

# Reviewing Vermont's Clean and Renewable Electricity Policies & Programs – Summary of Report and Recommendations

**TJ Poor, Director of Regulated Utility Planning, Public Service Department**

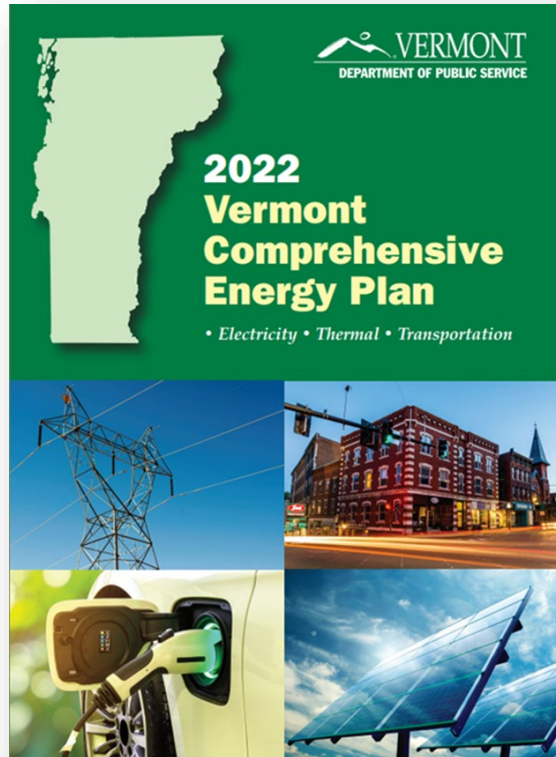
**At Vermont Climate Council Cross Sector Mitigation Subcommittee**

January 17, 2024



# What motivated this review of programs & policies?

To meet state renewable energy goals and greenhouse gas requirements, the 2022 Comprehensive Energy Plan and 2021 Climate Action Plan both made recommendations about reviewing and revising Vermont's Renewable Energy Standard.



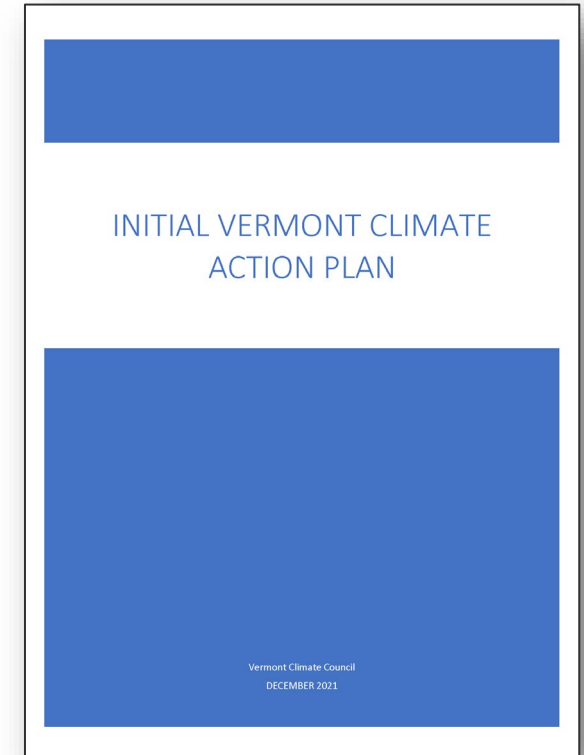
## 2022 Comprehensive Energy Plan:

“Consider adjustments to the Renewable Energy Standard and complementary renewable energy programs comprehensively, **through a transparent and open process**. . . .The Considerations should include:

- Consideration of a low-carbon or carbon-free standard, in addition to a 100% renewable energy standard
- Consideration of a cohesive set of programs to support the standard” (p.270)

## 2021 Climate Action Plan:

*Electric Sector Strategy 1 Pathway 1:* “Vermont should develop 100% carbon free or renewable electric portfolio standard to ensure progress continues into the 2030s and beyond while being **mindful of the economic impact on cost-burdened Vermonters** and maintaining the cost-effectiveness of fuel-switching to electric measures.” (p.111)



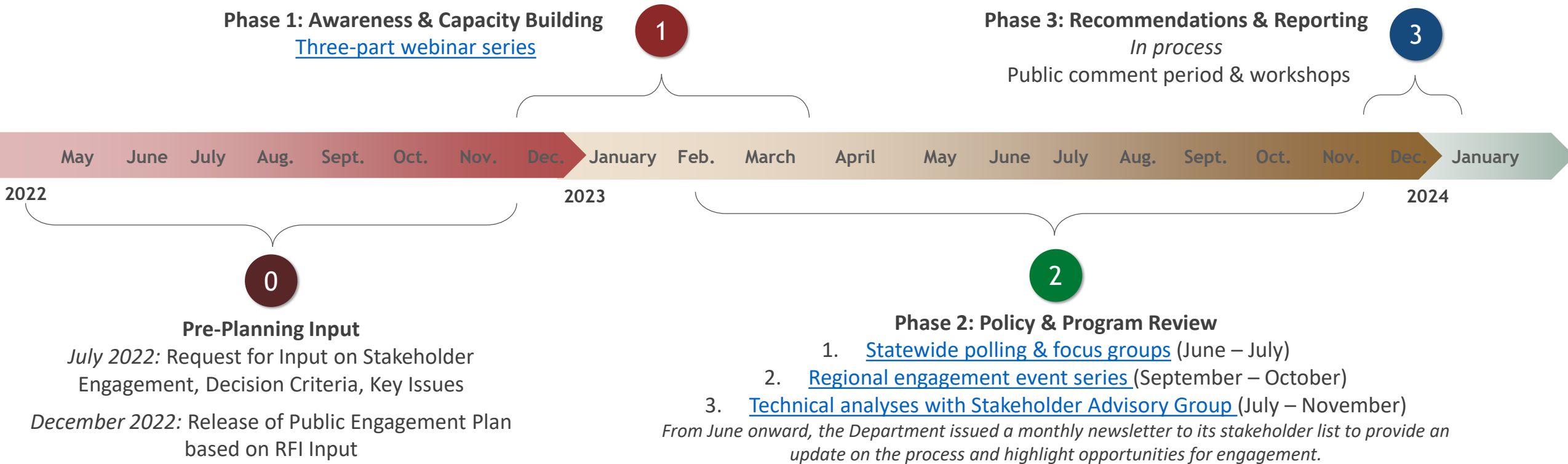
# Goals & Pathways for Accountability

The Department established four goals to guide the public engagement effort and identified pathways to hold itself accountable to those goals.

