Vermont Weighs In:

Public Opinion on Renewable Electricity

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Prepared by

The MassINC Polling Group

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We also wish to thank the other hosts for the in-person events: Do North Coworking in Lyndonville, Hub CoWorks in Rutland, The Brooks Memorial Library in Brattleboro, and the O'Brien Community Center in Winooski.

Most of all, we are grateful for the residents of Vermont who shared their opinions with us, some under difficult circumstances. This research took place in the midst of unprecedented rainfall and flooding throughout the state in July 2023. And prior to that, Vermont experienced unprecedented poor air quality from wildfires in Canada. We witnessed only a small portion of the aftermath during our travels up to conduct focus groups in Burlington, Winooski, and Lyndonville. Our hearts go out to the Vermonters affected by the flooding and hope for the best for the entire state as it recovers.

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Executive Summary

The MassINC Polling Group (MPG) is proud to present this summary of the survey and focus groups it conducted this summer on behalf of the Vermont Department of Public Service (PSD).

Project overview

This project was conducted in support of the effort by the PSD to conduct a comprehensive review of Vermont's renewable energy policies and programs[1]. The primary objective of this research was to engage with Vermont's residents directly, giving them a voice in the conversations and decision-making processes leading to renewable energy policies. The approach to doing so involved both a representative survey of Vermont residents and focus groups to better understand Vermonters' priorities around electricity generation. The focus groups were structured to provide participants with some basic information about Vermont's existing electricity supply and policies and programs, and then to provide a space to engage in conversation about those topics. The information shared by Vermonters throughout this effort will inform the PSD's recommendations on potential policy and program modifications moving forward.

Working closely with staff from PSD, MPG developed and fielded a representative survey of 700 Vermont residents, including an oversample of 100 Vermonters who identified as some race or ethnicity other than white. The survey included questions about Vermonters' priorities when thinking about where their electricity comes from, awareness of Vermont's current renewable electricity status, support for various electricity sources and possible policy changes, and willingness to pay more for renewable or low-carbon electricity. *See Appendix B for the full initial survey results.*

The survey was also used to recruit participants for a series of focus groups: 6 in-person throughout the state and 5 virtual. Participants in these groups received a policy brief drafted by Kevin Jones, Director of the Institute for Energy and the Environment at Vermont Law School, and edited by MPG and PSD. MPG presented a slide deck based on the policy brief to provide a common knowledge base for the focus group discussions. *See Appendix E and Appendix F for the policy brief and slides.*

At the end of each session participants filled out a follow-up survey that repeated some questions from the initial survey and asked some new questions. MPG used unique ID codes to anonymously link each participant's follow-up responses with their answers to the initial survey, allowing for comparisons between in the initial and follow-up surveys in the aggregate and at the individual level. *See Appendix C and Appendix D for the full follow-up survey results.*

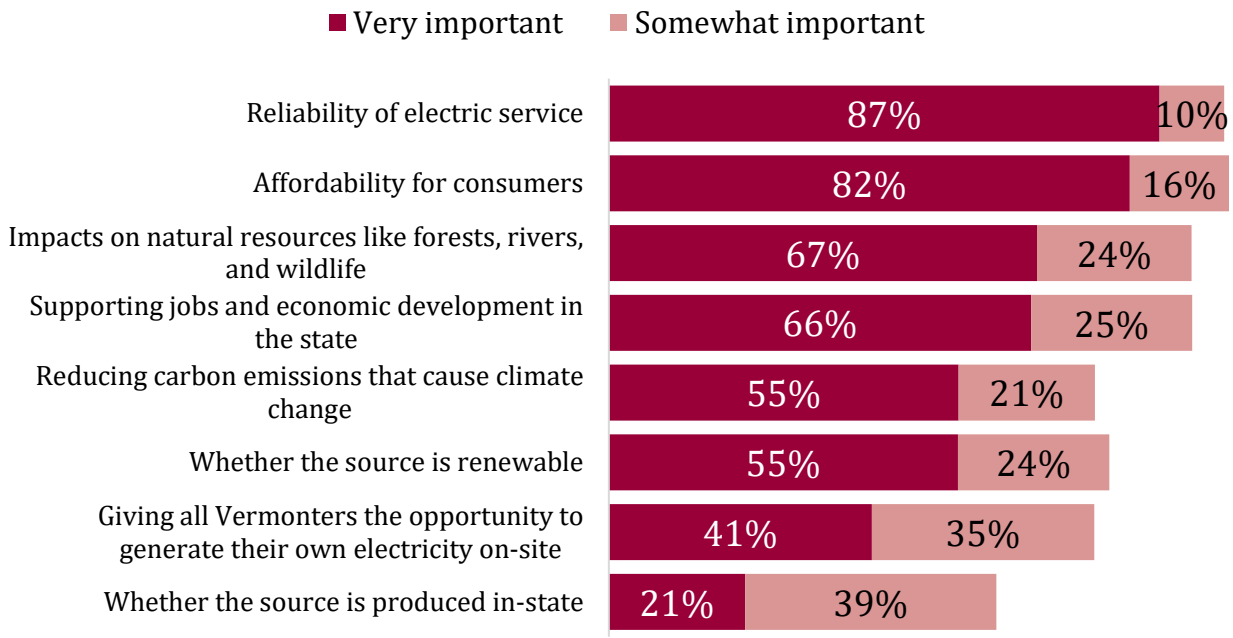
[1] More information on this effort is available at https://publicservice.vermont.gov/renewables

Priorities for generating electricity

Vermonters rated 6 of 8 factors tested as "very important", but two stood out above the rest: ensuring the reliability of electric service (87%) and making sure electricity is affordable for consumers (82%) Protecting Vermont's natural resources was the most broadly popular environmental goal (67%), followed by reducing carbon emissions and whether an electricity source is renewable (55% each).

Vermonters rate reliability, affordability as top factors

% who say _____ is _____ when considering how Vermont gets its electricity



Q: How important should each of the following be when considering how Vermont gets its electricity?

This rank order shifted slightly when residents were asked to choose one factor as the single most important. On that question, affordability was seen as most important (29%), followed by reducing emissions (19%) and ensuring reliability (17%). Emissions was propelled to the second highest priority largely by self-identified Democrats, 33% of whom rated it their top concern, compared to 9% of Independents and only 1% of Republican. This sharp partisan divide is very consistent with national polling on climate issues.

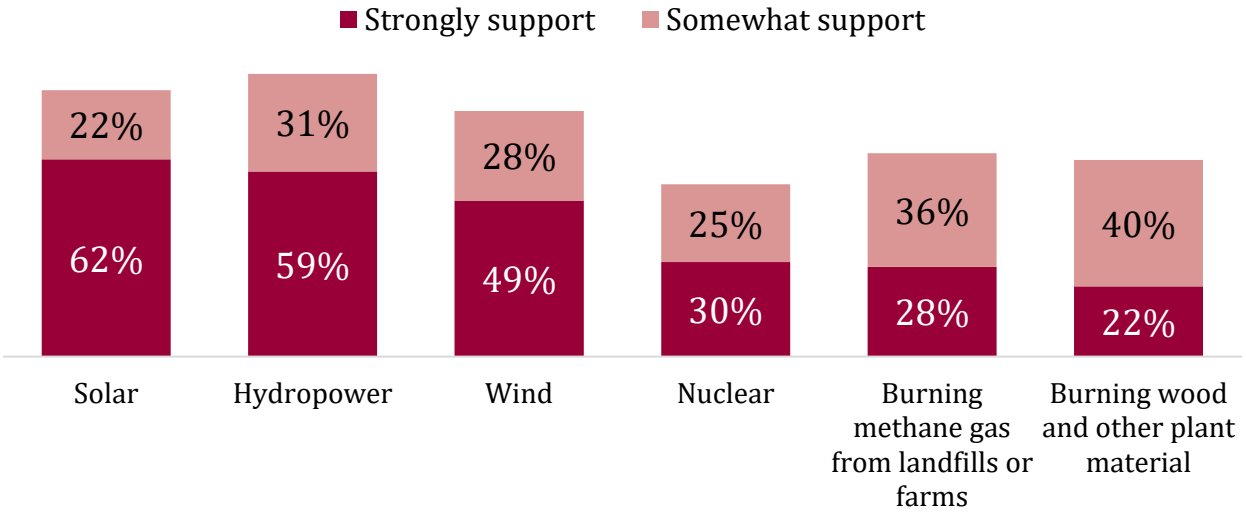
The follow-up survey showed that the focus groups sharpened concern about affordability and emissions. Vermonters want clean electricity, but they want it to be affordable, and they want it to be reliable.

Preferred sources of electricity

Majorities at least somewhat supported getting electricity from every source tested, but solar and hydropower were the two where "strong support" exceeded 50%. Residents who named emissions as their top priority were more interested in solar, wind and hydropower, and less interested in biomass, but also nuclear (a low-carbon but not renewable source). Residents who prioritized affordability and reliability had a more balanced set of preferences. Nuclear and biomass were the subject of some disagreement during the focus groups, and some participants also expressed broader environmental concerns about solar and wind power. Nonetheless, the follow-up survey found increased support for all options compared to those participants' initial responses.

Majorities strongly support getting electricity from solar and hydropower

% who say they strongly / somewhat support getting electricity from _____



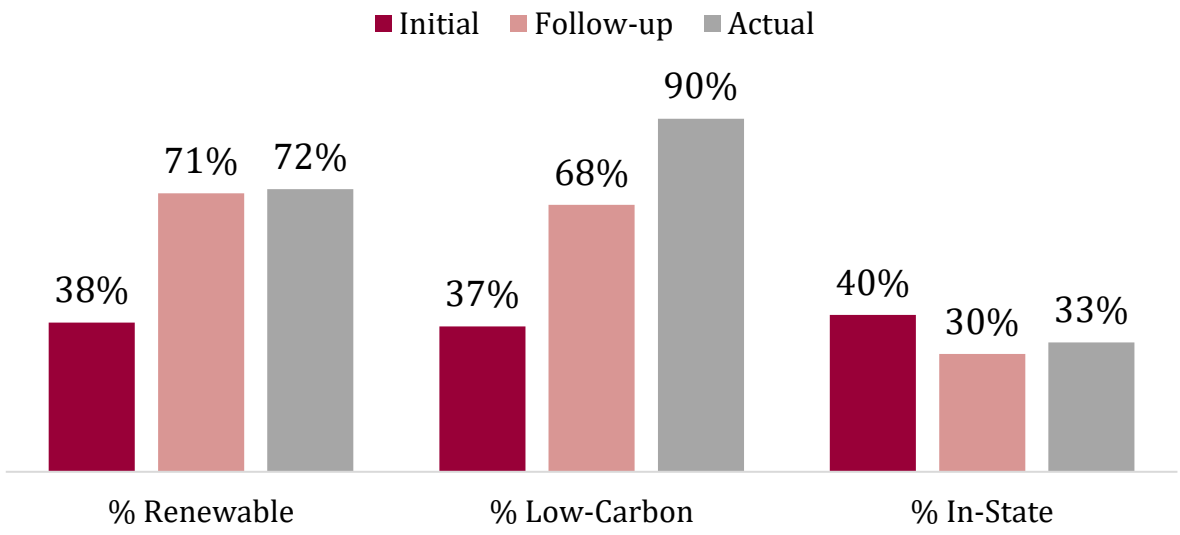
Q: Going forward, how much would you support or oppose Vermont getting its electricity from the following sources?

Awareness of current electricity mix and policies

The initial survey revealed that residents are largely unaware of Vermont's progress on renewable and low-carbon electricity, although they were more aware of how much power is generated in-state. This information was part of the focus group presentation, and the responses to these questions in the follow-up survey were much closer to the mark. Many participants remarked that they were pleasantly surprised that so much of Vermont's current electricity was renewable.

