

# Where Does Vermont's Electricity Come From?

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PUBLIC SERVICE DEPARTMENT

JANUARY 31 AND FEBRUARY 2, 2023



# Welcome!

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The **Vermont Public Service Department (Department)** is an agency within the executive branch of Vermont state government.

The Department represents the public interest in matters regarding energy, telecommunications, water and wastewater.



Many staff from the Department are supporting today's webinar:

**TJ Poor** – Director of Planning

**Anne Margolis** – Deputy Director

**Claire McIlvennie** – Data & Equity Policy Manager

**Lou Cecere** – Planning Engineer

**Adam Jacobs** – Utilities Economic Analyst

**Chris Heine** – Clean Energy Program Specialist

**Philip Picotte** – Utilities Economic Analyst

# Webinar Logistics

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Please remain muted with video off throughout the webinar.

We welcome participants to write questions in the chat box or, if you are unable to do so, raise your hand to ask the question directly.

If you would like to ask your question directly, you can press unmute (if joining via the web) or \*6 (if joining by phone).

Closed captioning is available for today's webinar, but please be aware the captions are autogenerated any may not be 100% accurate.



The webinar is being recorded and will be posted on the Department's renewables website after the event, along with copies of the slides: <https://publicservice.vermont.gov/renewables>

# Context

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This webinar series is part of an effort by the Public Service Department **to review our current state electricity policies and programs**, as recommended by the state Comprehensive Energy Plan and Climate Action Plan.

Throughout the process the Department **wants to hear from people like you** to better understand what Vermonters think is important in our state electricity policies and programs.



There will be a variety of ways to be involved throughout the process, and we hope you'll join us!

# Objectives

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**Today's webinar will answer two core questions:**



How does the electric grid deliver electricity to Vermont homes and businesses?



Where does Vermont's electricity come from?

# Breaking the Ice

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UNDERSTANDING WHO IS IN THE AUDIENCE &  
WHAT YOU KNOW ABOUT THE ELECTRIC SYSTEM

# Tell us about yourself!

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One of the goals the Department has for the process to review our renewable electricity programs and policies is to engage with a broader array of Vermonters than we have historically reached with our events.

As part of this effort, we have a few questions here to help us better understand who is in the audience today and the perspectives you're bringing to the table.

**Answering these questions in voluntary!** Please answer as many or as few as you feel comfortable.

**All responses will be anonymous.**

**We'll use the data collected here:**

- Internally to help inform our outreach efforts moving forward
- In our reports on this process, to be transparent about who we did (and didn't) hear from to offer context for our recommendations

# Poll: Electricity in Vermont

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**QUESTION 1:** WHERE DO YOU THINK VERMONT'S ELECTRICITY COMES FROM?



**QUESTION 2:** HOW RENEWABLE DO YOU THINK VERMONT'S ELECTRICITY IS?



# The Electric System in VT

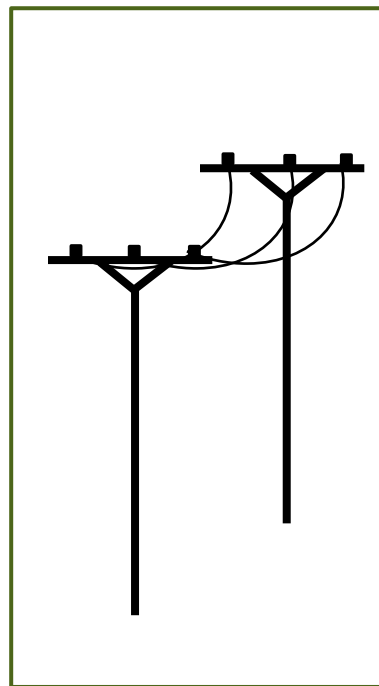
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HOW DOES IT WORK

