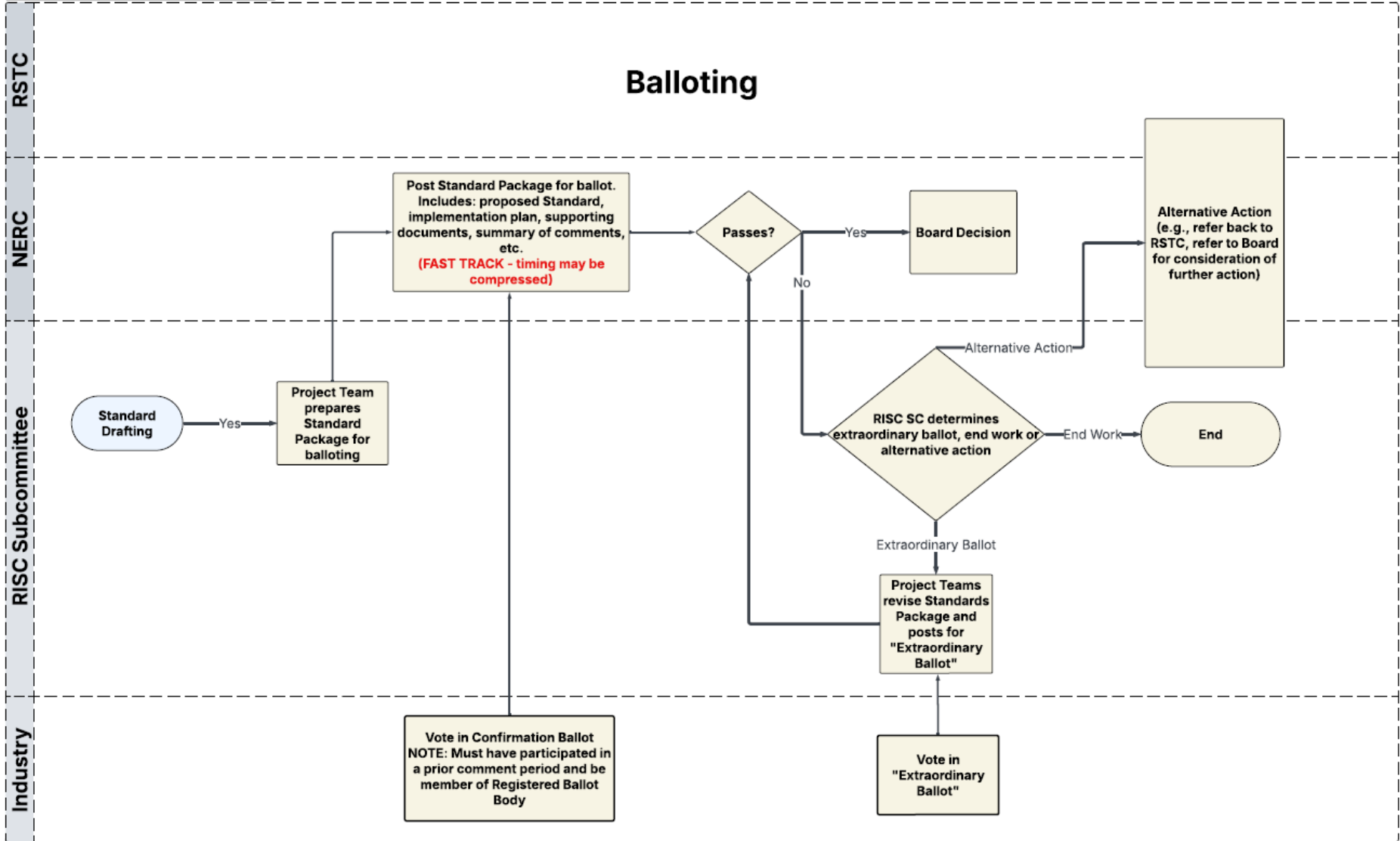
New Standards Development Process Map



New Standards Development Process Map



New Standards Development Process Map



Transmission Reinforcement in Ontario: Energizing the Future

NPCC Reliability Forum – May 7, 2026

Webinar Agenda

1

About Hydro One

2

Electricity Planning in Ontario

3

Transmission Reinforcements in Ontario

4

Take-Aways & Discussion



Alessia Dawes

Sr. Manager – Transmission System Planning, North

1 About Hydro One

Hydro One



Customers

Enrich our customers' experience.



Growth

Enhance grid value needed for sustainable growth.



Solutions

Create new solutions for an electrified future.



Partnerships

Win with partners.

Hydro One Limited, through its wholly-owned subsidiaries, is **Ontario's largest** electricity transmission and distribution provider, supplying approximately 1.5 million combined transmission and distribution valued customers covering approximately 75 per cent of the geographic area of Ontario.

Our team of skilled and dedicated employees proudly build and maintain a **safe and reliable** electricity system which is essential to supporting strong and successful communities.

We are committed to the communities where we live and work through community investment, sustainability, and partnership initiatives.

Hydro One Limited's common shares are listed on the **TSX**, and certain of Hydro One Inc.'s medium term notes are listed on the NYSE.

For more corporate details and how we are energizing life in Ontario for over 110 years, please visit:

<https://www.hydroone.com/about/>

Key Industry Players

Role of Key Players in Ontario



Ministry

The Government of Ontario, through the Ministry of Energy and Mines, sets the overall policy for the energy sector. It does this mainly through laws and regulations.

www.ontario.ca

Hydro One

Licensed transmission and distribution utility. Responsible for operating and maintaining the transmission and distribution system, including new connections once approved. Physically connects your facility and ensures safety.

www.HydroOne.com

IESO

The Independent Electricity System Operator (IESO) manages the supply and demand of electricity. Directs flow of electricity across Ontario. Manages conservation and energy-saving programs.

www.IESO.ca

OEB

The Ontario Energy Board (OEB) regulates electricity utilities in Ontario, including cost responsibility and electricity rates (Transmission System Code and Distribution System Code).

www.OEB.ca

ESA

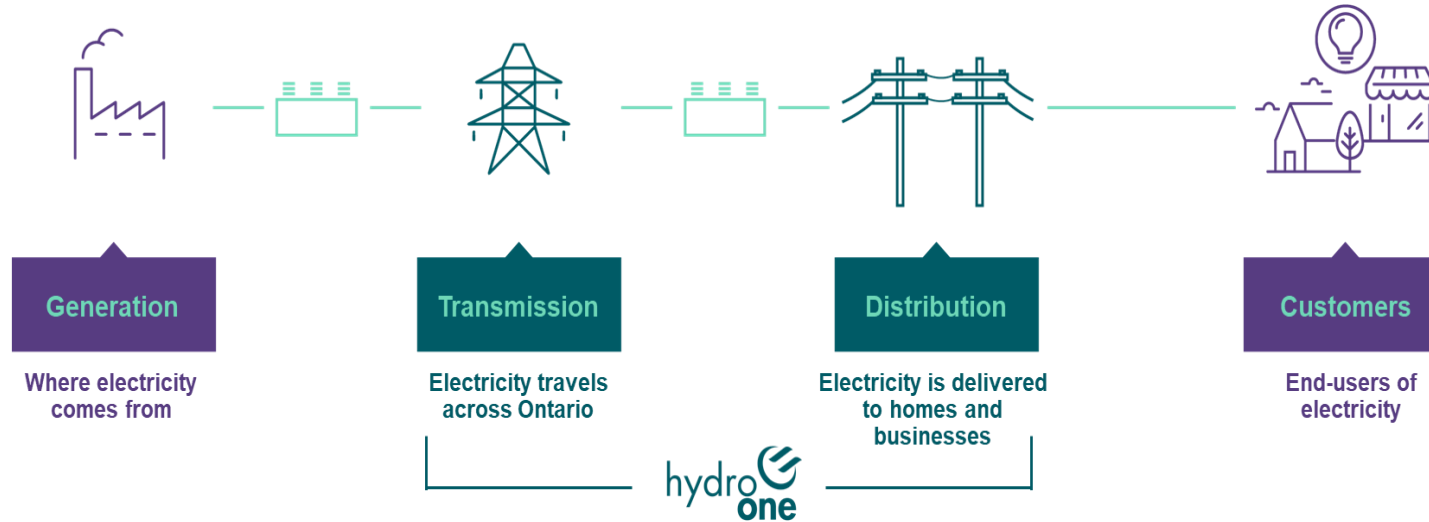
The Electrical Safety Authority (ESA) is mandated to enhance public electrical safety in Ontario. The ESA must provide authorization in order for a customer to connect to the system.

www.ESASafe.com

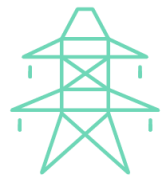
Hydro One's Role in the Ontario Electrical System



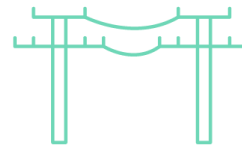
Hydro One's regulated business operates under a rate regulated Custom Incentive Rate Making Framework. Business energizes life for people and communities, helping Ontarians live a better and brighter future.



