

# Vermont Electricity 101

**TJ Poor**

**Director, Regulated Utility Planning**

January 28, 2025

Committee on Senate Natural Resources and Energy



# Overview

## **PART ONE (TODAY)**

1. Department of Public Service
2. Core Components of the Electric Grid
3. Vermont's Regulated Utilities & ISO-NE
4. Jurisdictional Oversight
5. Components of Electric Rates
6. Electric Cost Drivers
7. Forecasted Load and Demand
8. Electric Supply

## **PART TWO – Renewable Energy Programs and Deployment**

1. Energy Efficiency
2. Renewable Energy Standard
3. Standard Offer Program
4. Net Metering
5. Grid Modernization: Rate Design, Load and Generation Management, and Resilience

# Public Service Department: Representing Vermonters

Represents public interest in energy, telecommunications, water and wastewater utility matters

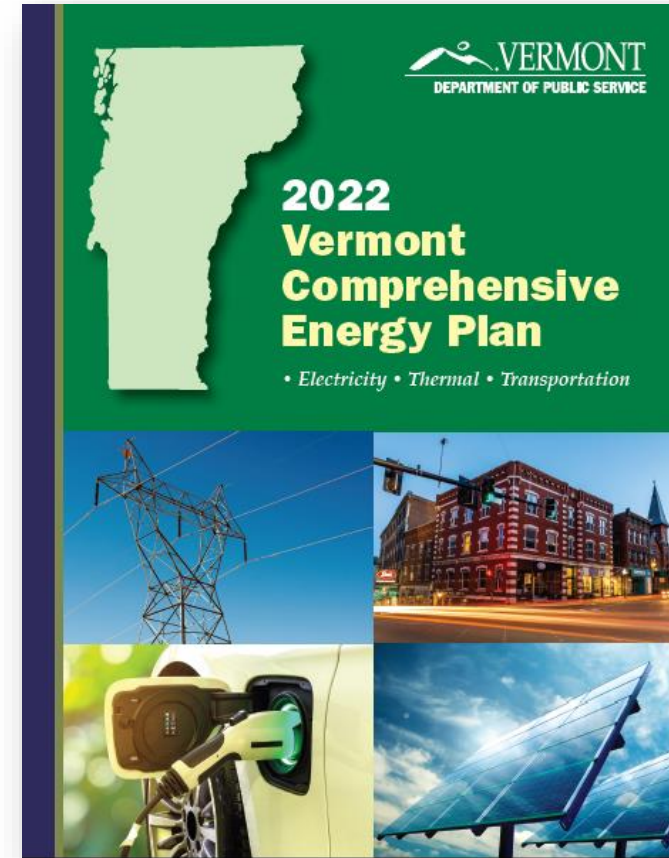
Mission: Serve all citizens through public advocacy, planning, programs, and other actions that meet the public's need for least cost, environmentally sound, efficient, reliable, secure, sustainable, and safe energy, telecommunications, and regulated utility systems in the state for the short and long term.

# State Energy Policy: Balancing Competing Objectives

30 V.S.A. 202a:

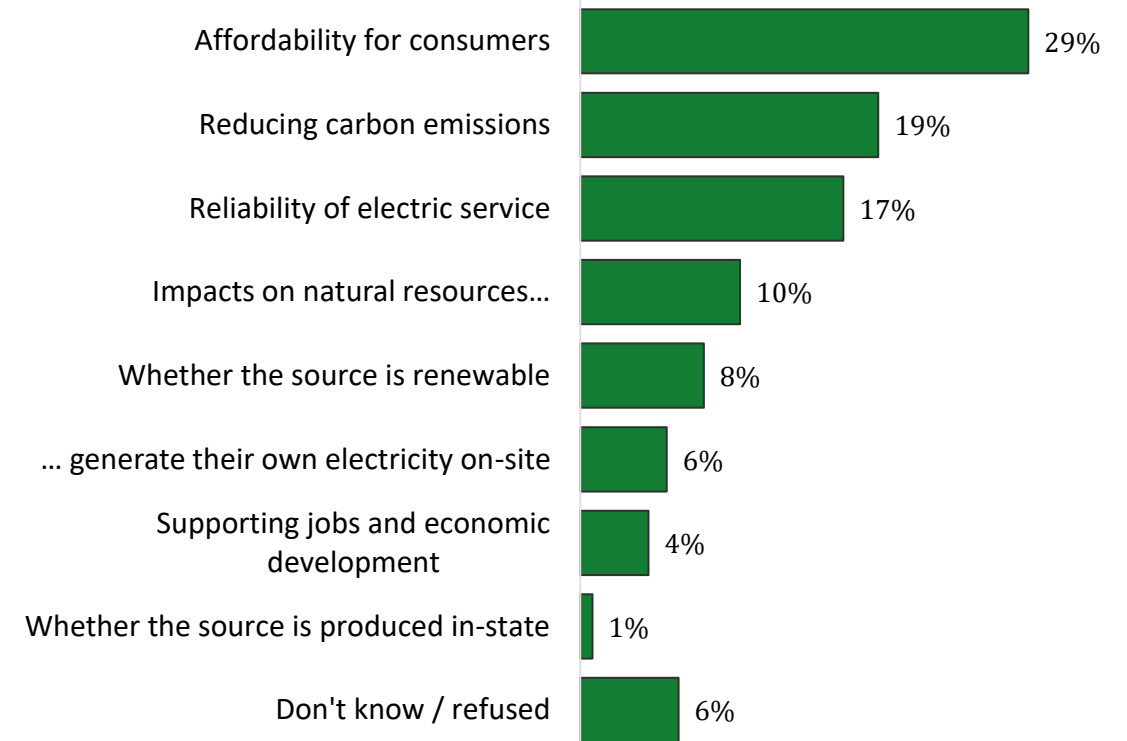
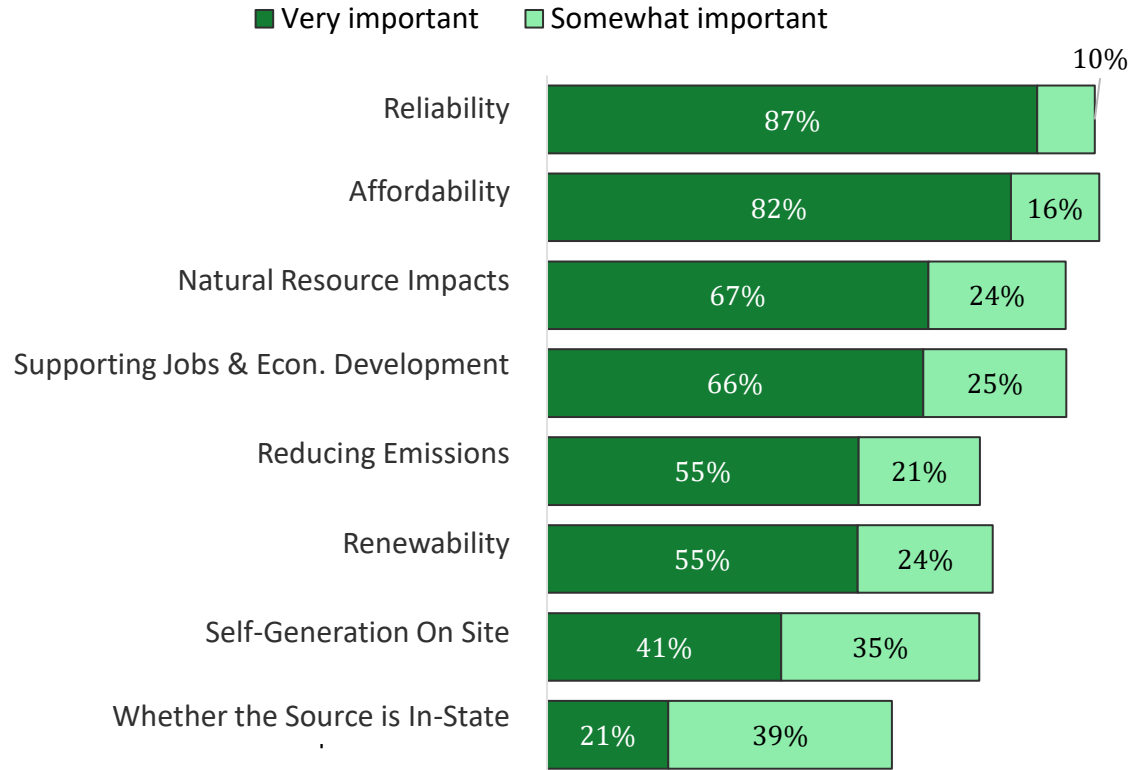
It is the general policy of the State of Vermont:

(1) To ensure to the greatest extent practicable that Vermont can meet its energy service needs in a manner that is adequate, **reliable**, secure, and **sustainable**; that ensures **affordability** and encourages the State's economic vitality, the **efficient** use of energy resources, and cost-effective demand-side management; and that is **environmentally sound**.



[See also the Vermont 2025 Annual Energy Report](#), Describing progress toward goals in the Comprehensive Energy Plan.

# Vermonters Prioritize Affordability, Reliability, and Reducing Carbon Emissions



% who say \_\_\_\_\_ is \_\_\_\_\_ when considering how Vermont gets its electricity

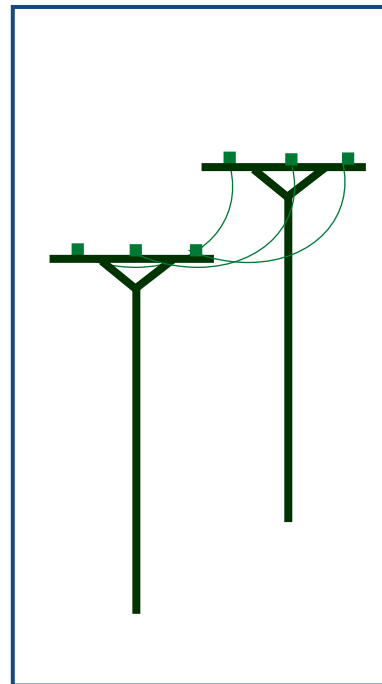
% who say \_\_\_\_\_ is the single most important factor when considering how Vermont gets its electricity.

Source: Public Service Department Electric Sector Public Engagement Process. Results above from Statewide Survey (700 responses). See [Final Report](#) and [Comprehensive Review Process](#) for more details on process and results.

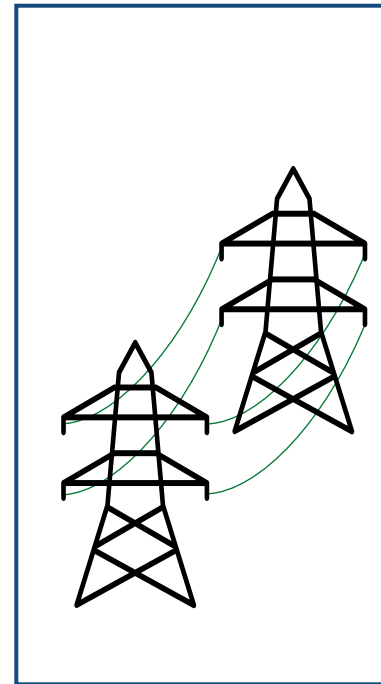
# Core Components of the Electric Grid are Increasingly Interdependent