Focus groups improved awareness of Vermont's electricity mix

% mean response in initial and follow-up survey versus actual amount



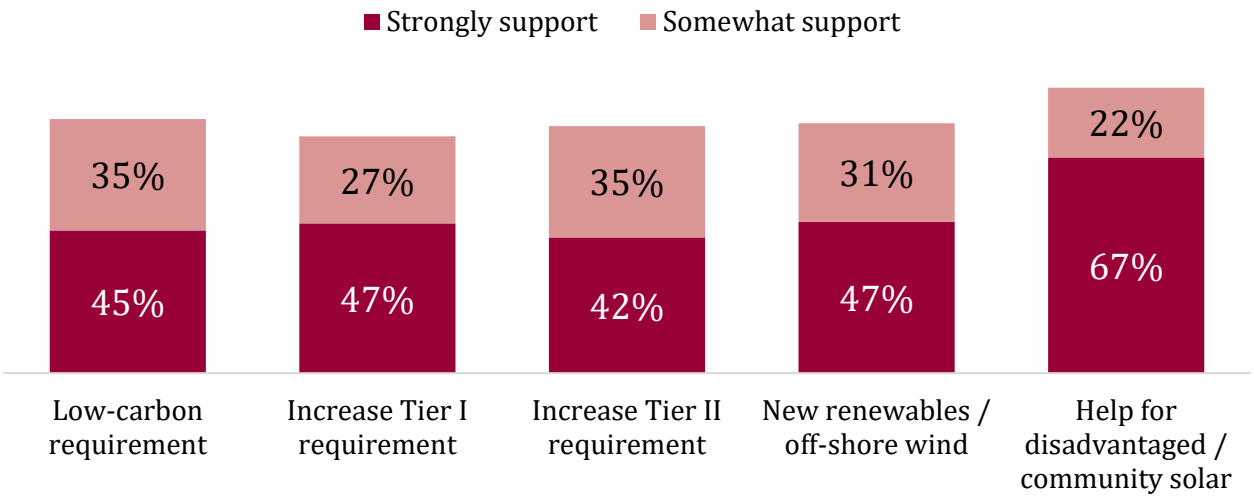
See Topline (Appendix B) for full question wording.

The focus group presentation also introduced participants to the state's renewables policies, including technical details like the trading of Renewables Energy Certificates (RECs) and net metering. While most participants seemed fine with these details, a few questioned whether RECs weren't just a form of "greenwashing" or that they actually discouraged renewables by allowing utilities to trade various forms of energy instead of investing directly in renewable generation. Many participants were surprised to learn that solar panel owners paying less for electricity can sometimes mean that other customers must pay slightly more.

Despite these hesitations, the follow-up survey showed that participants favored smaller-scale solar over larger installations, and they support pushing the Renewable Energy Standard beyond its current Tier I and Tier II goals.

Focus group participants support going further on clean energy

% of follow-up respondents who strongly or somewhat support each policy



See Topline (Appendix C) for full questions wording.

Willingness to pay more for renewables

Affordability was a primary concern throughout all phases of this project, and 30% of Vermonters in the initial survey were not willing to pay anything additional on their electric bill to achieve fully renewable or low-carbon electricity. Among those willing to pay something, the median amount was $30 more a month. In the follow-up survey, slightly more focus group participants were willing to pay something, but the median amount actually declined slightly when compared to these participants' responses in the initial survey. It's possible that learning how close Vermont is to its renewable goals caused some participants to lower their estimate of how much more they would have to pay to achieve fully renewable electricity.

Equity and clean energy

In most focus groups, the discussion about affordability was linked to the issue of equity: how can Vermont spread out both the burden and benefits of renewable energy evenly across all residents. Many focus group participants who were concerned about the cost of electricity cited concern for their lower-income neighbors, many of whom are struggling with rising costs for many other goods and services. Addressing equity in the net metering program was also a frequent topic of discussion – renters in particular felt that the program was aimed at homeowners, and more could be done to educate residents about incentives and tax breaks that could help with the initial cost of installing solar. Expanding programs to help disadvantaged Vermonters access clean energy was the most popular policy tested in the follow-up survey.

Initial Survey Results and Analysis

The first phase of the project was a survey of 700 Vermonters about what matters to them when thinking about how the state gets its electricity. Responses were collected from June 7-15, 2023, via live telephone interviews to landline and cell phones, and via text-to-web online surveying. The survey was offered in English, French, and Spanish. The survey questions were developed by MPG and staff from PSD.

In addition to substantive and demographic questions, the survey also served as a recruiting tool for the in-person and virtual events to follow. Residents were asked at the end of the survey whether they wanted to participate in an event on the subject matter of the survey. MPG then scheduled participants into events based on their availability as reported in the survey. Participants who participated in an event and completed a follow-up survey were compensated for their participation.

The 700-resident sample included an oversample of 100 Vermonters who identified as a race or ethnicity other than white. The oversample was weighted into the final results such that the overall results reported here reflect a representative sample of the state's adult resident population by age, gender, race, education, political party identification, and region within the state.

Below are the overall findings from the substantive questions in the survey, with key demographic breakouts as identified by MPG.

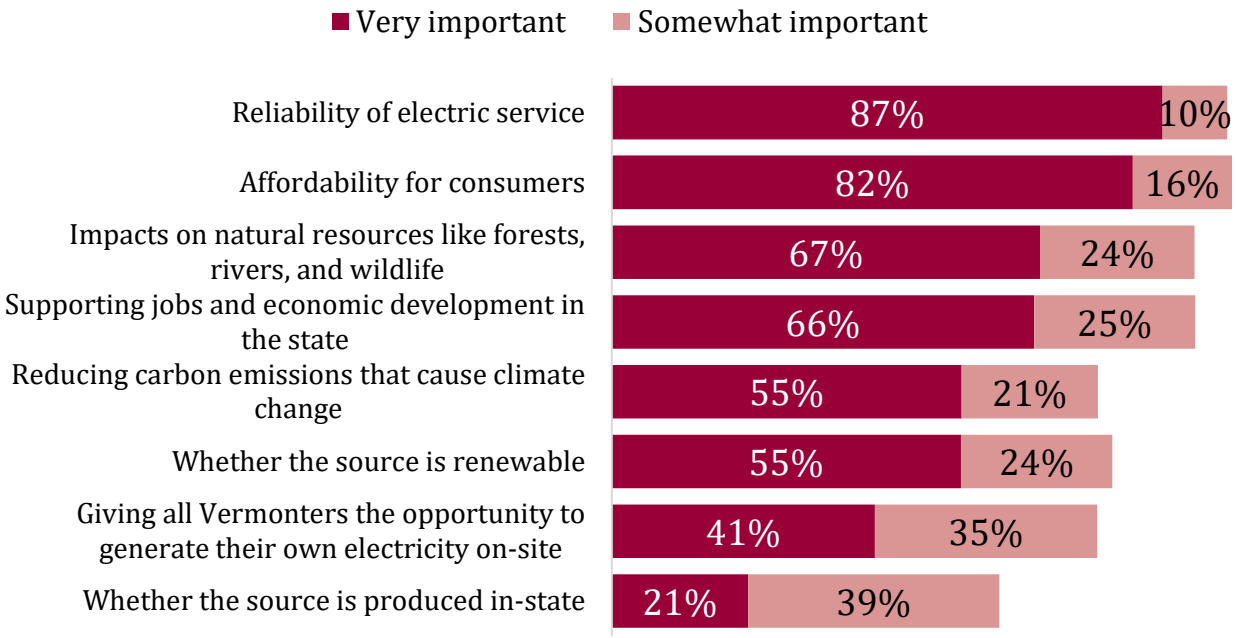
Please see Appendix B for a topline showing full question wording and the overall survey results.

Most important factors

Majorities of Vermont residents rated several policy considerations as "very important" (Figure 1), but two stood out: ensuring the reliability of electricity service (87%) and making sure electricity is affordable for customers (82%). Two-thirds of residents felt that protecting natural resources (67%) and supporting jobs and economic development were "very important" (66%), while 55% each thought that reducing carbon emissions and getting electricity from renewable sources were. Finally, two priorities were seen as "very important" by less than a majority of residents: giving all Vermonters the opportunity to generate their own electricity (41%), and whether the electricity is produced in the state or not (21%).

Figure 1: Reliability and affordability most important considerations for Vermonters

% who say _____ is _____ when considering how Vermont gets its electricity

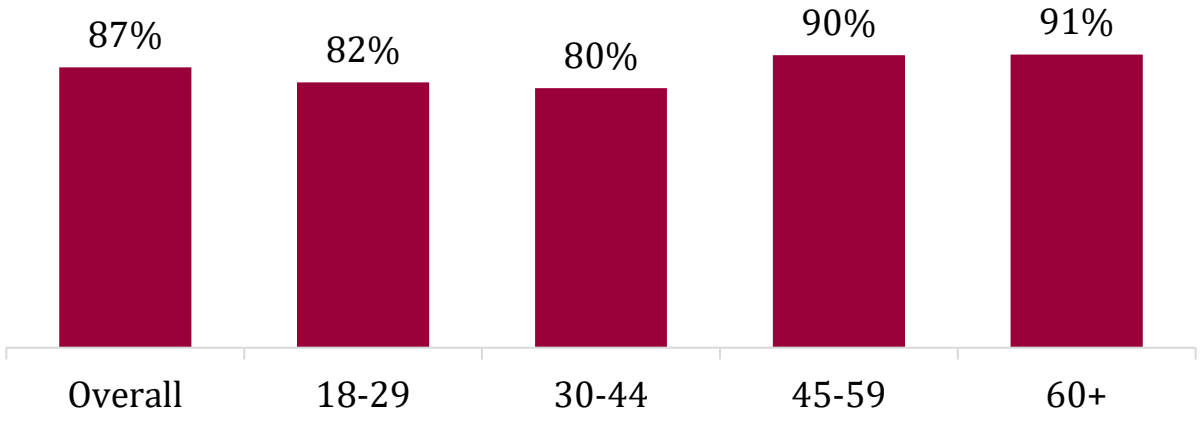


Q: How important should each of the following be when considering how Vermont gets its electricity?

There are some notable demographic differences in these rates. While residents of all ages were concerned about reliability, it was a near-universal issue for residents 45 years old or older (Figure 2).

Figure 2: Reliability of higher importance for older Vermonters than younger ones

% who say reliability is "very important" when considering how Vermont gets its electricity

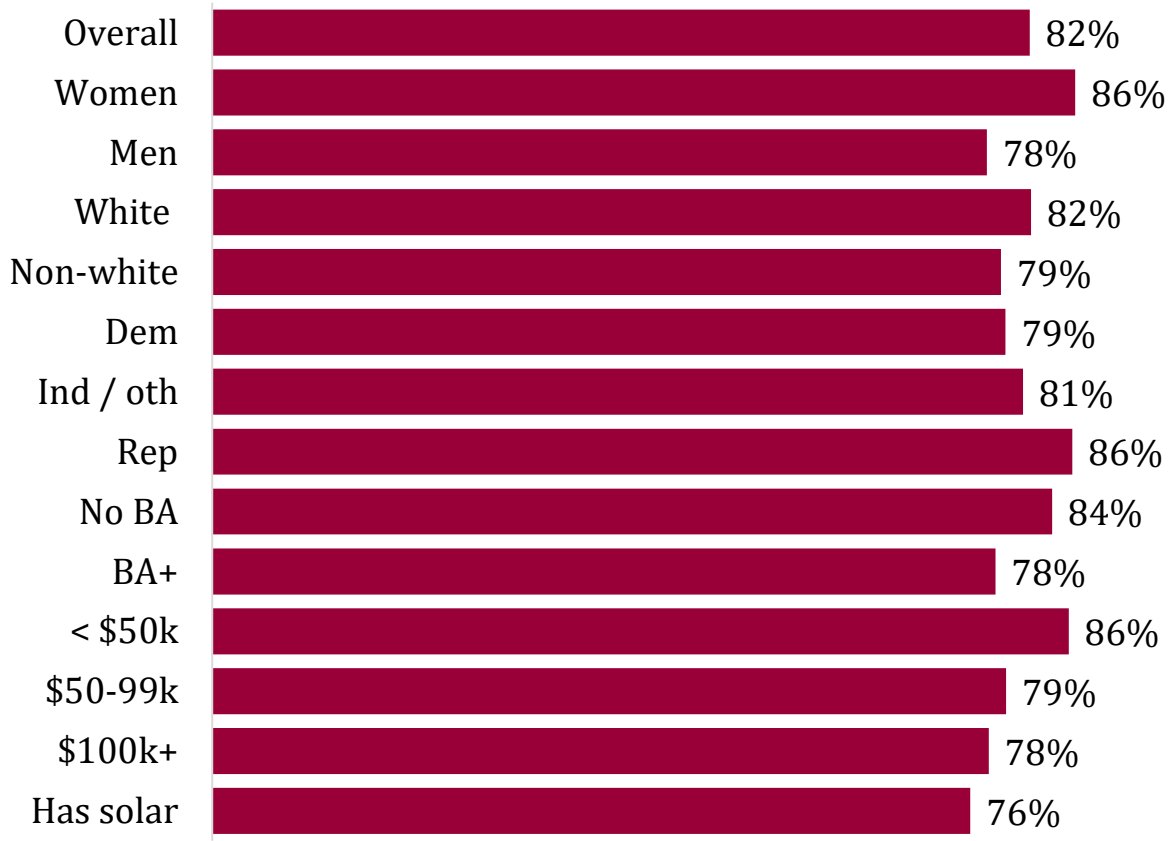


Q: How important should each of the following be when considering how Vermont gets its electricity?