	1	2	3	4
GOAL	Reach a broad array of Vermonters beyond those stakeholders already deeply engaged in these conversations	Create inclusive spaces where stakeholders feel heard and able to share their expertise and opinions	Be transparent in how feedback shared during engagement opportunities is incorporated into recommendations	Build capacity for engagement in these discussions in the long term through elevating energy literacy
ACCOUNTABILITY	Collect and report demographic information on who participates in engagement opportunities to develop a baseline understanding of who is (and is not) engaged	Develop feedback surveys to request input on how accessible and inclusive engagement opportunities are and understand how to improve moving forward	Continue to publish all feedback received and record where it was or was not included in final recommendations, where appropriate	Develop accessible educational materials to support engagement opportunities and include in feedback surveys, where appropriate, questions on how people feel their understanding of the concepts under consideration has changed
<p>The Department intends to publish an assessment of how it met these with the final report for this effort, building on the initial reflections highlighted in this document.</p>				

# The Process

Between December 2022 and November 2023, the Department, in collaboration with many partners, executed its three-phased process through educational webinars, polling, focus groups, regional events, and technical analyses. These efforts occurred through a mix of in-person and virtual opportunities. The following slides summarize each of the activities, the outreach undertaken, and who participated in each process.



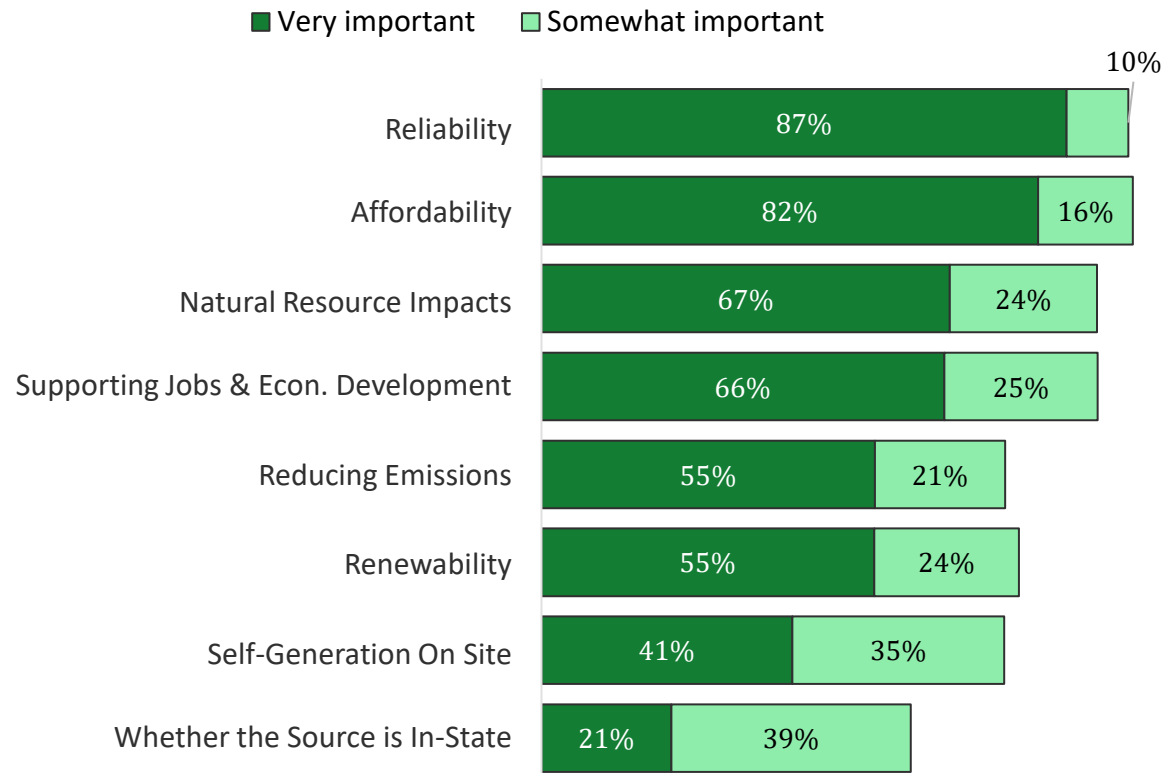
# Key Learnings Overview



In reviewing the public engagement efforts and technical analyses, the following initial takeaways have emerged about electricity in Vermont:

- 1 Affordability, reliability, and reducing carbon emissions were consistently highlighted as the most important issues to prioritize by Vermonters
- 2 A move toward a 100% Renewable or Clean Energy Standard, including increases in new renewable energy requirements, calls for tradeoffs between costs to ratepayers and societal benefits from emissions reduction
- 3 There is general support for solar, wind, and hydropower as sources of electricity. Support for nuclear and biomass is more mixed; a majority of Vermonters at least somewhat support every resource
- 4 Many Vermonters are at least somewhat supportive of policy and program changes that increase requirements for low carbon and renewable electricity in a way that supports the most vulnerable Vermonters
- 5 As Vermont considers achieving 100% renewable or low carbon electricity, it will need to do so in combination with a more granular understanding of the alignment of renewable generation and demand for electricity

# Understanding Priorities for Electricity



Results from statewide survey (700 responses)