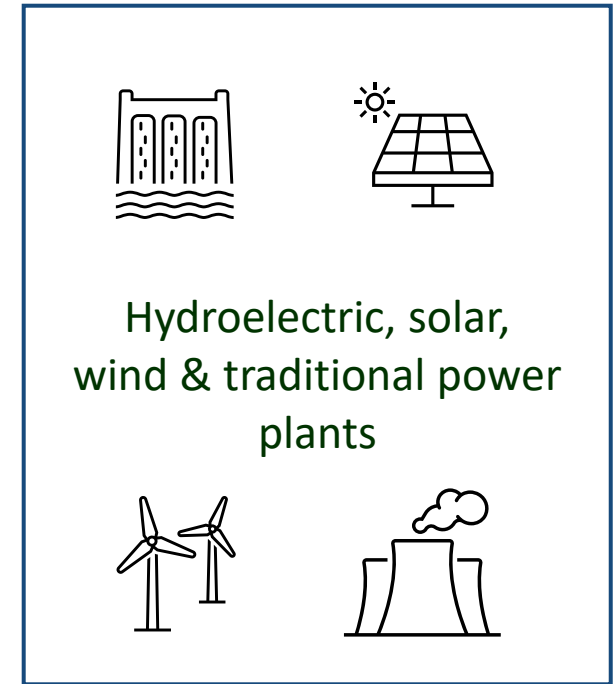
**Electricity Consumers**



**Distribution Lines**

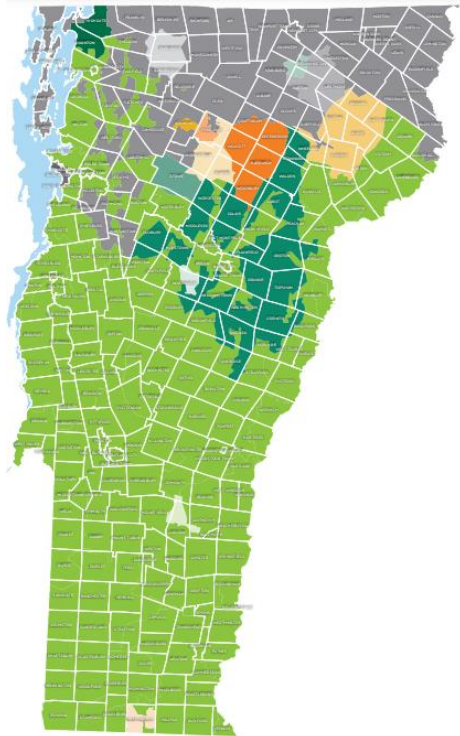


**Transmission Lines**

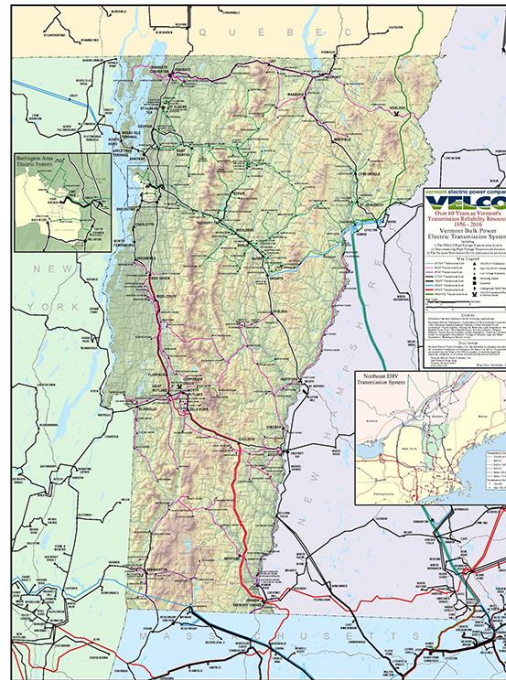


**Generation**

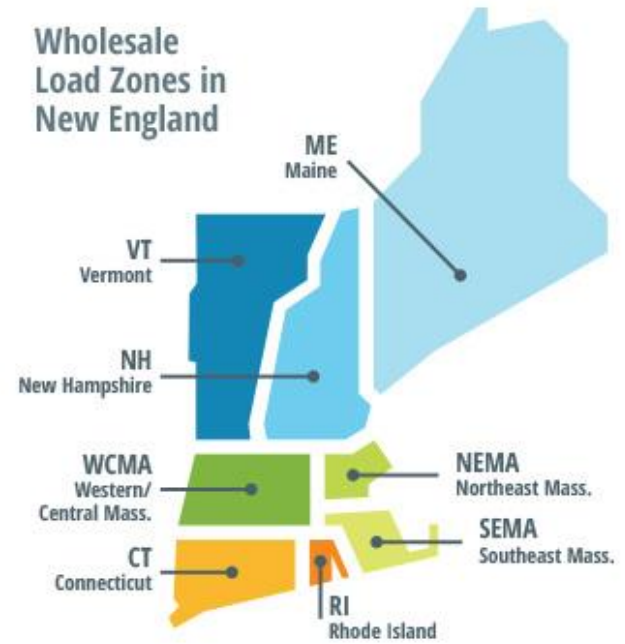
# Multiple Entities are Responsible for Managing the Grid



Vermont Distribution Utilities



VELCO



Source: ISO New England

ISO New England

# Regulatory Oversight has Multiple Layers

## Federal Energy Regulatory Commission (FERC)

- Sale of electric energy at wholesale (sale for resale) in interstate commerce
- Transmission of electric energy in interstate commerce
- Setting reliability requirements

Federal Power Act

## VT Public Utility Commission (PUC)

- Retail sales
- Siting of transmission and generation facilities
- Renewable energy requirements
- Service quality requirements

Title 30 of Vermont Statutes

## VT Public Service Department

- Ratepayer advocate in regulated utility matters
- State Energy Office
- Telecommunications Policy
- Consumer Affairs
- Comprehensive Energy Plan

Title 30 of Vermont Statutes



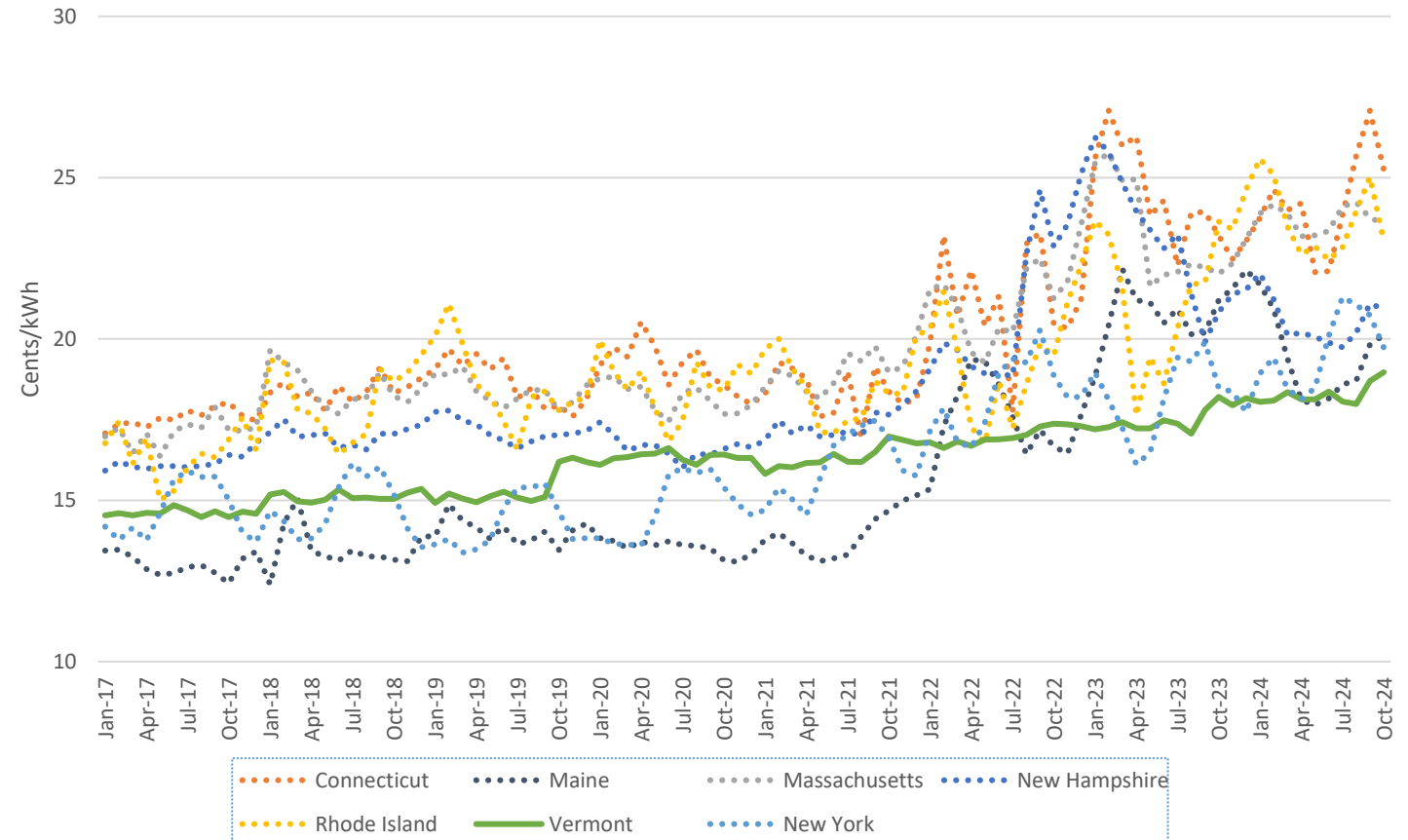
# Vermont's Regulatory Structure has kept Rates More Stable

Vermont distribution utilities remain “**vertically integrated**” and are responsible for supply, transmission, and retail services to end-use customers.

- Many other states have “retail choice”, where power generation and supply roles are managed separately from distribution services
- Vermont utilities are allowed to meet their supply needs through long-term contracts.
- Vermont contracts secured during periods of low cost insulate Vermont customers from some of the short-term market impacts.

Vermont's prices have risen over the last two years, albeit much more slowly and steadily than other Northeastern states.

Monthly Retail Cost of Electricity (All Sectors)



Data source: U.S. Energy Information Administration



Power Supply and  
Transmission (approx.  
61%)

Energy  
Capacity  
Renewable Energy Credits  
Regional & Local Network  
Service (~17% of total)  
Ancillary Services



Other Operations and  
Maintenance (approx.  
16%)

Distribution  
Customer Accounts  
A&G expenses



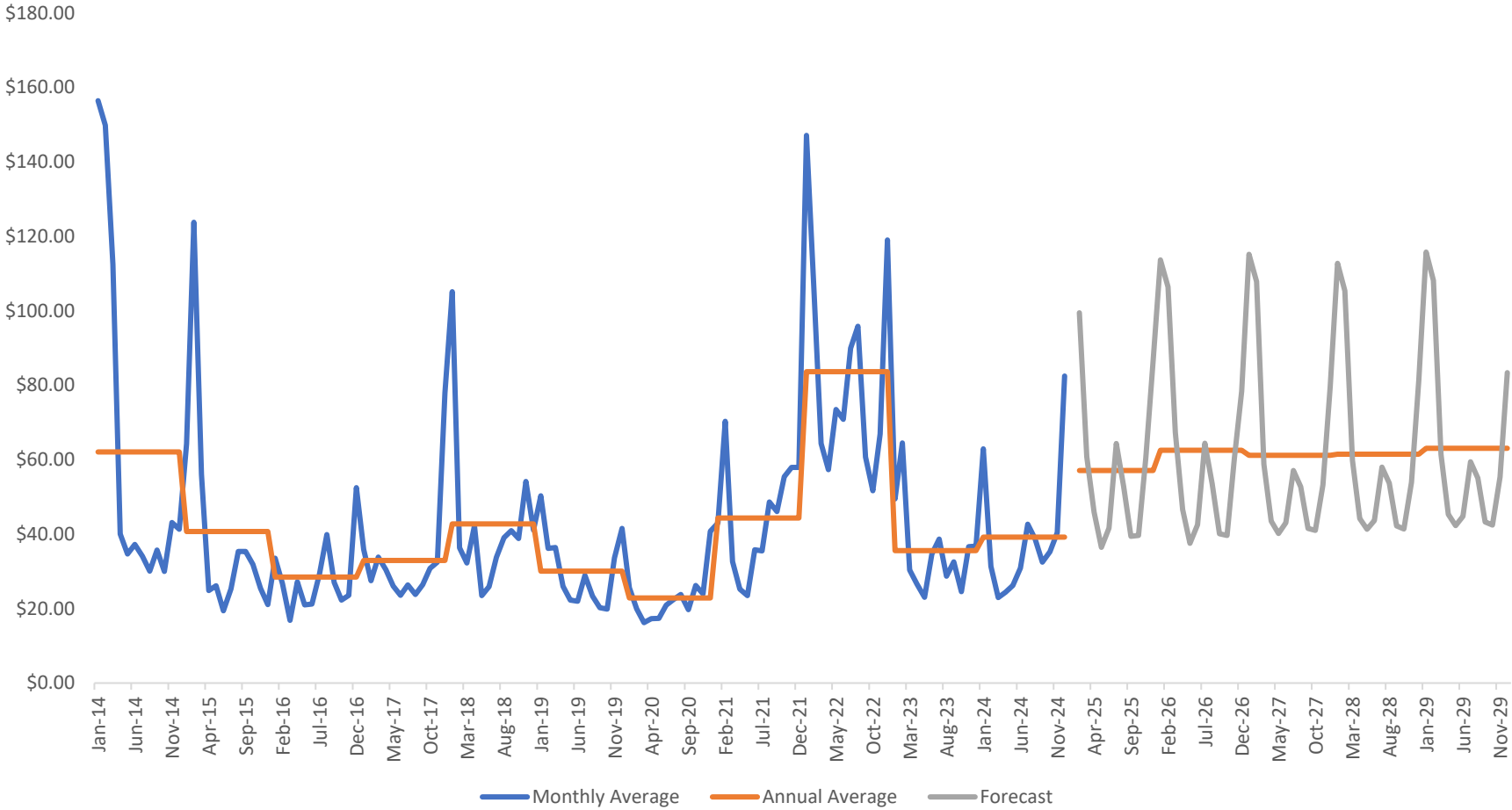
Capital Costs (approx.  
23%)

Return on equity or Times  
Interest Earned Ratio,  
Depreciation, Income Tax,  
Interest