Affordability was also a top concern across demographic groups, but there were still differences. Women (86%) and self-identified Republicans and Republican leaning independents (86%) were particularly concerned about affordability, as were residents without a bachelor's degree (84%) and those in households making less than $50,000 a year (86%) (Figure 3).

Figure 3: Women, residents with lower education and income levels are more concerned about affordability

% who say affordability is "very important"

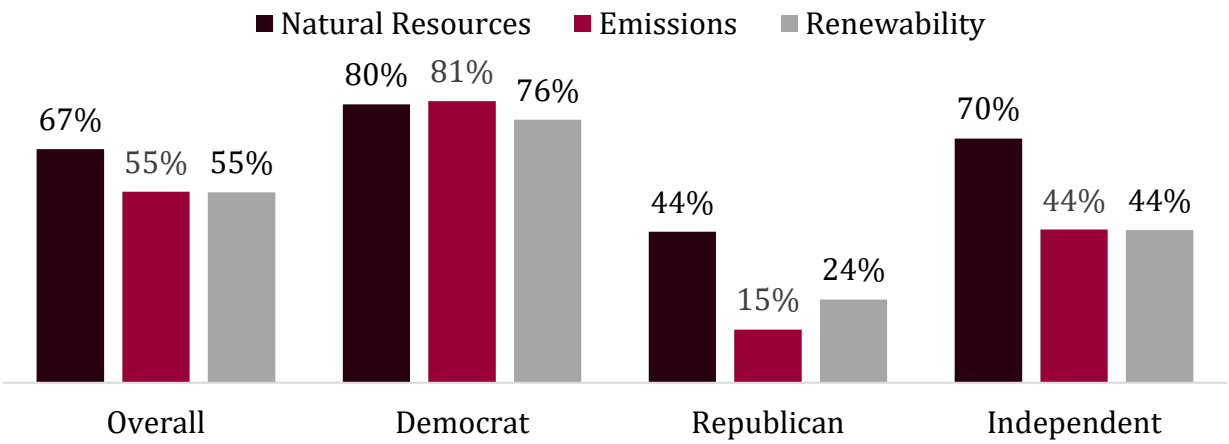


Q: How important should each of the following be when considering how Vermont gets its electricity?

While Republicans were more concerned than average about affordability, there is an even larger partisan gap on environmental priorities (Figure 4). For Democrats and Democratic-leaning independents, the three environmental factors tested are near the top of their priority list, while these factors did not register highly for Republicans. More than three-quarters of Democrats considered carbon emissions (81%), impacts on natural resources (80%), and renewability (76%) to be "very important", making them top-five concerns together with reliability (87%) and affordability (79%). Only 44% of Republicans consider natural resource impacts as "very important", and renewability (24%) and emissions (15%) rank even lower. Majorities of Republicans rated natural resources and renewability at least "somewhat important" (83% and 54%, respectively), but only 43% consider emissions that important. Political independents fall squarely between the two parties on these three measures. This partisan split on environmental issues, and on climate in particular, is a well-established dynamic in public opinion nationally and in other states.

Figure 4: Wide partisan gap on environmental concerns

% who say each is "very important", overall and by party with leaners

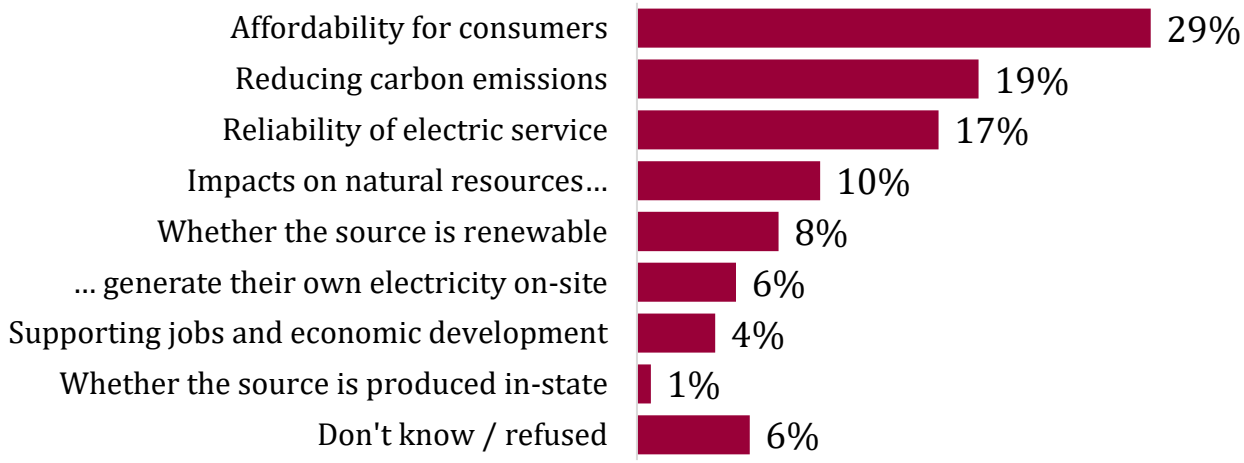


Q: How important should each of the following be when considering how Vermont gets its electricity?
Note: residents who identified as political independents were asked a follow-up of which party they leaned towards and were included with that party for this analysis.

While reliability and affordability garnered the largest share of residents rating them as "very important", a different rank order emerges when residents were asked to choose a single item as their most important consideration (Figure 5). Affordability emerges as the top single consideration (29%), but carbon emissions (19%) edged out reliability (17%) for the second position. Concern for emissions was driven largely by Democrats, 33% of whom chose it as their single highest priority. By contrast, only 1% of Republicans named emissions as their single highest priority. Vermonters with advanced degrees (29%) were the other demographic that ranked emissions over affordability.

Figure 5: Affordability top single concern, followed by emissions

% who say _____ is the single most important factor in how Vermont gets its electricity



*Q: And of the items you just rated, which do you think should be the **single most important** factor in how Vermont gets its electricity?*

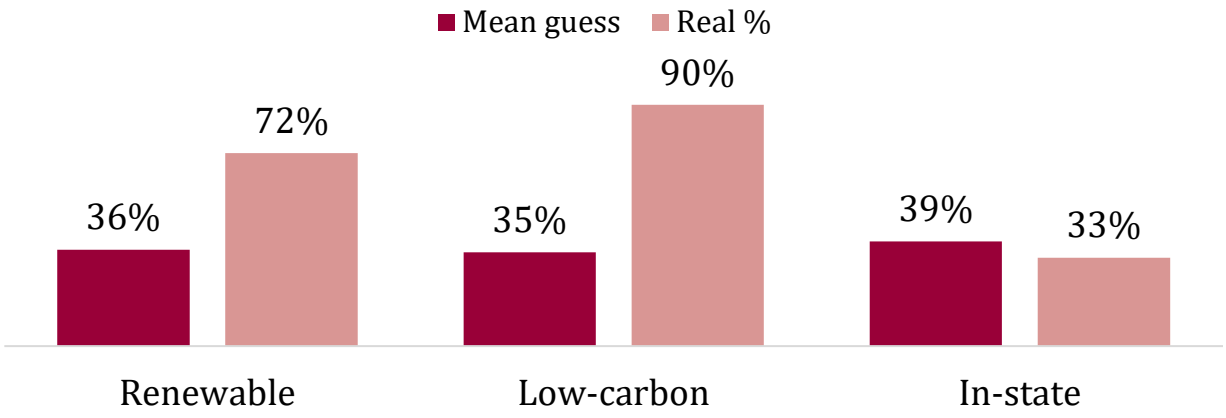
It is well-documented that climate change is a polarizing issue, but for those who care about it, it is at or near the top of their list of concerns. Of the three environmental issues rated, protecting natural resources did better than renewability and emissions. We heard from many in the focus groups talk about their pride in Vermont's natural beauty, and to the extent there was any pushback about the siting of certain renewable energy projects, it mostly centered on preserving natural and open space from development. But when asked to pick a single issue, emissions rose above renewability and other environmental concerns. Protecting Vermont natural beauty is a widely shared concern, but emissions is more of a motivating concern for those who are most worried about it.

Awareness of Vermont's current electricity mix

When asked to estimate certain figures about Vermont's current electricity mix, residents tended to underestimate the state's progress towards meeting renewable energy requirements, but they were closer to the mark as to how much electricity is generated in state (Figure 6). According to the most recent (2021) figures, 72% of Vermont's electricity is considered renewable, 90% is low-carbon, but only a third is generated in the state. The mean guess for all three was similar: 36% renewable, 35% low-carbon, and 39% in-state. Those averages are well below the mark for renewable and low-carbon, but fairly close for the percentage generated in-state.

Figure 6: Vermonters underestimate use of renewable and low-carbon electricity

Mean response versus actual percentage, as of 2021



See Topline (Appendix B) for full questions wording.

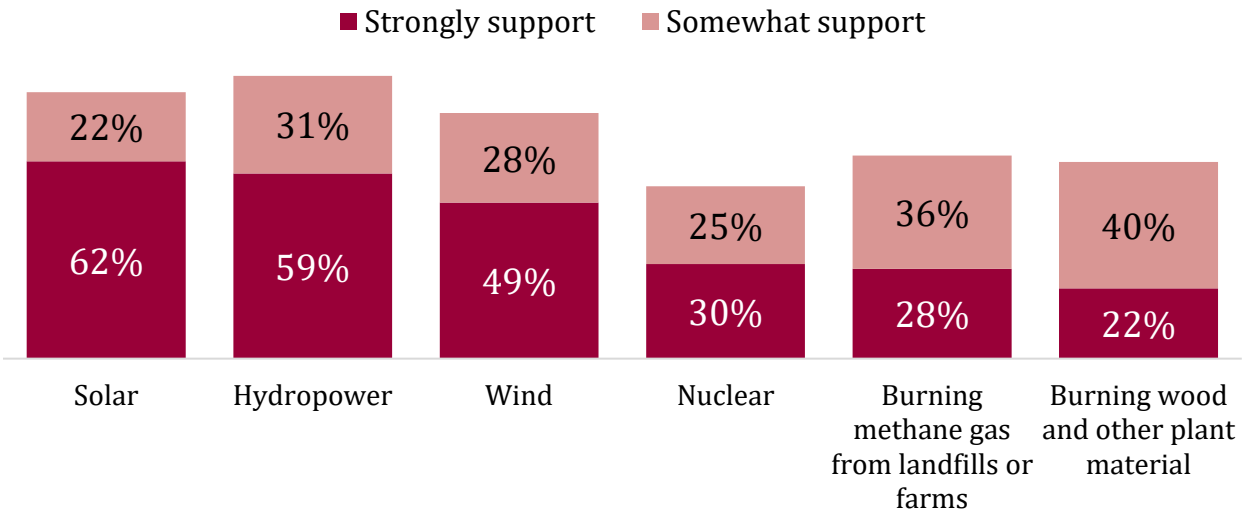
There is not much difference by demographics on these questions. The highest mean guess on "renewable" and "low-carbon" was 40%, while guesses on in-state ranged into the 40s, farther from the true mark. This has implications for how Vermont presents its current progress towards its renewable energy goals. Consistent with these numbers, many focus group participants were pleasantly surprised to learn that Vermont was doing so well on renewable and low-carbon electricity. That said, learning that Vermont was closer to the targets than they expected did not seem to deter them from wanting to push farther, given the strong support for increasing the current goals in the follow-up survey.

Support for electricity sources

Renewable sources were most popular with Vermont residents. Solar led the way in terms of strong support (62%), but hydropower was slightly more popular when those who "somewhat support" each option were included (Figure 7). Just under half of residents (49%) "strongly support" wind power. Nuclear and two types of biomass were less popular, but even so a majority of residents at least "somewhat support" these energy sources. Slightly more residents were unsure about nuclear (8%), and the two biomass sources (12% each), which is consistent with the discussion in the focus groups around these energy sources.

Figure 7: Majorities strongly support getting electricity from solar and hydropower

% who say they strongly / somewhat support getting electricity from _____



Q: Going forward, how much would you support or oppose Vermont getting its electricity from the following sources?

There is a relationship between strong support for these sources and residents' single most important factors. (Figure 8). Residents who were most concerned about reducing carbon emissions stand apart in terms of their support for solar and wind. Residents who were most concerned about affordability and reliability had a more balanced view. They "strongly supported" solar and wind at a lower rate, but they showed higher support for other options. Those who prioritized reliability were more likely to favor hydropower (69%).

It's notable that support for nuclear is low among those concerned with emissions, given that nuclear is a low-carbon option. This mirrors a dynamic we observed in the focus groups where some participants felt the state should focus more on emissions than renewability, but at the same time opposed nuclear power, which is low-carbon but not renewable.