640,000 km²
Service territory



30,000 circuit km
of high voltage
transmission line

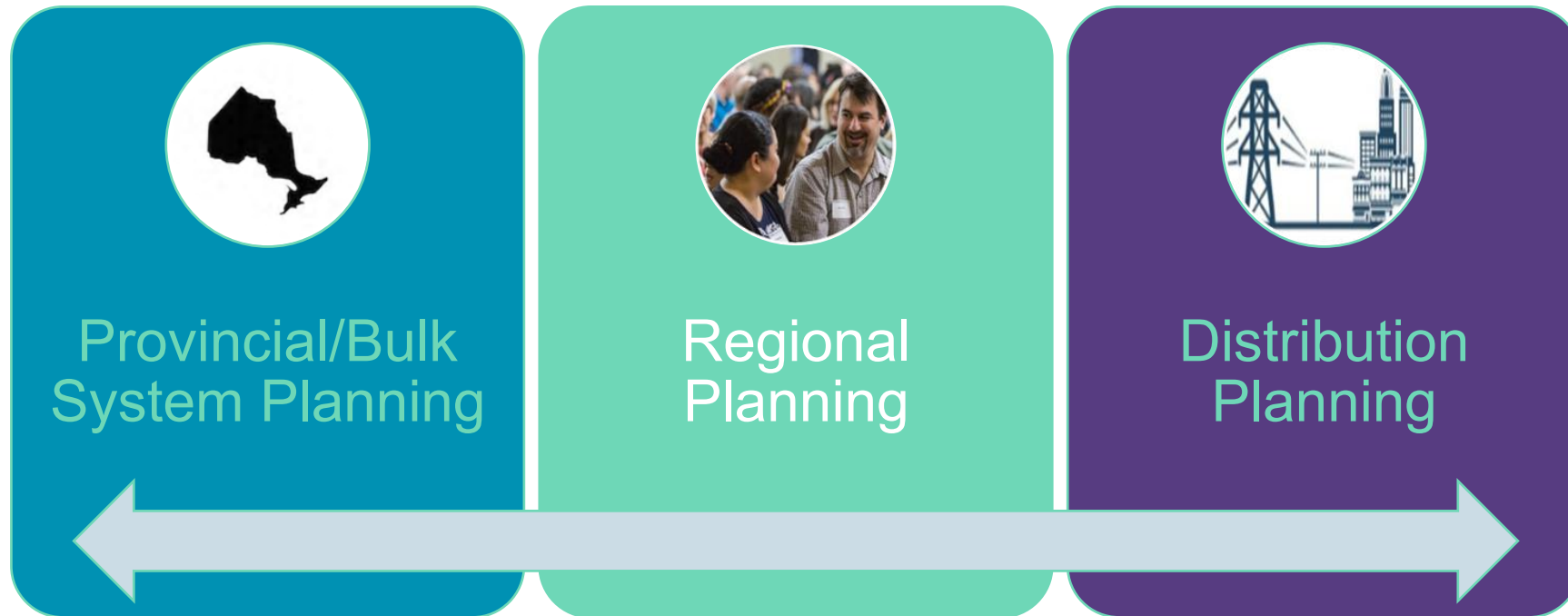


126,000 circuit km
of local distribution
lines

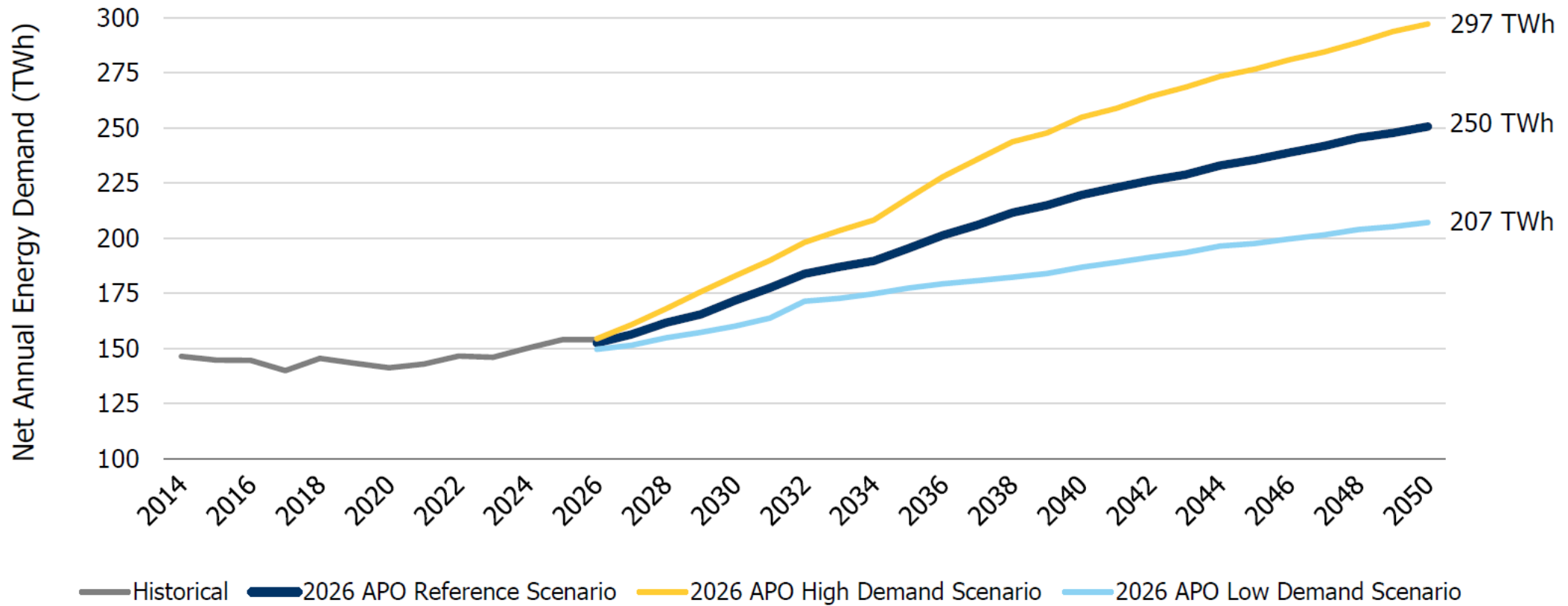


1.5 million
residential and business
customers cross Ontario

2 Electricity Planning in Ontario



Electricity Demand Long-Term Outlook



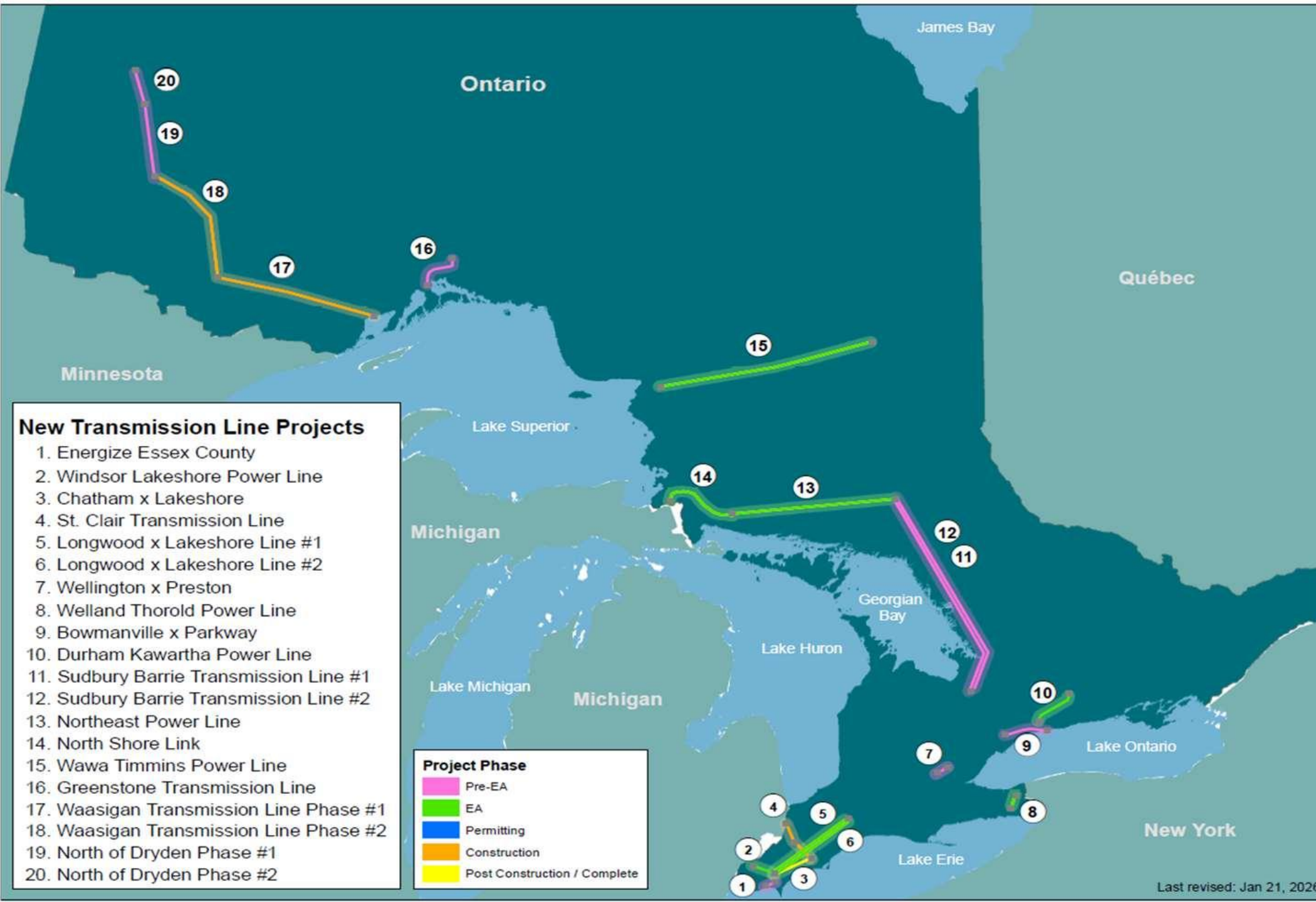
Composition of Growth

- Building electrification policy (e.g. municipal building codes, heat pumps, cooking)
- Nation-building and priority projects (e.g. mining of critical minerals and metals, high-speed rail)
- Commercial data centre development
- Industrial mineral extraction & processing sub-sector (e.g. mining electrification, new connections)
- Industrial primary metals & automobile/transportation machinery production sub-sectors
- Transportation electrification (e.g. EV adoption, rail)
- Agriculture (e.g. greenhouses)

Tackling the Growth

- > 2500 MW of capacity from battery storage being secured through IESO's long-term procurements
- New renewable supply procured: solar & wind projects under IESO 20-year contracts to be in-service by 2030
 - More procurements underway
- Bulk and Regional transmission reinforcement projects underway
 - Supporting mining, agricultural and industrial development
 - Transmission continues to be essential in unlocking growth while maintaining reliability and resilience
- Connection of new and refurbished generation resources
- More studies underway:
 - Resource
 - Transmission

3 Transmission Reinforcements in Ontario



New Transmission Line Projects

1. Energize Essex County
2. Windsor Lakeshore Power Line
3. Chatham x Lakeshore
4. St. Clair Transmission Line
5. Longwood x Lakeshore Line #1
6. Longwood x Lakeshore Line #2
7. Wellington x Preston
8. Welland Thorold Power Line
9. Bowmanville x Parkway
10. Durham Kawartha Power Line
11. Sudbury Barrie Transmission Line #1
12. Sudbury Barrie Transmission Line #2
13. Northeast Power Line
14. North Shore Link
15. Wawa Timmins Power Line
16. Greenstone Transmission Line
17. Waasigan Transmission Line Phase #1
18. Waasigan Transmission Line Phase #2
19. North of Dryden Phase #1
20. North of Dryden Phase #2

Project Phase

- █ Pre-EA
- █ EA
- █ Permitting
- █ Construction
- █ Post Construction / Complete

1. Waasigan Transmission Lines - additional 350 MW of power transfer capability into the NW region, 360 km of single & double circuit 230 kV lines
2. Northeast Power Line (NEPL) & Northshore Line (NSL) & Wawa x Porcupine Line – enhance major interface from 500 MW to 1400 MW transfer, 625 km of single and double circuit 230 kV and 500 kV lines
3. Greenstone Transmission Reinforcement – 230 kV reinforcement of a 115 kV radial line to enhance reliability for customers and provide capacity for new mining, generation and connecting off-grid communities. 240 km
4. Red Lake Transmission Line - 230 kV reinforcement of a 115 kV radial line to enhance reliability to customers and provide capacity for mining and generation. 160 km
5. Sudbury x Barrie Transmission line (SBTL) – 500 kV reinforcement of the North-South corridor to increase power transmission limits by 1000 MW South and 1500 MW North. 300 km

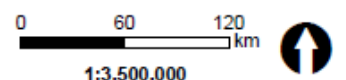
All new Hydro One transmission lines* are in 50/50 partnership with First Nations

Northern Ontario Projects



Legend

- HV Distribution Station
- Transmission Station**
 - 500 kV
 - 230 kV
 - 115 kV
- Transmission Line**
 - 500 kV Hydro One Owned
 - 230 kV Hydro One Owned
 - 115 kV Hydro One Owned
 - ~ New 500 kV Line
 - ~ New 230 kV Line
 - - - 230 kV Non Hydro One owned
 - - - 115 kV Non Hydro One owned



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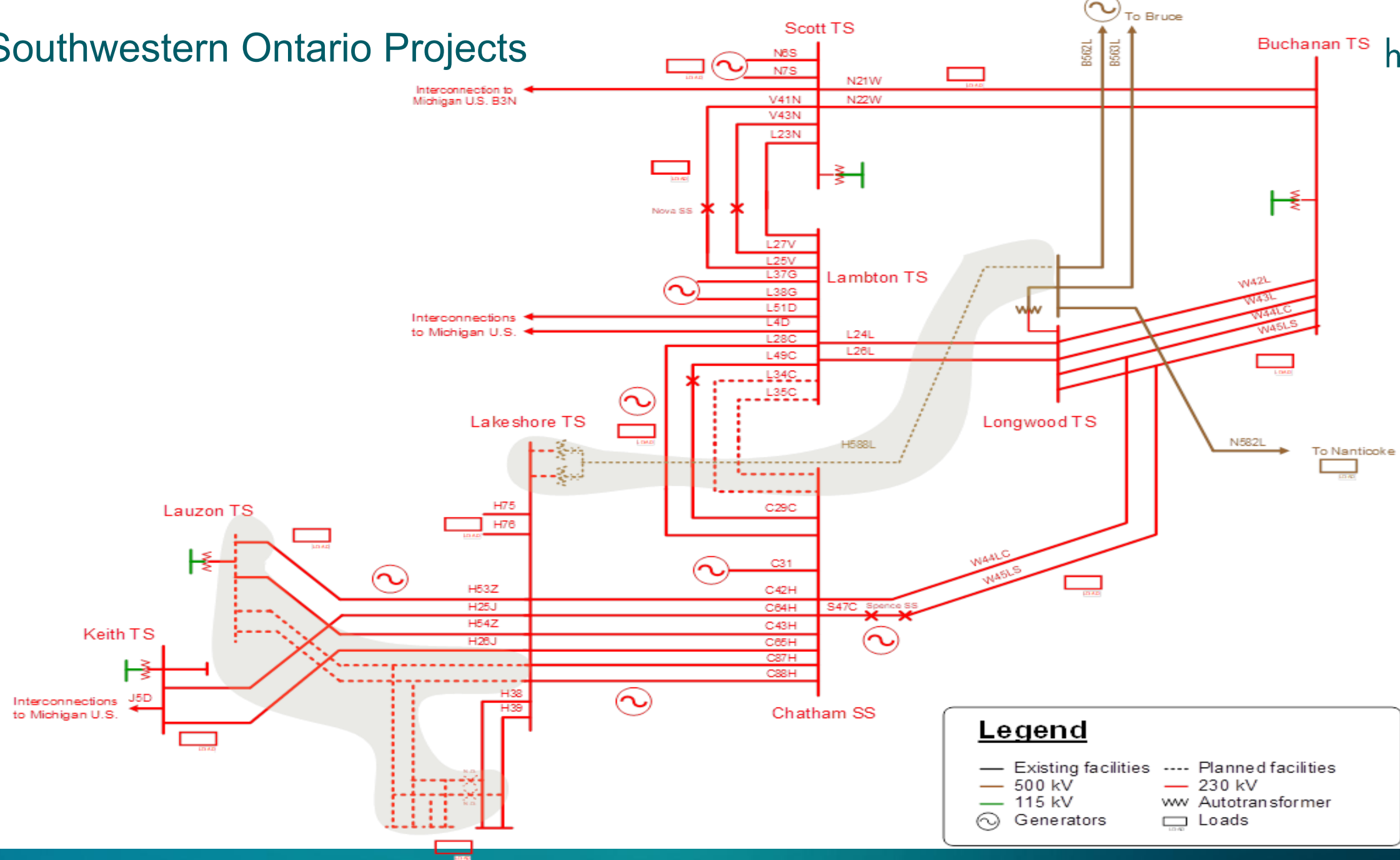
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Date: July 2006, Revised: Apr 2026
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Southwestern Ontario Projects