## Components of Electric Rates

# Wholesale Electricity Prices Affect Rates

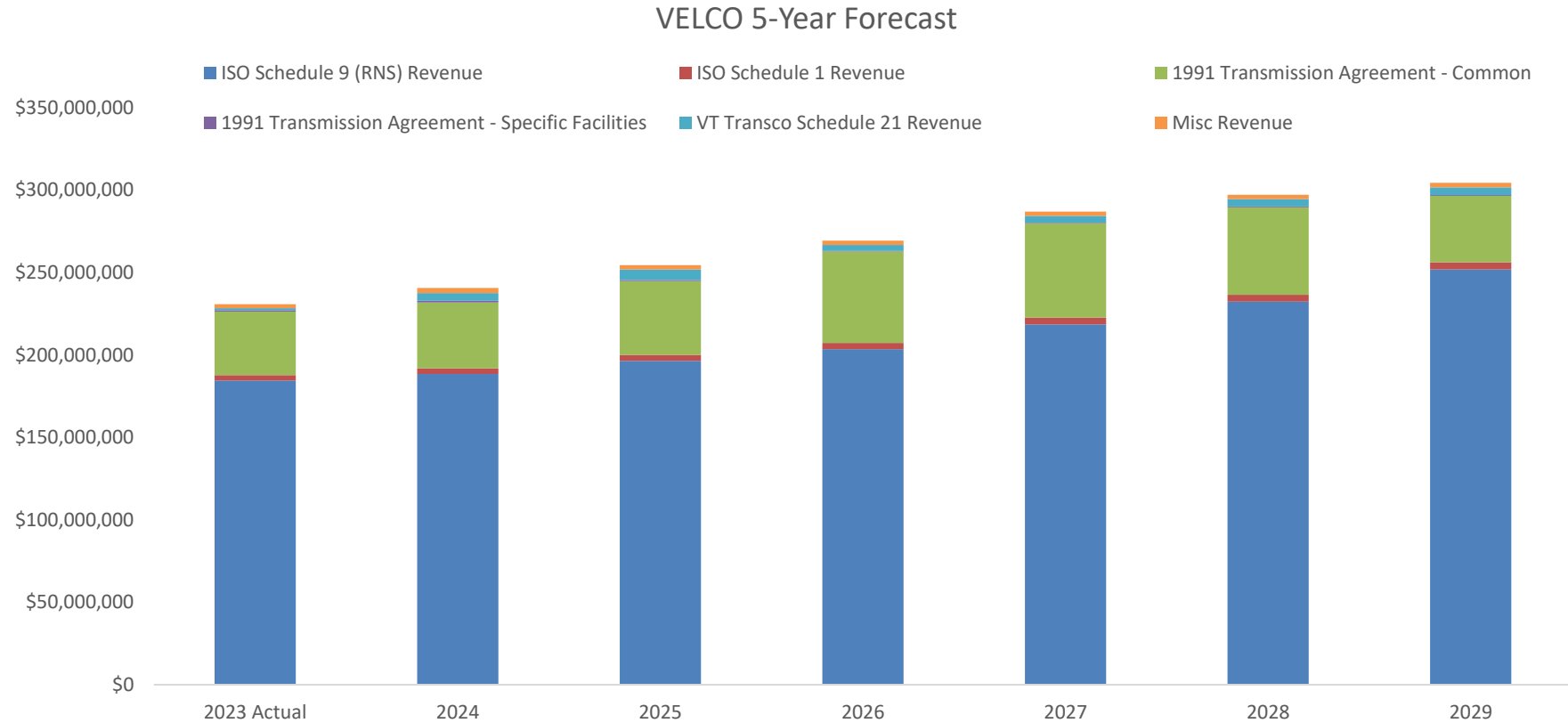
## Vermont Locational Marginal Prices (LMPs)



Actuals through December 2024 from [ISO New England](#)  
Forward prices (as of 1/17/25) from [CME Group](#) weighted 54/46 On/Off Peak



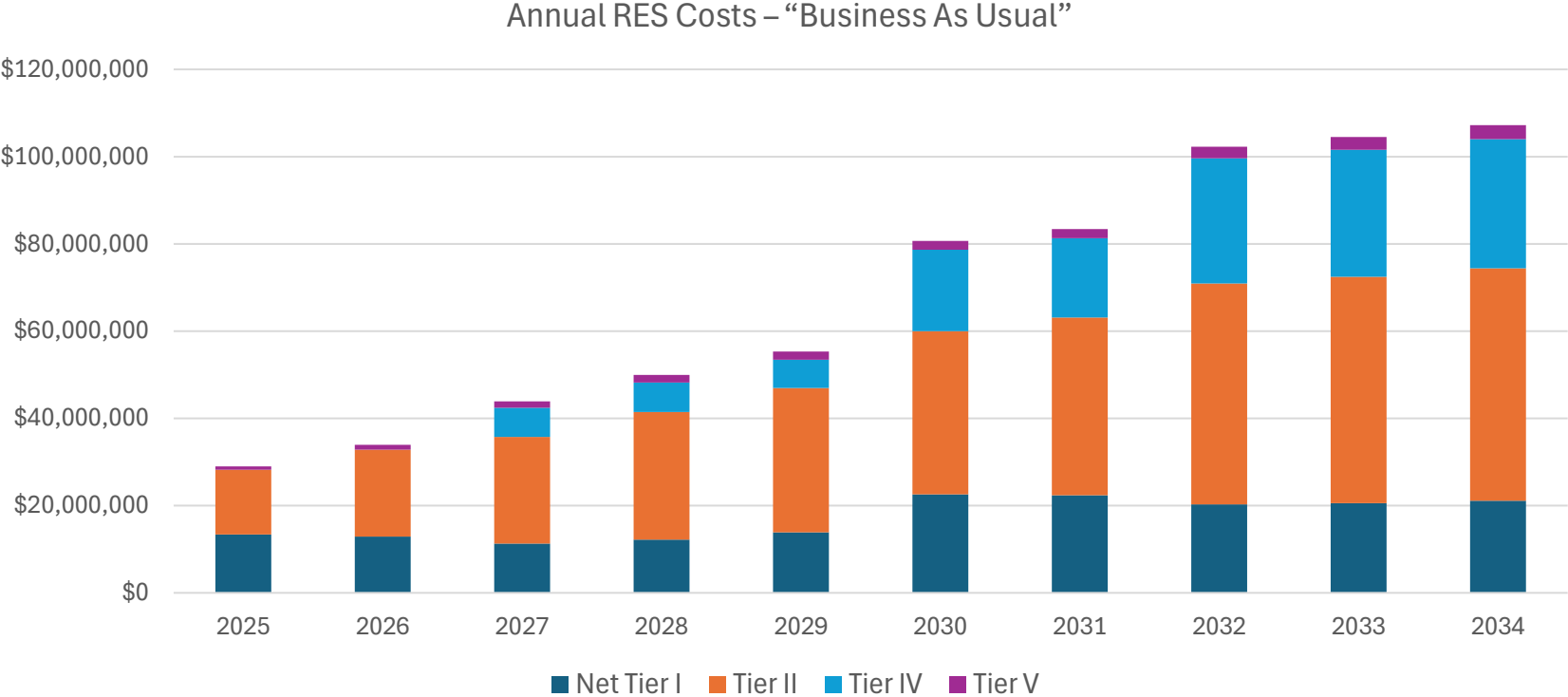
# Transmission Costs are Expected to Increase



From VELCO November 2024 Forecast Model

# Vermont Policies and Programs Impact Electric Rates

In 2023, the Renewable Energy Standard (RES) cost \$32 million (~3.5% rate impact). The Department’s projected cost of the newly enacted RES through Act 179 is a projected net annual cost of \$72 million by 2034 under a Business-As-Usual load forecast and up to \$97 million by 2034 if policy-driven levels of heating and transportation electrification occur. The average annual rate impact from 2025-2034 is projected to be between 6-8%.

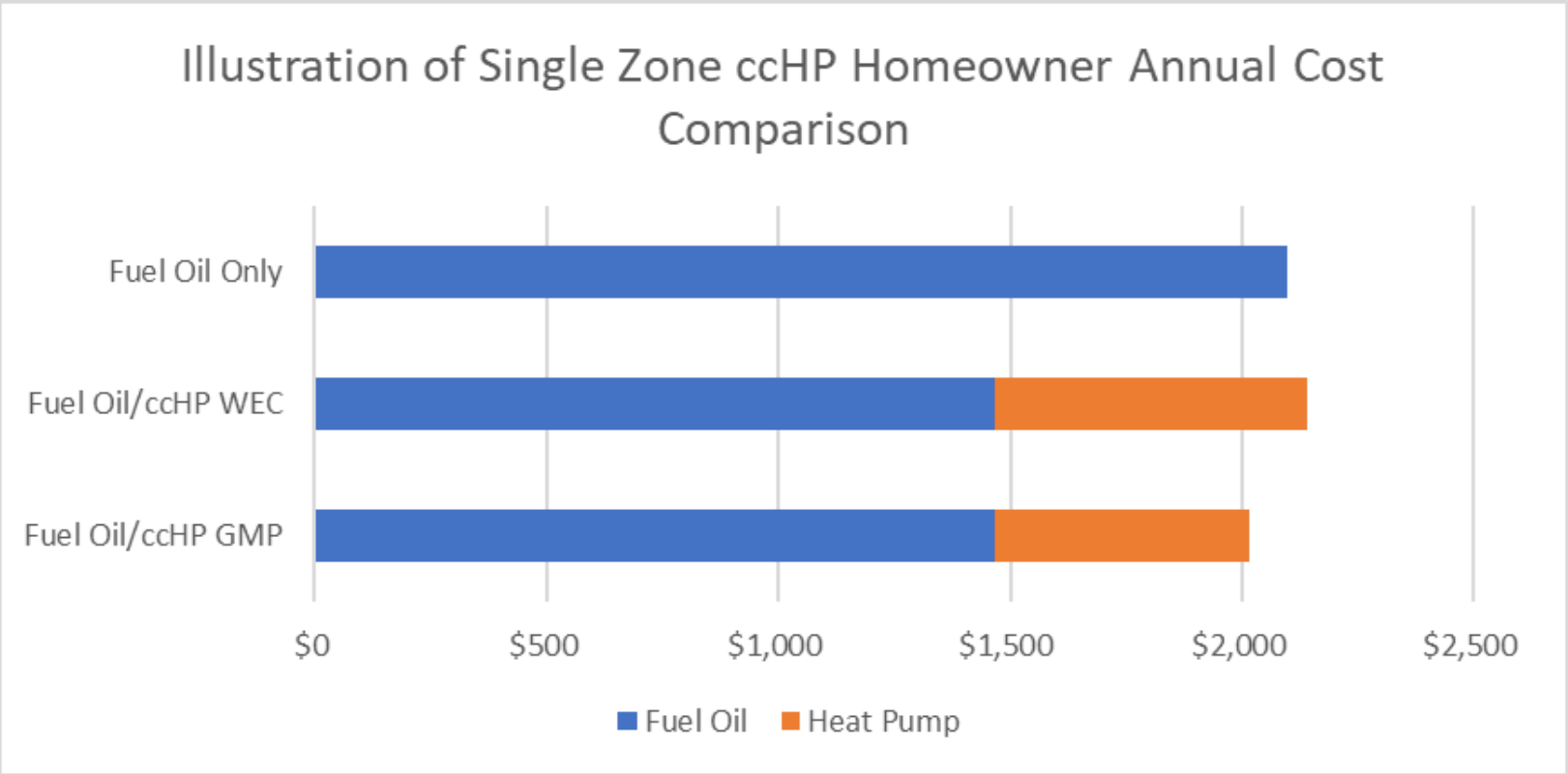


From [Vermont 2025 Annual Energy Report](#)

*\*Does not show Tier III Energy Transformation Projects, but are included in rate and cost impacts discussed above*



