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Planning Tomorrow's Grid

Renewable Energy Vermont

2024 Annual Conference

Sarah Adams

STATE POLICY ADVISOR, EXTERNAL AFFAIRS

ISO New England's *Mission and Vision*

Mission: *What we do*

Through collaboration and innovation,
ISO New England plans the transmission system, administers the region's wholesale markets, and operates the power system to ensure reliable and competitively priced wholesale electricity

Vision: *Where we're going*

To harness the power of competition and advanced technologies to reliably plan and operate the grid as the region transitions to clean energy

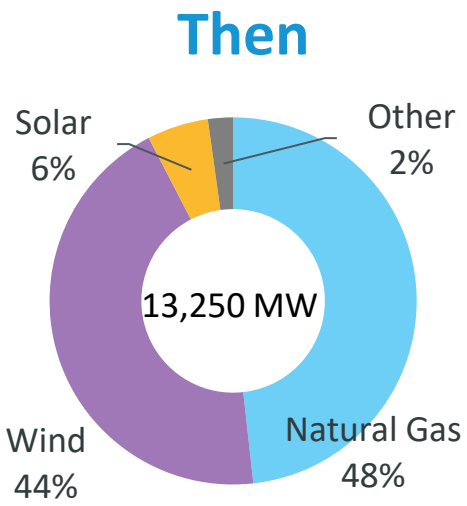
*The ISO's **Vision** for the future represents our long-term intent and guides the formulation of our Strategic Goals*

State Laws Target Deep Reductions in CO_2 Emissions and Increases in Renewable and Clean Energy

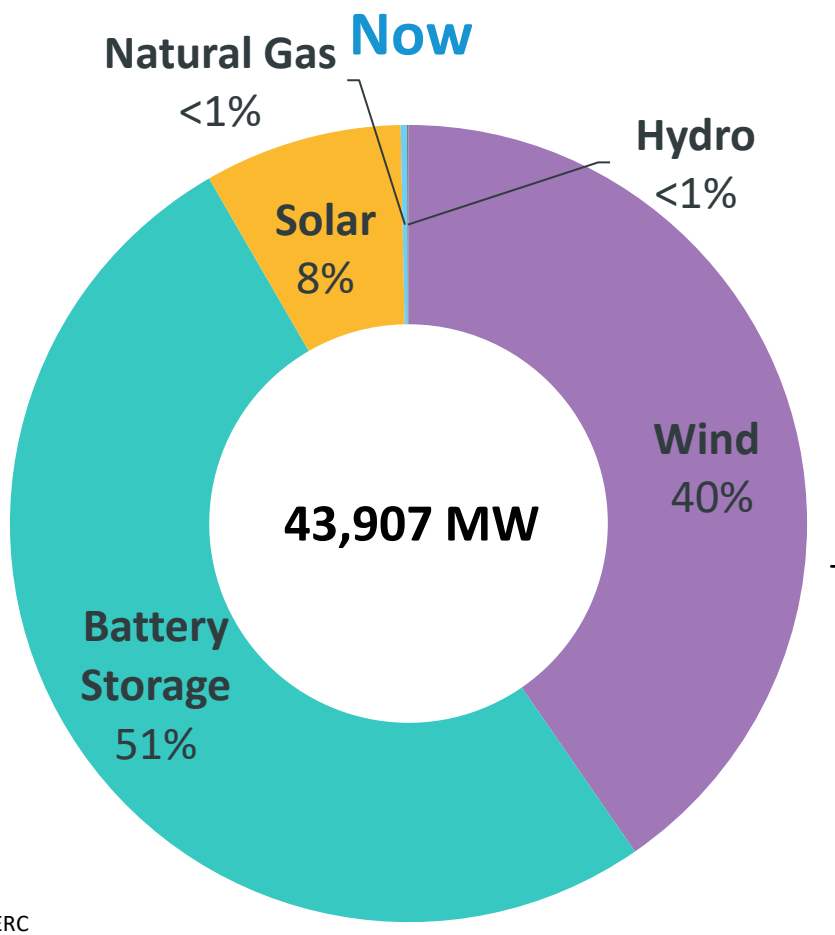
≥80% by 2050	Five states mandate greenhouse gas reductions economy wide: MA, CT, ME, RI, and VT (mostly below 1990 levels)
Net-Zero by 2050 80% by 2050	MA emissions requirement MA clean energy standard
100% by 2035	VT renewable energy requirement
100% by 2050 Carbon-Neutral by 2045	ME renewable energy goal ME emissions requirement
100% by 2040	CT zero-carbon electricity requirement
100% by 2033	RI renewable energy requirement