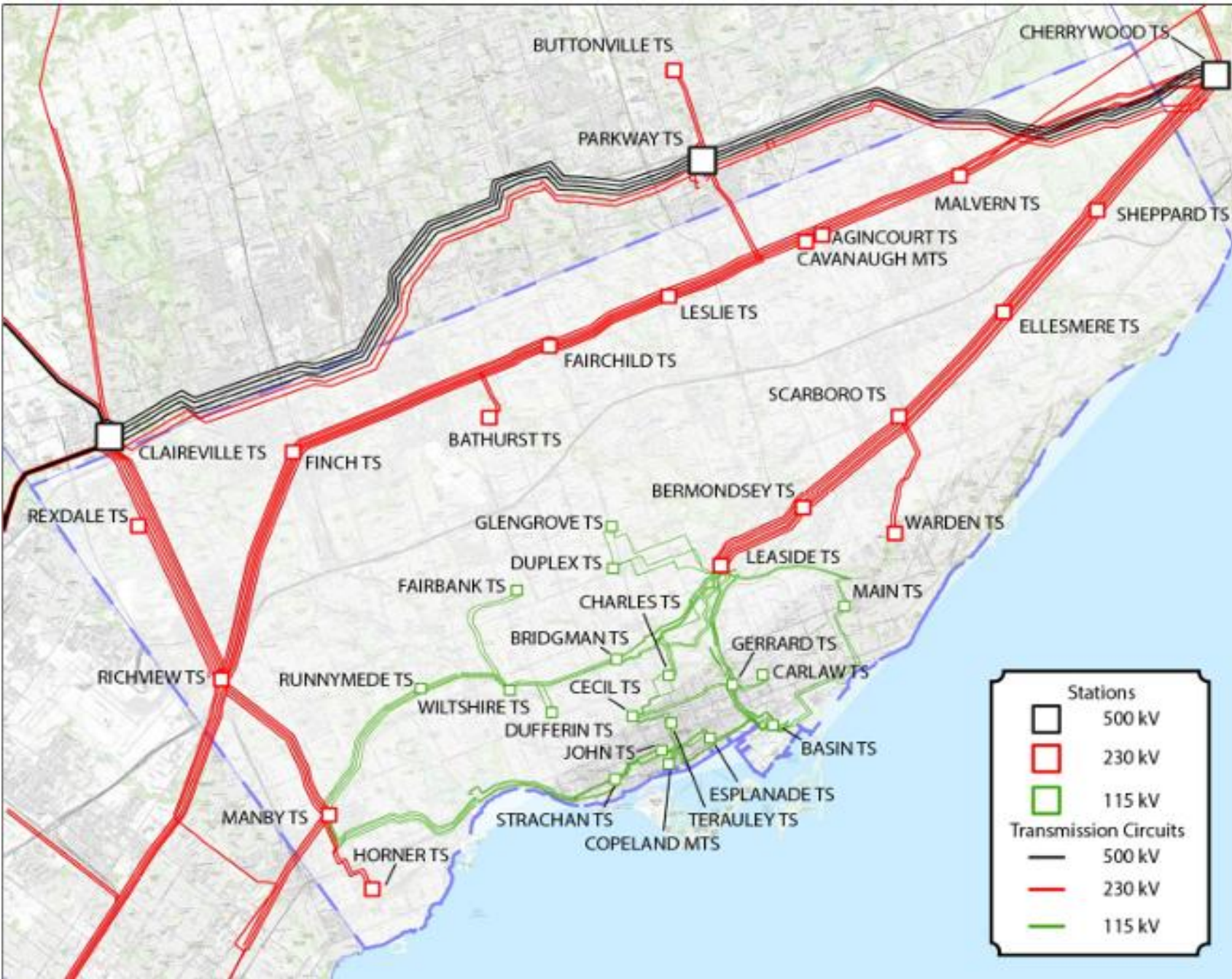
1. Supply to Essex County Transmission Reinforcement Project – new 13 km double-circuit 230 kV transmission line to connect two load supply stations in Leamington area (2018).
2. Establishment of Lakeshore TS – new station to sectionalize 230 kV circuits between Chatham to the Windsor area to connect new greenhouse load while ensuring supply security (2022).
3. Chatham to Lakeshore Line – new 46 km 230 kV double circuit line between Chatham and Lakeshore to further increase load meeting capability for the Leamington area (2024).
4. St. Clair Transmission Line project – new 64 km 230 kV double circuit line to address upstream system limitation to reliably serve load in the Leamington area (2027).
5. Longwood to Lakeshore Project – 120 km of 500 kV single circuit line to enable greenhouse expansion (2030).
6. Windsor Lakeshore Power Line Project – new 32 km 230 kV double circuit line to support rapid load growth in the Windsor area (2032).

Southwestern Ontario Projects



Greater Toronto Area (GTA) Projects

1. Richview x Trafalgar Reinforcement - reconductor 230 kV circuits to increase bulk transfer capability & reliability towards Toronto from the West, *completed*
2. Richview x Manby Reinforcement – converting existing 115 kV line to 230 kV to increase supply capacity to west and central Toronto, *completed*
3. Rail electrification – express rail system into the Greater Toronto and Hamilton Area (GTHA)
4. 3rd Supply into Toronto – underwater HVDC line recently announced by IESO as a regional solution to supply growth in the city, providing a 900 MW supply path, improve system resilience through diversification of supply sources, and ensure reliable electricity service to support Toronto's long-term growth.
5. Kleinburg TS Autotransformers and 230 kV Kirby Line –intersection the North-South bulk 500 kV system with 500 kV /230 kV transformation & 230 kV line providing supply capacity to northern GTA, 2031-2032
6. Milton TS Autotransformers – new 500 kV / 230 kV supply point in Western GTA, 2033
7. New 500 kV Line to reinforce bulk system between Bowmanville/Darlington site towards Toronto



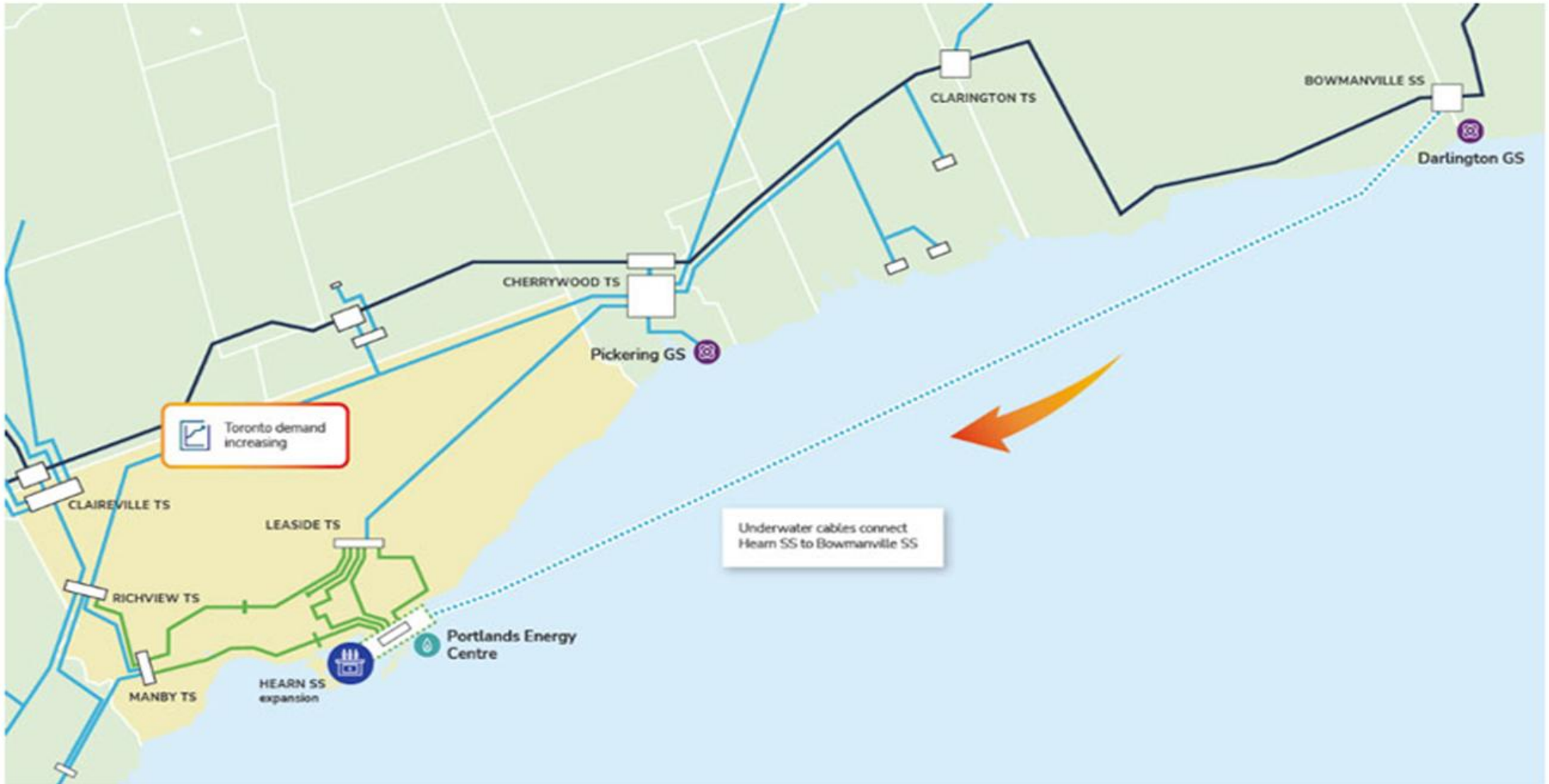
Toronto's 500 kV, 230 kV, 115 kV systems

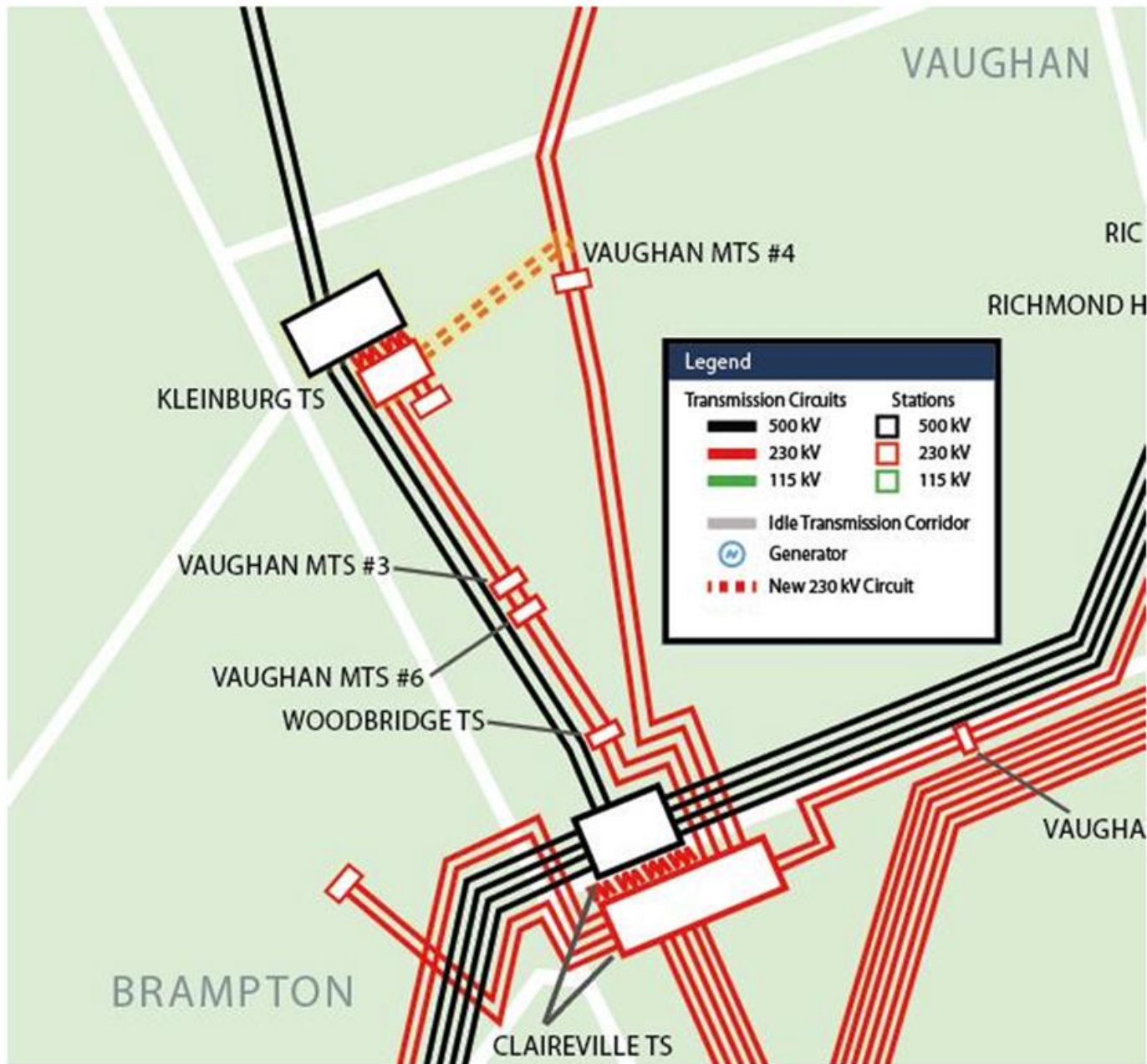


Richview x Trafalgar

Richview x Manby

3rd Supply to Toronto





New 500 kV-230 kV Supply into Northern Toronto's 230 kV local system

Ongoing Bulk and Regional Studies

South and Central Bulk Plan

- Reliable electricity supply to fast-growing regions between SW and Toronto
 - Delivery of future generation resources: new nuclear at Bruce & Darlington
 - Decrease reliance on emitting resources (gas)
 - Electrification and fuel switching and data centres and other large load centres
- Draft recommendations: 6 new 500 kV lines, 1 new 230 kV line, 2 new stations, 5 expanded stations

North of Sudbury Bulk Plan

- Growth in mining, mineral process, electrification and decarbonization policies
 - Increases pressure on an already constrained Northern system: single 500 kV lines in parallel with aging 230 kV and 115 kV infrastructure (dating back to the 1930's)
 - High reliance on several RASs and local gas generation
 - Delivery of future generation resources: hydroelectric
- Draft recommendations: Due spring 2026; expecting 230 kV & 500 kV reinforcements strategically paced

4 Take-Aways & Discussion

Take-Aways

1. Challenges remain with regulation and affordability. Changes are underway to establish consistency for data centres and cost allocation/economic develop.
2. Hydro One, in collaboration with communities, IESO, large generators and local distributors, is advancing transmission solutions to enable growth and opportunity in Ontario.
3. While we quickened the pace of study-to-build, Safety, Reliability and Resilience of the power system remain top priority.



Our Values

Safety comes first

We make the world a safer place.

Stand for people

We believe in equity, diversity and inclusion as the source of our strength.

Empowered to act

We recognize our power to improve people's lives.

Optimism charges us

We see potential in everything.