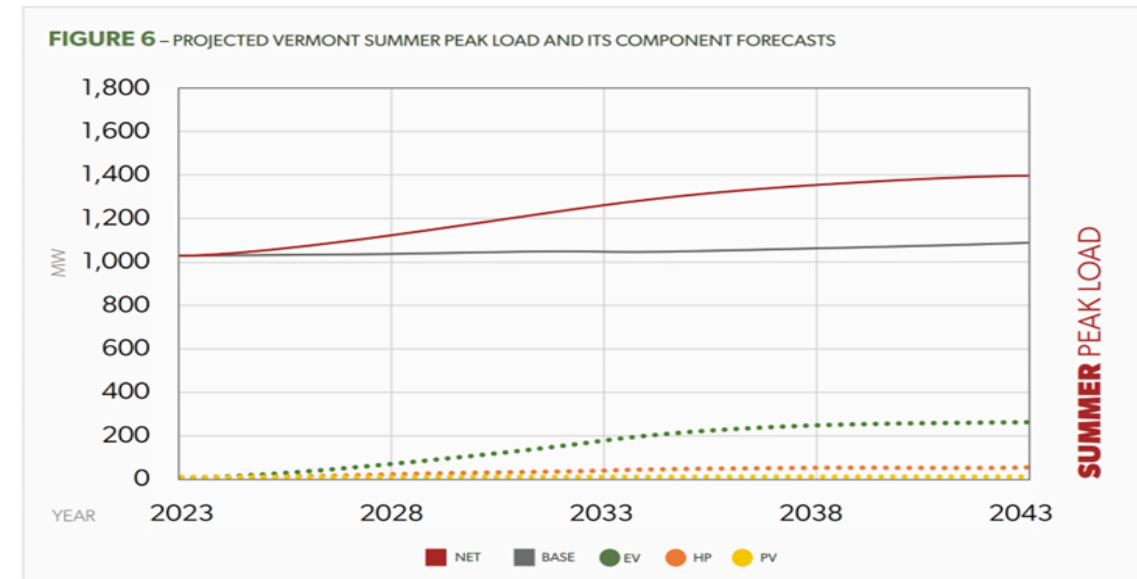
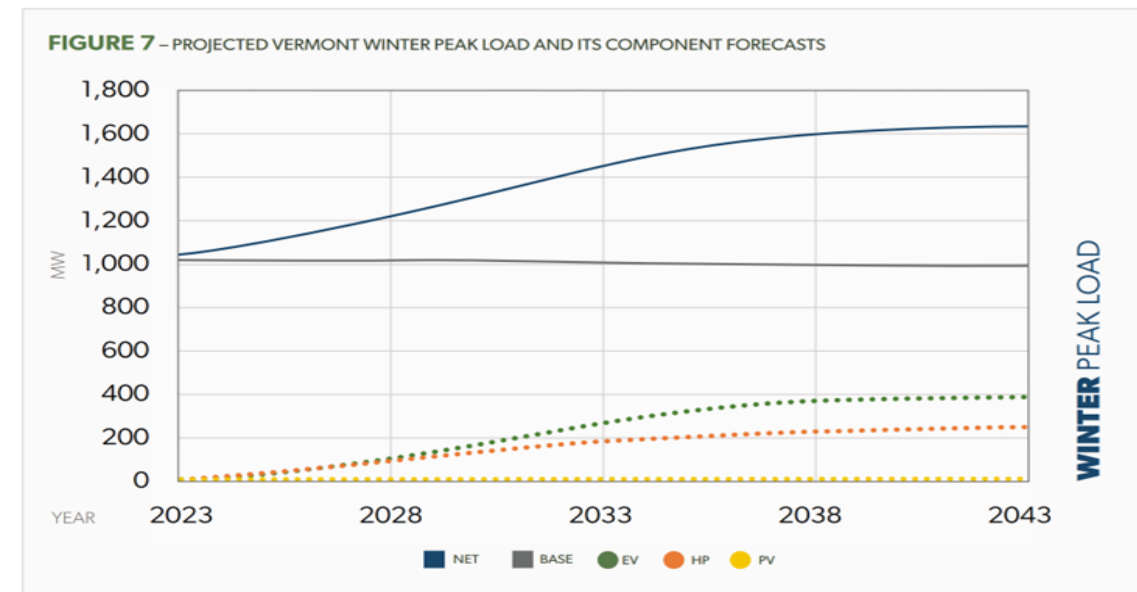
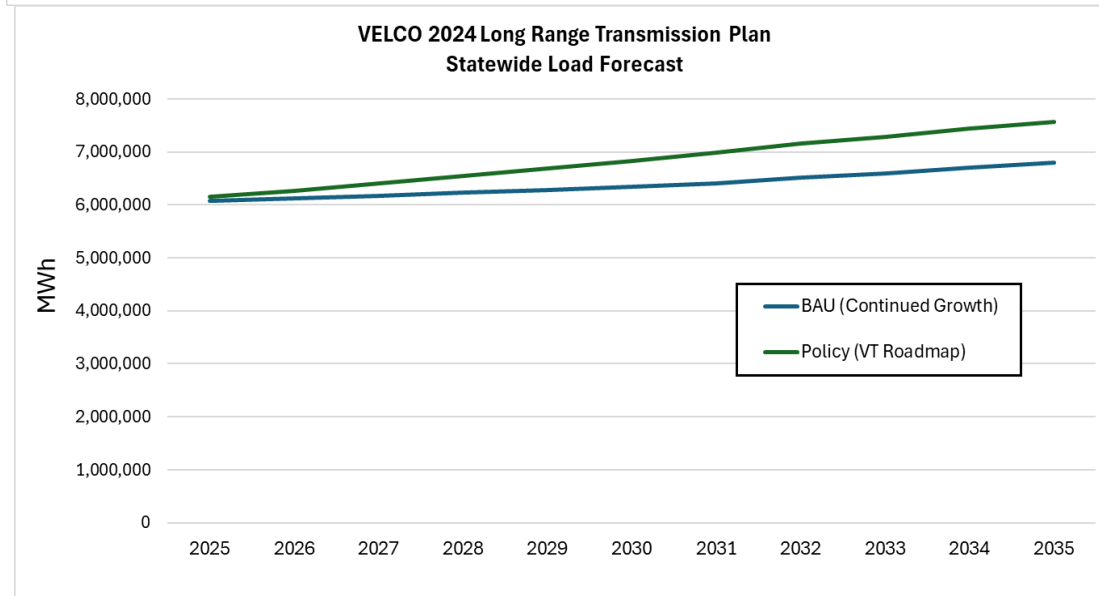
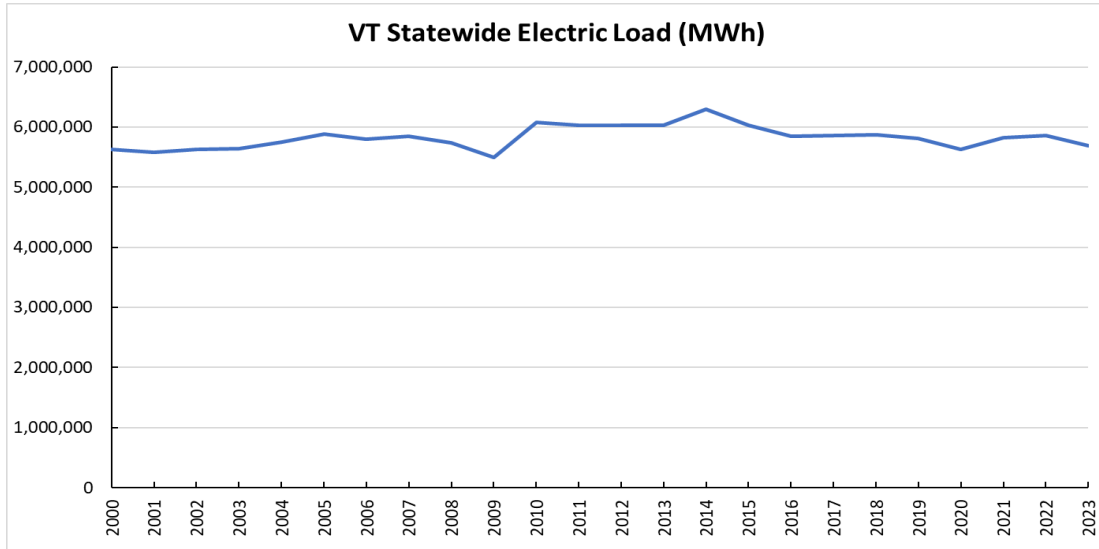
# Rates Matter!



## Operating Costs for a heat pump versus fuel oil, selected utilities

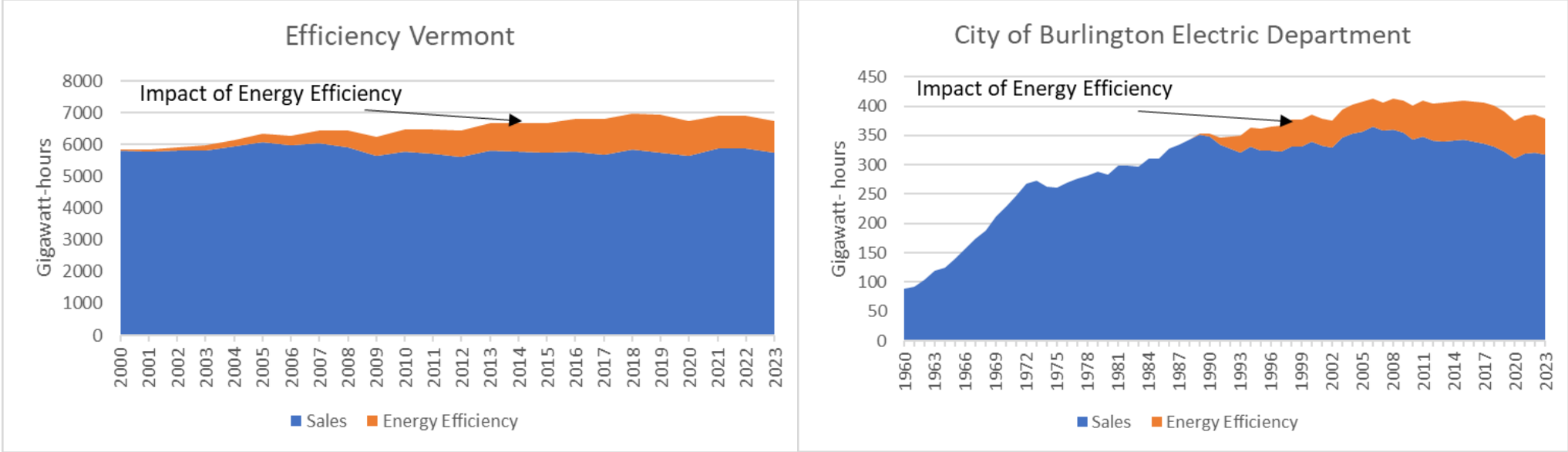
- Rates as of 12/2024
- Fuel Oil \$3.50/gallon
- ccHP COP: 2.4
- Fuel Oil Displacement: 30%
- Does not include ccHP install cost or maintenance

# Electric Demand Has Been Stable; Expected to Grow



Demand Forecasts do NOT include expected reductions from load flexibility

# Electric Efficiency Has Helped Maintain Flat Load

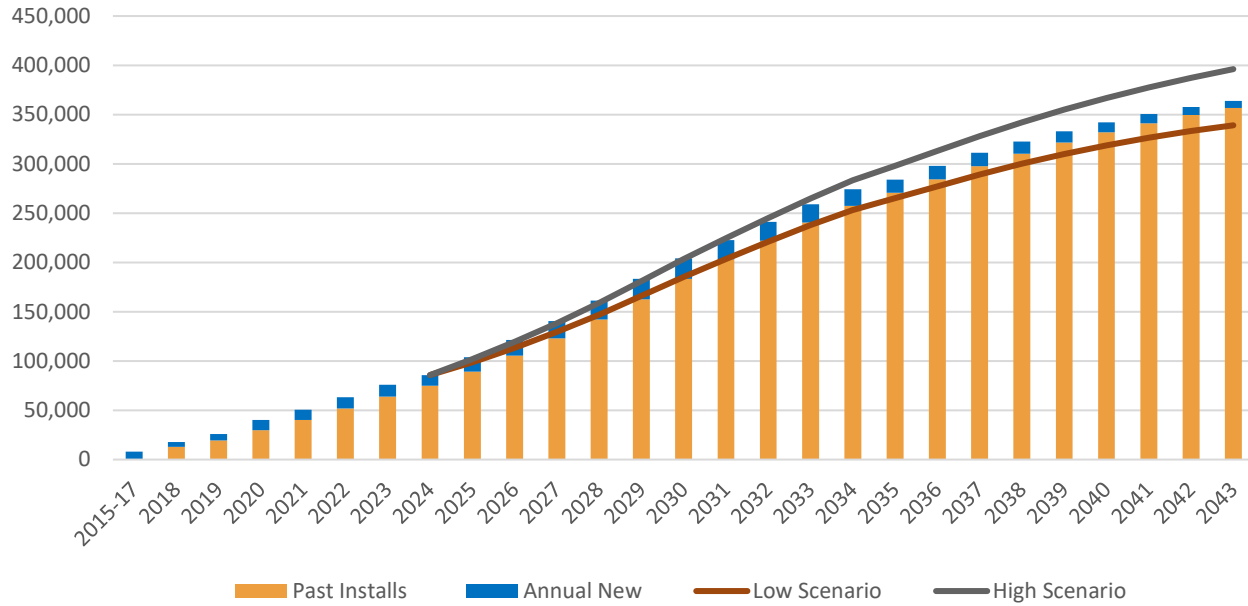


The Public Utility Commission sets EEU budgets to acquire “all reasonably available cost effective” electric efficiency, pursuant to 30 V.S.A. § 209(d) and least-cost planning principles of 30 V.S.A. § 218c. Since 2000, Vermont’s energy efficiency utilities (EEUs) have acquired electric efficiency resources that have met a significant portion of Vermont’s electric needs, at a lower cost than supply resources. The chart on the left shows Efficiency Vermont (EVT) cumulative savings over time, while the chart on the right illustrates the results of Burlington Electric Department (BED) efforts. EVT serves all of Vermont except Burlington.