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

## Key Takeaway 1

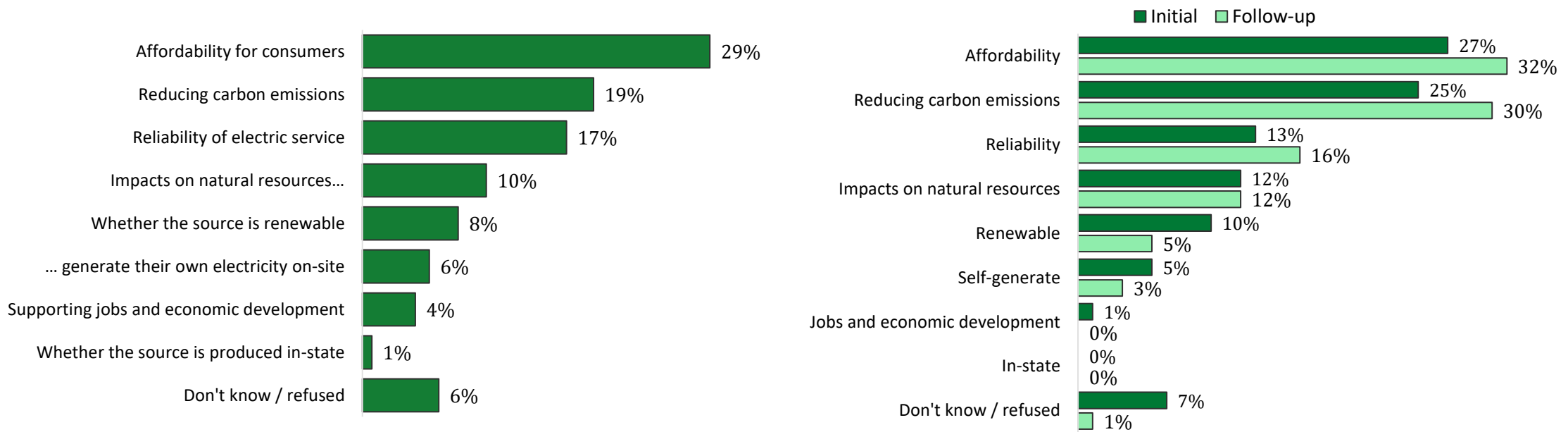
Affordability, reducing carbon emissions, and reliability were consistently highlighted as the most important issues to prioritize.

The importance placed on priorities often differed based on stakeholders:

- In the statewide poll, **reliability** of electricity service and **affordability** for consumers were considered very important by over 80% of Vermonters and at least “somewhat important” by nearly all people who took the survey.
- Across the regional events and conversations with the Stakeholder Advisory Group, the need to **reduce emissions** was often cited as a top priority.
- One regional planner observed that during their engagement events it seemed that energy-engaged stakeholders seemed to focus more on emissions reductions, assuming affordability and reliability would be taken care of, while less energy-engaged stakeholders focused more on the latter two issues.

# Understanding Priorities for Electricity

**Key Takeaway 1, continued:** When asked to select what they felt should be the single most important factor in thinking about where Vermont gets electricity, participants in the statewide polling and focus groups indicated **affordability, reducing emissions, and reliability** were the top three issues they were concerned about. Results of the follow up survey (taken after the focus groups) shows these conversations significantly increased concern for affordability and reducing emissions.

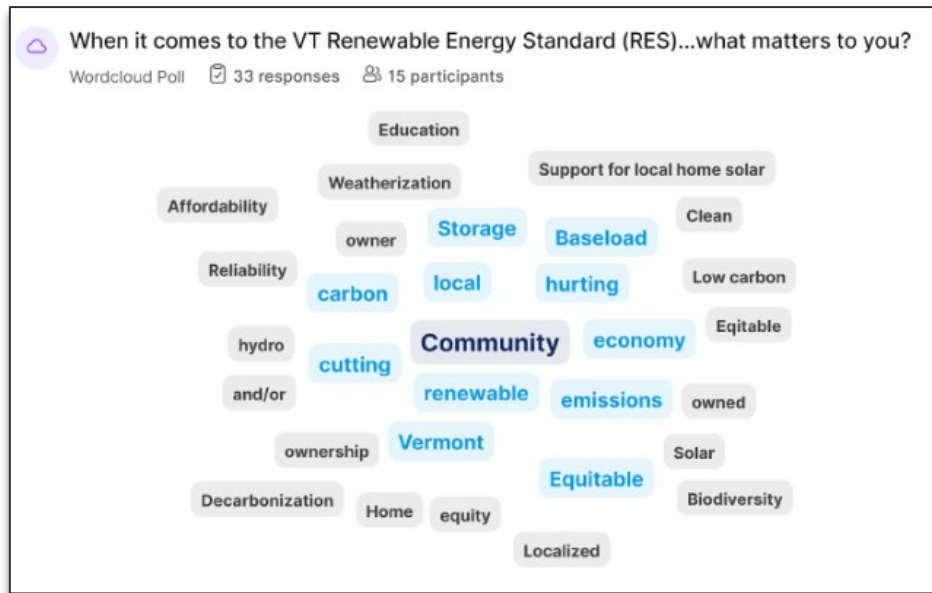


% who say \_\_\_\_\_ is the single most important factor when considering how Vermont gets its electricity.

**Results from initial statewide survey (left, 700 participants) and results from the follow-up survey (right, 92 participants) taken after the 11 focus group discussions.**

*Note: Results from the follow up survey show only the focus group participants responses from the initial survey and the follow up survey.*

# Understanding Priorities for Electricity



Results from Northeastern Vermont Development Association Virtual Event

## Key Takeaway 1, continued:

Although certain priorities were emphasized, Vermonters generally found it challenging to choose between the priorities under discussion.

*“How do we decide which is the ‘lesser evil’ when it comes to pursuing new methods of electrical generation that also have negative impacts (e.g. land use change, impacts to natural resources, increases in cost to consumers, etc)” – From ACRPC Event*

Notably, discussions particularly in the regional event series, expressed a desire to see more local, community-scale projects even though whether the source of the electricity was located in-state did not often rise to the top of issues to prioritize. This was frequently mentioned to support reliability of electric service and for communities to have more control over their energy sources.



# Understanding Priorities for Electricity

## Key Takeaway 2

The modeling highlights that a move toward a 100% Renewable or Clean Energy Standard from the current policy will face tradeoffs between costs to ratepayers (i.e., impacts on their bills) and societal benefits related to emissions reduction.

This mirrors the sentiments voiced in the focus groups that it felt there were often tradeoffs between what participants could afford to do and their desire to invest or participate in emissions reducing activities.