Win as one

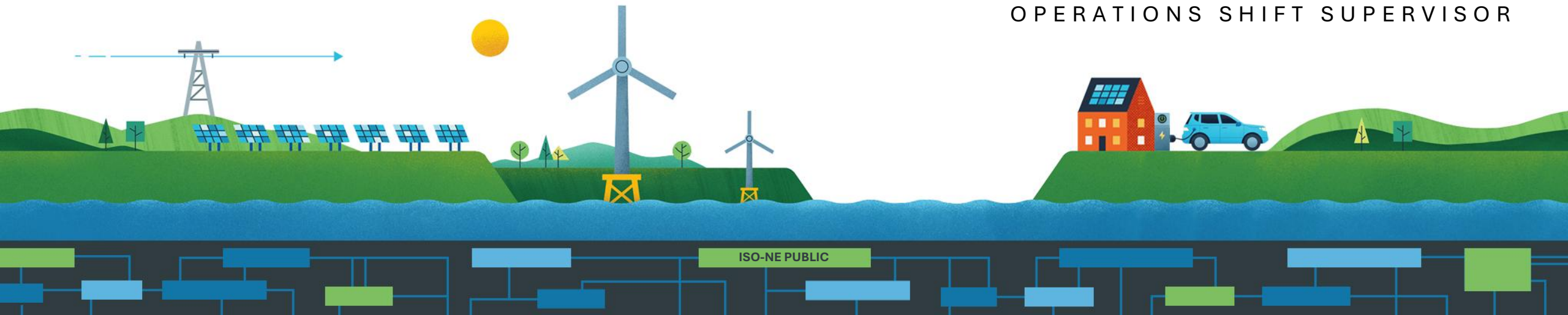
We work together to deliver results.

New England Clean Energy Connect Overview



Zach Bell

OPERATIONS SHIFT SUPERVISOR



Acronyms

- VSC-HVDC – Voltage-Source Converter High-Voltage Direct Current
- HQ – Hydro Québec
- ISO-NE – ISO New England
- NECEC – New England Clean Energy Connect
- STATCOM – Static Synchronous Compensator

New England Clean Energy Connect Overview

- What is NECEC?
- NECEC History
 - A brief overview of some of the project milestones
- NECEC Today
 - Commercial operation and regional benefits



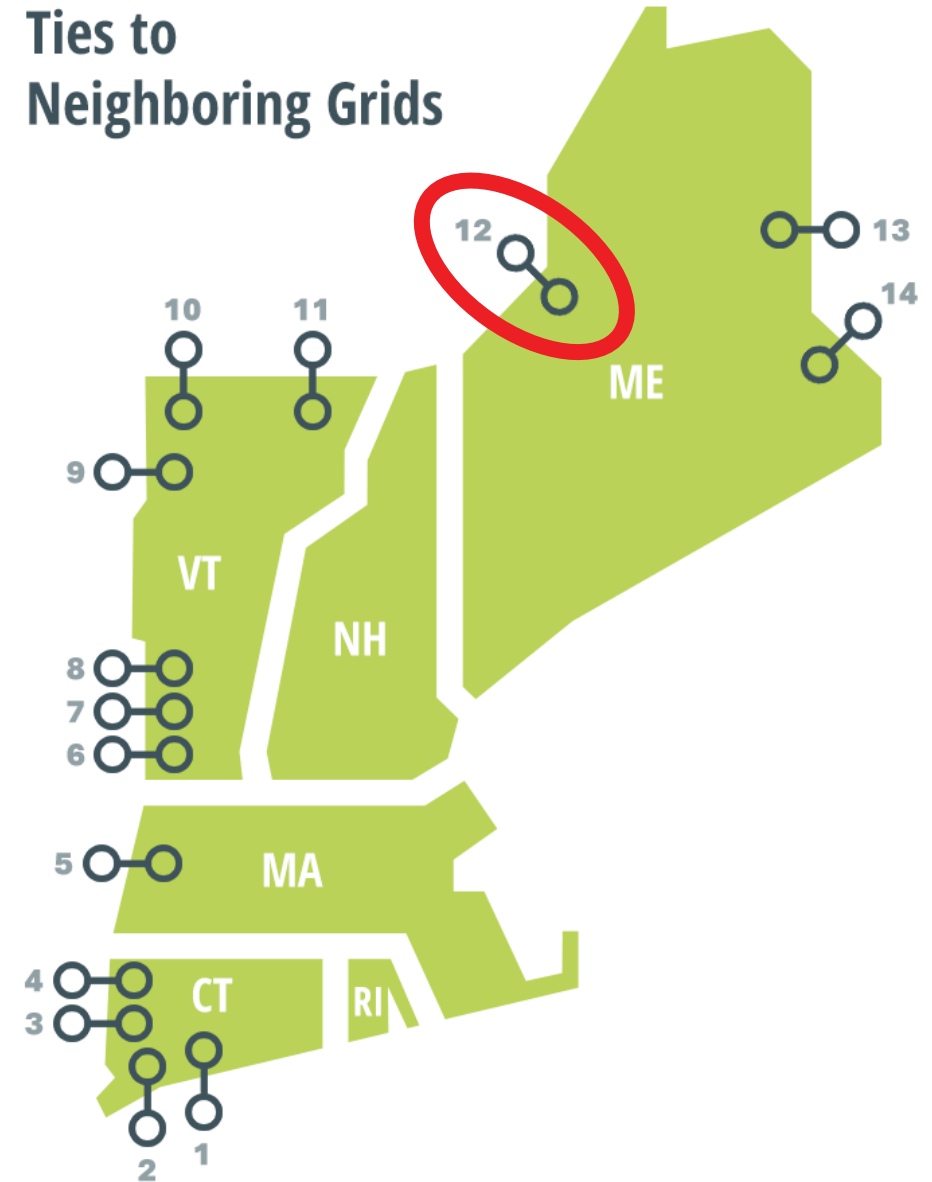
WHAT IS NECEC?



What is NECEC?

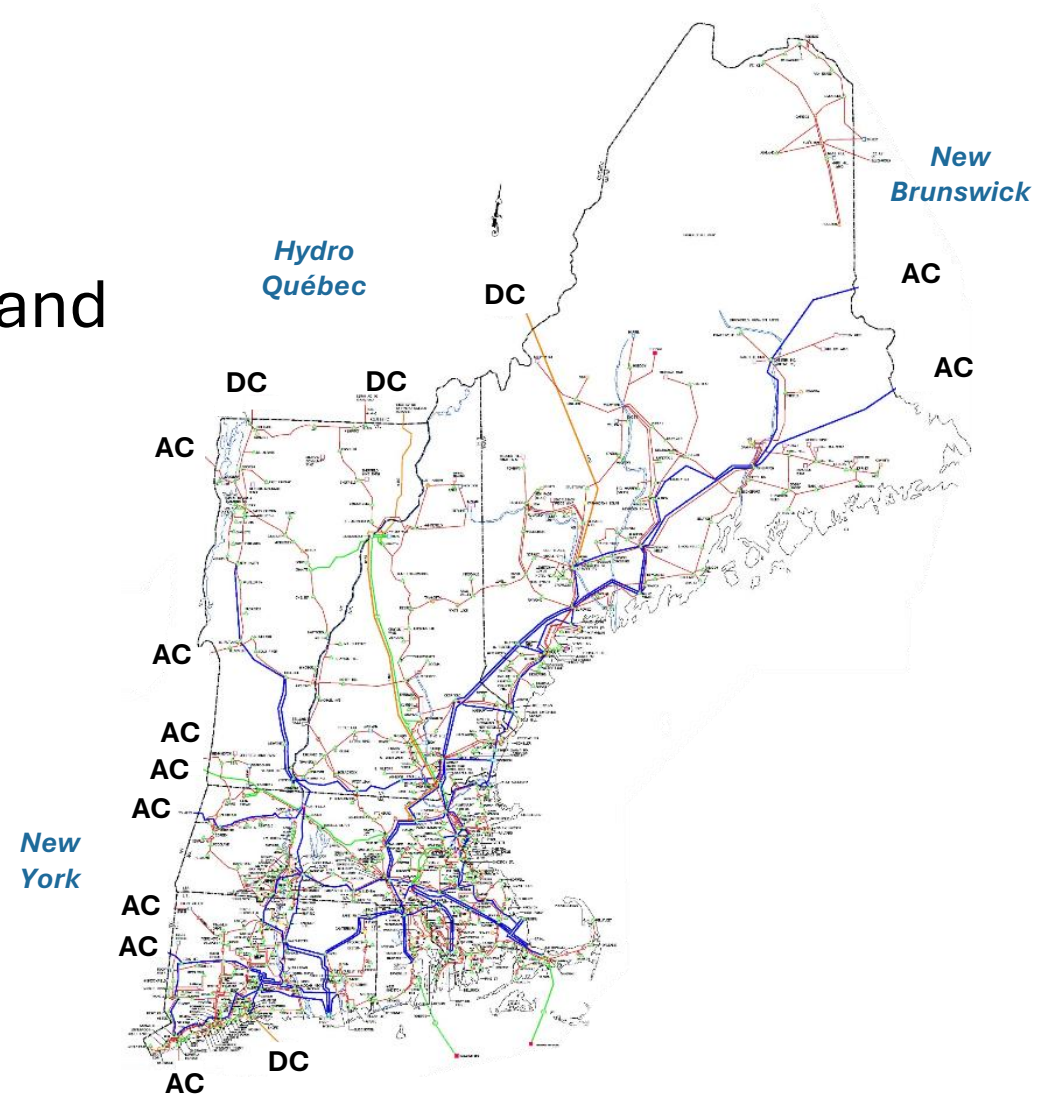
- NECEC is an HVDC tie line that began commercial operation on January 16, 2026
- Owned by Avangrid, Inc.
- Operated by Central Maine Power

Ties to Neighboring Grids



What is NECEC?

- ISO-NE transmission system is tied to neighboring power systems in the U.S. and Eastern Canada:
 - Hydro Québec (3 DC ties)
 - New York (8 AC ties, 1 DC tie)
 - New Brunswick (2 AC ties)



NECEC Capability

- VSC-HVDC
 - *A flexible power system device for high-voltage direct current transmission that uses a voltage source on the DC side of the conversion, enabling direct control of the active and reactive power output on each end of the converter*
 - Provides dynamic voltage regulation source in Maine
 - Fast recovery after DC fault is cleared

NECEC HISTORY



History of NECEC

- July 26, 2017
 - Permits begin initial requests
- October 19, 2018
 - FERC approval
- January 14, 2021
 - U.S. Department of Energy Presidential Permit issued
- 2021
 - Construction began
- January 16, 2026
 - Commercial Operation
- Massachusetts Agreement
 - 20-year agreement for 1090 MW (9.55 TWh annually)

NECEC TODAY



Increased Import Capability

- In 2025, 7% of ISO-NE region energy needs were met by imports on external interfaces
- NECEC increases our import transfer capability by approximately 22%
- With NECEC's contractual 9.55TWh annually, that alone would have made up approximately 8% of the energy served in the ISO-NE region in 2025



Increased Energy Diversity

- HQ is almost entirely hydroelectric
- In 2025, ISO New England's total generation was made up of:
 - 55% Natural Gas*
 - 25% Nuclear
 - 13% Renewables
 - 6% Hydro
 - 1% Oil + Other

* A portion of the Natural Gas fleet is dual fuel capable



Scheduling

- 1250MW Import-Only (HQ-NE)
 - This limit is used to schedule at the border
 - Ensures contractual delivery of 1200MW after losses
 - This capability makes a NECEC trip a Reportable Balancing Contingency Event if it were to trip while imports were high
- Exports not allowed
 - Presidential permit does not allow it
 - Government directive would be necessary to export in emergency conditions



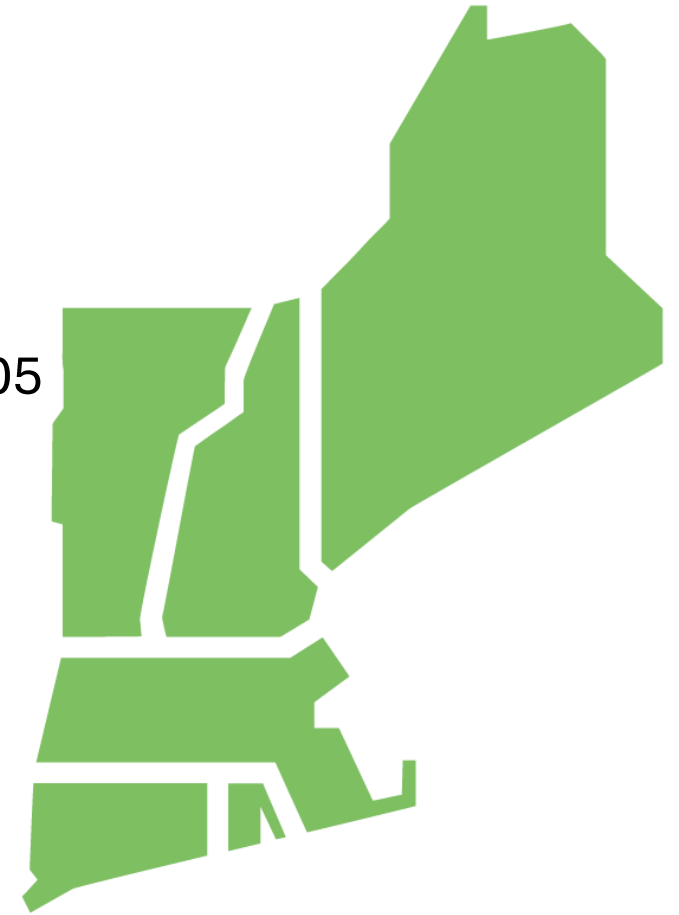
Total Transfer Capability

- HQ
 - NECEC Import: 1,250 MW, Export: 0 MW
 - Phase II Import: 2,000 MW, Export: 1,200 MW
 - Highgate Import: 225 MW, Export 170MW
- New Brunswick
 - Import: 1,000 MW, Export: 550 MW
- New York
 - NY AC Import: 1,400/1,600 MW (summer/winter)
Export: 1,400/1,200 MW (summer/winter)
 - NY CSC Import: 346 MW, Export: 330 MW
 - NY NNC Import: 200 MW, Export: 200 MW