# Electrification of Thermal and Transportation Loads Drives Growth

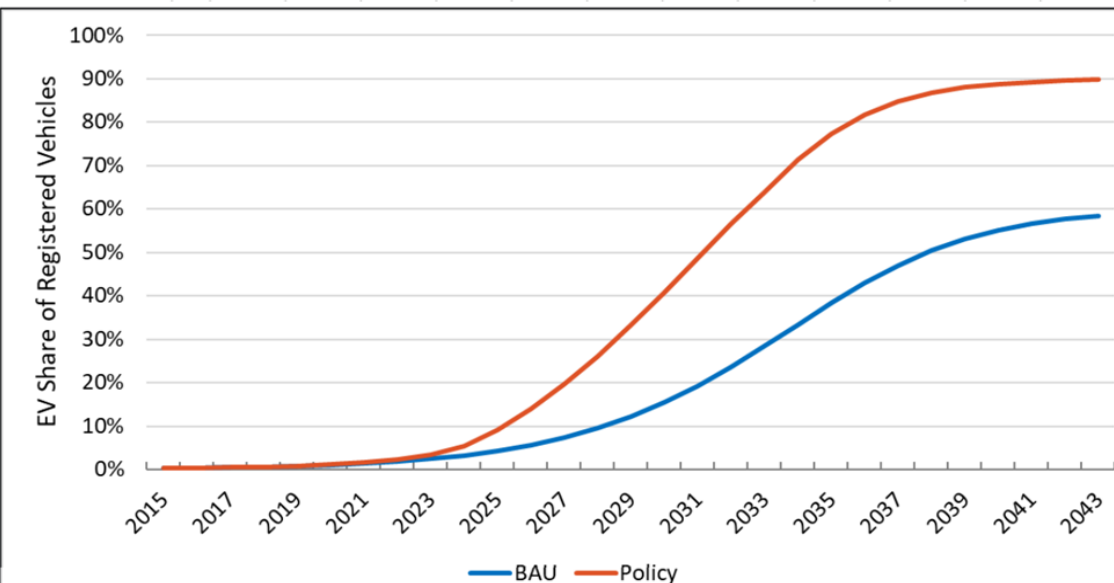
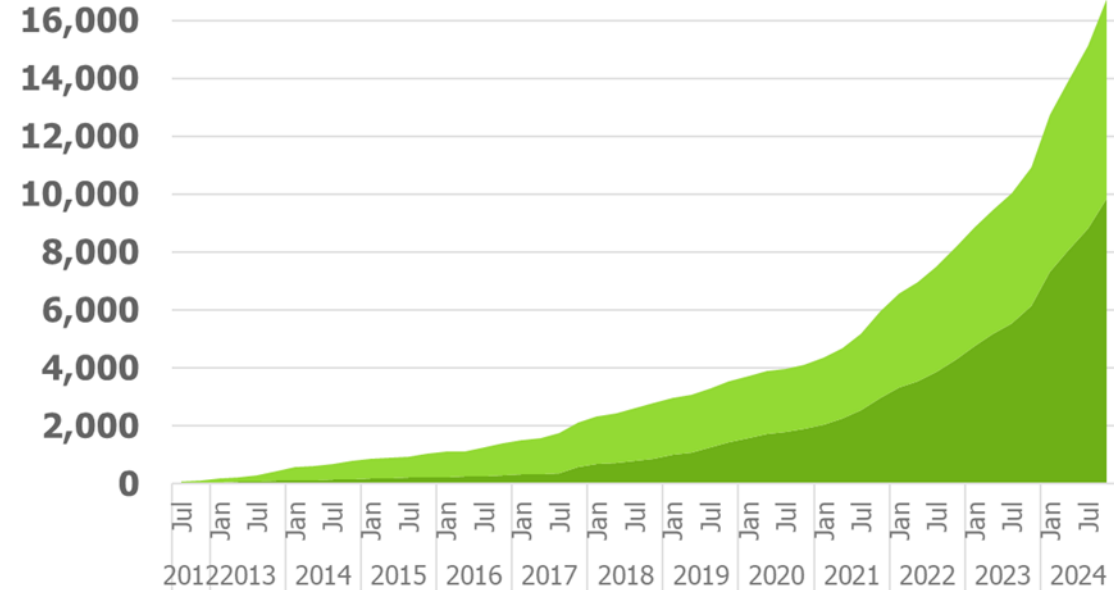
Forecast Installed Heat Pumps



Heat Pumps and Electric Vehicles are the main drivers of load increases.

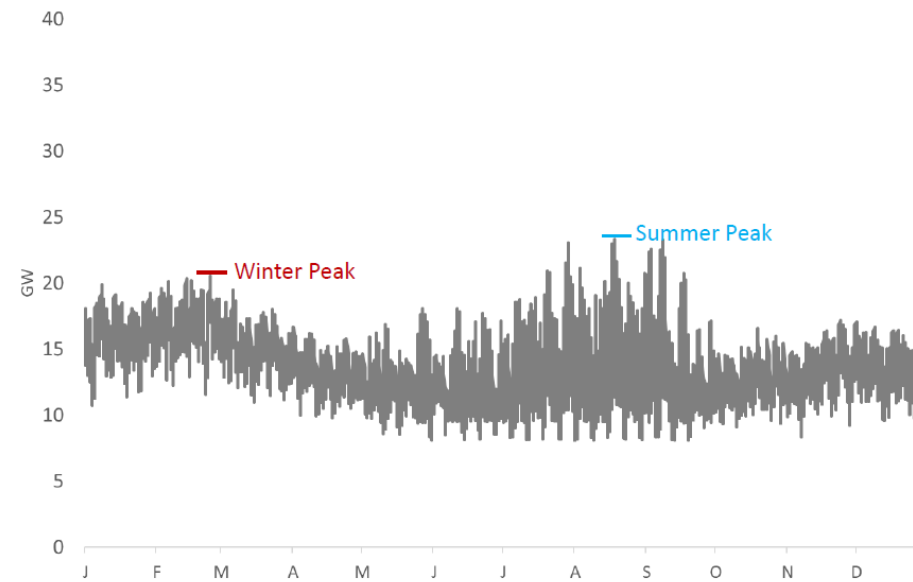
EV's now comprise 2.7% of all registered vehicles, 53% increase from the prior year. 16 models are priced under \$40,000 at base trim level.

■ All-Electric Vehicles ■ Plug-in Hybrid Electric Vehicles



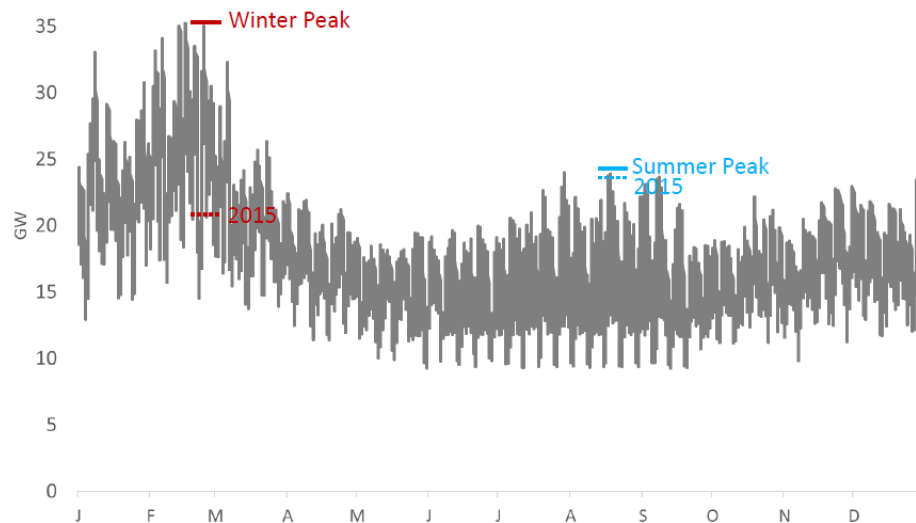
Electrification is expected to cause additional load growth primarily in winter months

## New England 2015 Aggregate Load Profile



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## Potential New England 2050 Aggregate Load Profile (Reference Case)



Source: Aidan Tuohy, EPRI: ISO-NE Grid Transformation Day, May 23, 2019: [https://www.iso-ne.com/static-assets/documents/2019/05/a2\\_grid\\_transformation\\_solving\\_technical\\_challenges\\_tuohy\\_epri.pdf](https://www.iso-ne.com/static-assets/documents/2019/05/a2_grid_transformation_solving_technical_challenges_tuohy_epri.pdf)

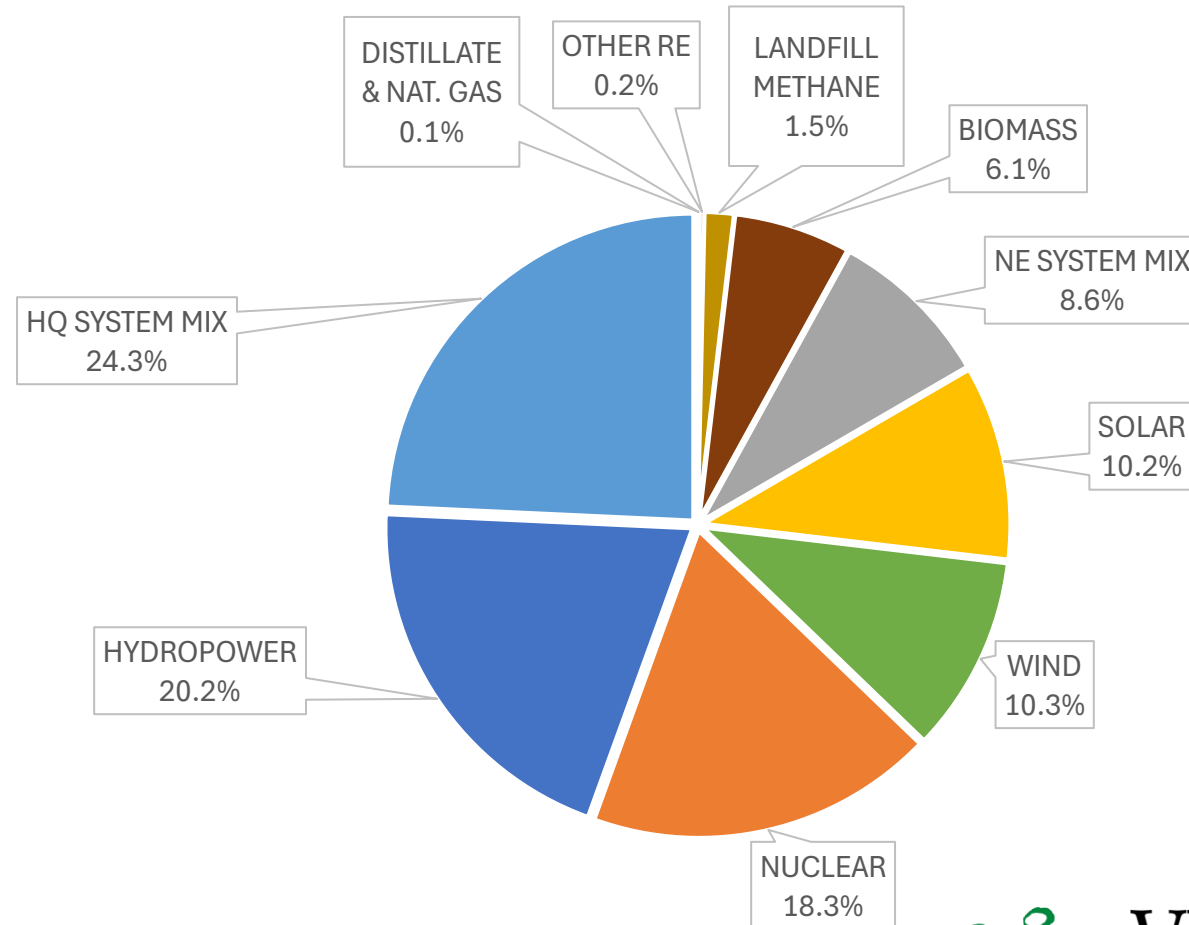
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EPRI ELECTRIC POWER RESEARCH INSTITUTE

# Vermont's 2023 Electric Power Mix Based on Physical Deliveries was 91% carbon-free

VT Utility 2023 Physical MWh Deliveries (% MWh)

In 2023, Vermont distribution utilities purchased 5.7 Million megawatt-hours of electricity to meet the demand of their customers. Of this: 73% came from renewable resources and an additional 18% came from carbon-free resources (nuclear)



# What is a renewable energy certificate (REC)?



## RENEWABLE ENERGY GENERATORS



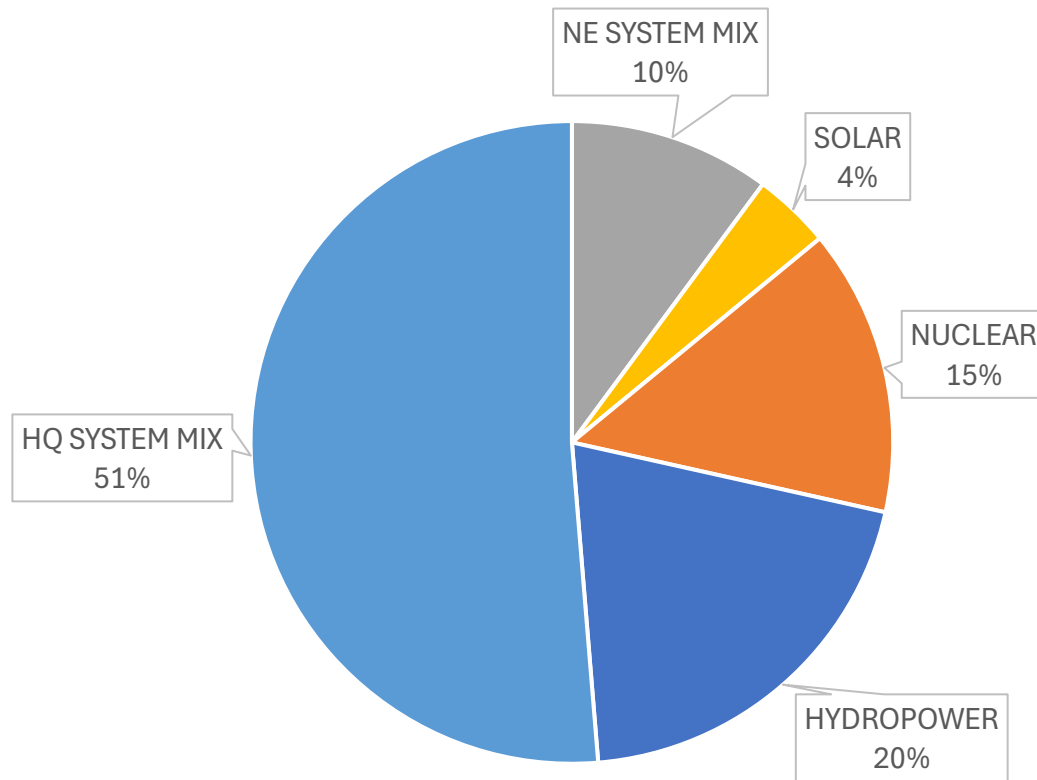
RECs provide a mechanism to:

1. Demonstrate that someone created the electrons coming from renewable resources
2. Prevent two different entities from claiming credit for supporting the same resource
3. Demonstrate compliance with the Renewable Energy Standard

RECs can be sold together with the electricity (i.e. bundled together) OR separately from the electricity (i.e. unbundled).