Figure 8: Residents most concerned about emissions are focused on solar, wind, and hydropower, while those concerned about affordability and reliability strongly support more options

% who strongly support each electricity source overall, and by their single most important energy priority

	Overall	Reliability	Emissions	Affordability
Solar	62%	43%	94%	43%
Hydropower	59%	69%	55%	55%
Wind	49%	37%	83%	32%
Nuclear	30%	43%	13%	41%
Burning methane gas from landfills or farms	28%	36%	19%	39%
Burning wood and other plant material	22%	26%	10%	32%

See Topline (Appendix B) For full questions wording.

These preferences carry over into the broader demographics. Groups that were more concerned about emissions in earlier questions also tend to have the strongest preferences for solar and wind (Figure 9). Looking at a strong support for each electricity source across various demographics reveals some gaps. For example, women were more likely to strongly support solar and wind than men (68% v 56% and 53% v 45%, respectively), but men were more supportive of nuclear (47%), methane (37%) and wood biomass (27%). The youngest cohort of Vermonters are most strongly supportive of solar (70%) and least supportive of the two biomass options, while residents 60+ were most supportive of hydropower (63%) and more open to methane (32%). There was not much of a gap between white and non-white residents, except that non-white residents were more likely to "strongly support" wind (58% versus 49%). College graduates were more strongly supportive of solar (78%) and wind (58%), while those without a bachelor's degree were more open to nuclear and biomass. There was less of a gap than might be expected based on income, except that "strong" support for nuclear increased with household income. Finally, Chittenden County was least interested in biomass, while other counties were more open to burning methane and wood.

These differences by strong support are interesting, but it's important to remember that majorities overall and across most demographic groups at least "somewhat support" each of the electricity sources tested. Solar, hydropower, and wind proved most popular, but there was some openness to other sources as well.

Figure 9: Strong support for each electricity source, by demographic
% overall and each subgroup who "strongly support" each electricity source

		Solar	Hydro	Wind	Nuclear	Methane	Wood
Overall		62%	59%	49%	30%	28%	22%
GENDER	Women	68%	59%	53%	13%	20%	18%
	Men	56%	59%	45%	47%	37%	27%
AGE	18-29	70%	56%	53%	32%	16%	18%
	30-44	64%	52%	47%	29%	31%	23%
	45-59	59%	59%	50%	33%	30%	25%
	60+	60%	63%	49%	27%	32%	21%
RACE	White	63%	59%	49%	30%	29%	22%
	Non-white	65%	61%	58%	34%	25%	19%
PARTY ID W LEANERS	Dem	87%	59%	68%	17%	21%	11%
	Rep	29%	62%	22%	53%	42%	38%
	Ind/other	49%	56%	39%	38%	32%	28%
EDUCATION	No BA	54%	58%	45%	32%	32%	26%
	BA+	78%	60%	58%	26%	21%	15%
INCOME	< $50k	66%	56%	49%	22%	26%	22%
	$50-99k	64%	57%	50%	30%	29%	20%
	$100k+	62%	61%	47%	35%	30%	22%
REGION	Chittenden	68%	61%	57%	28%	19%	12%
	Central	63%	53%	45%	31%	29%	26%
	North	60%	61%	45%	29%	37%	27%
	South	61%	58%	49%	31%	28%	24%
OWN HOME?	No	61%	59%	49%	31%	32%	22%
	Yes	69%	56%	49%	23%	15%	21%

Q: Going forward, how much would you support or oppose Vermont getting its electricity from the following sources?

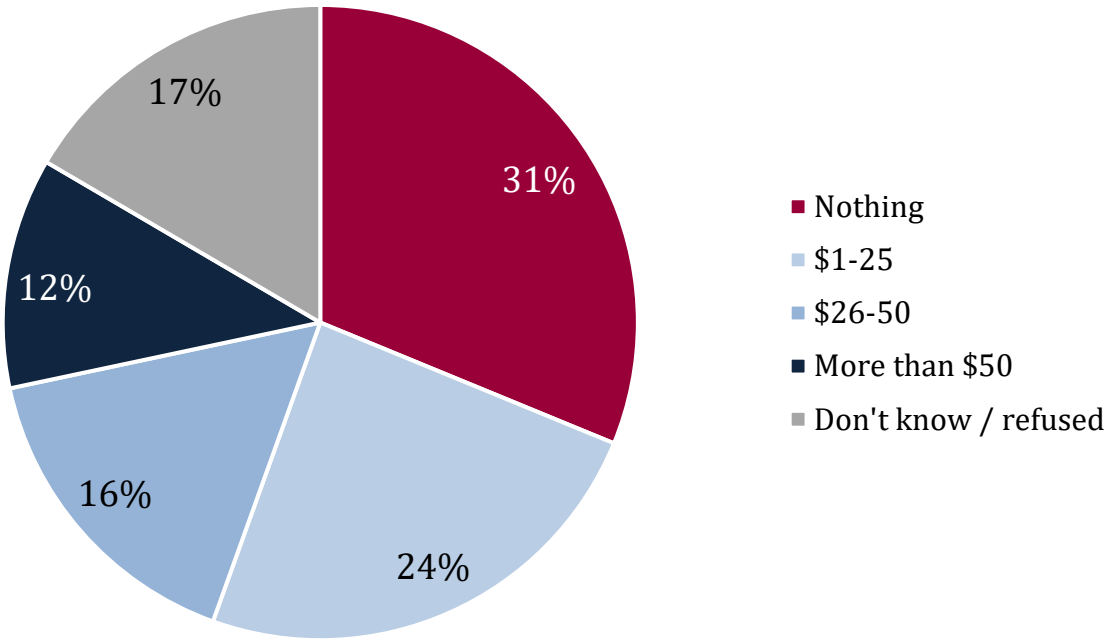
Willingness to pay more

As acknowledged in the policy brief and the focus groups, the cost of electricity is a bit of a moving target. Historically, fossil fuels have been the most affordable option, but that is changing as state and federal policies create incentives for renewables and the increasing supply of renewables brings down their price in the market. Nonetheless, given that affordability is an important priority, it's important to understand how sensitive Vermonters are to price.

Overall, 52% of residents said they would be willing to pay more for 100% renewable / low-carbon electricity (Figure 10). But 31% say they would not, and 17% were unsure or refused to answer. Among those willing to pay something, the median amount was $30 more per month.

Figure 10: Just over half of residents are willing to pay some amount more per month for fully renewable / low-carbon electricity

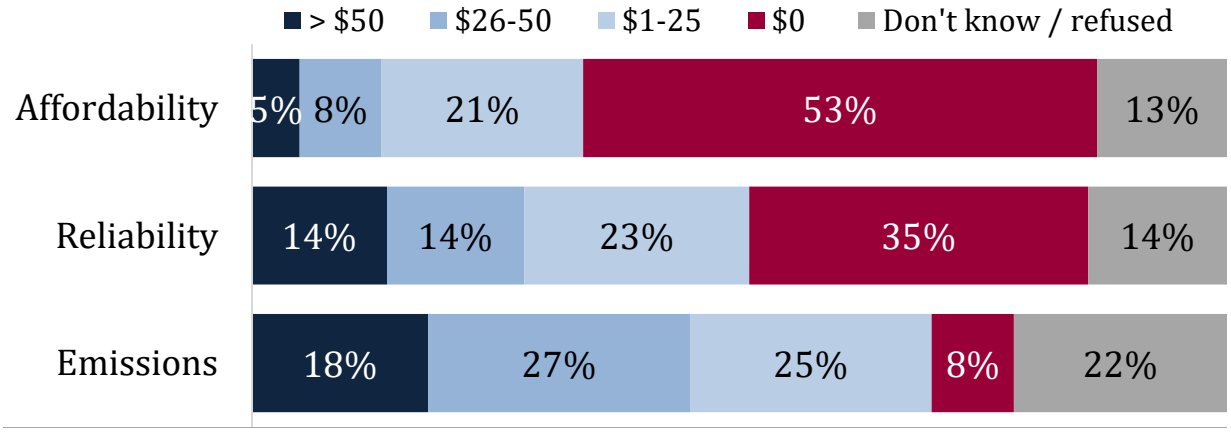
% of residents who are willing to pay ___ amount more per month



Q: Switching to renewable or low carbon electricity might cost more. How much more would you be willing to pay for electricity if it meant that all of Vermont's power came from renewable or low-carbon sources? Please answer, in US dollars, the amount you would be willing to pay in addition to what you pay now per month for electricity.

As with preferences for electricity sources, there was a relationship between willingness to pay and residents' top policy preferences (Figure 11). Perhaps not surprisingly, residents who cited affordability as their most important consideration were not very willing to pay more – 53% of them were not willing to pay anything extra for more renewable or low carbon electricity. On the other hand, 70% of residents who cited emissions as their top concern were willing to pay more; only 8% said they would not. Residents who cited reliability tracked within a few percentage points of the overall results.

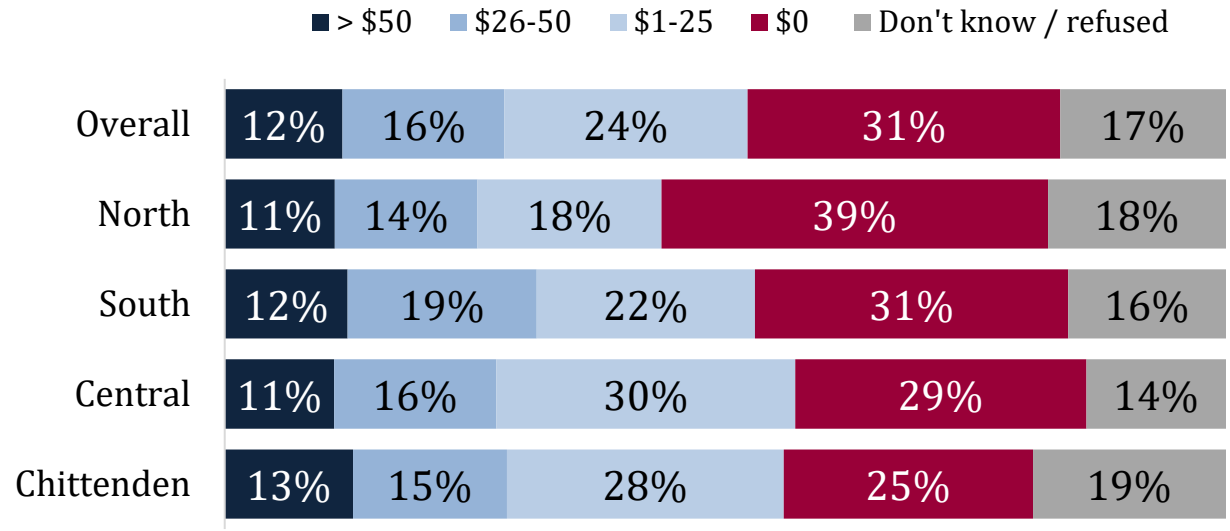
Figure 11: Residents' willingness to pay varies by their energy priorities
% willing to pay each amount by residents' most important factor



See Topline (Appendix B) for full questions wording.

Willingness to pay also varies by region within the state (Figure 12). In Chittenden County, 25% of residents were not willing to pay anything more for renewables. But in the North (the Northeast Kingdom and counties north of the Greater Burlington area), that number rises to 39%.

Figure 12: Willingness to pay more varies by region within the state
% willing to pay each amount by residents' region within the state



Q: How much more would you be willing to pay for electricity if it meant that all of Vermont's power came from renewable or low-carbon sources?