The ISO Generator Interconnection Queue Provides a Snapshot of Resource Proposals

Dramatic shift in proposed resources from natural gas to battery storage and renewables



June 2017



September 2024

Offshore Wind	
CT	3,675 MW
MA	9,432 MW
RI	1,904 MW

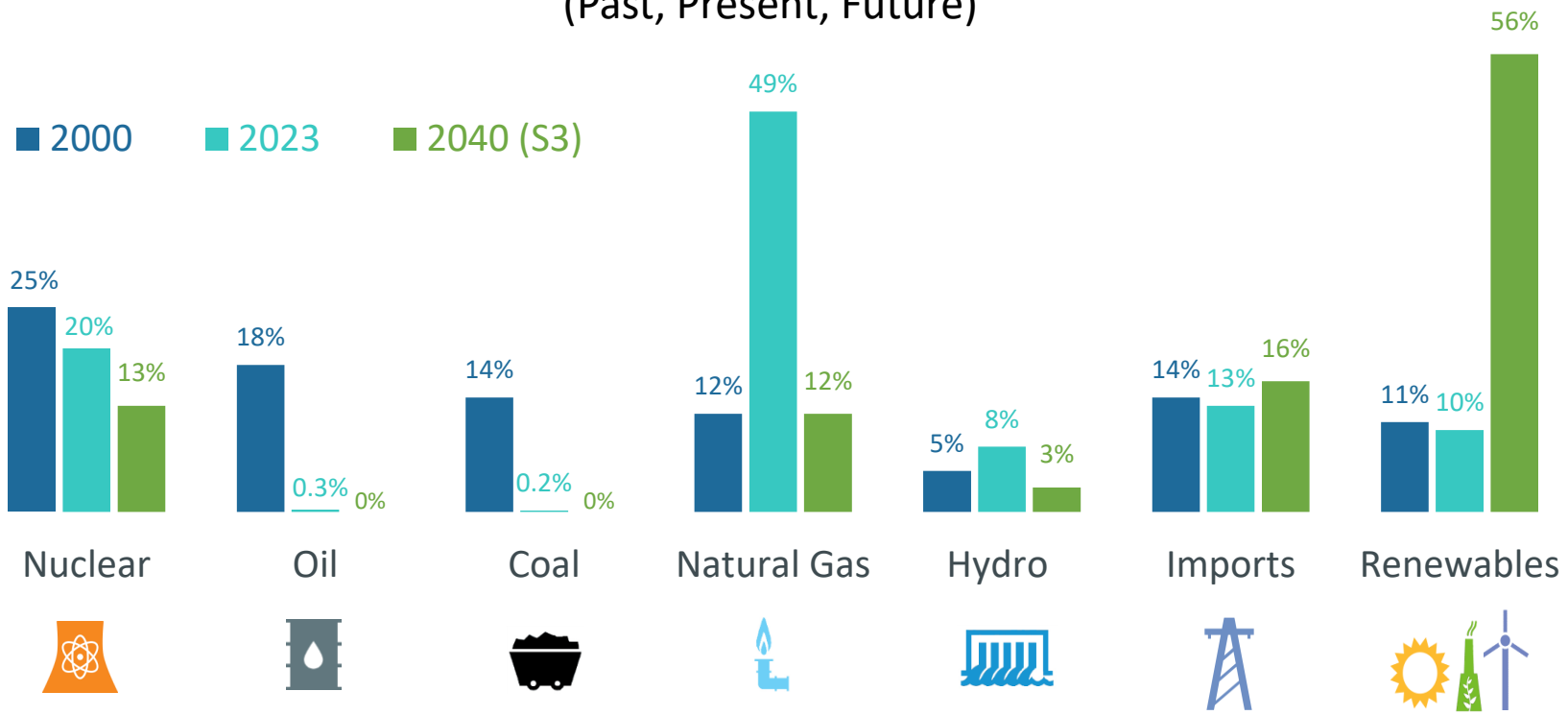
Onshore Wind	
ME	2,720 MW

Source: ISO Generator Interconnection Queue, FERC Jurisdictional Proposals; Nameplate Capacity Ratings.