# Vermont's 2023 Electric Power Mix After Renewable Energy Credit Retirements was 90% carbon-free

VT Utility 2023 Post REC Mix (% MWh)

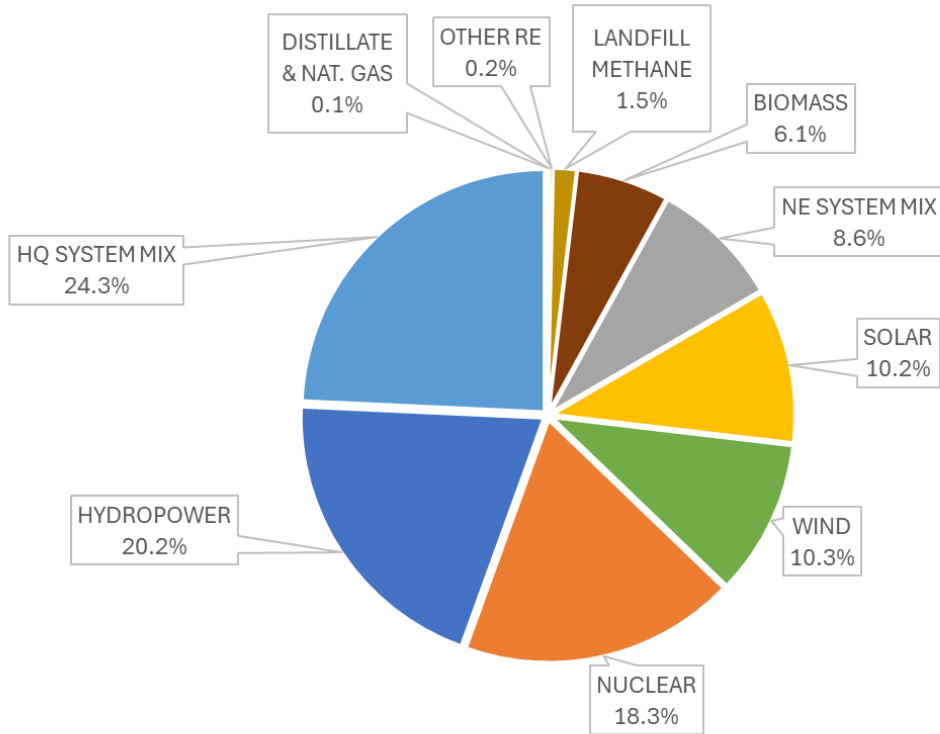


In 2023, Vermont distribution utilities retired 5.1 million renewable energy certificates (i.e. equivalent to 5.1 million megawatt-hours of electricity) to meet their obligations under Vermont's Renewable Energy Standard. These RECs accounted for 80.5% of Vermont's retail electricity sales in 2023.

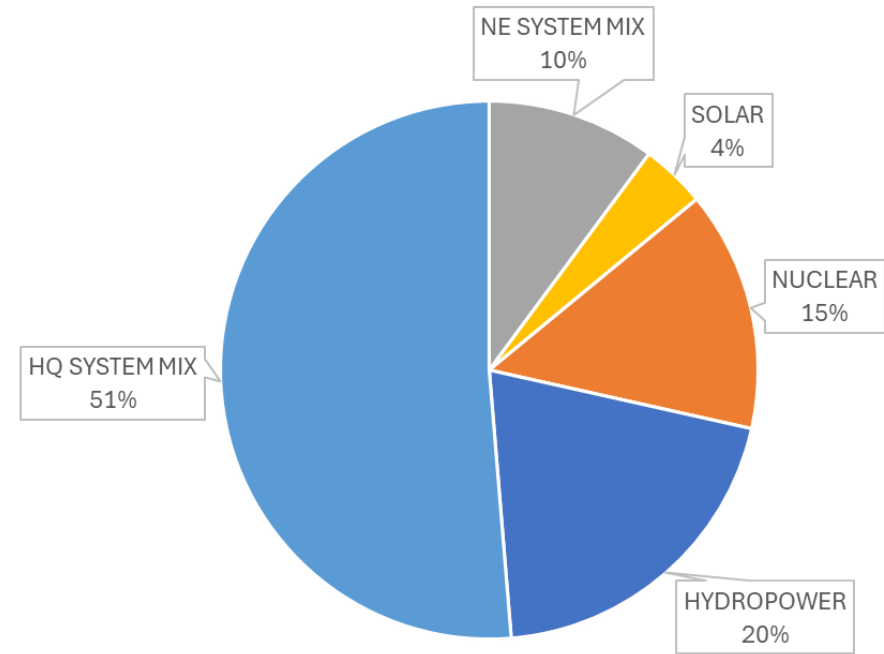
*Note – this chart depicts Vermont's electricity mix based on total load, which is approximately 7-8% higher than retail sales*

# Comparison: Physical Deliveries vs. RECs

VT Utility 2023 Physical MWh Deliveries (% MWh)



VT Utility 2023 Post REC Mix (% MWh)



# Thank You

TJ Poor  
Director, Regulated Utility Planning  
[tj.poor@vermont.gov](mailto:tj.poor@vermont.gov)

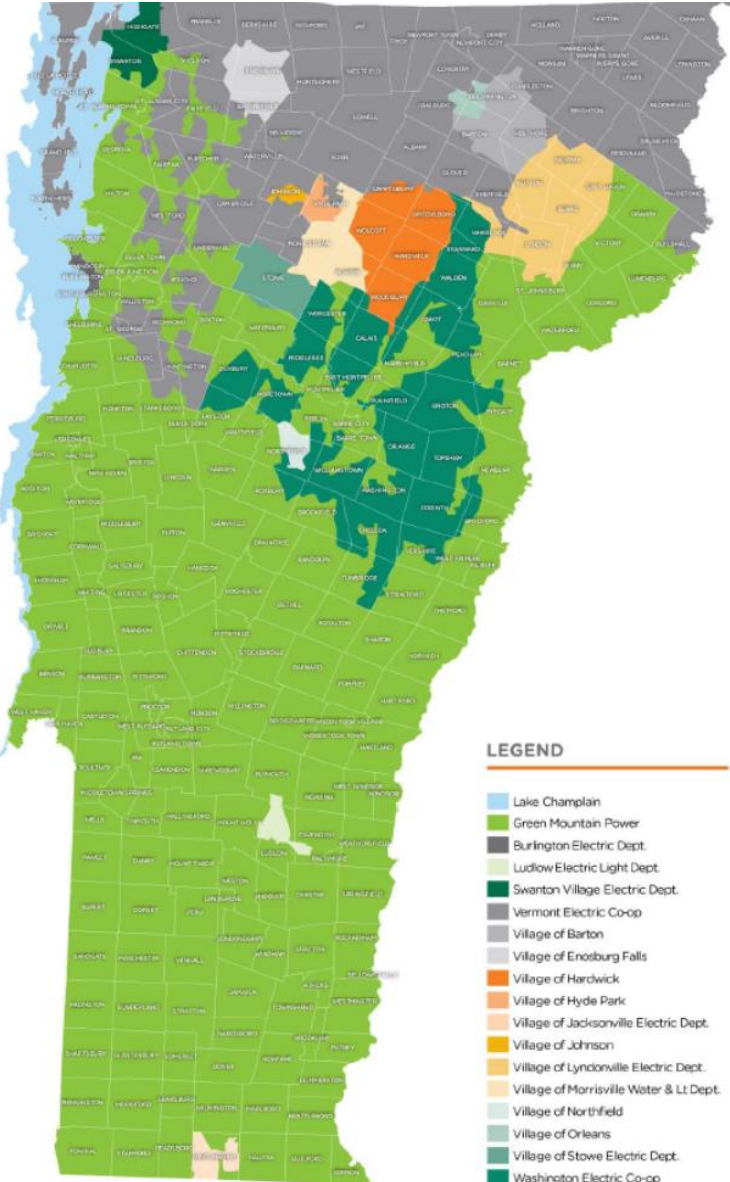
**COMING SOON: PART TWO – Renewable Energy Programs and Deployment**



# Appendix



# Vermont's Utilities



## Vermont Electric Utilities

- 1 Investor-Owned Utility (serving ¾ of VT demand ~ 275,000 customers)
- 2 Cooperative utilities
- 14 Municipal Utilities
- 1 Self-Managed Utility
- 1 Transmission utility

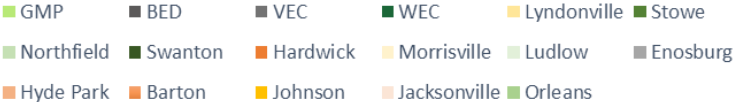
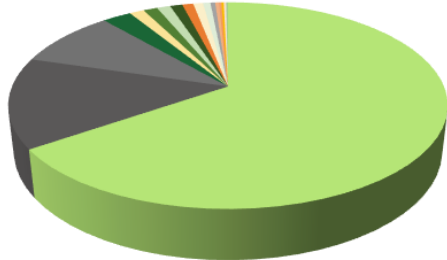
## 1 Natural Gas Utility

- Investor Owned ~55,000 customers in 3 counties

## 3 Energy Efficiency Utilities

- Delivering end use efficiency services

Share of VT load



\*GF Power currently under GMP load until full transition

# VELCO (Vermont Electric Power Company)



Owned by Vermont's distribution utilities

- Established 1956 to access energy from New York Power Authority

Subject to federal and regional reliability standards and operational control by ISO-NE

Funded through:

- Regional Network Service (RNS)– pays for transmission that provides regional reliability; same rate for all New England Transmission Owners
- Vermont Transmission Agreement – pays for local transmission and any other costs not recovered under RNS

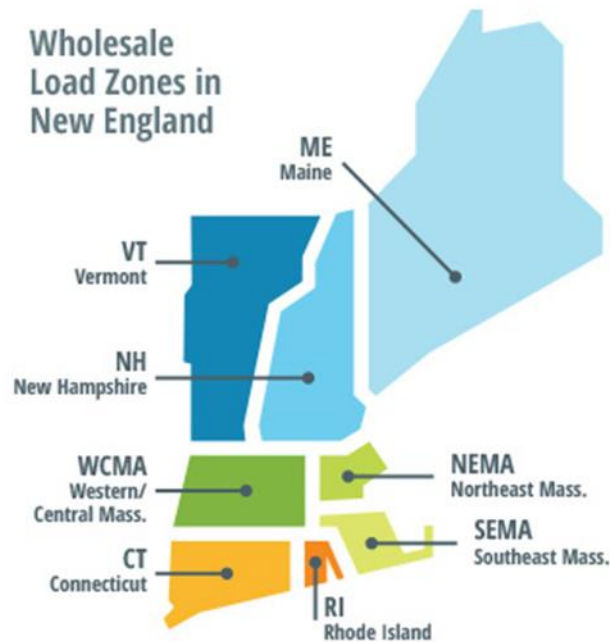
# ISO New England

(regulated by FERC)

Designs and implementing wholesale electricity markets

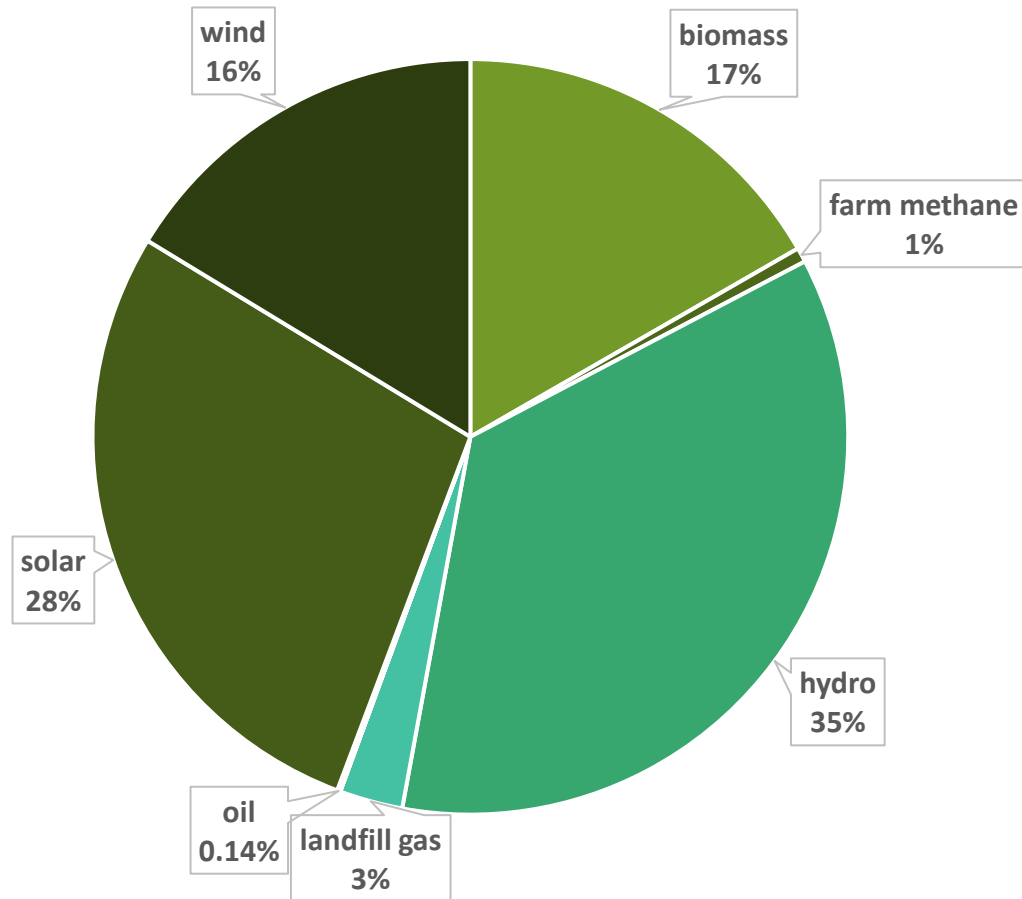
Operates the New England transmission system (VELCO owns but operation is under the direction of ISO-NE)