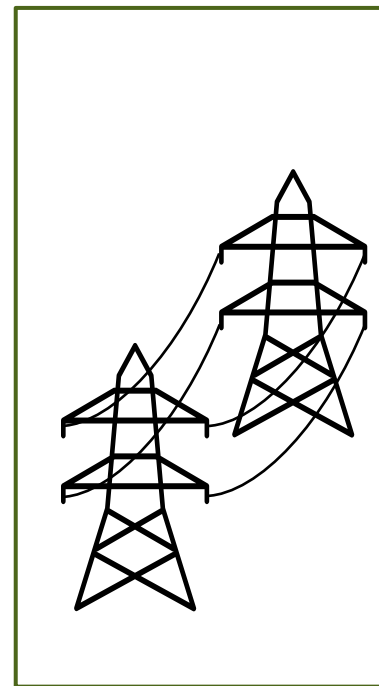
# Core Components of the Electric Grid



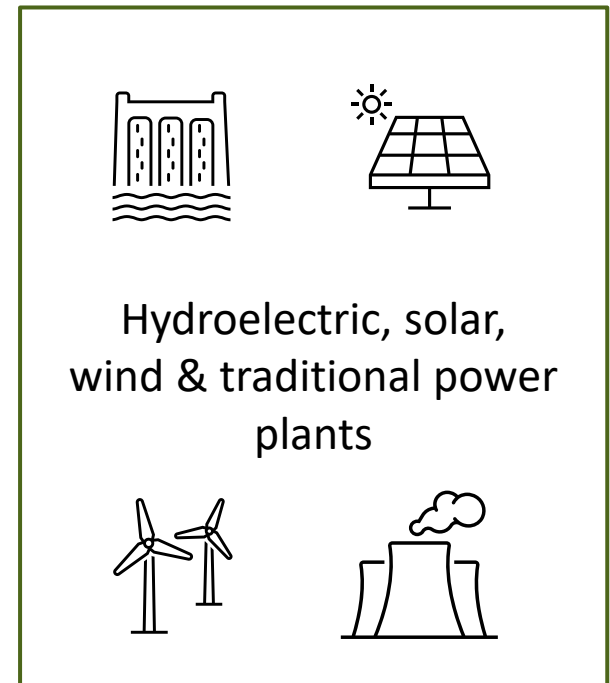
**Electricity Consumers**



**Distribution Lines**



**Transmission Lines**



**Generation**

# Where are Resources Located

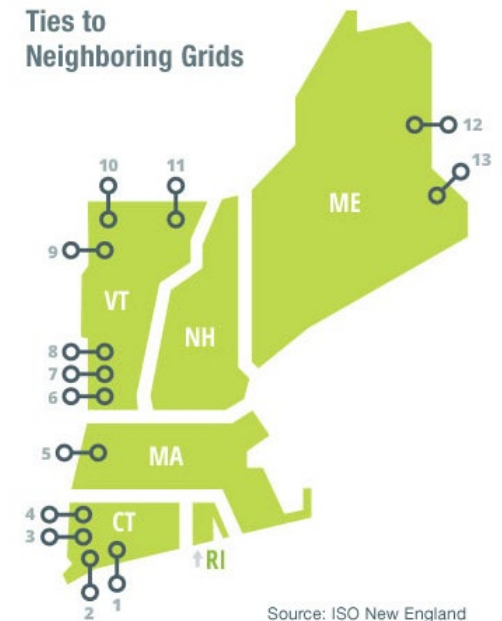
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Within Communities