Dramatic Changes in the Energy Mix

New England made a major shift from coal and oil to natural gas over the past two decades, and is shifting to renewable energy in the coming decades

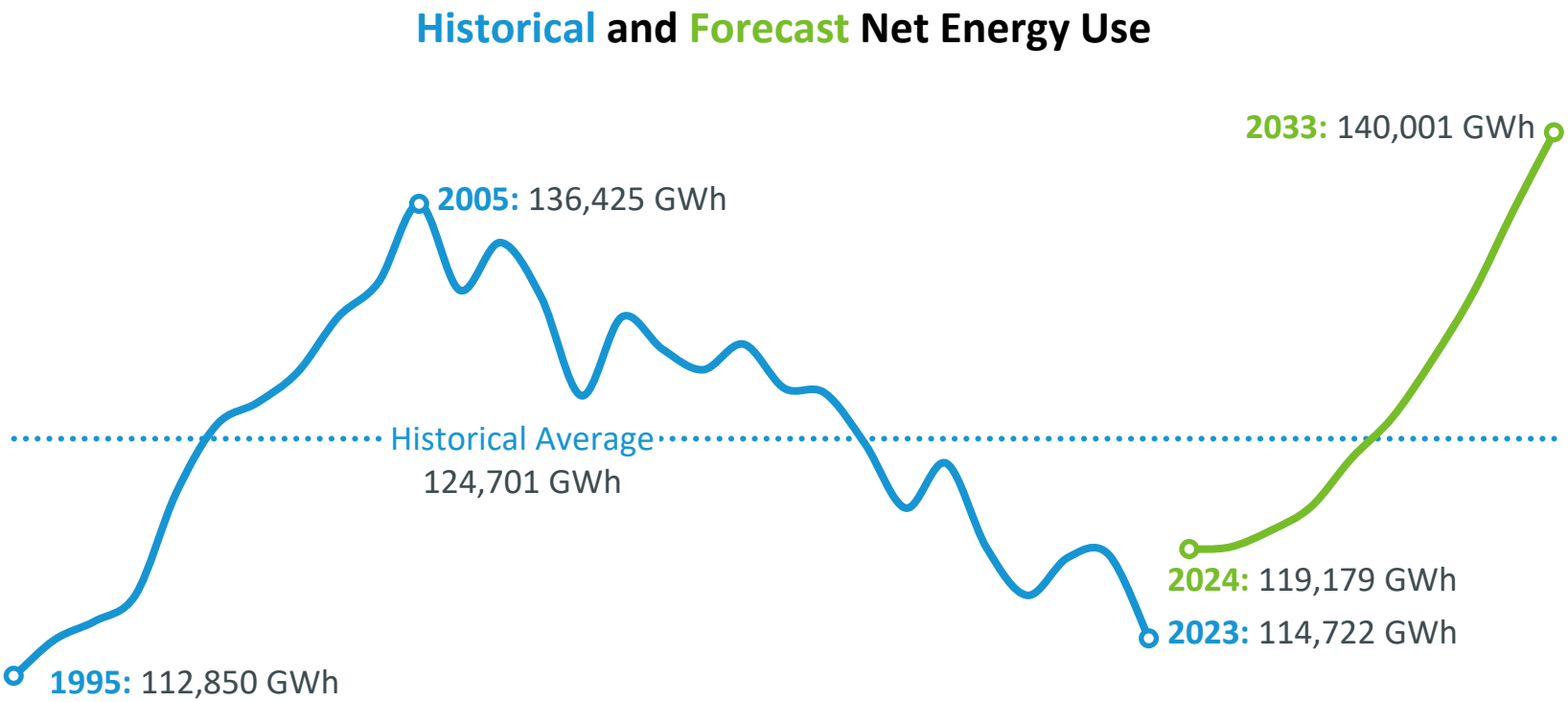
Percent of Total **Electric Energy** Production by Source
(Past, Present, Future)



Source: ISO New England Net Energy and Peak Load by Source; data for 2023 is preliminary and subject to resettlement; data for 2040 is based on Scenario 3 of the ISO New England 2021 Economic Study: Future Grid Reliability Study Phase 1.
Renewables include landfill gas, biomass, other biomass gas, wind, grid-scale solar, behind-the-meter solar, municipal solid waste, and miscellaneous fuels.