Plans Power System to meet federal and regional reliability standards



Source: ISO New England

# What does Vermont generate in-state?

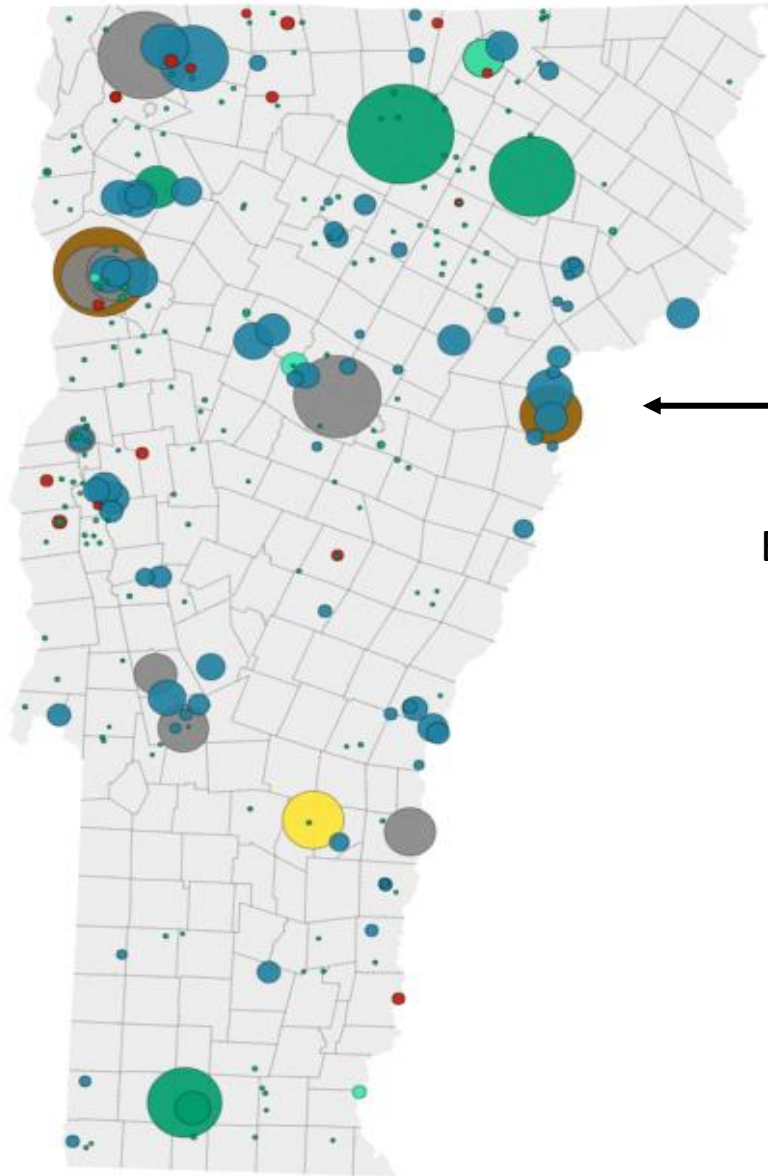


In 2023, generators based in Vermont produced more just over **2 million MWh\*** of electricity.

- By contrast, in 2023 Vermont utilities purchased or generated over **5.6 million MWh** of electricity to meet customer needs.
- Electricity generated in Vermont makes up **35%** of what is needed to meet customer's need.

**99.8%** of this electricity came from resources that current Vermont policy considers renewable.

Not all the electricity generated in Vermont is used by or sold to Vermont utilities.



## Vermont Generation by Resource Type

(excluding distributed solar <5MW)

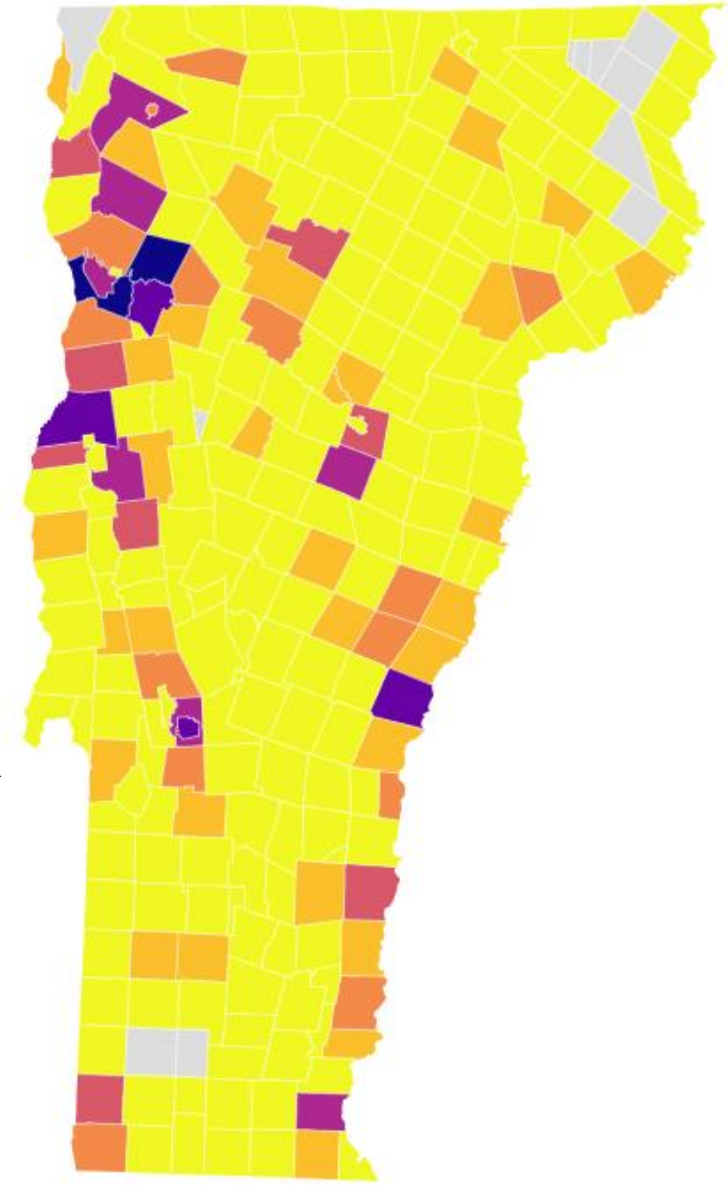
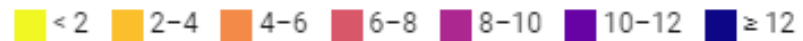


Electricity generators are located throughout Vermont

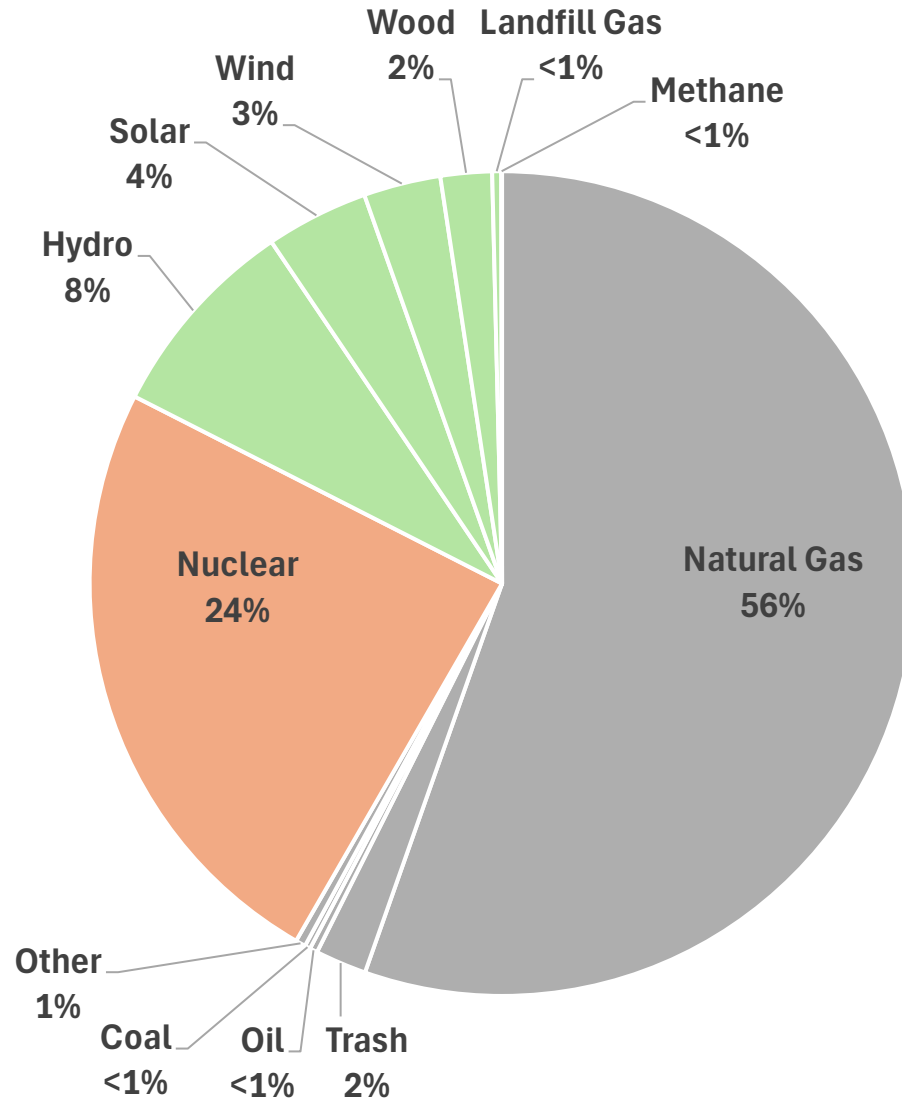


## Distributed Solar (< 5MW) by Town

Installed MW



# What electricity is generated in the New England region?



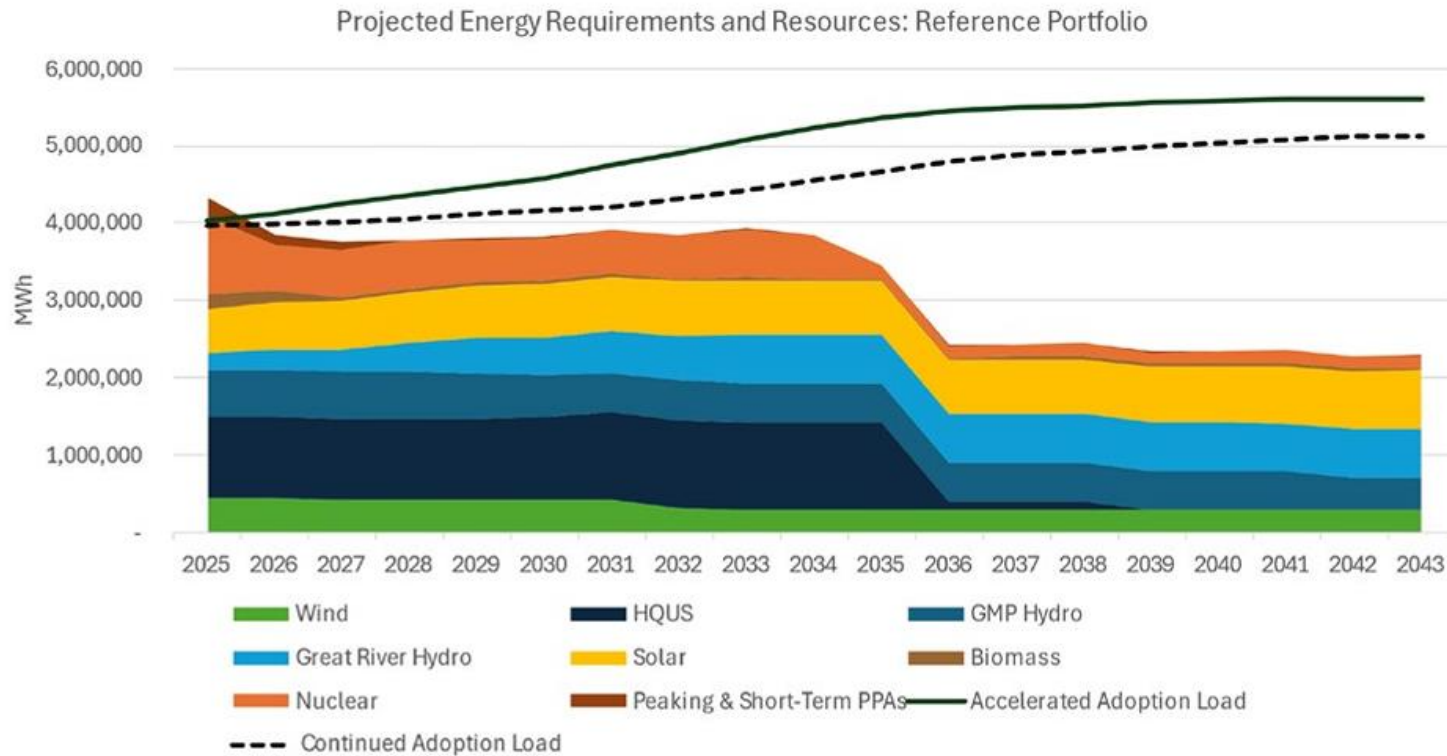
In 2024, generators in the New England region (including those in Vermont) produced roughly **109 million MWh** of electricity.