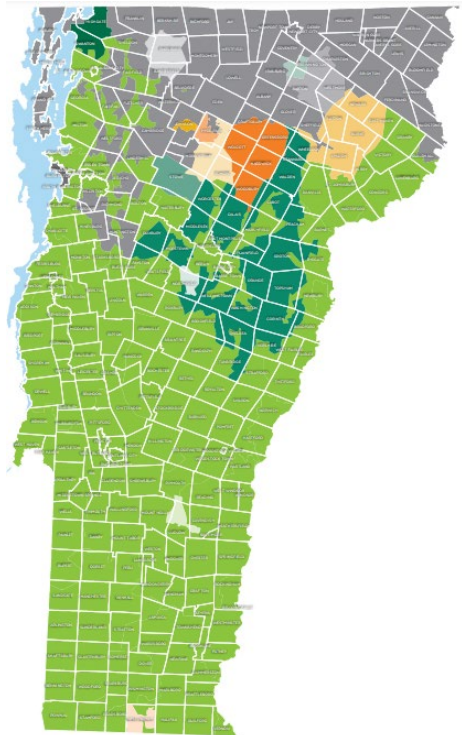


Vermont

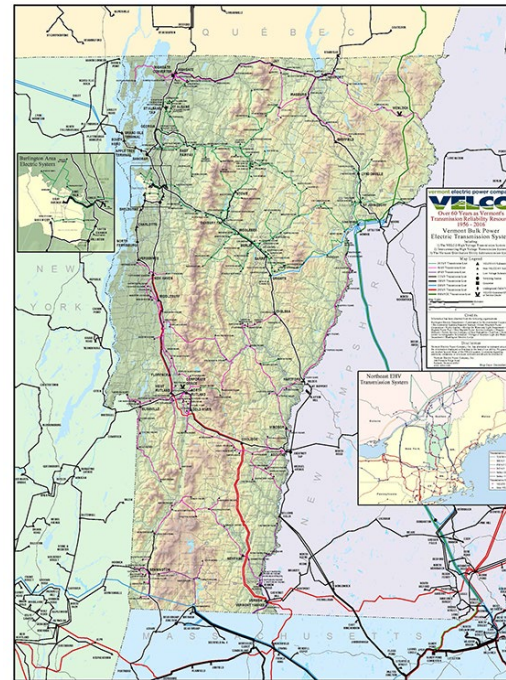


New England,  
New York, & Canada

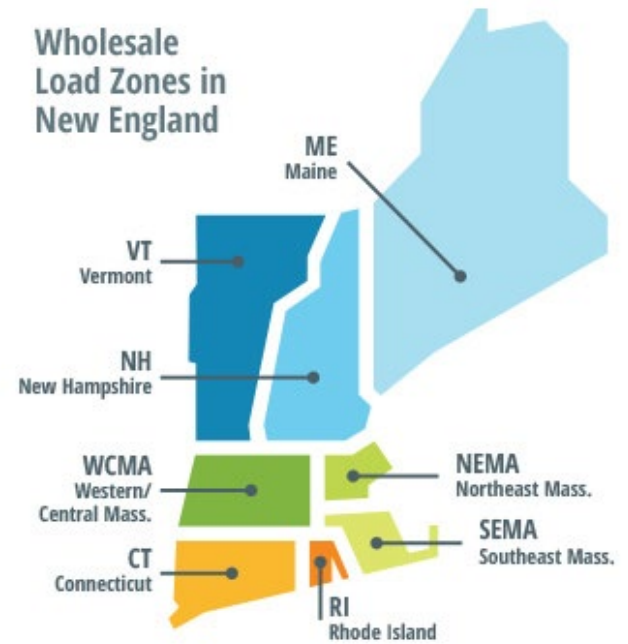
# Who Manages The Grid



Vermont Distribution Utilities



VELCO



Source: ISO New England

ISO New England

# Questions?

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# Electricity in Vermont

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FOUR PERSPECTIVES ON WHERE IT COMES FROM

# To start – some terminology:

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**Kilowatt (kW) / Megawatt (MW)** 

A measure of power

i.e. how much electricity something needs to turn on or can generate instantaneously

**1000 kW = 1 MW**



An average LED lightbulb requires **0.01 kW** to turn on



A hydropower plant with a capacity of **1000 kW (or 1 MW)** could help **100,000** light bulbs turn on at the same time.