Fig 1: Average Projected Increase of Electric Ratepayer Bills 2025-2035 Over the Business-as-Usual

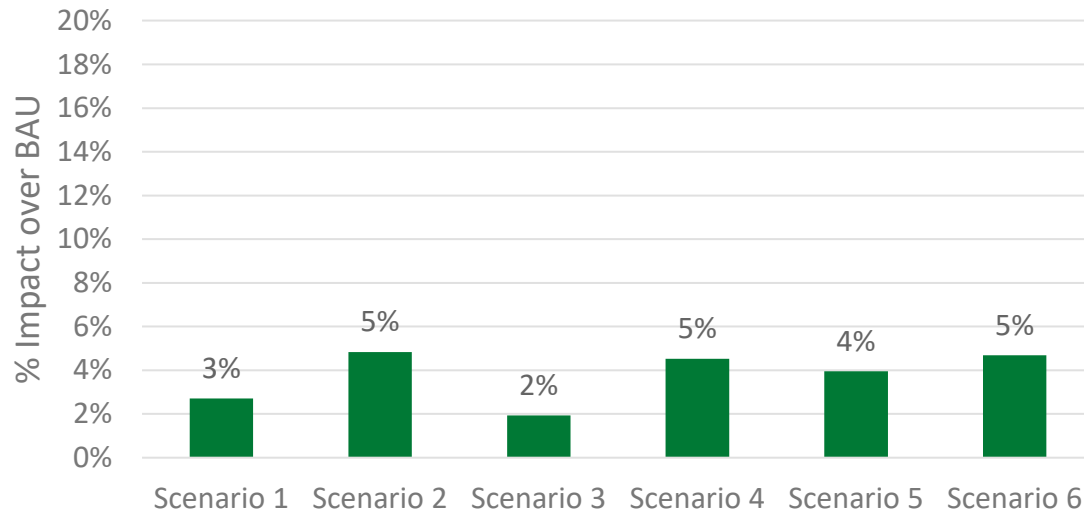
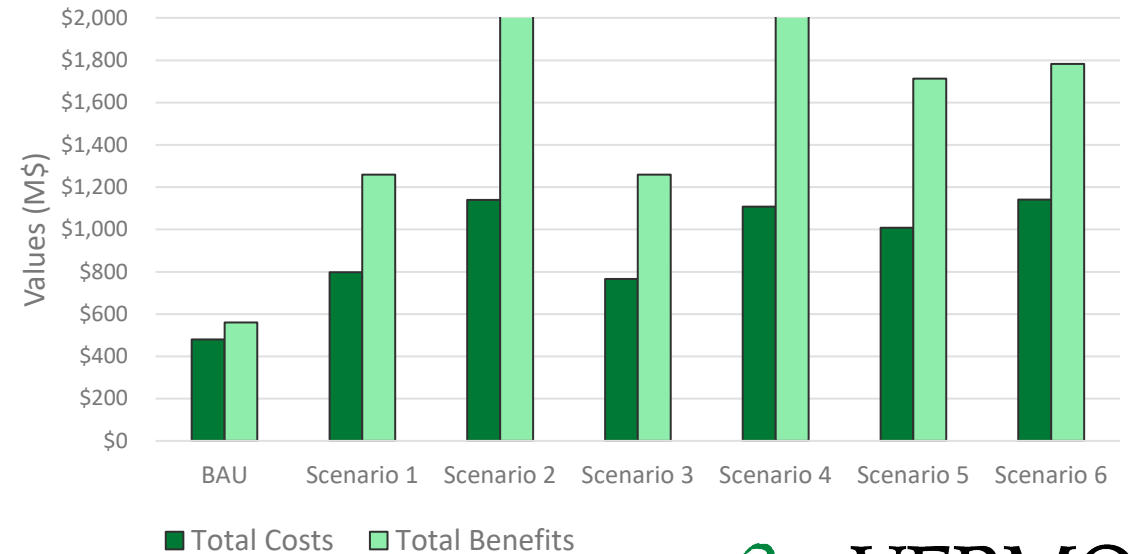
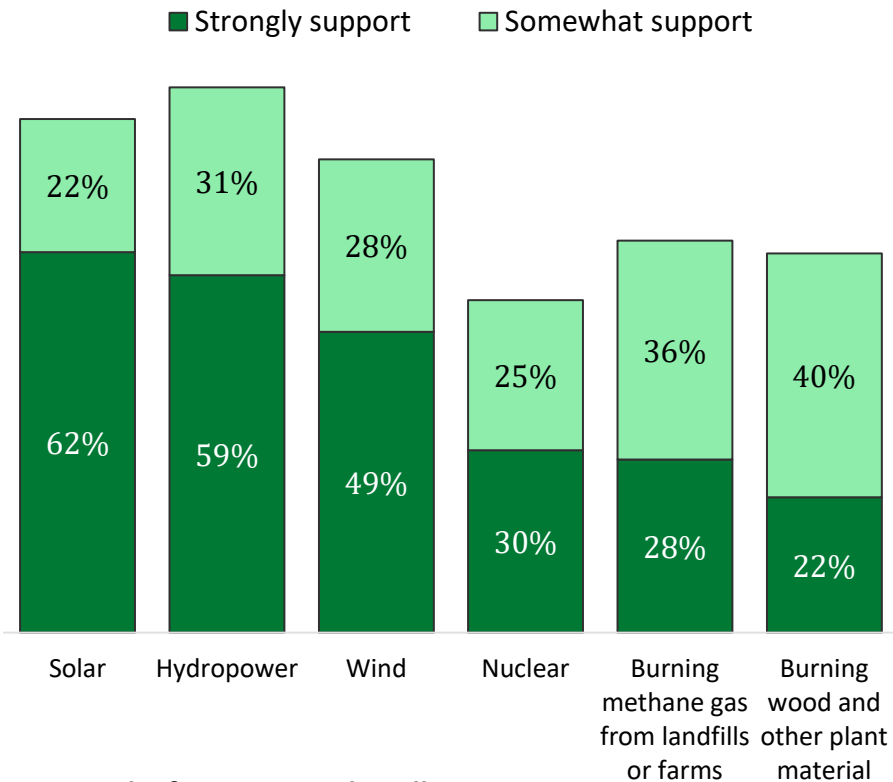


Fig 2: Total Costs and Benefits Projected to Result from Each Scenario Based on the Societal Cost Test



# Preferred Sources of Electricity



**Results from Statewide Polling**  
 % who strongly or somewhat support Vermont getting electricity from each source

## Key Takeaway 3

There is general support for solar, wind, and hydropower as sources of electricity. Support for nuclear and biomass is more mixed, although a majority from the statewide polling at least somewhat supported every resource.

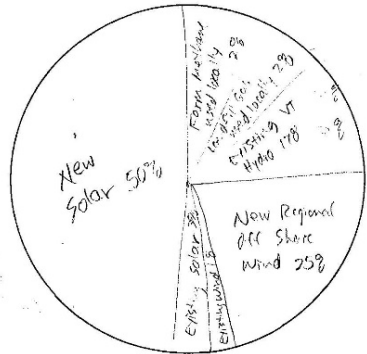
**Preferences were also expressed for getting electricity from a diversity of resources.** Although not included in the statewide polling, several participants in the regional events expressed support for geothermal as a source of electricity.