**17%** of this electricity came from resources that Vermont considers renewable. These resources are **highlighted in green**.

**24%** of this electricity came from nuclear, which is not considered renewable but is **considered carbon free**.

# Purchased Power – Wholesale Electricity Prices

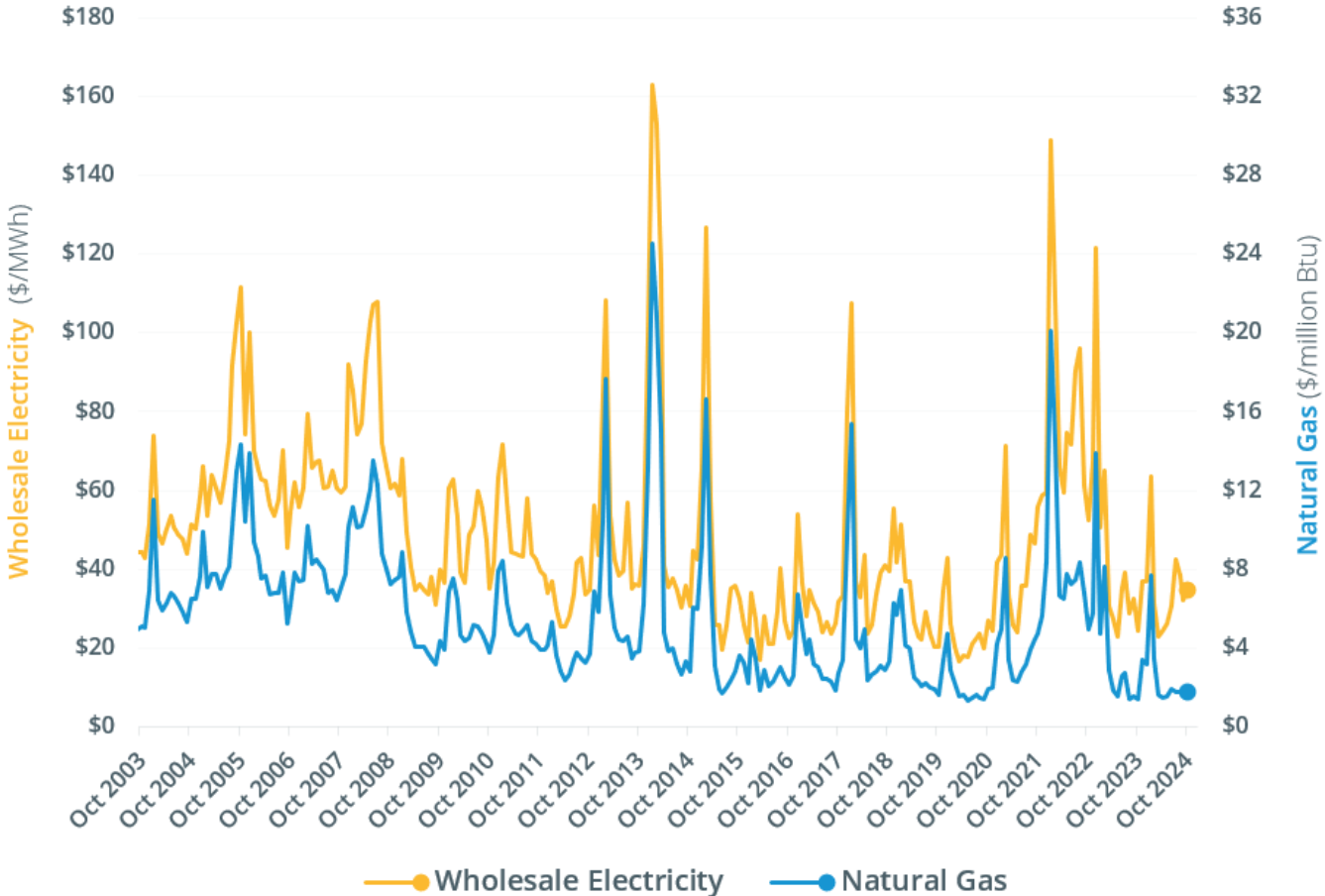
The extent to which Wholesale Electricity Prices impact Vermont Utilities and their ratepayers is based on how hedged they are on an annual and hourly basis. Generally, Vermont utilities are between 85-95% hedged for the upcoming year, then this percentage gradually declines further out into the future.



Example: [GMP 2024 IRP](#)

# Purchased Power – Wholesale Electricity Prices

Natural gas is the predominant fuel in New England, used to generate 55% of the power produced in 2023 by New England’s power plants, and natural gas-fired power plants usually set the price of wholesale electricity in the region. As a result, average wholesale electricity prices are closely linked to natural gas prices.



From [ISO New England](#)





# Purchased Power – Capacity Prices

Annual auctions in the Forward Capacity Market (FCM) ensure the system has sufficient resources to meet future electricity demand. Obligations to provide capacity are determined through these auctions three years before the commitment period.

## Results of the Annual Forward Capacity Auctions

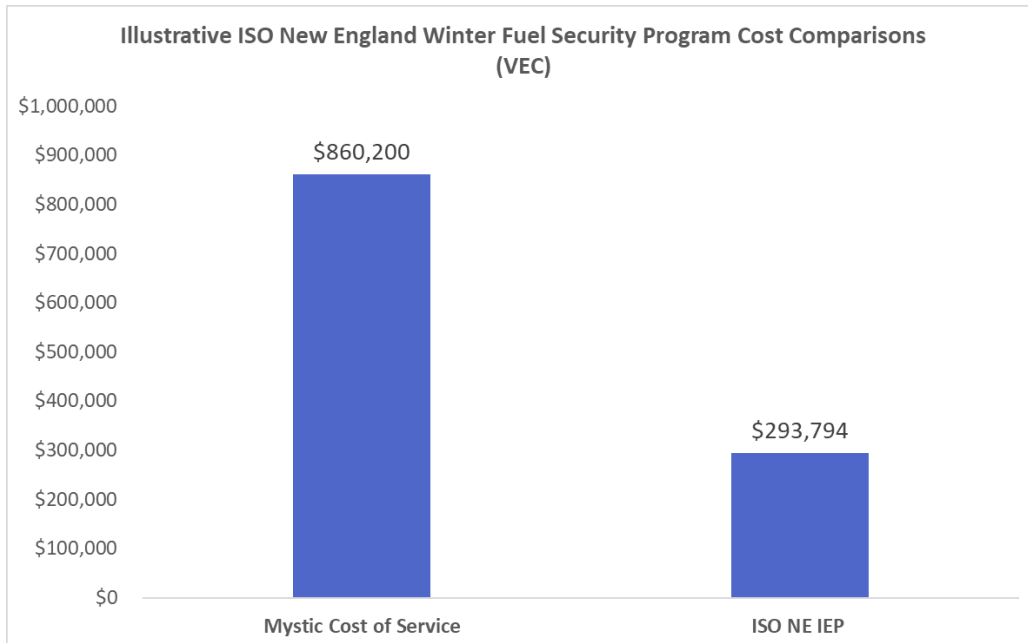
AUCTION COMMITMENT PERIOD	TOTAL CAPACITY ACQUIRED (MW)	NEW DEMAND RESOURCES (MW) <sup>1</sup>	NEW GENERATION (MW) <sup>2</sup>	CLEARING PRICE (\$/KW-MONTH) <sup>3</sup>
FCA 18 in 2024 for CCP 2027/2028	31,556	105	998	\$3.580
FCA 17 in 2023 for CCP 2026/2027	31,370	130	619	\$2.590
FCA 16 in 2022 for CCP 2025/2026	32,810	230	311	ROP: \$2.591 NNE: \$2.531 & SENE: \$2.639
FCA 15 in 2021 for CCP 2024/2025	34,621	170	950	ROP: \$2.611 NNE: \$2.477 & SENE: \$3.980
FCA 14 in 2020 for CCP 2023/2024	33,956	323	335	\$2.001

From: [ISO New England](#)

# Vermonters Pay for Winter Reliability

Over the past decade, many fossil and nuclear generating units have been retired from ISO New England's system, increasing the reliance on natural gas as a generating resource. Natural gas pipeline import capability in New England can become constrained in the winter as gas for electricity generation competes with demand for heating purposes in other New England states. (Vermont Gas is supplied by a Canadian pipeline and its load does not impact the New England electricity prices.) As a result, when there is a prolonged cold snap and home heating requires more natural gas, New England risks electric supply shortages. With milder temperatures projected for this winter, the likelihood of such an event is greatly diminished.

ISO New England published its [seasonal outlook](#) for the 2024-2025 winter regarding system readiness. ISO-NE anticipates that there will be sufficient generation resources to meet consumer demand this winter with forecasts slightly above average temperatures and normal precipitation in the region. Utilizing its rolling 21-day energy supply forecast, the ISO Operations team will monitor resource availability and fuel supply levels to ensure adequate transmission service. This winter will be the first with the Mystic generating station having fully retired, and the second winter with the Inventoried Energy Program in place. This program provides incremental compensation to certain resources that maintain fuel reserves on site in reserve for an emergency. It is expected to cost substantially less than previous support for the Mystic Generating Station.

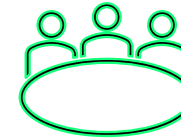


From: case 24-3432-TF, VEC Rate Case Test Year Actuals 7/1/23-6/30/24



Mystic Generating Station in Everett, MA

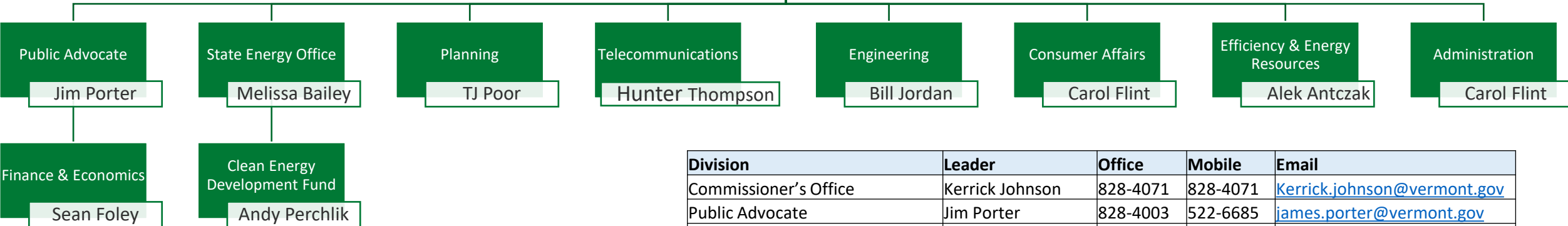
# Public Service Department Organization Chart



Vermont Community Broadband Board  
Executive Director – Christine Hallquist

**Commissioner**  
Kerrick Johnson

Commissioner Contact:  
Audrey Fargo  
828-4071



Division	Leader	Office	Mobile	Email
Commissioner's Office	Kerrick Johnson	828-4071	828-4071	<a href="mailto:Kerrick.johnson@vermont.gov">Kerrick.johnson@vermont.gov</a>
Public Advocate	Jim Porter	828-4003	522-6685	<a href="mailto:james.porter@vermont.gov">james.porter@vermont.gov</a>
Telecommunications	Hunter Thompson	522-2311	522-2311	<a href="mailto:Hunter.Thompson@vermont.gov">Hunter.Thompson@vermont.gov</a>
Planning	TJ Poor	558-7022	558-7022	<a href="mailto:tj.poor@vermont.gov">tj.poor@vermont.gov</a>
State Energy Office	Melissa Bailey	461-6352	461-6352	<a href="mailto:melissa.bailey@vermont.gov">melissa.bailey@vermont.gov</a>
Engineering	Bill Jordan	522-3959	522-3959	<a href="mailto:bill.jordan@vermont.gov">bill.jordan@vermont.gov</a>
Efficiency & Energy Resources	Alek Antczak	828-4020	461-3298	<a href="mailto:Alek.Antczak@vermont.gov">Alek.Antczak@vermont.gov</a>
Consumer Affairs	Carol Flint	828-4009	522-2527	<a href="mailto:carol.flint@vermont.gov">carol.flint@vermont.gov</a>
Administration	Carol Flint	828-4009	522-2527	<a href="mailto:carol.flint@vermont.gov">carol.flint@vermont.gov</a>