**Kilowatt-hour (kWh) / Megawatt-hour (MWh)**  

A measure of energy

i.e. the amount of power delivered or generated over some amount of time

**1000 kWh = 1 MWh**

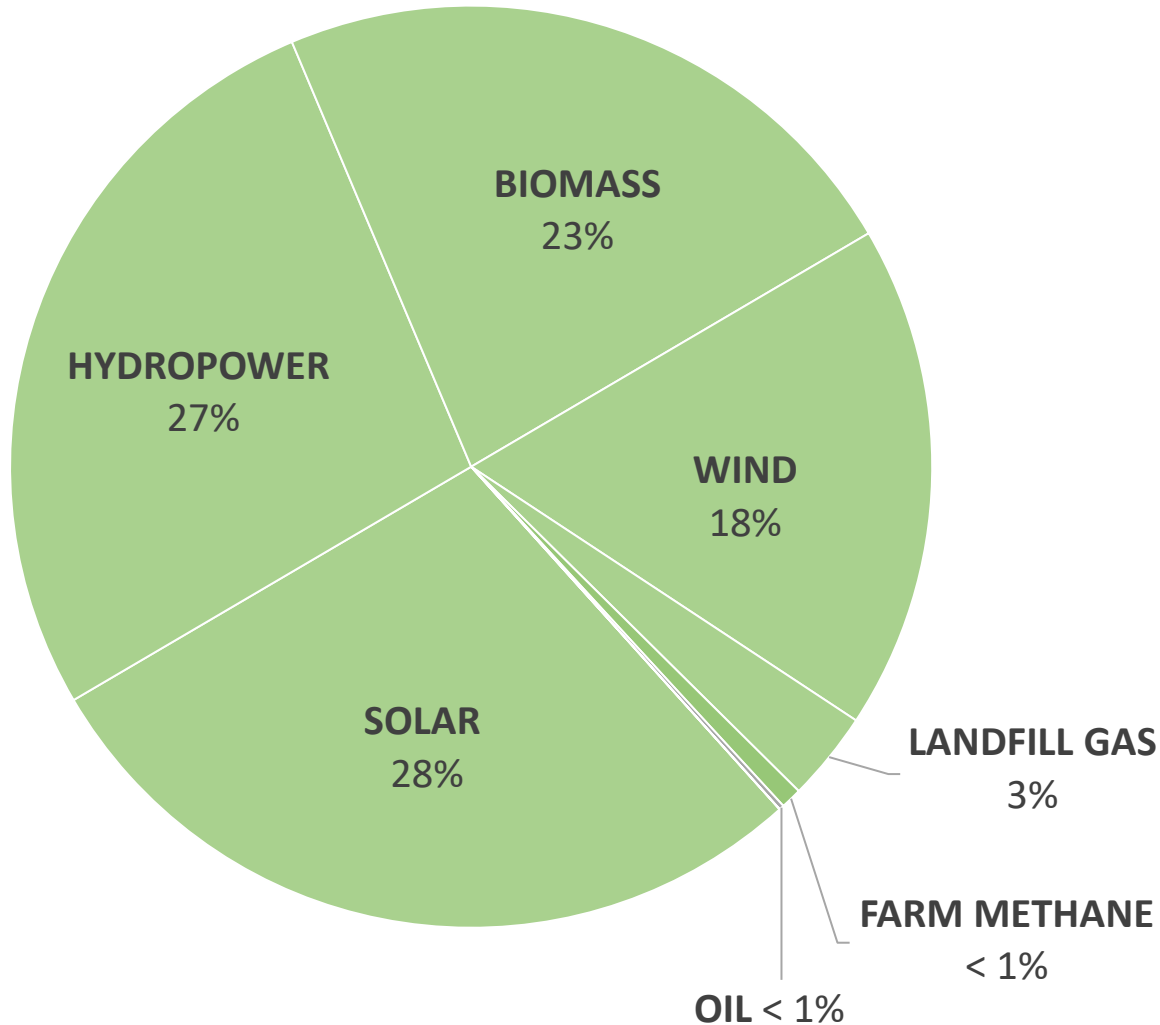


If you turned on one LED light bulb for **3 hours**, it would use **0.03 kWh** of electricity.



A hydropower plant with a capacity of **1000 kW (or 1 MW)** that was on for **3 hours** at full capacity could power **100,000** light bulbs for that time by producing **3 MWh** of electricity.

# What does Vermont generate in-state?



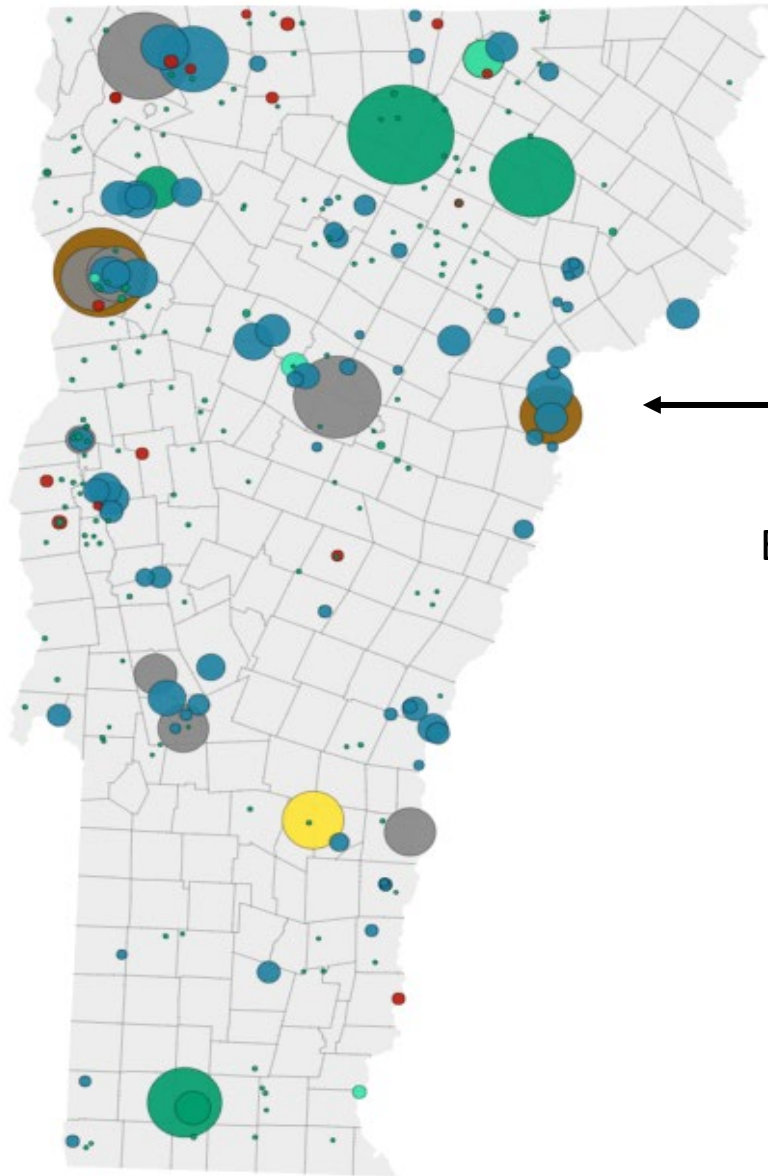
In 2021, generators based in Vermont produced more than **1.9 million MWh\*** of electricity.