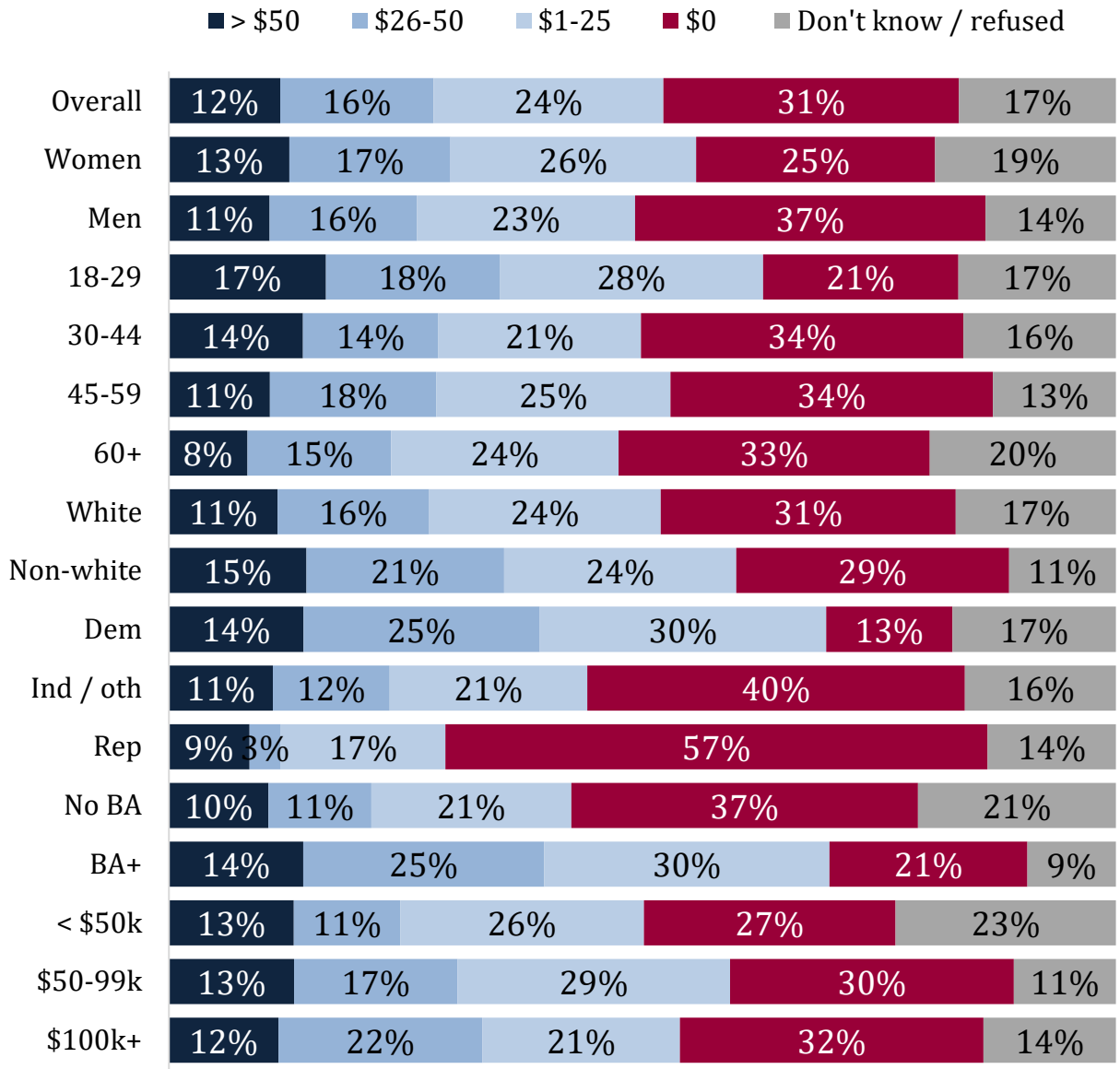
There were also demographic differences (Figure 13). Women were more willing to pay than men, and residents aged 18-29 were more willing than older residents. Non-white residents were more willing to pay than white, as were college graduates versus those without a degree. Once again, political party was one of the widest gaps: 57% of Republicans were not willing to pay any more, compared to just 13% of Democrats. There was a much smaller difference by income: residents

making $100,000 or more a year were a little more likely to pay more than $25, but more of them are not willing to pay anything at all.

It's important to note that what a respondent says they are willing to pay in a survey, it is an estimate and may be different than what a respondent thinks if they see an increase on their monthly electric bill. Nonetheless, these results show at least some openness to paying more, especially among those who are most concerned about reducing carbon emissions.

Figure 13: Willingness to pay varies by gender, age, party and education

% willing to pay each amount by demographic subgroup



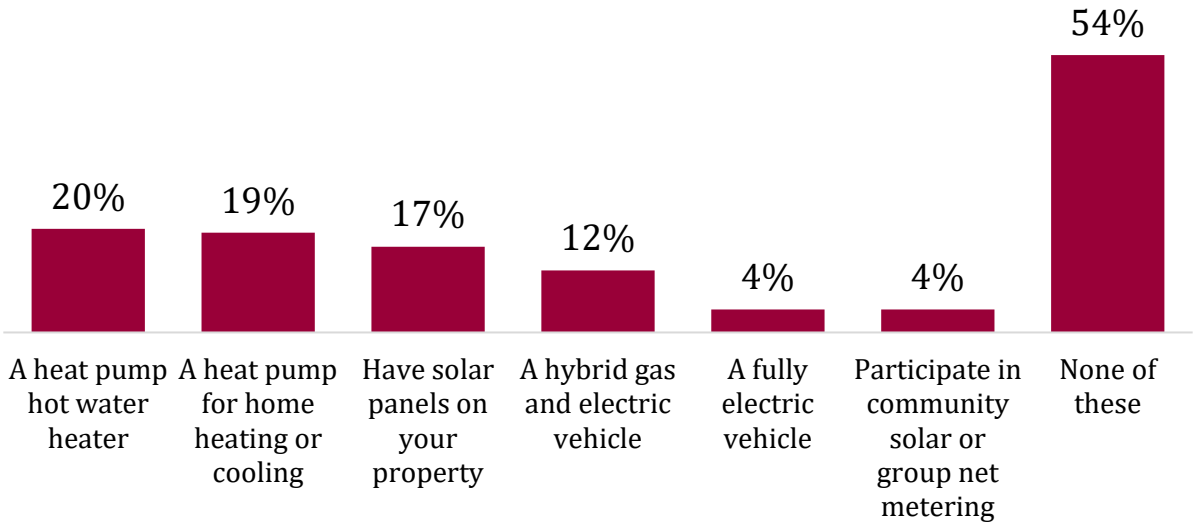
Q: How much more would you be willing to pay for electricity if it meant that all of Vermont's power came from renewable or low-carbon sources?

Solar, heat pumps, and EVs

By its own standards, Vermont is doing well at meeting its renewable electricity goals, but the survey suggests that clean energy technology is still relatively rare among the general population (Figure 14). One fifth of residents reported owning a heat pump (19%) or heat pump hot water heater (20%). Slightly fewer had solar panels on their property (17%), while another 4% participate in community solar or group net metering. Only 12% drive a hybrid, and only 4% have a fully electric vehicle.

Figure 14: A minority of respondents have heat pumps, solar panels, or electric vehicles

% of residents who own / do each item



Q: Do you own or do any of the following?

Many of these technologies are expensive, and income levels affect whether people can afford some of them (Figure 15). Among those making $100,000 or more, 24% reported owning a heat pump hot water heater, 28% have a heat pump for heating and cooling, and 16% drive a hybrid. There was less of an income effect with solar panels or net metering, but homeowners were much more likely to have panels on their property than renters (18% versus 9%). Homeowners were also twice as likely to have both types of heat pumps (18% versus 9% for each). Expanding access to solar beyond homeowners was a theme that emerged in the focus groups, and that gap is very present in the survey results.

Figure 15: Clean energy usage varies by income and home ownership

% overall who report owning / using each item, by income and homeownership

	Overall	< $50k	$50-99k	$100k+	Own home	Rent
A heat pump hot water heater	20%	16%	20%	24%	22%	11%
A heat pump for home heating or cooling	19%	15%	15%	28%	22%	11%
A fully electric vehicle	4%	2%	4%	6%	5%	3%
A hybrid gas and electric vehicle	12%	10%	11%	16%	13%	10%
Have solar panels on your property	17%	15%	20%	17%	19%	8%
Participate in community solar or group net metering	4%	2%	7%	4%	5%	3%
None of these	54%	60%	57%	44%	49%	73%

Q: Do you own or do any of the following?

Focus Group Analysis

Overview

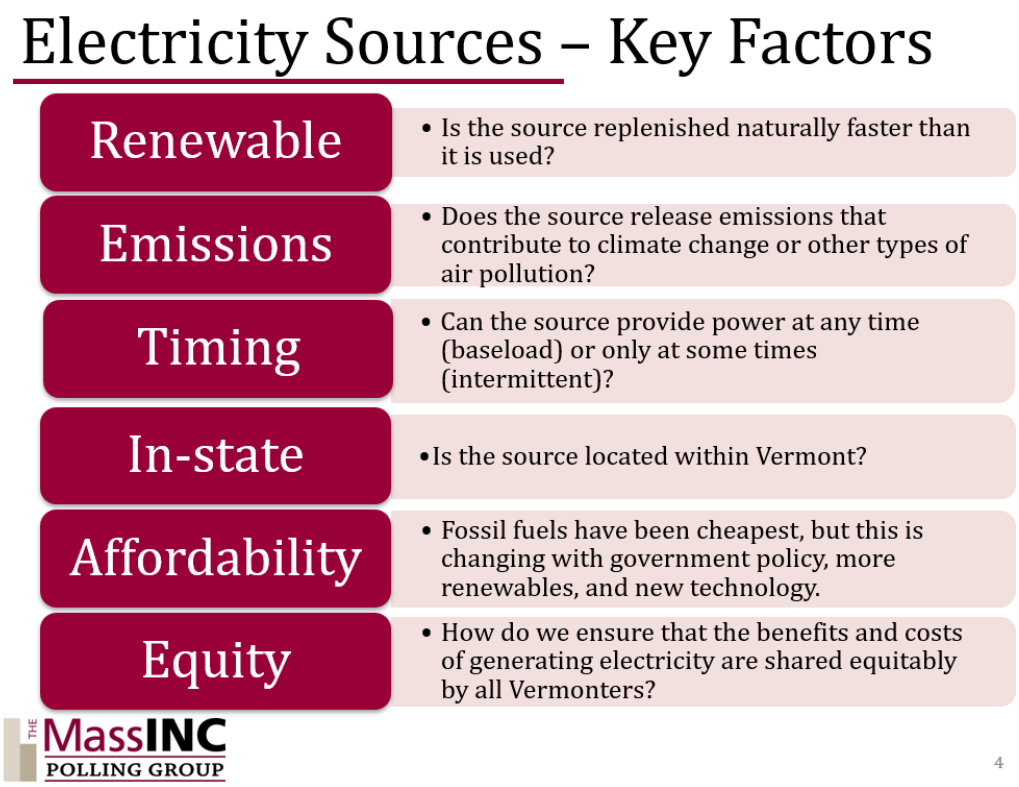
MPG conducted 6 in-person and 5 virtual focus groups recruited from the initial survey, plus an additional round of recruiting to increase the pool of potential participants for virtual events.

Location	Date/Time	# of follow-up surveys collected
Rutland	June 27, 6:30-8pm	3
Brattleboro	June 28, 6:30-8pm	9
South Royalton	June 29, 6:30-8pm	6
Winooski	July 12, 6:30-8pm	11
Burlington	July 13, 6:30-8pm	9
Virtual 1	July 17, 5:30-7pm	12
Virtual 2	July 17, 7:30-9pm	9
Virtual 3	July 18, 5:30-7pm	10
Virtual 4	July 19, 5:30-7pm	10
Virtual 5	July 19, 7:30-9pm	7
Lyndonville	July 20, 6:30-8pm	6

Note that the Lyndonville event was originally scheduled for July 11 but was rescheduled due to the flooding that occurred in Vermont that week. Some Lyndonville participants attended a virtual event, as did some Burlington and Winooski participants who couldn't make the in-person events due to flood impacts. It should also be noted that the earlier in person events took place in June, a month where Vermont saw poor air quality due to Canadian wildfires.

Participants received a policy brief document via email prior to their events, and MPG presented a slide deck summarizing the brief to structure the events. The deck was presented in three parts, with discussion after each section. Each section circled back to a slide of Key Factors to serve as an anchor for the conversation. At least one member of the PSD attended each event virtually to address any technical questions that MPG staff could not address, although PSD staff participation was limited in all events.

While each focus group followed this structure, the conversation varied based on the attendees and the group dynamics. In Brattleboro, for example, we heard from renters about their inability to benefit from having solar panels because they didn't own their homes. The Royalton group included some participants with professional experience in energy, and as a result got more in the weeds about policy and energy alternatives. The Winooski and Burlington groups were conducted miles from each other and just days after historic flooding. In Winooski the flooding barely came up, and instead the discussion focused on affordability, while in Burlington concerns about climate change were present from the start.



Despite these inevitable differences, there were several repeated themes that emerged across the groups that we have highlighted below.

Key Factors: Affordability and Equity

Consistent with the initial survey, affordability invariably came up as one of the first "key factors" that group participants cited. For some, the issue was personal. One Brattleboro participant, a new homeowner, said:

"I was going to say affordability is my top. Obviously, the better angels of my nature want equity, renewability, and low emissions to be a priority. But I bought an old New England house for pennies on the dollar. I can't afford startup costs for new loans, and I don't have the budget for monthly payments in addition to my mortgage."