ISO-NE Stats

- 7.6 million retail customers (population of 15.1 million people)
- 2025 total annual energy served: 117,744 GWh
- All-time highest total annual energy served: 136,355 GWh in 2005
- All-time summer peak demand: 28,130 MW on August 2, 2006
 - Since 2000, summer peak averages approximately 25,600 MW
- All-time winter peak demand: 22,818 MW on January 15, 2004
 - Since 2000, winter peak averages approximately 21,000 MW
- All-time lowest demand : 5,318 MW on April 20, 2025
- Behind-the-Meter solar was approximately 5,000 MW in 2025 (nameplate)

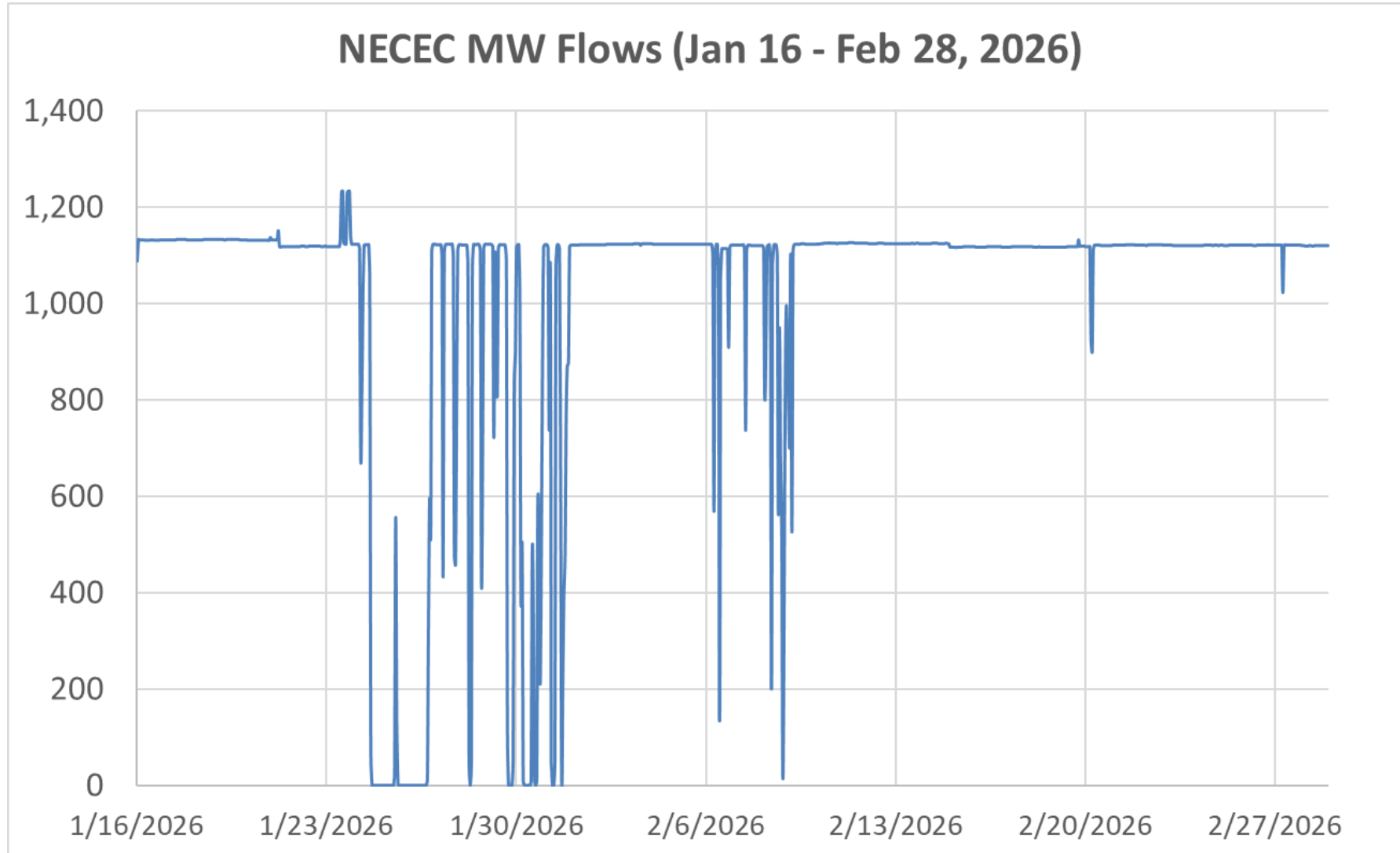


How is NECEC Scheduled?

- Hourly Scheduling
 - HQ and ISO-NE System Operators perform hourly checkout
 - Amount
 - Ramp Start Time
 - Ramp Duration
- Curtailments are made for reliability, as needed



Flows in Early 2026



Winter Storm Fern

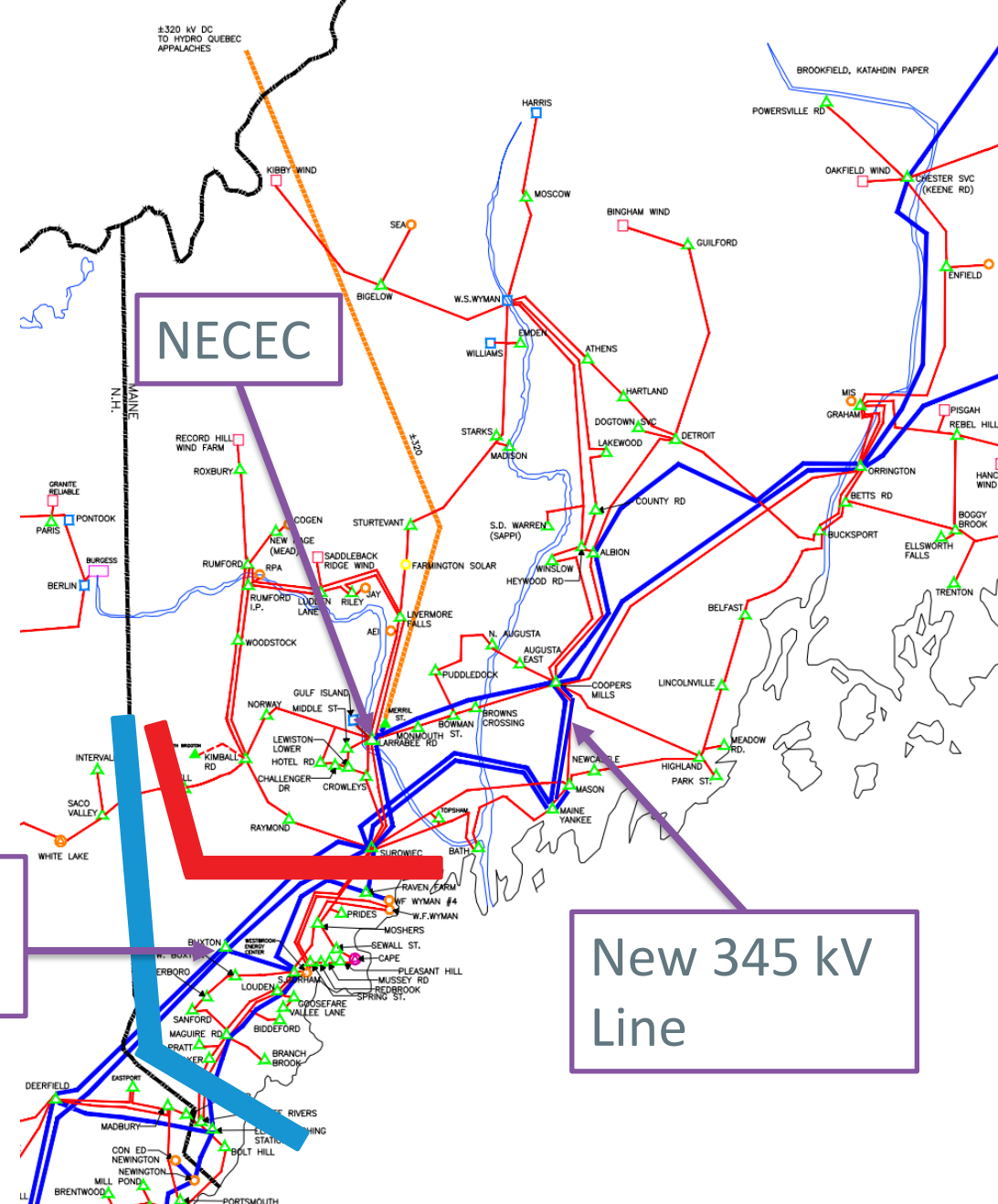
- January 23 to 27, 2026
- New England and Québec regions were impacted
- This storm was followed by prolonged period of below average temperatures, causing in increase of demand in Quebec

Stability Limits

- New large import in Maine
- Several stability interfaces were evaluated
 - Limits were increased due to upgrades associated with NECEC.
 - In addition to the VSC-HVDC installation, other area upgrades included new transmission lines, various line rating increases, and two ± 300 MVAR STATCOMs
 - Conservative limits put in place to prevent unit/area instability, insufficiently damped system response, and unacceptable transient low voltage conditions

Stability Limits

- ME-NH
 - Increase of 200 MW w/ NECEC on
- Surowiec-South
 - Increase of 1200 MW w/ NECEC on



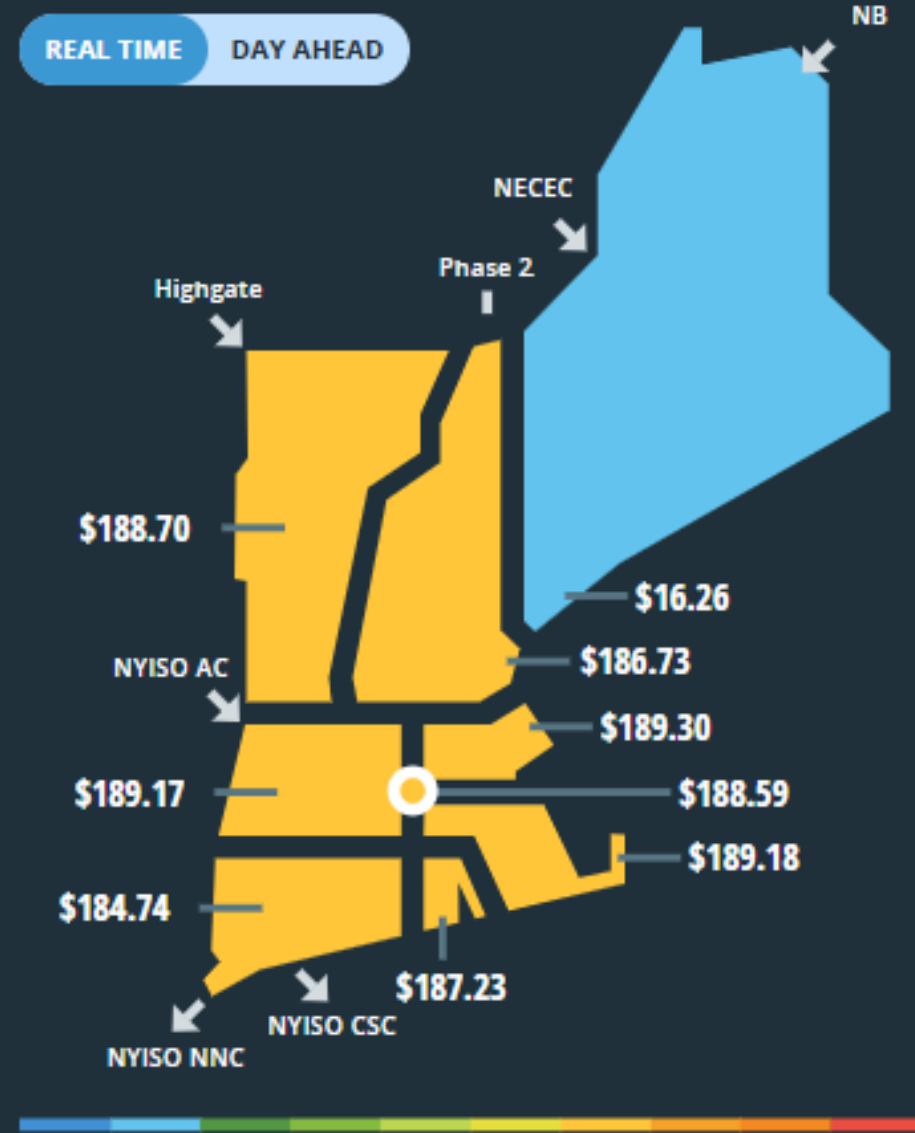
Two ± 300 MVAR
STATCOMs

New 345 kV
Line

Congestion

- Congestion has always been possible
 - Maine has a significant amount of dynamic supply, including wind and solar, along with imports from New Brunswick
 - During unexpected light load conditions, this can increase the amount of energy flowing in the direction of Maine to New Hampshire