**Storage and load flexibility** were also highlighted as a key consideration through conversations with the Stakeholder Advisory Group for the technical analyses.

# Preferred Sources of Electricity

REDUCES ELECTRIC CONSUMPTION NEEDS TO Make the whole "Pie" smaller.

What would you like to see Vermont's energy mix look like in the future?

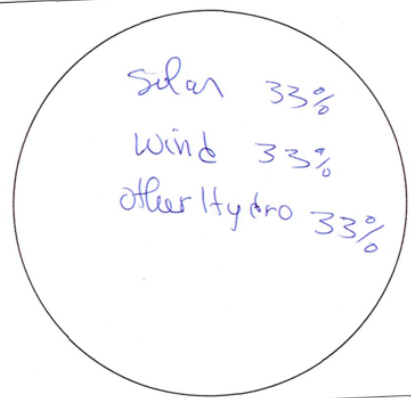


Percent of Mix (should add up to 100%)

Hydro-Quebec 52% <i>N/D</i>	Nuclear 18% <i>N/D</i>
Other Hydro Power 17% <i>Existing</i>	ISO New England Mix 10% <i>N/D</i>
Solar 3% <i>Existing 3%</i>	Farm Methane <1% <i>2%</i>
New Solar 30%	Landfill Gas <1% <i>5%</i>
Biomass (Wood) <1% <i>N/D</i>	Natural Gas <1% <i>N/D</i>
Wind 1% <i>Existing 1%</i>	
Offshore Wind 25%	

*USED locally used locally*

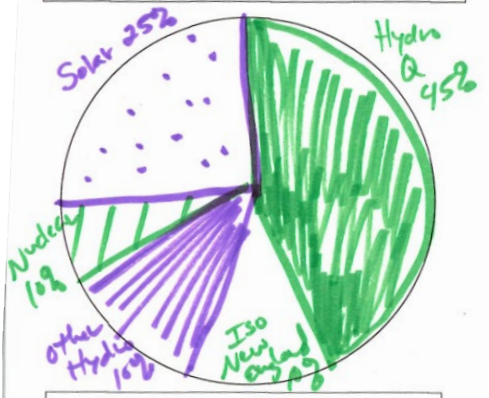
What would you like to see Vermont's energy mix look like in the future?



Percent of Mix (should add up to 100%)

Hydro Quebec 52%	Nuclear 18%
Other Hydro Power 17%	ISO New England Mix 10%
Solar 3%	Farm Methane <1%
Biomass (Wood) <1%	Landfill Gas <1%
Wind 1%	Natural Gas <1%

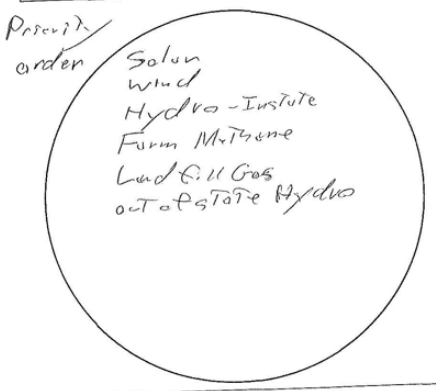
What would you like to see Vermont's energy mix look like in the future?



Percent of Mix (should add up to 100%)

Hydro Quebec 52% <i>45%</i>	Nuclear 18% <i>10%</i>
Other Hydro Power 17% <i>10%</i>	ISO New England Mix 10%
Solar 3% <i>25%</i>	Farm Methane <1%
Biomass (Wood) <1%	Landfill Gas <1%
Wind 1%	Natural Gas <1%

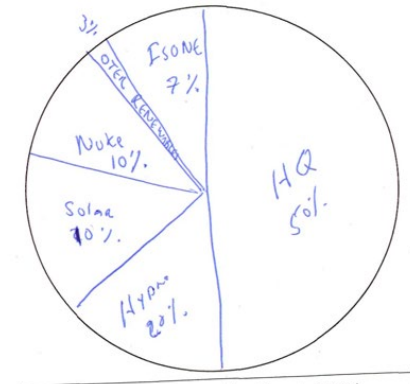
What would you like to see Vermont's energy mix look like in the future?



Percent of Mix (should add up to 100%)

Hydro Quebec 52%	Nuclear 18%
Other Hydro Power 17%	ISO New England Mix 10%
Solar 3%	Farm Methane <1%
Biomass (Wood) <1%	Landfill Gas <1%
Wind 1%	Natural Gas <1%

What would you like to see Vermont's energy mix look like in the future?



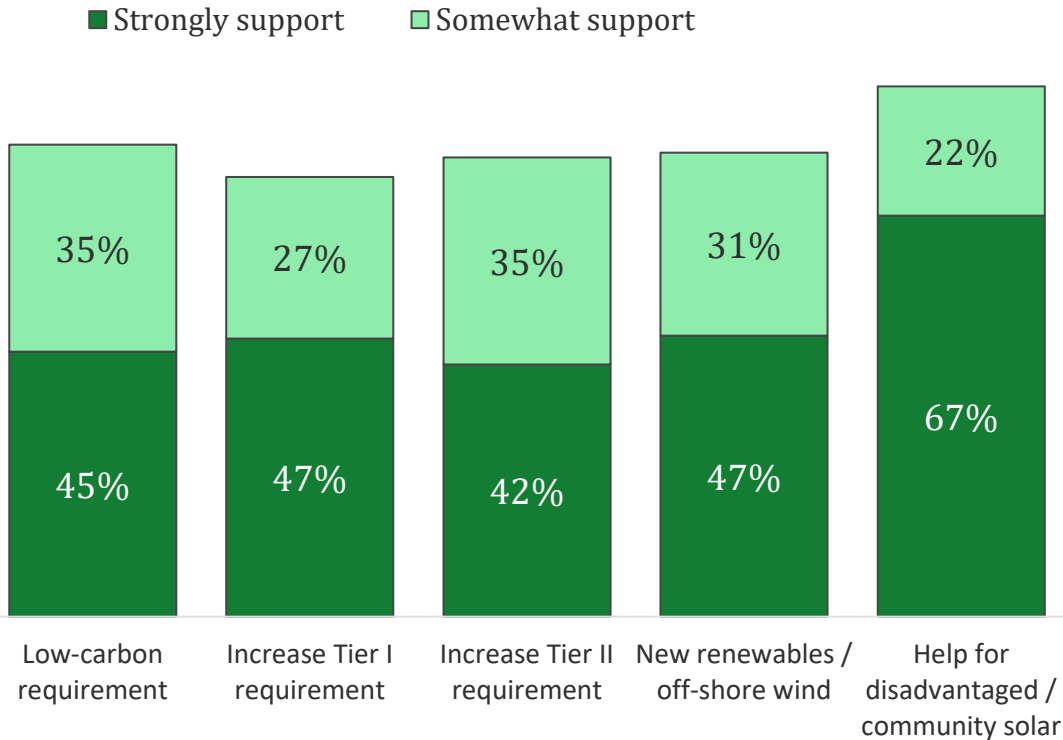
Percent of Mix (should add up to 100%)