Increased Electrification is Expected to Drive Steady Growth in Net Annual Energy Use

This follows two decades of decreased net energy use as a result of state policies incentivizing solar PV and energy efficiency



Source: ISO New England 2024-2033 Forecast Report of Capacity, Energy, Loads, and Transmission (2024 CELT Report) (May 2024)

A TIME OF TRANSITION

Capacity Auction Reforms

CAR explores a complete redesign of the capacity market and related functions

Four major design changes being considered with wide ranging impacts to outcomes:

1. Modeling

Improve hourly modeling used in the resource adequacy assessment (RAA)

2. Accreditation

Use a marginal accreditation framework

3. Prompt

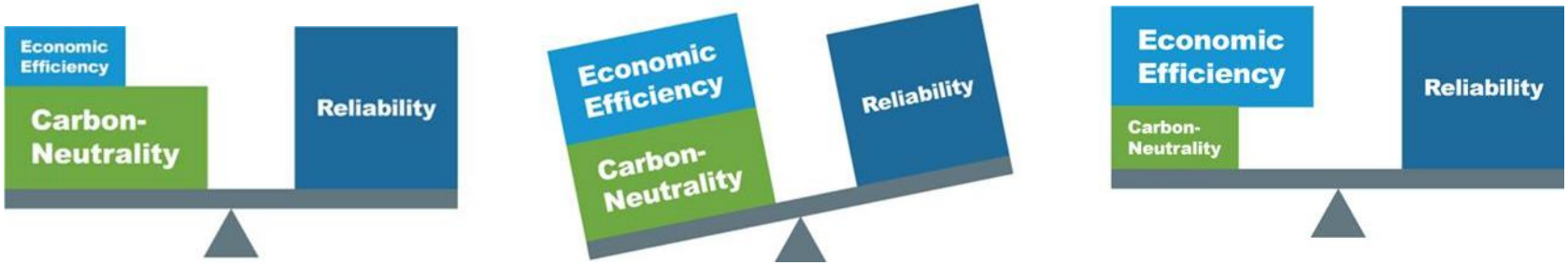
Shift qualification and auction timing to be closer to the commitment period

4. Seasonal

Develop a seasonal product

Economic Planning for the Clean Energy Transition (EPCET) Overview

- EPCET explores the operational, engineering, and economic challenges the region must address in order to support the New England States' commitment to reduce carbon emissions over the next several decades
- Most of the six states aim to cut emissions by at least 80% from 1990 levels by the year 2050 through a shift to renewable energy and electrification of heating and transportation
- Work performed over two years, draft report published in August



EPCET's key findings converge on a common theme: ***designing the power system of the future requires balancing reliability, economic efficiency, and carbon-neutrality***

Average Annual Buildout Necessary to Achieve State Goals by 2050

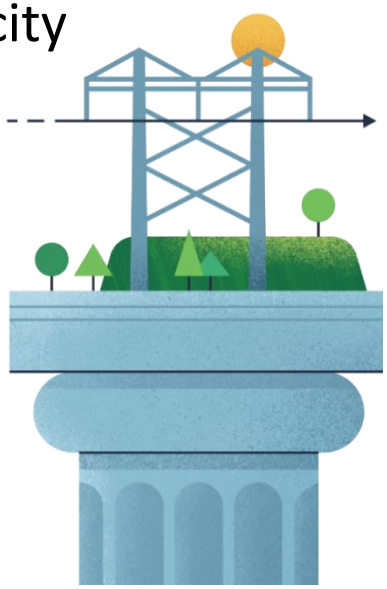
1,293 MW
per year
of offshore wind (OSW)

955 MW
per year
of solar

268 MW
per year
of land-based wind (LBW)

952 MW
per year
of batteries

Longer-term Transmission Planning (LTTP)