We heard from another new homeowner in one of the virtual groups who expressed similar budget concerns and lacked the ability to make expensive upgrades like solar or heat pumps. Others noted that the other side of affordability is reducing the amount of energy consumed which has upfront costs as well. Another Brattleboro participant noted:

"Something aside that hasn't been mentioned too frequently here is efficiency. Myself and most of my friends, we are all renters and we don't have a lot of power to weatherize our homes. It's not up to us. It's up to our landlords. And they don't eat the costs of the wasted energy that we use because it's all escaping from the windows."

As mentioned above, the inability of renters to access the benefits of net metering came up first in the Brattleboro group and was a theme we heard across other groups as well. One older participant in a virtual event saw a generation gap emerging:

"It seems like a lot of younger people are raising families, and they don't have a lot of money to put into these solar panels or solar projects that some of the older people could do now. But we won't recoup the cost necessarily that they would, but they don't have the income in order to get to that point."

Affordability was very much seen as linked to equity – the slide presentation explicitly made that point – and so for some participants, their concern about the cost of energy seemed more directed at lower-income neighbors than their own personal needs. One Lyndonville participant drove the point home:

"A part of why I would pick equity is because I certainly know people who […] would go and get gas oil from somewhere and pour it in their tank because they can't afford it. Not even necessarily a specific quality of oil, just, like, let me get this in a tank, I'm cold. So to me, a part of it being equitable is poor people are often under the radar no matter what. And then therefore, they will go to what they can afford and find. And some of that may actually be environmentally not sound. So they're tied together for me."

Some participants took a pragmatic approach and saw affordability as an important first hurdle to solve before tackling other problems. As one virtual group participant, a father from the Northeast Kingdom put it:

"One of the key things for me is the affordability aspect. I'm on my town's energy committee, and that's always what we talk about. It's not how we save energy. It's how we save money. […] Climate change is real, in my opinion. Will you make people listen? Not necessarily. Will you make people listen to money? Yes. So affordability is important to me."

Some participants pointed to other high costs in Vermont, including the cost of housing, as a reason to focus on keeping energy prices down. Participants cited Vermont not being the most affluent state, or that they knew people who struggled to make ends meet or heat their homes in the winter.

Key Factors: Reliability

Although it was not explicitly listed on the key factors slide (although is tied to considerations of timing and when different resources can produce electricity, i.e. the concept of intermittent versus baseload power), there was a repeated theme of concern about reliability and whether renewables would be sufficient as a source of consistent electricity. As one Brattleboro participant, a former electric plant worker, put it:

"My overriding concern about everything is baseload power, because if you turn on the switch and nothing comes, then you can't see anything. … You have these loads that occur in the evening when people are getting home and turning on the electric still open, turning off the air conditioner or turning the heat up. […] You don't have wind and solar generation that is stable enough. It's intermittent."

There were also some concerns about whether the grid could handle new sources of demand like charging electric vehicles, or if it were equipped to accommodate residents generating their own solar power and sending that back into the grid. One woman in a virtual group said she had been told she could not get solar panels on her home because other neighbors had already done so and there wasn't sufficient capacity to add another system in her neighborhood at that time.

For some participants, these concerns were reason enough not to pursue a higher renewable energy standard – they supported clean power but were skeptical that Vermont's grid could handle it. They were a distinct minority in the groups – the follow-up survey found broad support for going further on renewables – but the fact that there are some concerns about the grid is worth some consideration as PSD thinks about approaching the public on this issue going forward.

Key Factors: Emissions v. renewables

Two environmental concerns were listed on the "Key Factors" slides: emissions and renewables. Of these two, we heard far more about emissions. For one farmer in the Rutland group, emissions were paramount:

"I have felt for quite a few years that greenhouse gases, that carbon emissions, that is the most important thing. That everything else, we can deal with it later. I really tried myself to cut down my carbon emissions. And I really think that that's a tremendous challenge and that that comes before anything else that it makes everything else pales by comparison in importance."

Others saw emissions as the goal and renewable energy sources as a means towards that end. "I feel like if I had to pick one from that list it's the emissions," said a woman from Lyndonville. "What is the ultimate goal? It's like climate change is hammering the planet now. We're trying to decrease the effects. If oil and gas didn't produce emissions, we'd use them without question, but the emissions are changing our whole planet. I would say that the renewable leads to that."

"The world is burning, and we're drowning," answered one Burlington participant, the week of the floods, when asked why emissions mattered to her.

There were not many participants who cited renewability in and of itself as a factor. It was more that renewable sources of power tend to be lower in emissions and that was what led them to favor that approach. One virtual event participant advocated for focusing on emissions instead of renewables as a matter of policy:

"I more and more find that the term renewable has an expandable and contractable definition, and I think it's not useful. I would much prefer that we had an emissions reduction standard than that we have a renewable energy standard. That would get us more on track and it would eliminate that first category. The focus would be on emissions, and I think that would be a better way to do it."

Favored Energy Sources

Both the initial and follow-up surveys found that solar, hydropower, and wind were the most popular electricity sources, but the conversation around these in the events, as well as with nuclear and biomass, was more nuanced. For some, expanding renewables like solar and wind came into conflict with another key environmental concern: protecting Vermont's open space and natural beauty.

Solar

Much of the discussion around solar power focused on net metering and rooftop solar, because almost every group had at least one participant who had experience with it. Most solar owners had positive experiences to share, although these were tempered by concerns about not all Vermonters being able to participate. "Affordability and equity to me go together," said a South Royalton participant. "When I implemented the solar system in our in our home, I didn't understand that people who could not afford to do what I was doing were going to take the brunt of my lower rates, and that then is still a big concern." Not many participants were familiar with community solar or group net metering, which enables residents to buy into solar projects without placing them on their properties.

Another big topic around solar was the question of siting larger solar projects. Most participants preferred to place solar panels on existing residential and commercial buildings, or in parking lots or other spaces that were already developed. There was much less interest in solar in natural areas, although there was some awareness of successful applications that combined solar fields with agriculture.

There were also concerns about the full lifecycle impacts of solar panels: where the raw materials were sourced from, and how they could be safely disposed of. These comments came up without prompting in multiple groups, suggesting that participants are hearing about these concerns as part of the wider discussion about renewable energy.

Wind

Similarly, we heard push back on wind, and offshore wind in particular, concerning impacts on wildlife. "I am very, very strongly opposed to wind turbines," said one woman in a virtual group. "My family, my children, grandchildren, many of them still live at the shore in New Jersey. And every week we are we are getting dead whales, dead dolphins… it's become a major, major issue." As with the issue of solar materials and recycling, we heard these concerns in multiple groups, suggesting that they are very much circulating among residents.

Some participants also expressed aesthetic concerns about wind turbines in Vermont, although at least one participant found them to be a welcome addition to the skyline.

Hydropower

Hydropower did not come up as often in the initial conversation about sources as solar or wind, but it came up after later slides showing how big of a portion Hydro-Quebec is of Vermont's energy mix. The primary contention around hydropower wasn't the potential flooding of indigenous and other surrounding land or the accrual of heavy metals behind hydroelectric dams (neither of which were covered in the presentation but that knowledgeable participants raised as issues), but the reliance on Hydro-Quebec to the detriment of a more diversified grid.

"It's almost like a word is missing from that list [of Key Factors], which would be resiliency," said a woman in the Winooski group. "Systems are only as good as they're being used and maintained, and the more centralized things are, the riskier they may be. Maybe it's cheaper to have more electricity coming from a consolidated place. But if that has issues, then where is power going to come from?"

Nuclear

Participants were divided over nuclear power. Some participants who were focused on reducing emissions supported nuclear power as a reliable source of low-carbon baseload energy. Participants in several groups independently brought up new nuclear reactors designs that are supposed to be less dangerous than older designs.

The divide on nuclear was less based on potential accidents but the dilemma of disposing of waste material that would remain radioactive for centuries. One Brattleboro participant who was staunchly against biomass and wary of nuclear outlined it as following:

"It's low in carbon during production but massive amounts of carbon, both in the production of the facility, the mining, the even the production of the fuel and the final price tag is still unknown since we haven't learned how to dispose of nuclear. Not to mention the waste, which is basically a genetic time bomb."

For many energy sources, concerns about the full life-cycle emissions came up. These came up so frequently that we began telling groups that PSD was working on a simultaneous technical report analyzing these electricity sources in that way.

Vermont, of course, has direct experience with a now-decommissioned nuclear plant, Vermont Yankee. Many participants were surprised to see that Vermont still gets a considerable amount of its electricity from nuclear (Seabook in New Hampshire) now that Vermont Yankee is closed.

Biomass

Of all the energy sources presented in the slides, the two types of biomass – burning wood or other plant material or burning methane from landfills or agricultural – were the least familiar to participants. There were staunch biomass opponents in the groups, including those who questioned why and how Vermont classified biomass as renewable and low-carbon. But others seemed open to biomass, especially the burning of methane as associated with agriculture – or "cow power" as one Burlington participant put it.

Despite the concerns from a few, the follow-up survey (analyzed further in the next section of the report) found that focus group participants were more supportive of most electricity sources after the presentation and discussion, compared to their responses on the initial survey. Still, it is worth noting these criticisms and concerns, especially when they surfaced organically in multiple groups, as did the concerns about solar life-cycle, off-shore wind and wildlife, and nuclear waste. These concerns, whether they are accurate or not, are clearly part of the information stream that at least some Vermonters are reading or hearing about clean energy sources.

Explaining the Renewable Energy Standard and RECs

The second section of slides explained the system for accounting for renewable energy via Renewable Energy Certificates (RECs) and how that relates to Vermont's Renewable Energy Standard. For the purposes of the discussion, we focused on two parts of the Renewable Energy Standard:

- Tier I: Utilities must obtain 75% of their electricity from renewable sources by 2032; and
- Tier 2: Utilities must obtain at least 10% of their total electricity from new, smaller, in-state, renewable sources by 2032.

This was complex material to explain to a lay audience, and most folks largely accepted it without much pushback or concern. Generally, participants were surprised to learn how high Vermont renewable energy goals were and that utilities were exceeding them.

Most participants largely accepted RECs as well, but a handful were mistrustful of them. A couple of participants likened them to carbon offsets consumers purchase when flying or renting a car. One woman in the Winooski group went further, saying that RECs felt like "greenwashing" to her. One participant in the Burlington group thought RECs felt like a "bait and switch."

The most involved critique of RECs came in one of the virtual focus groups. It was clear that this participant had a level of knowledge coming in beyond most other participants, having sent in a complex, multi-part question ahead of the group. Here's what he said:

"You've been presenting the Renewable Energy Standard as a means toward achieving the transition from fossil fuel generation of electricity to low [carbon] emissions generation of electricity. And that certainly is the intention of the Renewable Energy Standard. But there are a number of ways in which it has exactly the opposite effect. … Green Mountain Power has lots of solar RECs and it sells those RECs outside the state to other states that need those RECs. And it makes a lot of money by doing that. … And with the profit that Green Mountain Power, for example, makes from selling those RECs at a high rate, it performs a marvelous act of arbitrage, where it goes to Canada and it buys very low quality, relatively high emissions RECs from hydropower generated by Hydro-Quebec…"

This gentlemen's point was that, absent the market for RECs, utility companies would have to build more renewable energy of their own, rather than selling the credit for solar generated by their customers' rooftop solar and buying other types of energy that Vermont considers renewable but other states may not (even if those states consider those types of energy "clean").

When we asked if others in the group understood this critique or shared these concerns, another participant responded with a more pragmatic view:

"I am aware this is a bit of a shell game, and I understand that. But at the same time, there're so many other complex factors here. Like, for instance, no one wants transmission lines running through their backyards. No one wants their field that's very scenic turned into a solar farm. No one wants windmills on top of their ridge lines. They look ugly. No wants to raise taxes to make it more affordable for people to get grants or incentives to bypass the power walls or to take up public space in local towns to create communal solar farms."

"So, I think that the shell game is going to exist. … Yeah, Hydro-Quebec produces hydropower that displaces all sorts of, habitat and things like that. But at the same time, compared to coal-fired power plants in the Midwest or the Southwest, I think everyone would agree that that is perhaps more advantageous. I think that we have to think incrementally because we're not going to go from a system that is what it is right now to everybody having solar panels in their backyards. It just not going to happen. … Industry has to be able to move forward and within the realities of what they can and can't do and what our society can and can't support."

It should be noted that this was the one time in the 11 groups that there was a back and forth of this level of detail about RECs and their role in Vermont renewable energy policy. If other participants had misgivings, they did not express them.

Net Metering

We presented an explanation of net metering – the policy by which consumers are able to get financial credit for generating their own electricity, most often through solar panels on their rooftops or elsewhere on their properties – as part of the conversation about RECs and the Renewable Energy Standard. Net metering is a key part of how utilities are able to meet the Vermont local renewable goals, by utilizing the RECs generated through customers' solar panels.