- By contrast, in 2021 Vermont utilities purchased or generated over **5.8 million MWh** of electricity to meet customer needs.
- Electricity generated in Vermont makes up **33%** of what is needed to meet customer's need.

**99.8%** of this electricity came from resources that current Vermont policy considers renewable. These resources are **highlighted in green**.

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





## Vermont Generation by Resource Type

(excluding distributed solar <5MW)

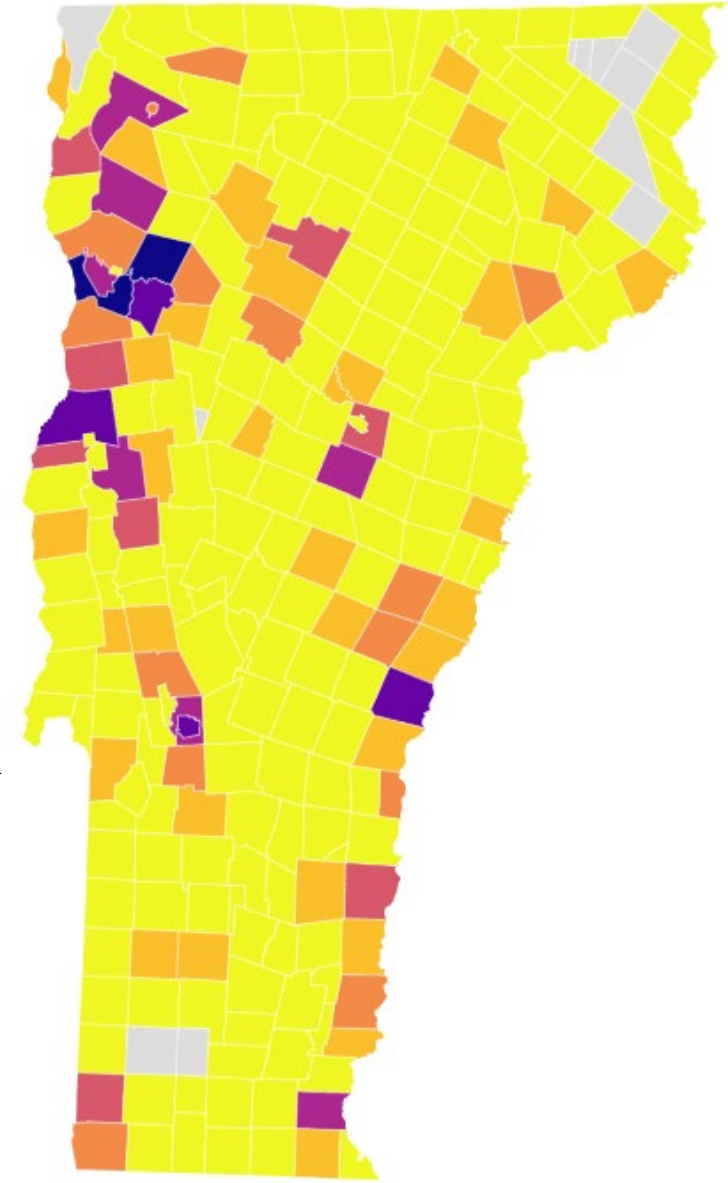
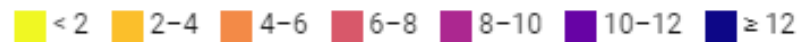