- In 2020, the New England States Committee on Electricity (NESCOE) vision statement recommended that the ISO work with stakeholders to conduct a **comprehensive long-term regional transmission study**
- In response, the ISO began the study and received **FERC approval** to revise the ISO Tariff to establish a repeatable longer-term study process
- The resulting 2050 Transmission Study was the **first longer-term transmission study** conducted for New England
- The study informs stakeholders of the **amount and type** of **transmission infrastructure** necessary to provide reliable, cost-effective energy to the region through the **clean energy transition**, driven by state policy

Looking to the Future: LTTP Phase 2

- Accepted by FERC in July 2024, Phase 2 creates a **new process to implement transmission system upgrades** based on LTTP studies
  - Provides an avenue for the **states** to evaluate and finance transmission upgrades needed to ensure a reliable grid throughout the clean energy transition
  - ISO will issue and evaluate requests for proposals (RFPs) to **address needs identified by the states** and provide technical assistance to the states in support of their procurements and efforts to secure federal funding for transmission investments

- Many elements of LTTP Phase 2 are aligned with FERC's recent Order 1920, which also addresses future regional transmission planning
  - FERC Order 1920 also endeavors to ensure a reliable grid looking towards longer term planning, outlining cost allocation provisions and focusing on "right sizing" or modifying existing facilities when needed

System Planning in Transition

In response to new regulatory requirements, policy and stakeholder requests, and changing industry dynamics, System Planning in the New England region is evolving significantly

Planning Tomorrow's Grid: Longer-term Transmission Planning

Lou Cecere, Department of Public Service

2024 Renewable Energy Vermont Conference

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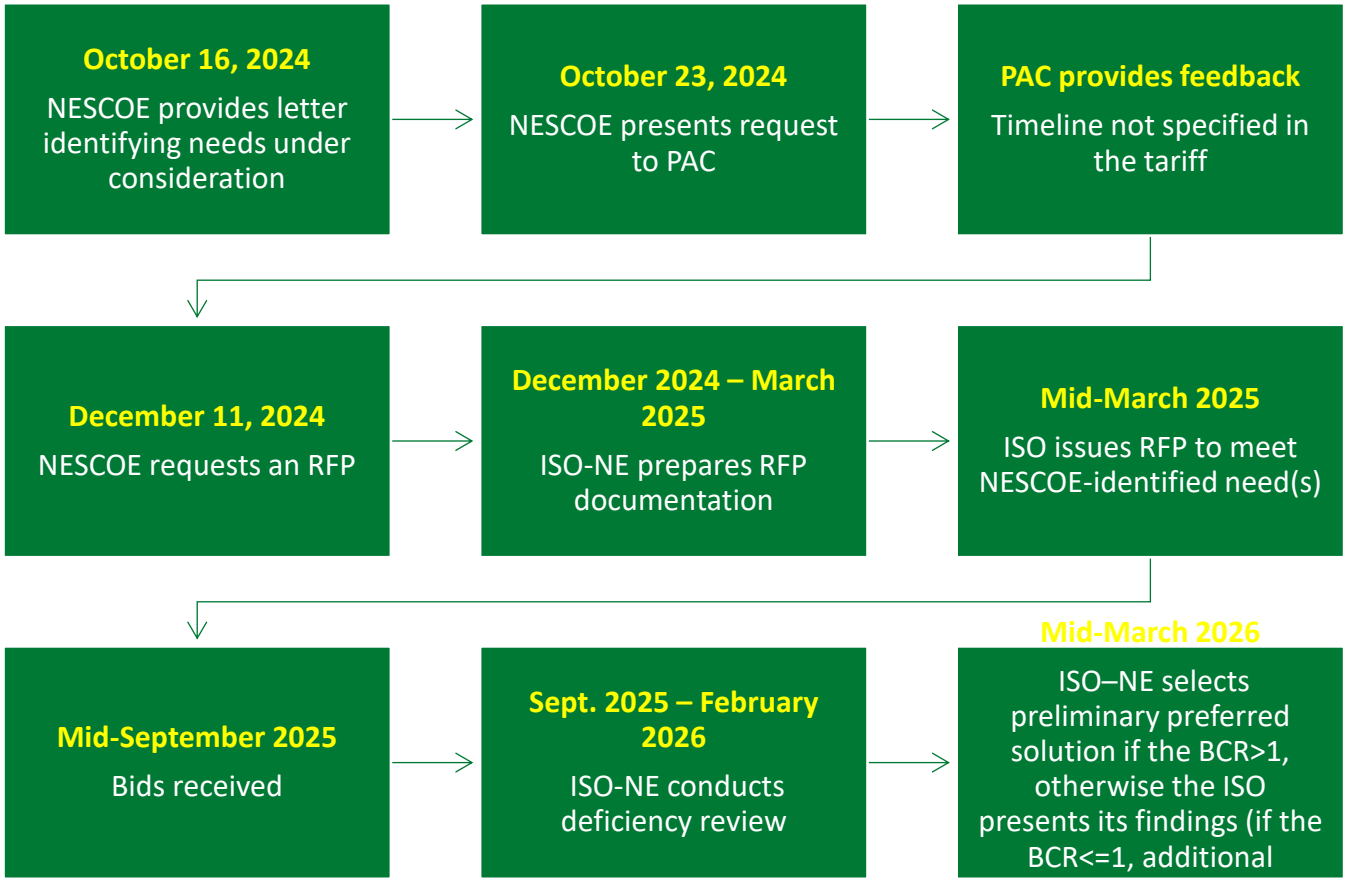
Process