Hydro Quebec 52% <i>50%</i>	Nuclear 18%
Other Hydro Power 17% <i>10%</i>	ISO New England Mix 10% <i>7%</i>
Solar 3% <i>10%</i>	Farm Methane <1%
Biomass (Wood) <1%	Landfill Gas <1%
Wind 1%	Natural Gas <1%

*Total 3%*

Example responses from events hosted by Bennington County Regional Commission and Windham Regional Commission showing what participants would like Vermont's future electricity mix to look like. These illustrate the variety of visions participants had on this topic.

# Possible Policy & Program Changes



% of **follow-up survey (92 responses)** takers who strongly or somewhat support each policy. See the [Appendix](#) for full question wording for each option.

## Key Takeaway 4

Many Vermonters are at least somewhat supportive of policy and program changes that increase requirements for low carbon and renewable electricity in a way that supports the most vulnerable Vermonters

### Low carbon and renewable requirements:

Individuals participating in the focus groups and follow up survey were asked about support for different policy or program changes. A majority of the 92 people who participated indicated they were at least somewhat supportive of additional policy requirements around low carbon or renewable electricity, supporting both new regional and in-state generation.

Similar themes emerged in conversations across the regional events. When asked about what would like future electricity mix to look like, while some participants in regional events noted they liked the current electricity mix, many supported getting electricity from more low-carbon or renewable resources.

### Supporting Vulnerable Vermonters *(discussion continued the next slide)*

Discussions across the 11 focus groups and regional event series highlighted equitable access to the benefits from and opportunities to engage with renewable electricity as an area for future focus. In the follow-up survey following focus groups conversations, two-thirds of those individuals voiced strong support for future policies providing support to disadvantaged Vermonters through mechanisms such as community solar, a theme often echoed in the regional events.

# Possible Policy & Program Changes

## Key Takeaway 5

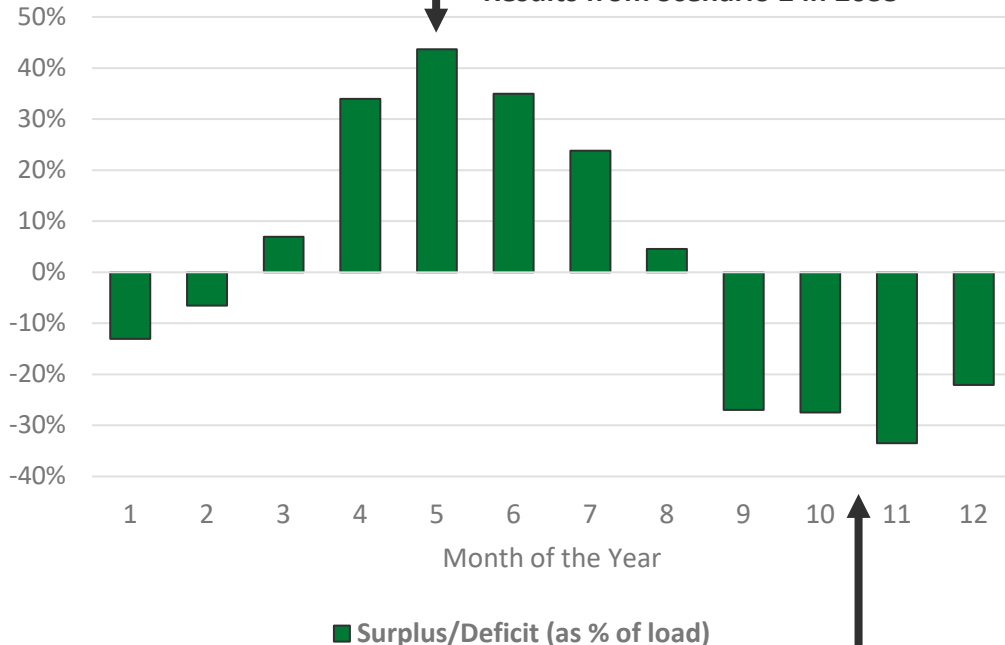
As Vermont considers achieving 100% renewable or low carbon electricity, it will need to do so in combination with a more granular understanding of the alignment of renewable generation and demand for electricity.

Compliance with the Renewable Energy Standard currently occurs on an annual basis. This means credits from times of the year with overgeneration by renewable sources can be used to cover requirements from other months where there is a deficit of renewable electricity generation. Results from the modeling indicate each scenario could achieve 100% renewable or low carbon electricity on an annual basis. However, this comes with significant variability of when renewable or low carbon electricity is produced throughout the year (a consistent finding across scenarios). Scenarios with larger seasonal swings between surpluses and deficits carry more exposure to wholesale electricity market volatility. Plus, during months of renewable generation deficit, Vermont's grid would rely on electricity from the regional generation mix which is anticipated to be primarily fossil fuel for the foreseeable future (albeit with decreasing emissions over time due to the combination of New England states' policies).

Becoming renewable or low carbon in all hours of the year will require holistically thinking about the diversity of Vermont's electric supply portfolio and demand-side resources: efficiency, load/generation flexibility including storage, and conservation. In the regional events, many Regional Planning Commissions noted participants struggled to discuss electricity generation without also discussing the roles of energy efficiency, weatherization, or other electrification measures in achieving decarbonization objectives. This may also warrant consideration of more granular (sub-annual) accounting of renewability.