Electricity generators are located throughout Vermont

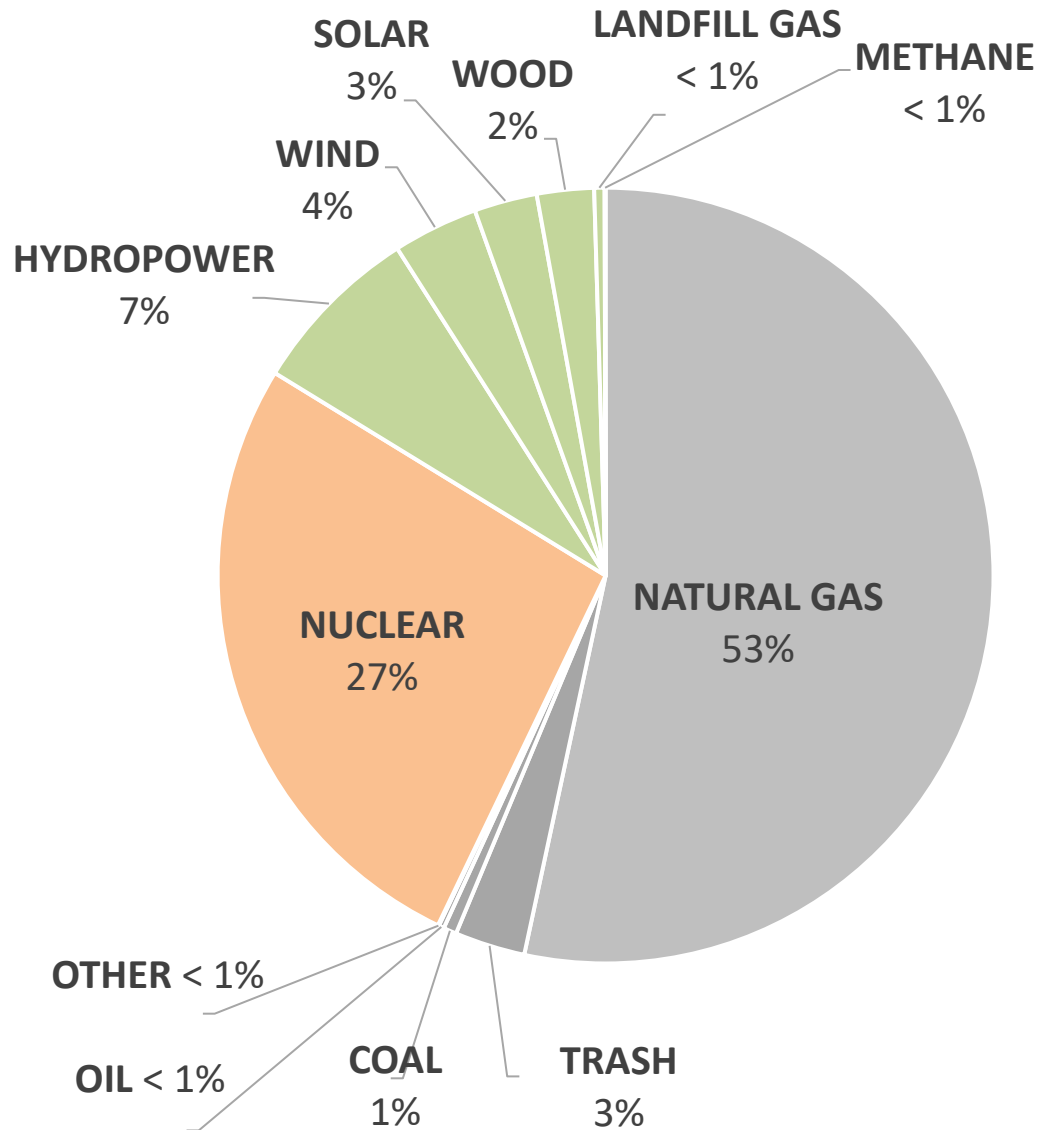


## Distributed Solar (< 5MW) by Town

Installed MW



# What electricity is generated in the New England region?









In 2021, generators in the New England region (including those in Vermont) produced roughly **102 million MWh** of electricity.

**16.3%** of this electricity came from resources that Vermont considers renewable. These resources are **highlighted in green**.

**27%** of this electricity came from nuclear, which is not considered renewable but is **considered carbon free**.

# What electricity do Vermont utilities generate or buy?

When utilities in Vermont decide what power to generate or purchase to meet the needs of their customers, they are guided by existing Vermont energy policy. These policies require consideration of issues like:

- Adequate electricity 
- Affordability of rates 
- Cost-effective use of resources
- Economic vitality 
- Efficient use of resources
- Environmental justice & equity 
- Reliable electricity 
- Secure electricity
- Sustainable & Environmentally Sound 