In many groups, participants had already touched on net metering earlier in the conversation, through participants discussing their personal experience with solar panels on their property. Most solar owners had a positive experience with net metering, mostly focused on the financial savings from generating their own electricity. Few had much knowledge about the disposition of the RECs generated by their solar systems.

Some participants had concerns about equity around net metering, given the upfront costs and the fact that the program is most accessible by homeowners. Even solar customers who had benefited from financing or government incentives acknowledged that the process can be complex and difficult to navigate, and that there was a role for government to provide more outreach and education about the options available to consumers.

There was also a larger concern about whether solar panel owners were getting a good deal possibly at the expense of other electric customers. As one Lyndonville participant put it:

"The grid is like the highway, and we're using the highway, so we should pay for it. Just because they're making electricity, shouldn't mean I should get all this credit and don't have to pay anything, because they're providing me with the grid. And I think people don't realize it costs these companies money to run it. If everybody puts solar panels on and makes their own electricity, where are they going to get the money to maintain grid? That's a big problem."

Energy Mix Reactions

The last set of slides showed participants Vermont current energy mix, accounting for RECs, and what electricity Vermont produces in-state. Many participants were pleasantly surprised at how much renewable electricity Vermont used and produced, although it was also aligned with their general perceptions that Vermont was likely doing better on environmental issues than other places. Some were expecting more fossil fuels to be in the mix.

A few participants had questions about how RECs influenced the percentage of renewables, and whether the mix without RECs was lower. In later groups we incorporated the pre-RECs renewable percentage into the presentation as a talking point at this stage in the presentation, to anticipate this concern.

The large percentage of electricity coming from Hydro-Quebec did come up in some groups. Some participants were concerned about Vermont getting too much of its power from a single source. Others remembered that Hydro-Quebec was controversial when it was first developed, and that the renewable power it is now generating came at a cost. But overall, participants seemed fine with Vermont tapping into that resource.

At the end of the groups, we returned to the "Key Factors" slide to see if anything discussed had changed anyone's opinion. Most participants took the opportunity to restate their original positions – not many minds appeared to have changed, although some participants acknowledged that they had learned in information about Vermont's current electricity sources, RECs, net metering, and community solar.

We did receive feedback in several groups about the importance of energy efficiency in the discussion. As one Lyndonville participant put it: "I personally feel like the big emphasis should be on conservation and efficiency and, you know, cutting back, change people's behavior. Because we have all the technology we need, but to change people's behavior is the hardest thing." The absence of energy efficiency from most of the presentation was intentional, as the focus of the project energy sources for generation. Still, some participants noted that absence and felt that was an important part of meeting Vermont's clean or renewable energy goals.

Follow-up survey results

At the end of each event, participants were asked to fill out a follow-up survey. The survey included some repeated questions from the initial survey, as well as some new questions. MPG tracked participants responses with unique ID codes, allowing us to compare them anonymously with each participant's responses to the initial survey, including their original demographics. All told, there were 92 responses to the follow-up survey.

Follow-up survey demographics

By definition, the participants in the follow-up events were a self-selected subgroup from the initial survey. It is to be expected, then, that this group would differ demographically from the original survey, which was targeted and weighted to be representative of the entire state adult population. Comparing the demographics of the follow-up survey responses to that of the initial survey (Figure 16) reveals some key differences.

The follow-up participants were split evenly by gender overall, although some of the events had more men or more women. Follow-up participants were older, with only 12% aged 18-29 and 41% 60+. They were slightly more racially diverse, owing in part to the oversample in the initial survey which allowed for more non-white respondents to be recruited into the groups. They were more likely to hold a college degree and less likely to have a high school diploma or less education. They were much more likely to identify as or lean towards being a Democrat (68% versus 52% in the initial survey). They were more likely to make between $50,000 and $100,000 (41% versus 31%), and they were slightly more likely to have solar panels on their property (22% versus 17%).

Because of these demographic differences, it is most appropriate to compare the follow-up survey results to this set of respondents' answers within in the original survey, rather than to compare them to the entire initial survey sample. This also allows us to see if these respondents' opinions shifted between the initial survey and the follow-up survey.

Of course, there are other factors that could influence opinion since the initial survey. A major one is the flooding that took place in July 2023, before the in-person groups held in Burlington, Winooski, and Lyndonville, and prior to all of the virtual events. Our impression from moderating those groups was that the floods were somewhat of a factor, but perhaps less than might be expected. Some participants made the connection between the floods and climate change and carried that into the discussion of energy sources, but in other groups the floods did not enter into the discussion much at all. Nonetheless, we did see emissions rise as a concern in the follow-up survey, and it is possible that the floods played some role in that movement.

Figure 16: Follow-up survey respondents demographics

% of respondents to each survey in each demographic subgroup

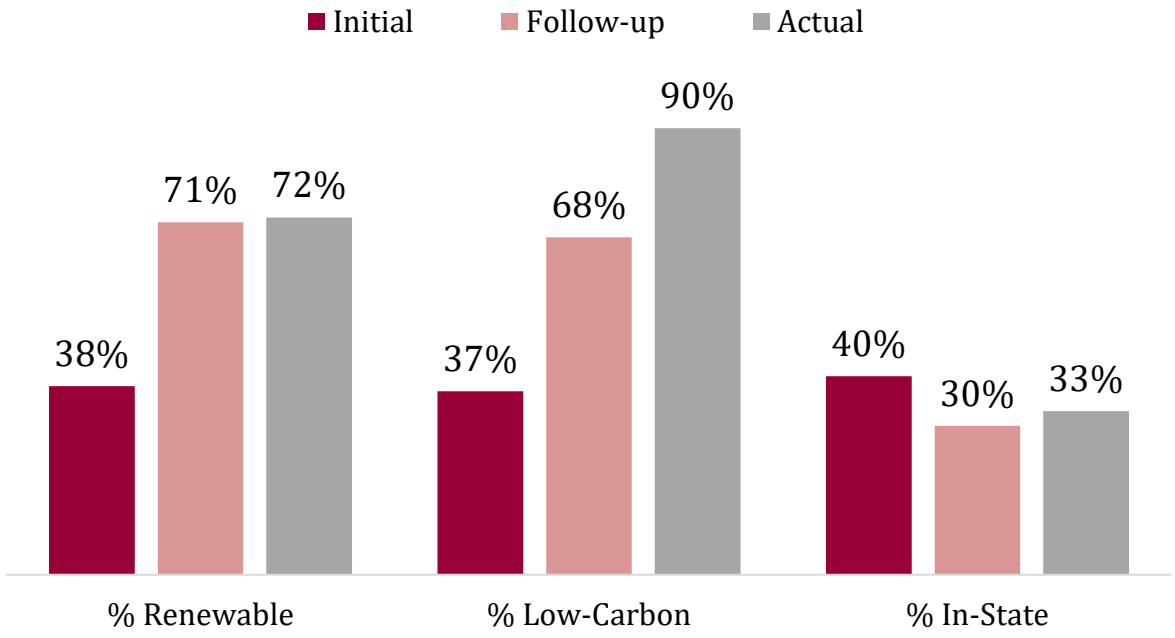
		Initial	Follow-up
GENDER	Woman	51%	49%
	Man	48%	49%
	Non-binary	1%	2%
AGE	18-29	20%	12%
	30-44	21%	24%
	45-59	24%	23%
	60+	34%	41%
RACE	African American, Black, or African	1%	2%
	American Indian / Indigenous	2%	8%
	AAPI	2%	2%
	Hispanic, Latinx or Spanish Origin	2%	9%
	White	92%	86%
PARTY ID W LEANERS	Democrat	52%	68%
	Republican	27%	18%
	Independent / Other	15%	12%
	Don't know / Refused	5%	1%
EDUCATION LEVEL	High School or less	35%	21%
	Some college, no degree	28%	26%
	College graduate (BA/BS)	22%	35%
	Advanced degree	14%	17%
INCOME	< $50K	28%	28%
	$50-99K	31%	41%
	$100K+	28%	24%
	Don't know / Refused	13%	7%
Do you own or do any of the following?	A heat pump hot water heater	20%	17%
	A heat pump for home heating or cooling	19%	17%
	A fully electric vehicle	4%	8%
	A hybrid gas and electric vehicle	12%	13%
	Have solar panels on your property	17%	22%
	Participate in community solar or group net metering	4%	4%
	None of these	54%	48%

Awareness of renewable, low-carbon, and in-state electricity

The follow-up survey repeated the questions asking for an estimate of the Vermont percentage of renewable, low-carbon, and in-state electricity, in part to test retention and awareness of these facts from the slide presentation. The responses were much closer to the mark than in the initial survey (Figure 17).

Figure 17: Presentation improved awareness of Vermont's electricity performance

% mean response in initial and follow-up survey versus actual amount



See Topline (Appendix B) for full questions wording.

Participants were very accurate on the percentage of Vermont's electricity coming from renewable sources, and from in state. They were less accurate about the share coming from low-carbon sources. The actual figure of 90% is the sum of the 72% renewable plus the 18% that Vermont gets from nuclear power. It's possible that some participants didn't connect those two pieces.

When asked for their key takeaways from the presentation, 39% of respondents mentioned learning about these facts: how much of Vermont's energy is renewable, low-carbon, or produced in state. "I am pleasantly surprised by how much of the energy is renewable or low carbon, I had honestly expected more fossil fuel use," wrote one respondent.

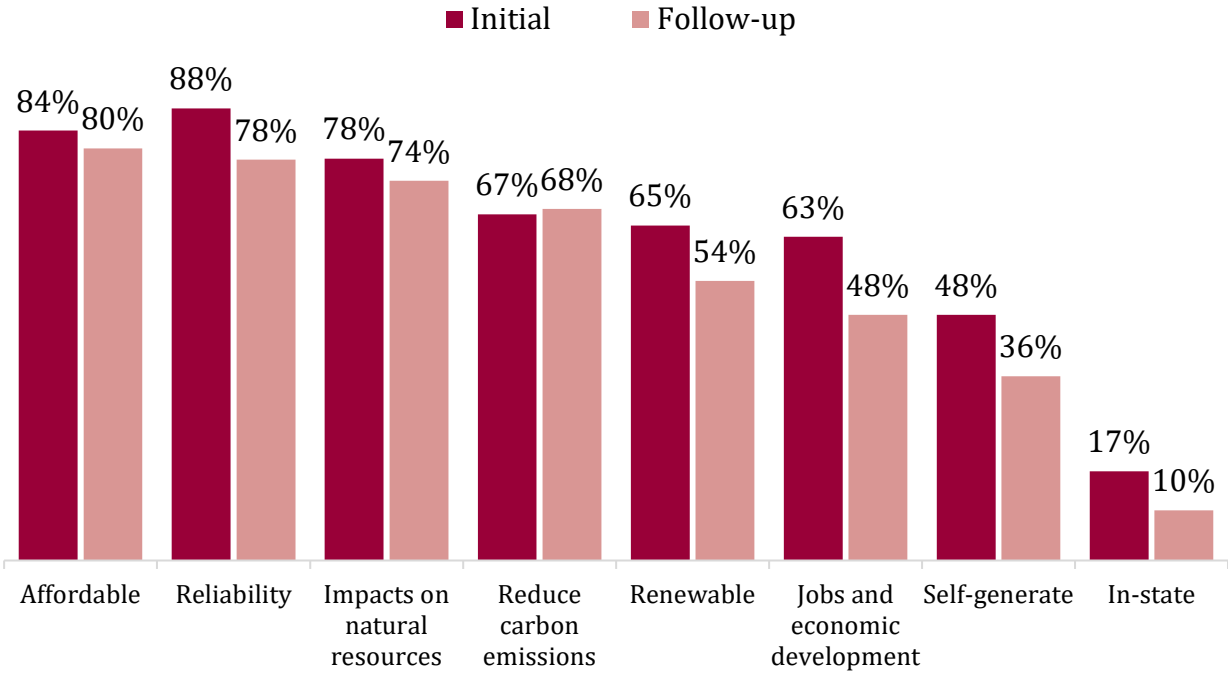
Key Factors for Generating Electricity

Next the follow-up survey repeated the rating exercise from the initial survey. The overall ratings of which factors were "very important" track fairly closely with these participants' answers on these questions in the initial survey, with some exceptions (Figure 18). Most items were rated a few points lower, and the lower-ranked items like jobs, self-generation and in-state production fell off more. Reliability also declined 10 points, although it remained the second highest priority. This is consistent with the tenor of the discussion in most groups, which focused on affordability, equity, and environmental concerns. Carbon emissions was the only item that held its ground from the initial survey.