- NESCOE (New England States Committee on Electricity) requests a Longer-term Transmission Planning study (LTTP)
- ISO-NE conducts LTTP study (2050 Transmission Study was later designated as the first LTTP study)
- States choose whether to request that ISO-NE issue an RFP based on study results and ISO-NE's input
- ISO-NE conducts RFP and performs regional economic benefit-cost analysis (BCA)
- If one or more projects have a BCA ratio greater than 1.0, ISO-NE recommends project with highest BCA
- States can walk away at any point in the process

Timeline



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NEW ENGLAND CLEAN POWER LINK

PLANNING TOMORROW'S GRID

LONGER TERM TRANSMISSION PLANNING

OCTOBER 17, 2024

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NECPL: PROJECT OVERVIEW

1,000 MW (+) buried HVDC transmission project

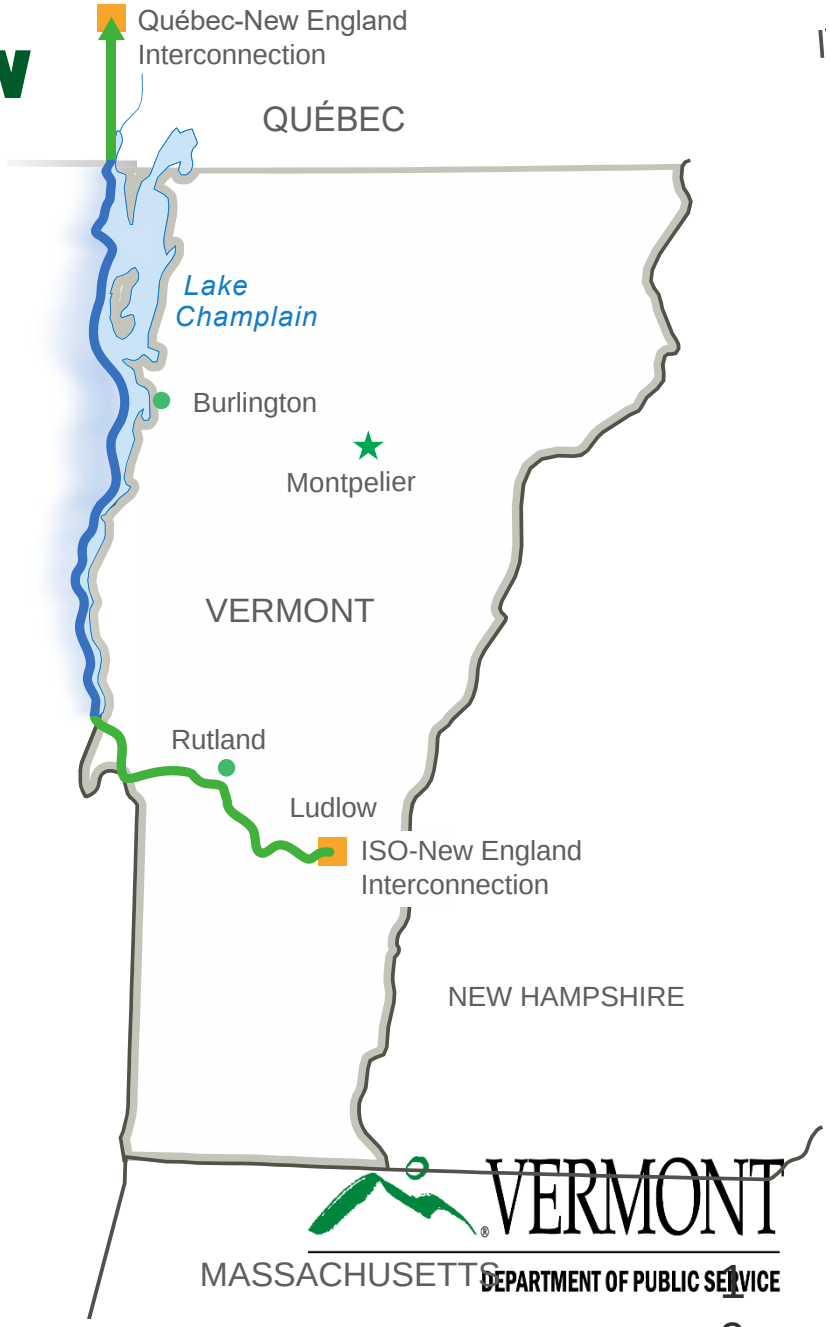
- 154-mile route from Canadian border to Ludlow, VT
- 100% buried; no above ground transmission
- 2/3 buried in Lake Champlain; 1/3 buried along road rights-of-way