# **Poll:** How do you think we should prioritize these issues when deciding where our electricity comes from?

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Affordable

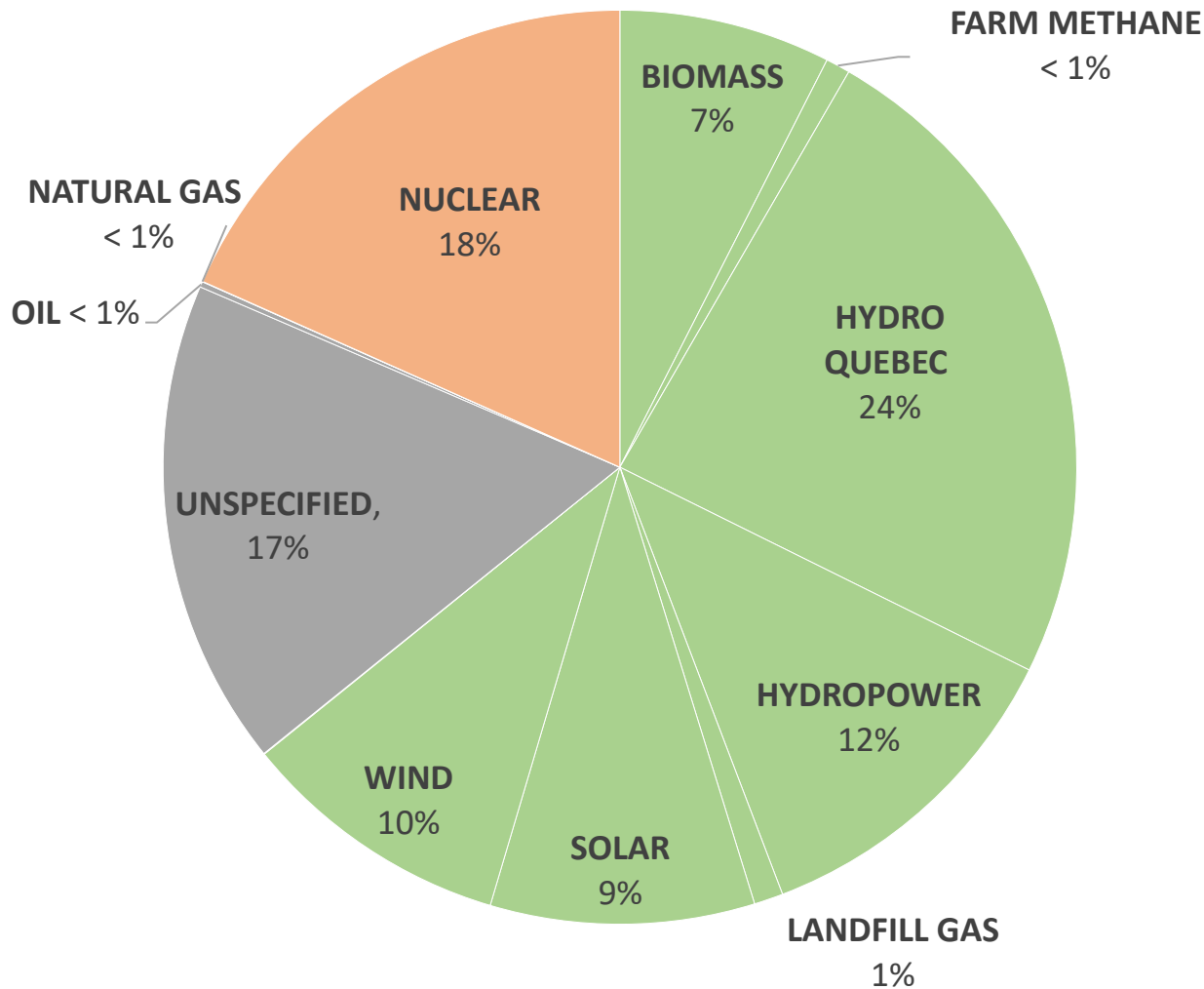
Local economic development

Equitable

Reliable

Sustainable / Clean

# What electricity do Vermont utilities generate or buy?



In 2021, Vermont distribution utilities purchased over **5.8 Million MWh** of electricity to meet the demand of their customers.

Of this:

**64%** came from **renewable resources**

**18%** came from **carbon-free resources** (Nuclear)

# How renewable is our electricity based on renewable energy certificates (REC)?

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*BUT FIRST..... What is a renewable energy certificate?*