Periods in the spring and summer months show surplus generation (more generation than demand) by renewable resources

Results from Scenario 2 in 2035

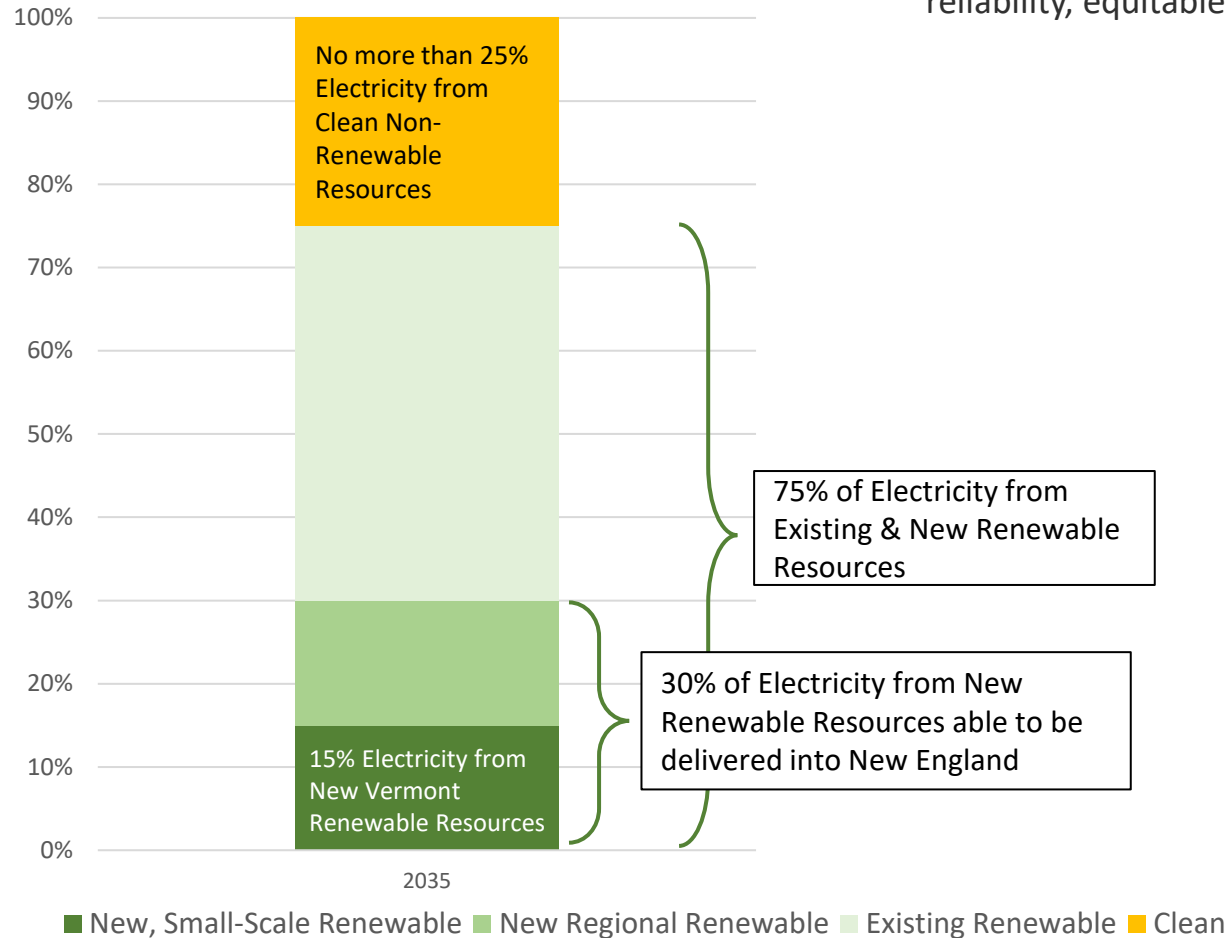


Periods in the fall and winter months show deficits of electric generation (less generation than demand) by renewable resources

# Public Service Department Policy Recommendations Based on Stakeholder Engagement

# Policy Recommendations

100% Clean Energy Standard in 2035



The Department’s proposal balances competing priorities of affordability, emissions reductions, reliability, equitable access to renewable energy, and in-state economic development:

- **100% Clean Energy by 2030** while maintaining 75% renewable by 2032.
- **30% New Renewable Energy by 2035** from resources that can deliver into ISO-NE
  - **15% New Renewable Energy connected to Vermont Distribution Grid** (extending current Tier II), as part of the new renewable requirement.
  - The remaining requirement may be met with in state or out of state resources.
  - New Resources are those built after January 1, 2010.
- **Develop a Community Renewables Program** as a successor to the Standard Offer Program for small-scale projects designed to deliver community benefit. Require utilities to procure 10-15 MW per year from this program.
- **Changes to the current net-metering program** to compensate “excess generation” at “avoided cost” (what utilities could otherwise purchase)
- **Additional study and reporting requirements** to understand impacts for the T&D system and opportunities for more granular reporting and to monitor impacts to affordability

# Stakeholder Engagement Materials can be found on PSD's website

<https://publicservice.vermont.gov/renewables>



# Additional Slides (as may be Useful)

# Initial Reflections on the Process to Date



Throughout this effort, the Department has sought to comprehensively engage Vermonters in the development of recommendations for policy and program changes in the electric sector. Although this process is not yet complete, the Department has the following reflections on this process to date and welcomes public input on this topic to help the Department refine its efforts to engage with the public moving forward. They are discussed in more detail on slides 50 and 51 of the [full report](#):



Centering public engagement in this process offered the opportunity to more meaningfully engage with Vermonters throughout the lifecycle of this effort



Establishing goals for the effort and accountability mechanisms for those goals ensured the Department collected data on who we were engaging and their experiences at events. This helped to build a baseline understanding of the success of public engagement



Partnerships were critical to reach broader audiences and think outside the box on engagement strategies to use



Prioritizing limited resources (staff capacity, budget, and time) to reach the most impacted is challenging and involves tradeoffs



There is a need for better educational materials and ongoing efforts to build capacity to engage in these discussions

# Technical Analyses Scenarios

In partnership with the Stakeholder Advisory Group and Sustainable Energy Advantage, the Department defined **six core scenarios** to compare to the current Renewable Energy Standard (“**business-as-usual**” or “**BAU**”). The current standard requires Vermont distribution utilities to purchase 75% renewable electricity by 2032 (Tier I), with 10% of this coming from in-state, scale-scale, new renewables (Tier II).