Price Map



Questions



Hydro-Québec Grid Operations and Interregional Transmission Briefing

MAY 7, 2026



Agenda

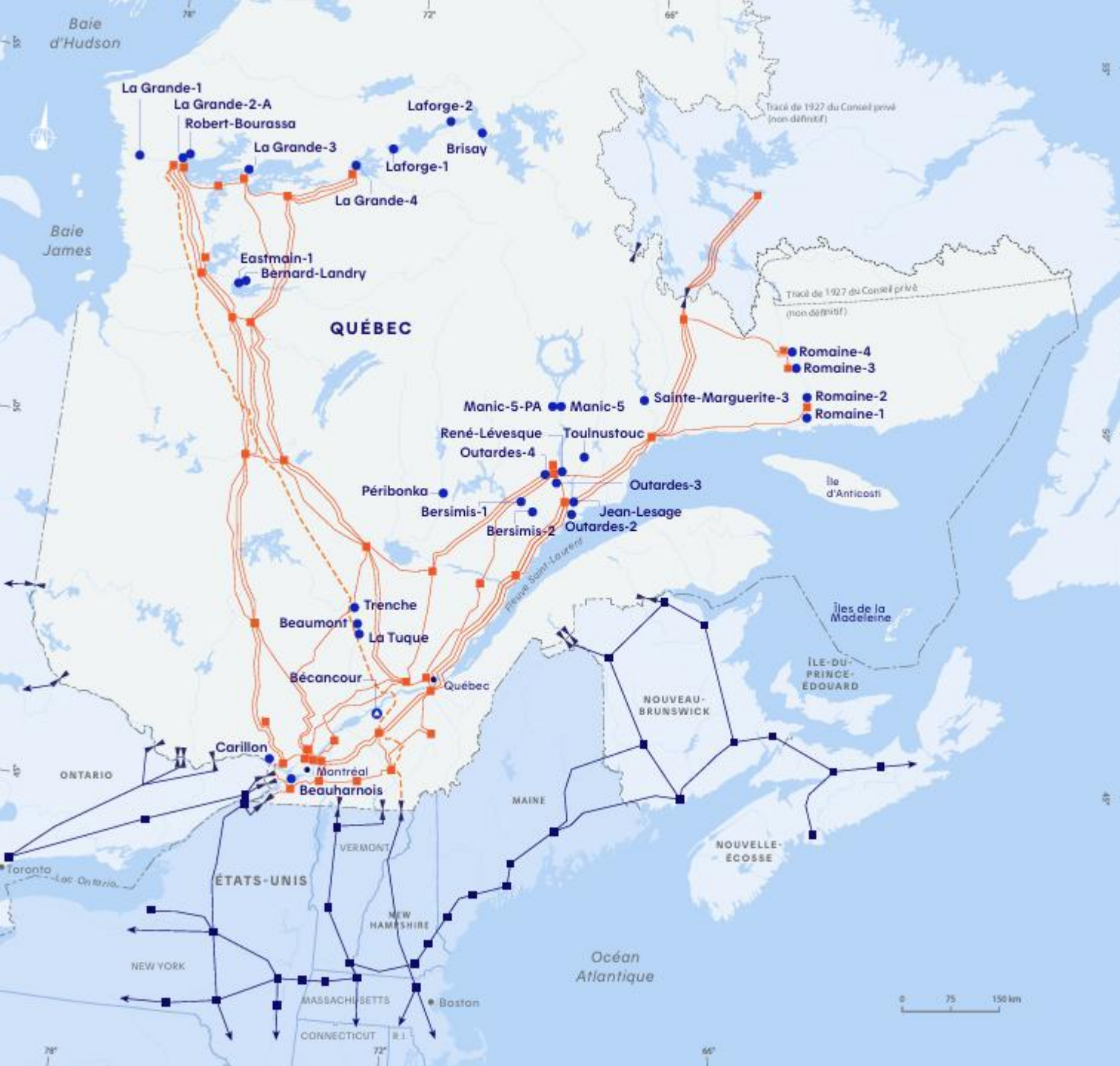
1. Hydro-Québec System Overview
2. CHPE
3. NECEC
4. Supply and Demand Growth
5. Future Outlook
6. Questions



Hydro-Québec Overview:

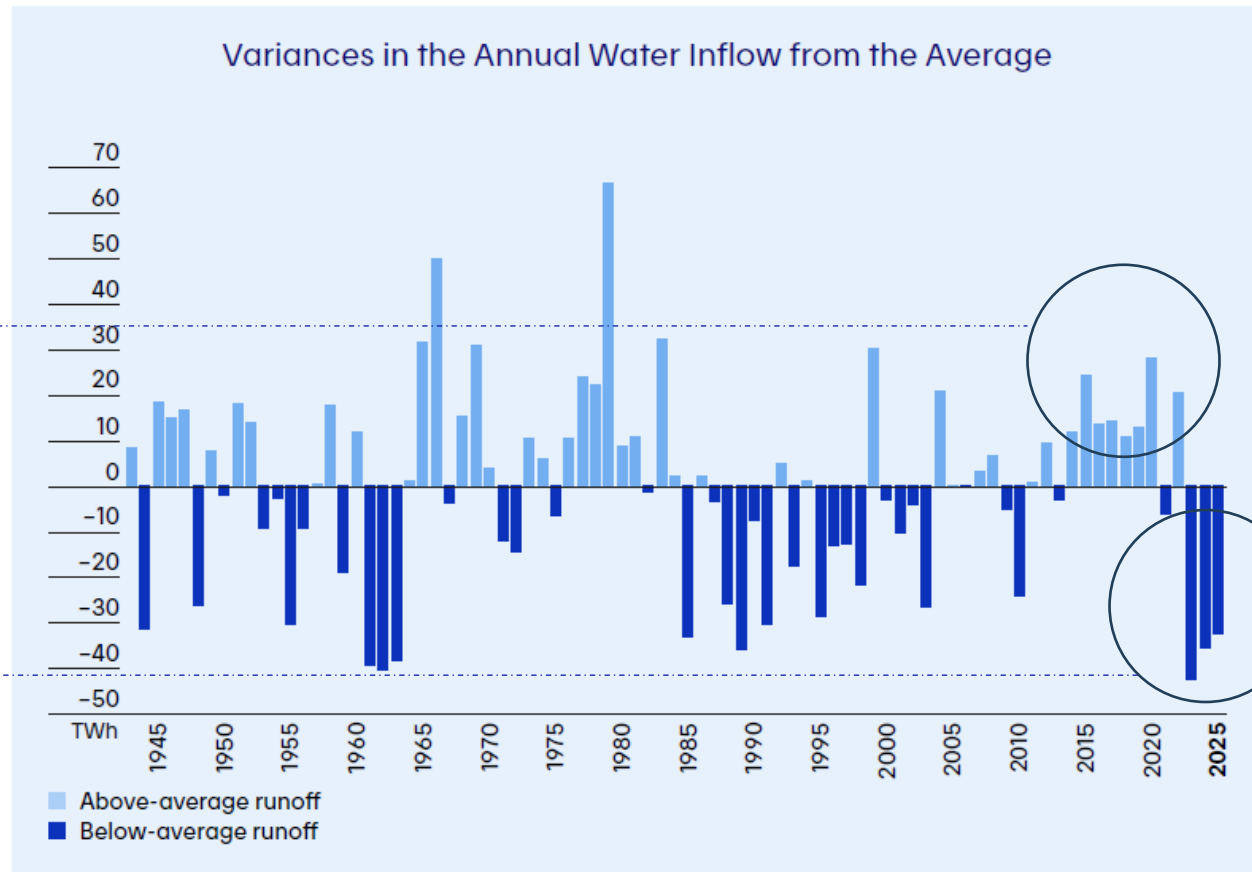
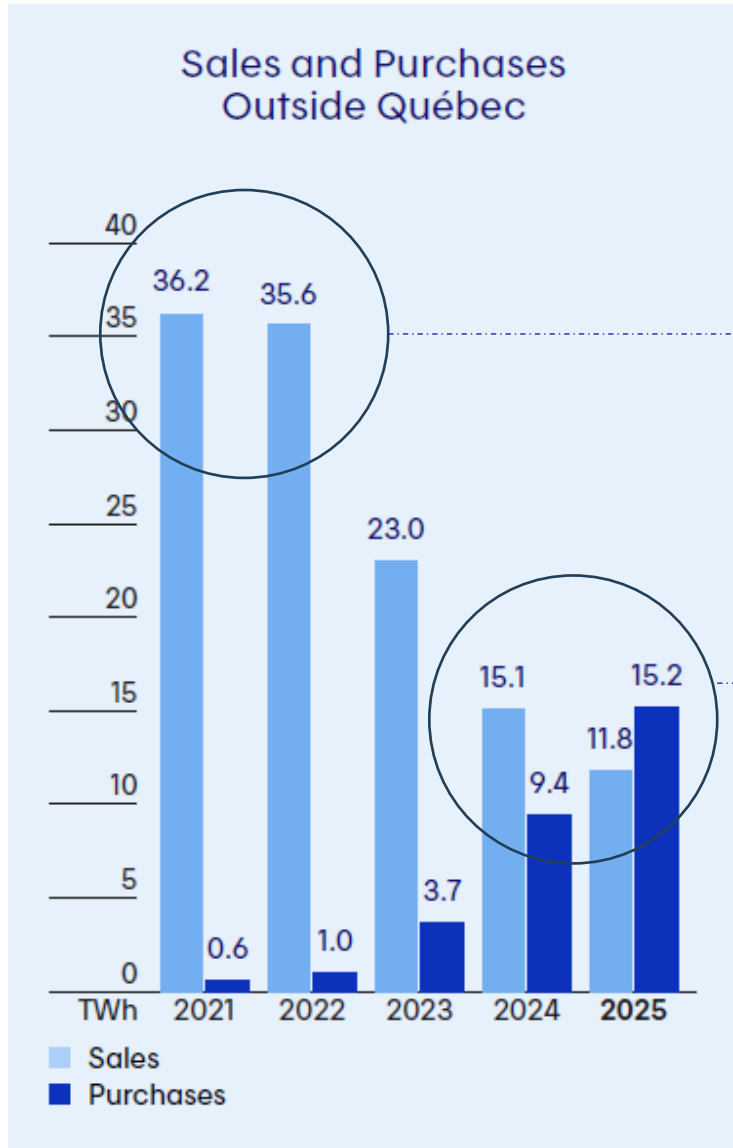
One of the largest Renewable Energy generators in North America: Robust electric system comprising primarily large hydropower, increasing amounts of wind, and an extensive transmission network

- 37 GW of installed capacity – 99% renewable energy
- Québec hydropower lifecycle emissions similar to wind and solar
- Resources capable of providing baseload and dispatchable operation
- 176 TWh of reservoir storage capability
- Interconnected to 5 adjacent markets via 15 interconnections
- Reliable, system-backed capacity
- Additional transmission interties will enable greater regional optimization



Net Exports

HQ manages our system to ensure delivery of all firm commitments



More flexibility in use of interties enables HQ to:

Promote Market Efficiency

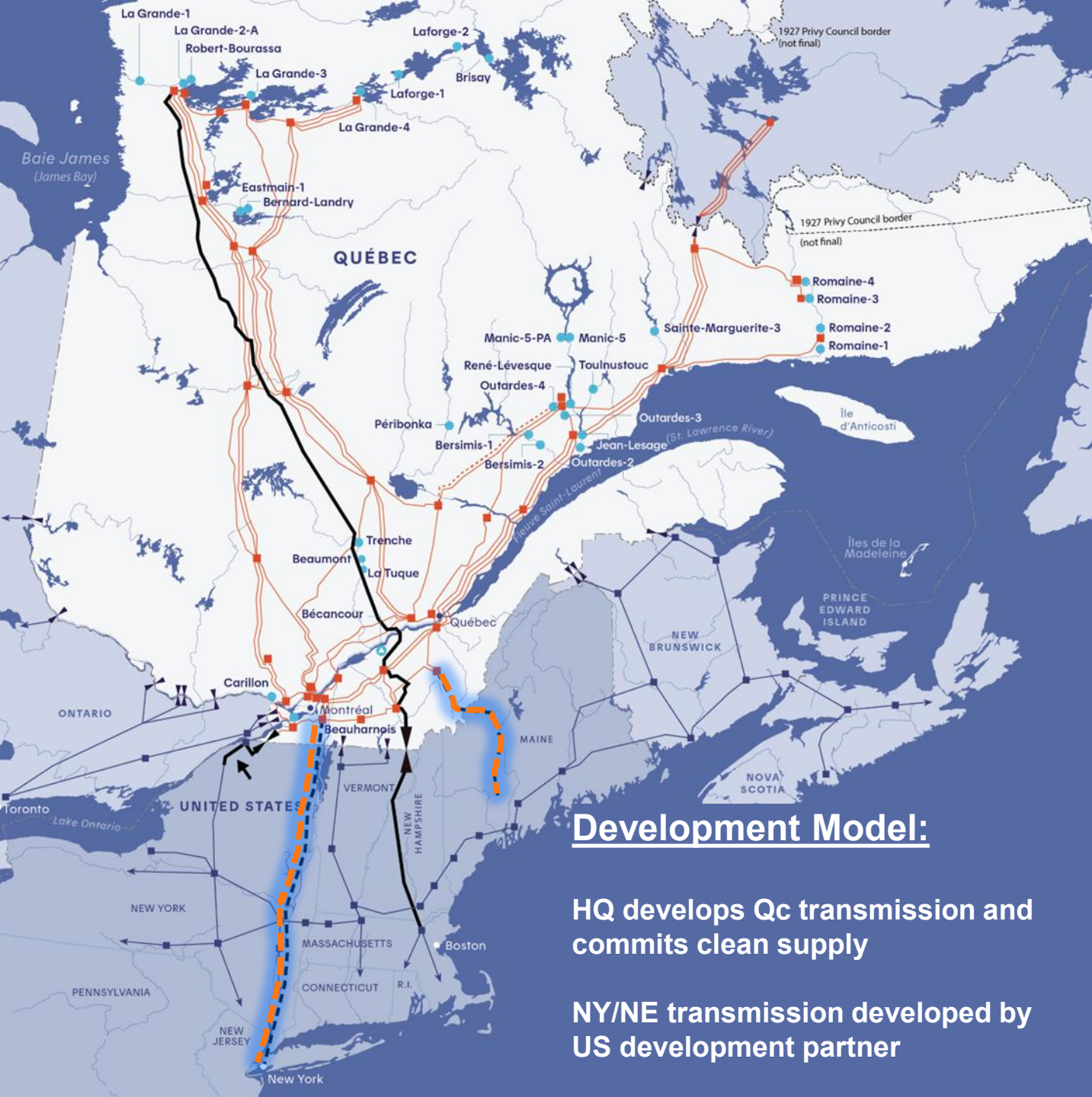
Manage Hydraulicity

Balance Supply Additions

Source: Hydro-Québec 2025 Annual Report

New Intertie Projects

- **Historical Exports:** uncommitted short-term spot market sales
- **Shift to long-term contracts:** New transmission projects are enabled through long-term contracts for baseload clean energy supply
- Contracts awarded through competitive solicitations
- **Benefits:** These projects will deliver significant economic, environmental and reliability benefits
- Legacy Benefits: 20–25-year energy supply contracts facilitate transmission infrastructure that will operate 60-80 years and facilitate future clean energy exchange between Québec and the Northeast



Development Model:

HQ develops Qc transmission and commits clean supply

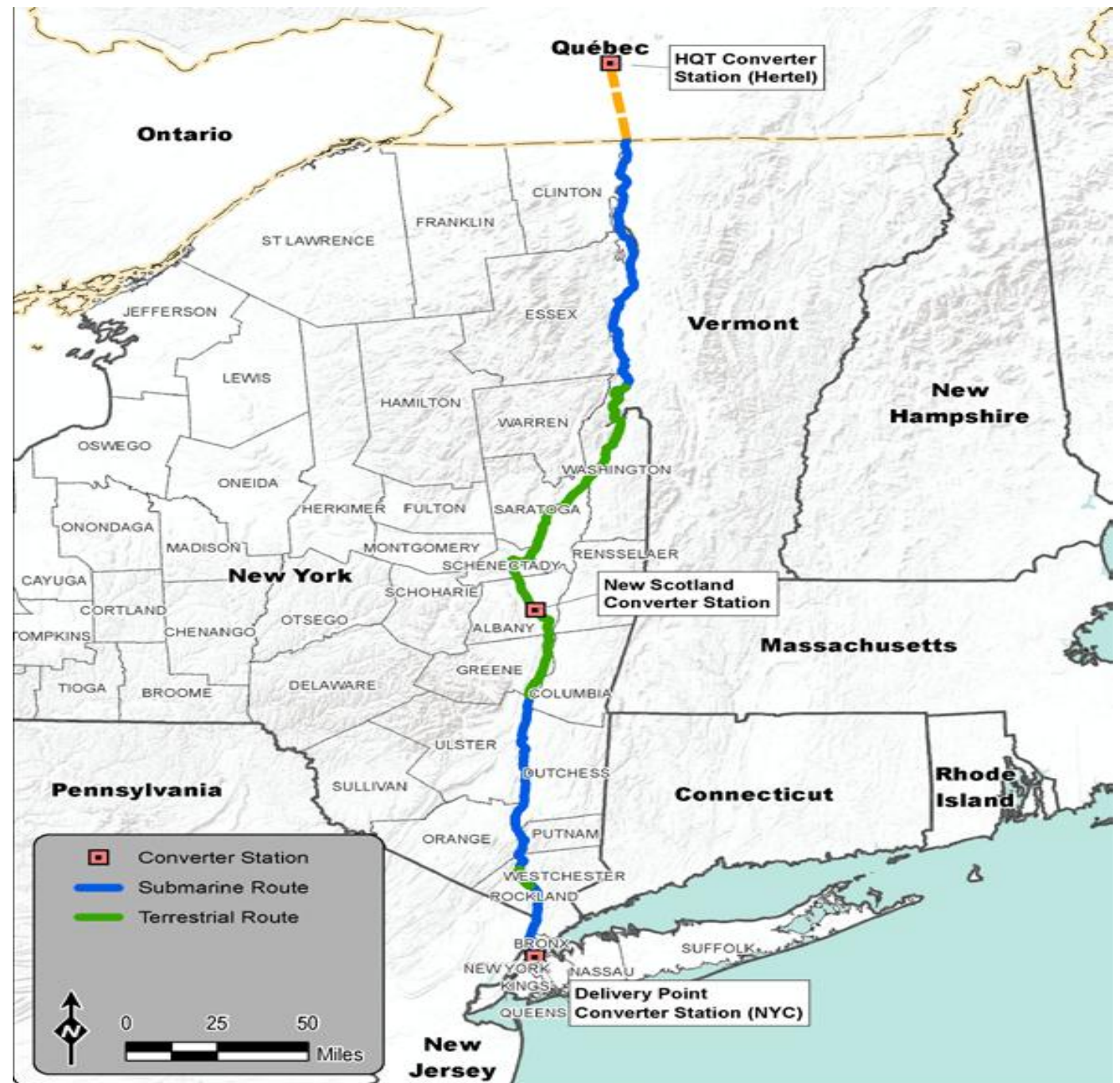
NY/NE transmission developed by US development partner



**Champlain Hudson
Power Express**

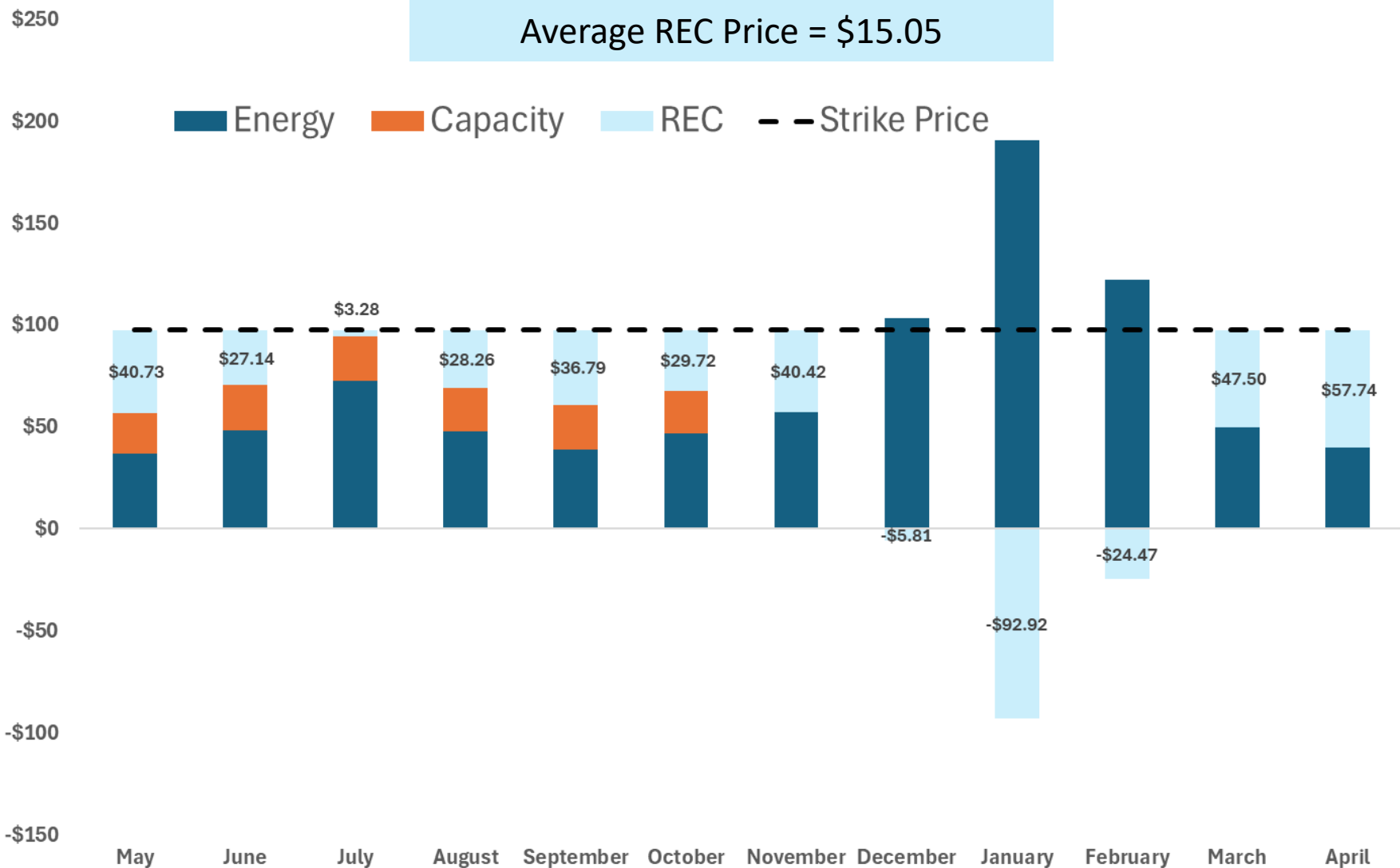
Champlain Hudson Power Express Project

- 1,250 MW HVDC buried transmission line (underwater and underground) from southern Québec to New York City
- Physical delivery of 10.4 TWh of HQ hydropower to New York City each year (20% of NYC's annual demand)
- 25 Year contract with a NYSERDA selected through a competitive solicitation under the Clean Energy Standard Tier 4 program
- Spring 2026 In service date
- Contractual provisions related to (1) Environmental and Community benefits in New York (2) protections and benefits for Indigenous groups in Québec (3) ensure energy deliveries over CHPE aren't backfilled from fossil-fuel generation



CHPE Index REC Example

Average REC Price = \$15.05



**Index REC: Price
Certainty**

Strike Price: \$97.50

Escalation: 2.5%

Summer only UDR

**No requirement to
offer/provide capacity**

**Seasonal Minimum Delivery
Requirements**

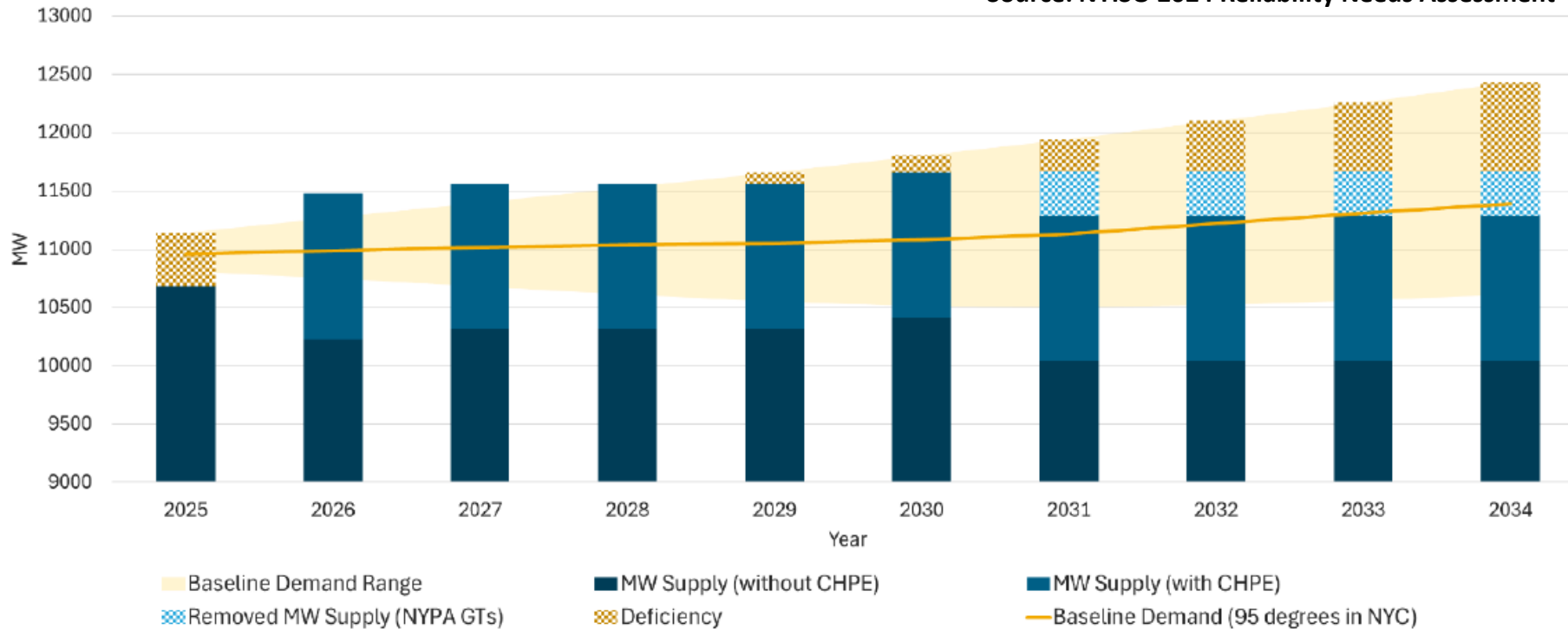
**Allowable reductions for
(i) reliability curtailments,
(ii) Force Majeure, (iii)
negative LBMP, and (iv)
transmission unavailability**

NYC Capacity Contribution

Source: NYISO Q2 2023 STAR Report

Figure 1: New York City Margin Forecast Uncertainty

Source: NYISO 2024 Reliability Needs Assessment



Permanent Solution



1,250 MW of Canadian hydro power to NYC

- Overall, the New York City reliability margin is expected to improve in 2026 if the Champlain Hudson Power Express (CHPE) connection from Quebec to New York City enters service on schedule in spring 2026.
- CHPE has received all major necessary permits, and several segments of the project are now under construction.
- Without the CHPE project in service or other offsetting changes or solutions, New York City's reliability margins continue to be deficient for the ten-year planning horizon.
- Through quarterly STAR studies, NYISO will continuously evaluate system reliability as changes occur and will carefully monitor the progress of the CHPE project toward completion.