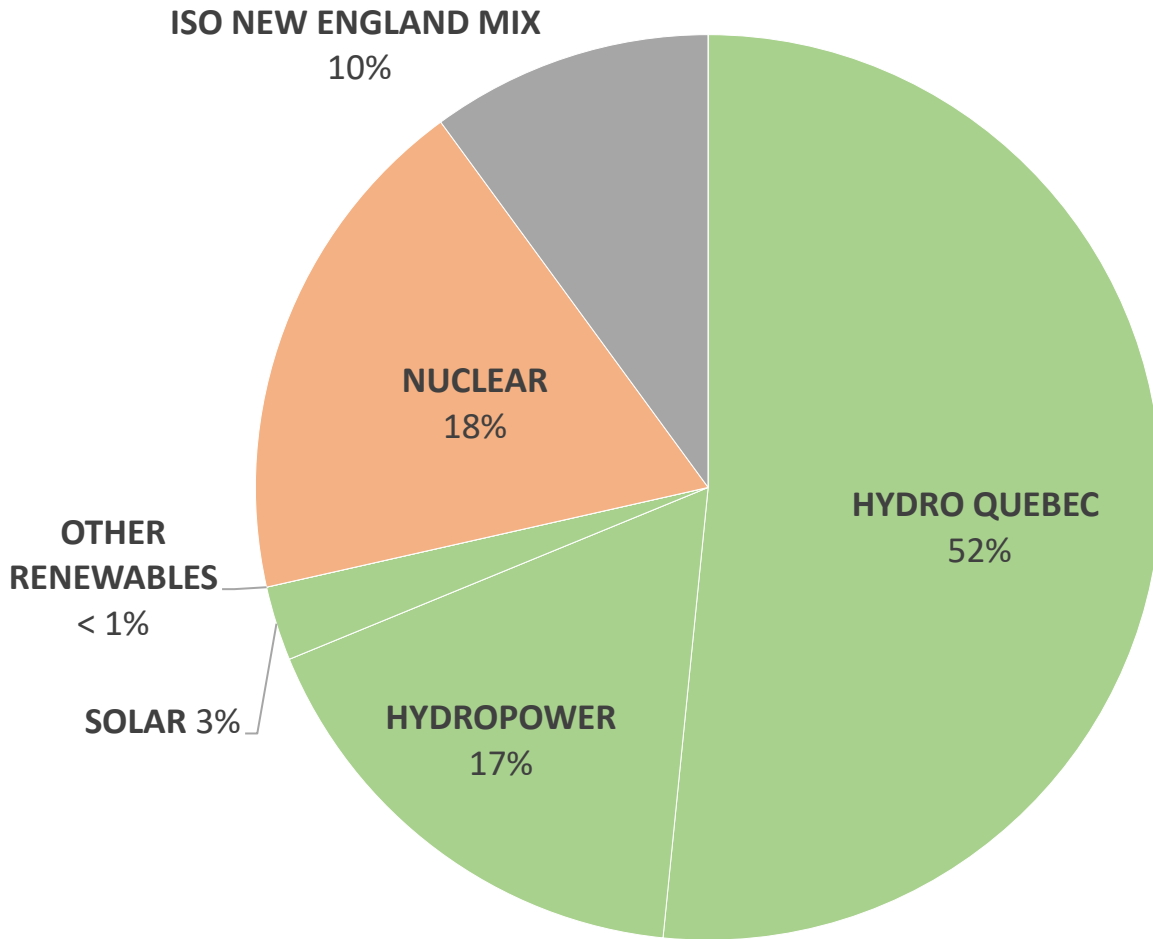


RECs provide a mechanism to demonstrate that someone specifically paid for the electrons coming from renewable resources and prevents two different entities from claiming credit for supporting the same resource.

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

# How renewable is our electricity based on renewable energy certificates (REC)?

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In 2021, Vermont distribution utilities retired just over **4 million renewable energy certificates** (i.e. equivalent to just over **4 million MWh** of electricity) to meet their obligations under Vermont's Renewable Energy Standard.

These RECs accounted for **71%** of Vermont's electricity in 2021.

# Questions?

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# Recap & Questions

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**Question 1:** What is your biggest takeaway from today?



**Question 2:** Did anything you heard today surprise you?

**Poll: Reflections on what you heard today**

# Circling Back to Our Objectives

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**We hope you learned about / refreshed your information on:**



Core components of how the electric grid delivers electricity to Vermont homes and businesses



Different perspectives on understanding where Vermont's electricity comes from

# Questions?

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# Next Steps

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INTERESTED IN LEARNING MORE AND INFLUENCING WHERE VERMONT'S ELECTRICITY COMES FROM IN THE FUTURE?

# Webinar Series

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## ***Webinar 2: Current Renewable Electricity Policies***

- What are Vermont's current policies and programs on renewable electricity?
- How have they helped promote renewable electricity to date?
- Dates, times, & registration:
  - Tuesday February 14, 12:00 pm-1:30 pm
  - Wednesday February 15, 6:00 pm-7:30 pm

## ***Webinar 3: Parking Lot Session***

- Topics to be covered will be added as we get closer to the date.
- Dates, times, & registration:
  - Thursday March 9, 12:00 pm-1:30 pm
  - Monday March 13, 6:00 pm-7:30 pm

**Register at:** <https://publicservice.vermont.gov/renewables>

# Thank you!

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Questions or comments about next steps in the process to review renewable electricity policies and programs?

Interested in staying in the loop and hearing about upcoming events?

Email [PSD.REPrograms@vermont.gov](mailto:PSD.REPrograms@vermont.gov) to reach out and/or be added to our mailing list.