## The six core scenarios considered:

- Changes to the Tier I target date from 2032 to 2030
- Changes to the Tier II requirement:
  - Changes to the target date from 2032 to 2035
  - Increasing the total requirement from 10% to 20% or 30%
- The addition of a new “Regional Tier” which would require utilities to buy electricity from new renewable resources that can be imported into the New England region
- Changes to resources that can currently be used by utilities to meet Tier I, specifically biomass and nuclear
- Two different load forecasts: A “base case” and one considering high electrification of heating and transportation

	Regional Tier Target	Tier II Target	Tier I Target	Target Date	Nuclear Tier I Eligible	Biomass Tier I Eligible
<b>BAU</b>	0%	10%	75% by 2032	2032	No	Yes
<b>Scenario 1</b>	0%	30%	100% by 2030	2035	No	Yes
<b>Scenario 2</b>	30%	30%	100% by 2030	2035	No	Yes
<b>Scenario 3</b>	0%	30%	100% by 2030	2035	Yes	Yes
<b>Scenario 4</b>	30%	30%	100% by 2030	2035	Yes	Yes
<b>Scenario 5</b>	30%	20%	100% by 2030	2035	No	No
<b>Scenario 6</b>	50%	10%	100% by 2030	2035	Yes	No

Load flexibility, including storage, was intended to be assessed as a modeling output, on a scenario-specific basis.

In total, **68 different case runs** were modeled to explore the impacts of different combinations of and sensitivities around the issues identified.

# Net metering rates

Program	CPG Application Date	Statewide Blended Rate	RECs		CATEGORY				
			Transfer to Utility	Retain Ownership	I	II	III	IV	Hydro
NM 1.0 <sup>27</sup>	before 1/1/2017	\$0.149	n/a		n/a				
NM 2.0	1/1/2017 - 6/30/2018	\$0.149	\$0.03	-\$0.03	\$0.01	\$0.01	-\$0.01	-\$0.03	\$0.00
NM 2.1	7/1/2018 - 6/30/2019	\$0.154	\$0.02	-\$0.03	\$0.01	\$0.01	-\$0.02	-\$0.03	\$0.00
NM 2.2	7/1/2019 – 2/1/2021	\$0.154	\$0.01	-\$0.03	\$0.01	\$0.01	-\$0.02	-\$0.03	\$0.00
NM 2.3	2/2/2021 – 8/31/2021	\$0.164	\$0.00	-\$0.04	\$0.00	\$0.00	-\$0.03	-\$0.04	\$0.00
NM 2.4	9/1/2021 – 8/31/2022	\$0.164	\$0.00	-\$0.04	-\$0.01	-\$0.01	-\$0.04	-\$0.05	\$0.00
NM 2.5	9/1/2022 – 6/30,2024	\$0.17141	\$0.00	-\$0.04	-\$0.02	-\$0.02	-\$0.05	-\$0.06	\$0.00

# Storage Deployment & Dockets:

54 MW of storage is operational, with another 20 under development in specific dockets (with additional residential storage added every month).

	MW	MWh*	Proceeding	Type
GMP Powerwall & BYOD pilots/tariffs	26	70.2	19-3167-TF, 19-3537-TF, 21-5254-TF, 22-0955-TF, 23-1355-TF	GMP tariffs approved June 2020; 2851 installations thru 8/31; various pilots ongoing
VEC BYOD pilot	0.45	1.201	VEC Tier III program offering	Installations in BYOD program thru 9/28
GMP Stafford Hill Solar + Storage, Rutland	2	3.4	Docket 8098	First utility storage project in VT (GMP, permitted 2014). Actually 4 MW but inverter-limited to 2 MW.
Panton Storage	1	4	Case No. 17-2813-PET	GMP battery co-located with solar; amended to enable islanding
Essex Solar + Storage	2.1	8	Case No. 18-2902-PET	GMP JV Solar + Storage
Milton Solar + Storage	2	8	Case No. 17-5003-PET	GMP JV Solar + Storage
Ferrisburgh Solar + Storage	2.1	8	Case No. 17-5236-PET	GMP JV Solar + Storage
Dynapower	1.5	6	N/A	Backup power only
E. Barre Co Barre	4.999	20	Case No. 18-1658-PET	ESA with GMP
Viridity Hinesburg	1.9	5.3	18-3088-PET	ESA with VEC
Georgia Storage	4.99	10	21-1042-PET	ESA with GMP
Springfield Storage	4.99	10	21-1254-PET	ESA with GMP
<b>Operational</b>	<b>54</b>	<b>154*</b>		
<i>Bristol Solar &amp; Storage</i>	<i>2.958</i>	<i>11.832</i>	21-0974/5-PET	Co-located (but not integrated) with 2.2 MW Standard Offer solar project
<i>Pittsford Solar &amp; Storage</i>	<i>0.498</i>	<i>2</i>	21-0100-NMP	Net metered project with integrated storage behind the inverter
<i>Royalton Storage</i>	<i>4.9</i>	<i>19.6</i>	21-2114-PET	ESA with GMP
<i>S. Hero Storage</i>	<i>4.99</i>	<i>14.94</i>	21-5049-PET	ESA with VEC. On hold as of 9/28 due to increases in battery prices
<i>E.R. South St. Storage</i>	<i>2</i>	<i>8</i>	21-3022-PET	ESA with GMP
<i>N. Troy Storage</i>	<i>3</i>	<i>12</i>	22-4009-PET	GMP & VEC Joint owners. Under construction as of 9/28
<i>Rochester Brandon Mountain Solar</i>	<i>2</i>	<i>8</i>	23-1639-PET	3rd party project selected by GMP for "Rochester Resiliency Zone," paired with 1 MW solar; CPG issued 12/5/23
<b>Operational + under development</b>	<b>74</b>	<b>230*</b>		*Assumes all systems are 4 hours

# Vermont Storage Deployment in New England Context

State	Goal	Milestone	2023 summer peak (MW)	Goal as % of 2023 summer peak	2023 deployed storage (MW)	Current % of peak
CT	1000 MW x 2030	300 MW x 2024	5864	17	12	0.2
ME	400 MW x 2030	300 MW x 2025	1762	23	63	3.6
MA	1000 MWh x 2025	N/A	11843	2**	330	0.7**
NH	N/A	N/A	2428			
RI	N/A	N/A	1792			
VT	N/A	N/A	706		54	7.5 (10.3 including under construction/in permitting; note these does not include proposals for transmission-level storage)

The above table shows New England State’s storage deployment targets. While three states have targets, those same states are currently at far lower levels of storage deployment relative to Vermont, as measured by percent of peak load. Vermont is already on pace to exceed the targets set in other states.

\*MA and CT storage goals apply just to Investor-Owned Utilities (“IOUs”). ME’s is unclear.

\*\*Assumes all batteries are 4 hours in duration