NYC Reliability

- ❑ Contributes directly toward Local Requirements
- ❑ System backed capacity
- ❑ Resource diversification

Winter Capacity

- ❑ No requirement to offer winter capacity
- ❑ Sizable merchant opportunities for excess sales available in the winter
- ❑ **FERC Protest for necessary market rules to make this available to New York**



New England Clean Energy Connect

MA Selection- “NECEC”

100 %



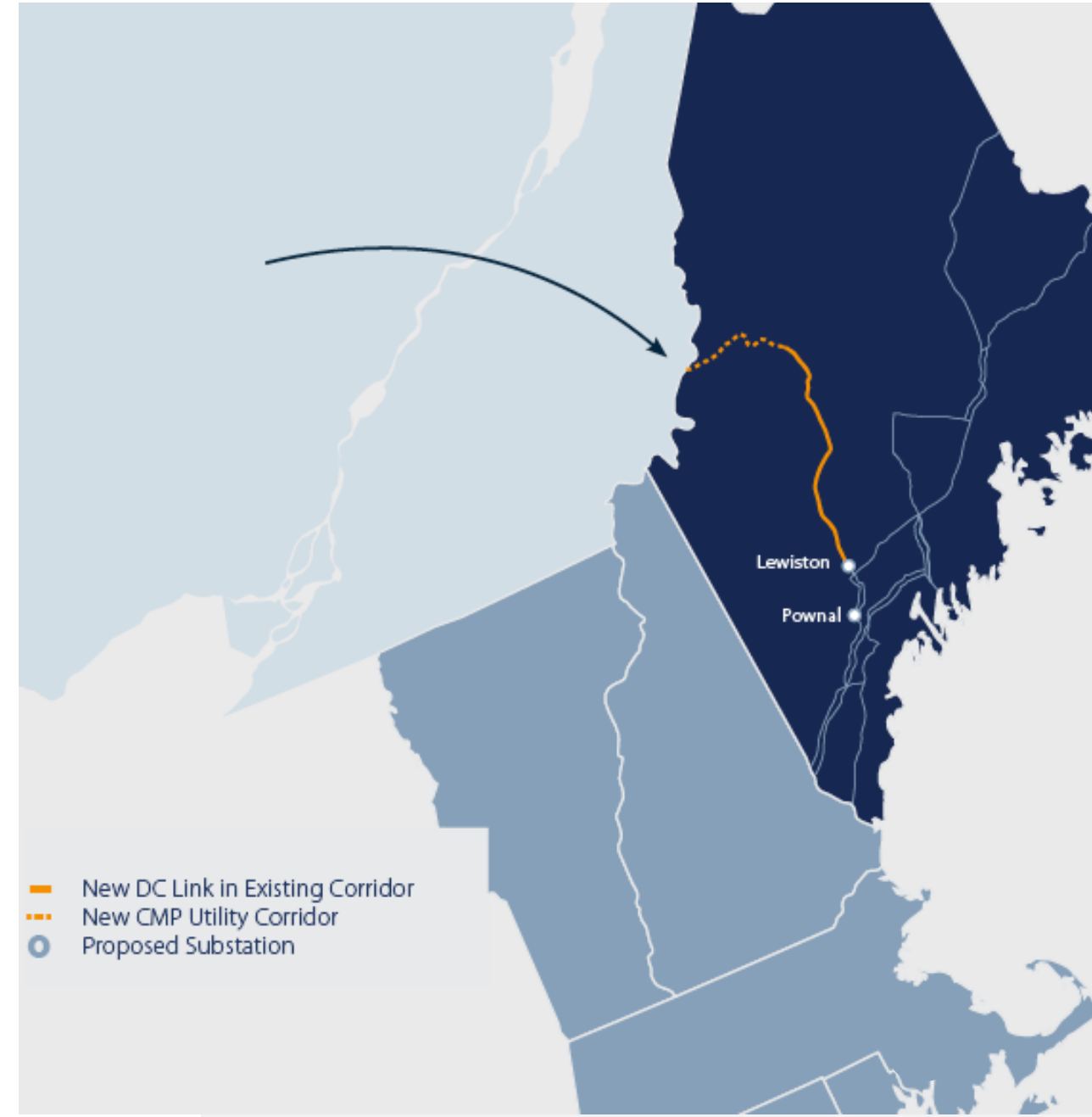
Firm clean energy sourced from Hydro-Québec’s hydropower resources

- Selected in Massachusetts Clean Energy RFP seeking 9.5 TWh of firm clean energy
- Competitive solicitation which included onshore wind, offshore wind, solar, batteries, etc.
- 1,200 MW overhead HVDC transmission line developed by Avangrid
- Began deliveries January 16, 2026

PPA provides for:

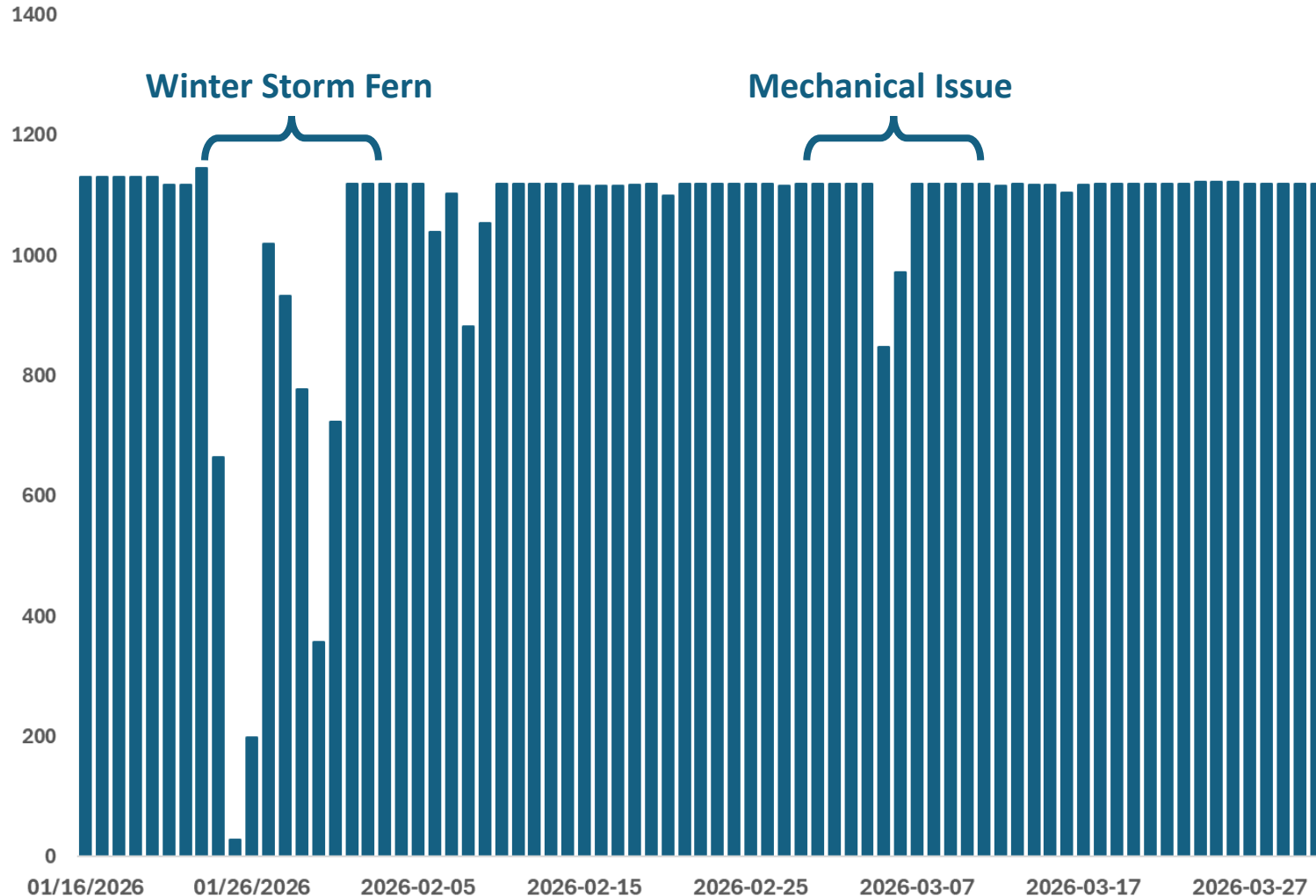
- 9.5 TWh energy/year ~ 1,090 MWs All-hours + unit specific environmental attributes
- 20 Year Contract Term
- Deliveries over NECEC to be additional to NE deliveries over existing ties

New England Clean Energy Connect



NECEC Deliveries

NECEC Average Daily Deliveries



NECEC Operational Data and Project Benefits

- Deliveries began January 16, coinciding with one of the coldest and highest demand winters over last 20 years
- Contract provisions to account for temporary reduction in deliveries
- Delivery factor of over 93% in January and February, 97% through March
- 20-year contract – estimated benefits of up to \$740M in annual wholesale electricity benefits and over 3.5M metric tons of yearly GHG emission reductions*
- Critical fuel diversity benefits to New England

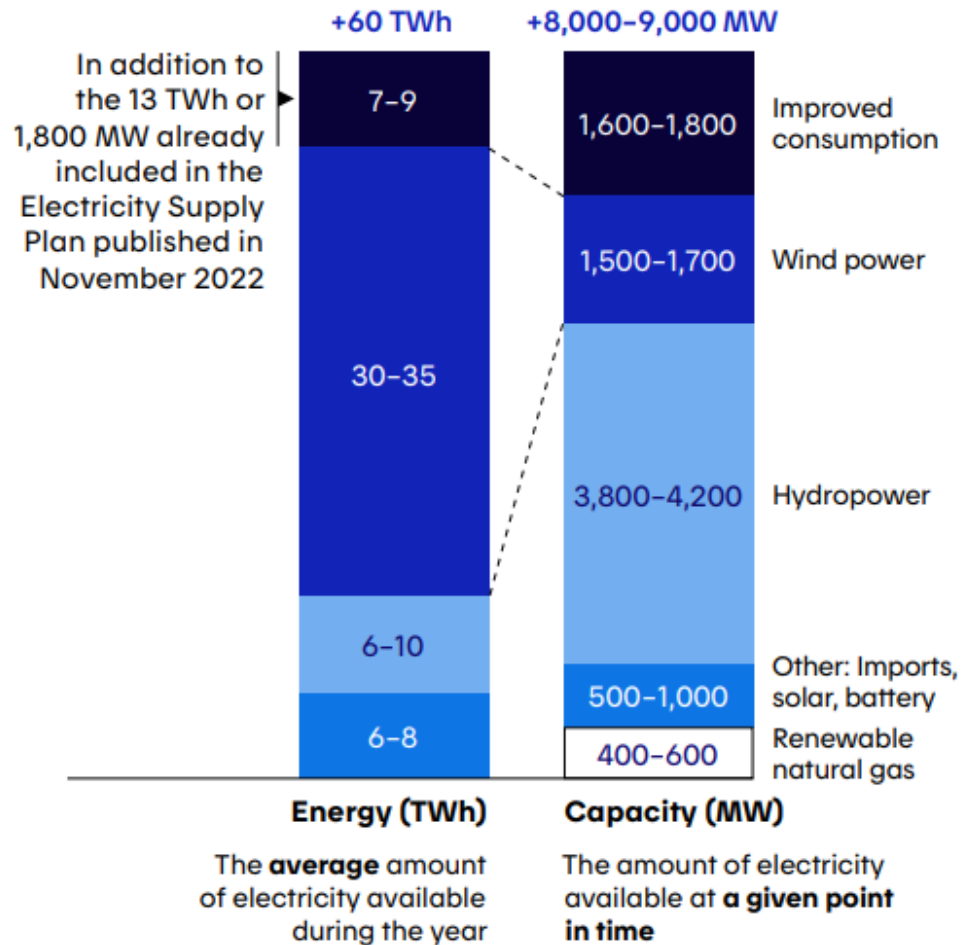
*Independent Analysis from London Economics and Daymark Energy Advisors

Supply and Demand



2035 Action Plan

Original Plan (2022)



Update/Progress

Demand-side management (1,600 MW -1,800 MW)

- Between energy efficiency and demand response programs, we plan on doubling our peak shaving capacity and reducing annual energy demand by 22 TWh (through rate offerings, subsidies, technical support)
- Current progress ahead of targets – 1.9 TWh in savings



Onshore Wind Power (10,000 MW)

- 3,900 MW in development
- Potential for 12,500 MW through community partnerships



New Hydropower (3,800 MW to 4,200 MW)

- Refurbishment goal increased from 2,000 MW to 2,400 MW



Other renewable sources

- First solar RFP issued April 2026 for 300 MW

Energy Exchange in Canada



HQ ENERGY MARKETING INC.

**REQUEST FOR INFORMATION
FROM**

**OFFSHORE WIND
AND
TRANSMISSION
DEVELOPERS**

March 25, 2026

NEWFOUNDLAND AND LABRADOR

Churchill River Study and Hydroelectric Developments

In December 2024, Newfoundland and Labrador Hydro and Hydro-Québec signed an agreement in principle for the generation of hydroelectricity in Labrador. This is an historic opportunity for prosperity through jobs, economic growth and access to new, clean energy. The agreement is currently under review by an independent committee established by the Government of Newfoundland and Labrador.

Project partners



Current Actions/Strategy

- Procure offshore wind in Nova Scotia and partnerships for associated transmission
- MOU with Newfoundland and Labrador for 2,400 MW of new hydropower generation
- Bolster East to West energy exchange in Canada to more efficiently serve regional needs and unlock complementary resources
- Québec can play a central role through multiple interconnections and long-duration storage

HQ exploring opportunities to supplement supply with neighboring Provinces

Future Outlook



Bidirectional Transmission Concept

- **Explore** how interregional transmission projects can address emerging needs in U.S. markets and create additional value across regions
- New HVDC transmission projects would operate on a bidirectional, **supply/export-neutral basis**
- Unlike projects such as NECEC and CHPE*, this new model enables flexible, two-way energy trade **without a fixed supply commitment**
- Leverage resource and load diversity across neighboring systems
- Accurately reflect future operating conditions in Québec
- Replicate example of Norway in leveraging hydropower to balance wind and solar in neighboring markets
- Benefits studies build on previous work conducted by MIT (2020)



Additional transmission optimizes HQ's clean dispatchable generation and long-duration storage to meet emerging challenges in U.S. markets

*Champlain Hudson Power Express and New England Clean Energy Connect



Invitation for Questions



Forum Survey and Closing Remarks

Survey



We invite you to complete a [brief survey](#) about your experience with the NPCC Reliability Forum. The questionnaire will take approximately two-three minutes to complete.

2026 Outreach Activities



State & Provincial Outreach

- NERC and NPCC Seasonal Reliability Assessments
- NERC Long-Term Reliability Assessment (LTRA) and NPCC Long Range Adequacy Overview (LRAO)

Reliability Forums

- Various Reliability Topics
- Regional Transmission, Large Loads, Resource Adequacy

Regional Webinars/Workshops

- Spring and Fall Compliance and Reliability Conference
- Physical and Cyber Security
- Extreme Weather Preparedness





QUESTIONS?

Contact Us: npcc.org/contact

Gerry Dunbar and Faisal Nahian
NPCC Communications

NPCC Reliability Forum | Public

05/07/2026