Strong Interconnection and Resilient Infrastructure

- Connects to ISO-NE system at Coolidge substation in Ludlow, VT
- Robust interconnection point verified by ISO-NE
- Buried transmission lines protects infrastructure

Fully permitted and supported; minimal impacts

- Enjoys widespread support in VT and region
- All permits received; recently extended
- Interconnection Agreement completed



NECPL – Value Proposition

NECPL can be one of several needed interregional transmission solutions
New Cross-Border Transmission Infrastructure • Project is consistent with Nation's goal to increase transmission; identified as one of 22 shovel-ready projects in U.S. • Project is consistent with New England goal of decarbonization and electrification
Reliability • Strong interconnection point in Northwest New England; proximity to NYISO • Ability to provide dependable energy during winter gas shortages. • Opportunity to relieve congestion to enable VT renewable build-out.
Bi-Directional HVDC Line • Transmit excess U.S. OSW into HQ System which can act as a seasonal battery (excess OSW energy likely in winter, New England peak demand in summer) • Increase efficiency of OSW build-out by reducing curtailment and MW installed • Enables Vermont to become part of the OSW market
Opportunity to uprate line to 1,250 MW

NECPL & TDI: PROJECT EXPERIENCE

- Strong Project & Team
  - Project meets regional needs, has minimal impacts, widely supported, fully permitted
  - Project Team has decades of experience with developing and building transmission lines
  - Global Partnerships with transmission installers and manufacturers
  - Strong and committed owners

- New England market has presented minimal opportunities for non-reliability transmission contracting

- NECPL needs off-take contract with credit worthy counterparties to finance construction

- Experience in NY with CHPE project indicates that creativity is needed to develop opportunities for off-take contracts for non-reliability regional transmission

- ISO-NE Order 1920 provides an opportunity for such an off-take contract, but urgency needed

Order 1920 Opportunity

- NESCOE requests an LTPP study of the cost / benefits of a new bidirectional transmission line.
- ISO-NE conducts the study, in accordance with the tariff provisions.
- Depending on the study outcome, New England stakeholders can decide whether to pursue a new line.
- If New England decides to pursue a new line, ISO-NE would conduct an RFP.
- Once the winning proposal has been built and is operating, the annual costs of the new line would be recovered through the ISO-NE tariff, in accordance with the cost allocation provisions of the tariff.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