The gap in the follow-up ratings between emissions and renewability is also consistent with the conversation in most of the groups. It's not the case that participants were opposed to renewability so much as they saw it as overlapping with emissions, which they saw as the most important priority. Democrats were overrepresented in these groups, and emissions was a top priority for that group in the initial survey.

Figure 18: Follow-up responses were similar or lower on most factor except emissions

% rating each factor as "very important", follow-up survey versus initial survey



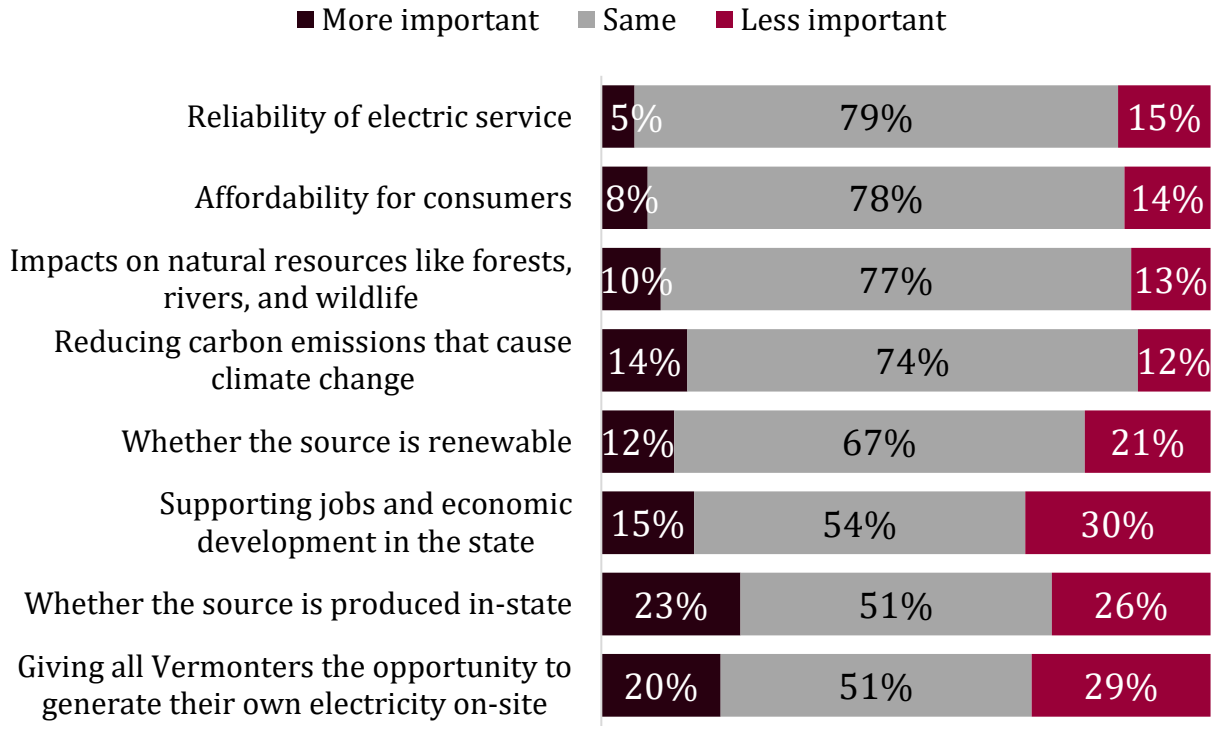
Q: How important should each of the following be when considering how Vermont gets its electricity?

Comparing individual responses reveals that most respondents did not change their answers between the initial and follow-up surveys (Figure 19). Respondents were particularly firm in their views on reliability, affordability, and natural resources. Carbon emissions was the only factor where more participants shifted towards considering that "more important" rather than less important.

There was more movement on items that tended to rate lower. Jobs and economic development, which did not come up much in the group discussions, saw the biggest net decline, with 30% of participants rating it as less important than they did in the initial survey.

Figure 19: Most follow-up participants maintained their initial survey ratings

% of follow-up ratings compared to participants' ratings in the initial survey



Q: How important should each of the following be when considering how Vermont gets its electricity?

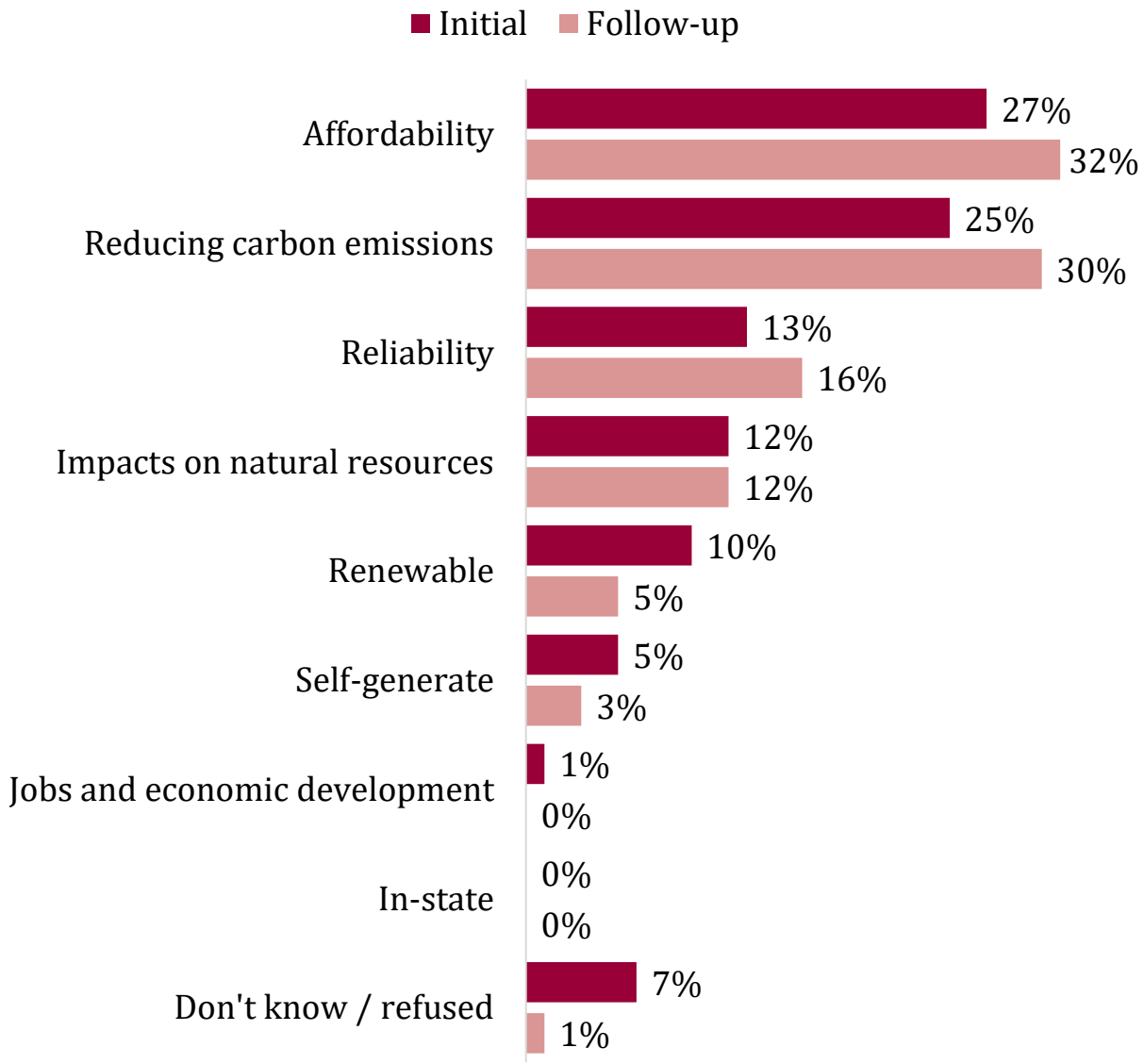
Most important factor

When asked to pick their single most important factor, affordability and emissions came out on top, improving by 5 points each on their percentages from the initial survey (Figure 20). Reliability also improved slightly, while all other items held steady or were ranked as less important.

Respondents were asked to explain their choice on this question. "We do not have time to wait to reduce emissions. Some might argue it's too late," wrote one respondent who chose emissions. "I live in one of the poorest counties in Vermont. Economies flourish when energy is cheap," wrote another concerned about affordability. Some respondents saw emissions reduction and affordability as being in conflict with each other. "Affordability is the top priority for me; no matter how renewable a source of energy is or how great it might be for conservation and climate change action - it doesn't matter if I cannot afford or use it." But others saw them, and other factors, as interconnected: "If the source is renewable, lower emissions tags along - and the more renewable development will bring the cost and make it more affordable. And more jobs in Vermont if renewables happen in the state."

Figure 20: Affordability, emissions gained ground as single most important factors in follow-up survey

% rating each item their most important factor in the initial and follow-up surveys



*Q: And of the items you just rated, which do you think should be the **single most important** factor in how Vermont gets its electricity?*

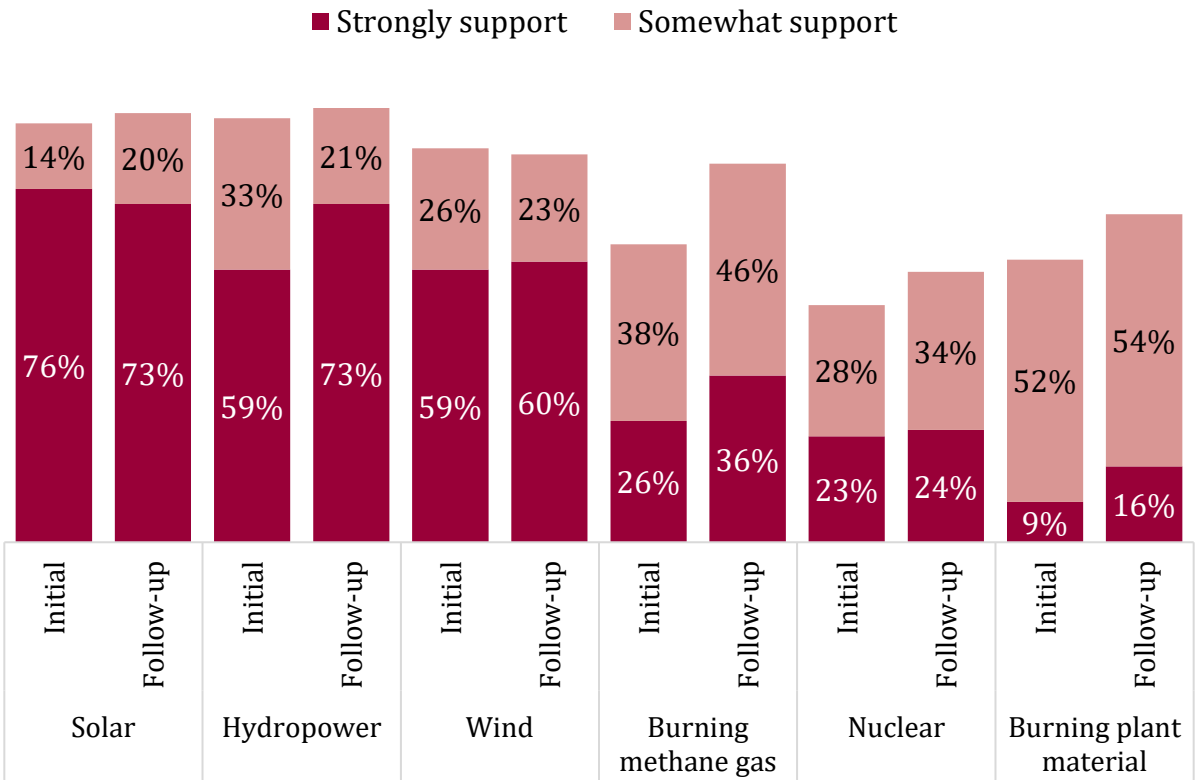
Comparing individual responses on this question reveals that 42% of respondents kept their most important factor from the initial survey, including 16% who cited emissions both times and 18% who named affordability. Another 18% switched from some other factor to emissions, including 7% who had named renewability in the initial survey. This accounts for emissions' rise in the follow-up survey.

Favored electricity sources

When asked to rate various electricity sources, the follow-up survey largely preserved the rank order from the initial survey, with a couple of notable exceptions. The share who strongly supported hydropower jumped 14 points, from 59% to 73% (Figure 21). This pushed hydropower to a virtual tie at the top with solar. This may be due to participants learning how much hydropower Vermont relies on during the discussion, and the fact that Vermont considers large hydropower renewable.

Figure 21: Uptick in strong support for hydropower, methane in follow-up survey

% who strongly / somewhat support each energy source, follow-up versus initial survey

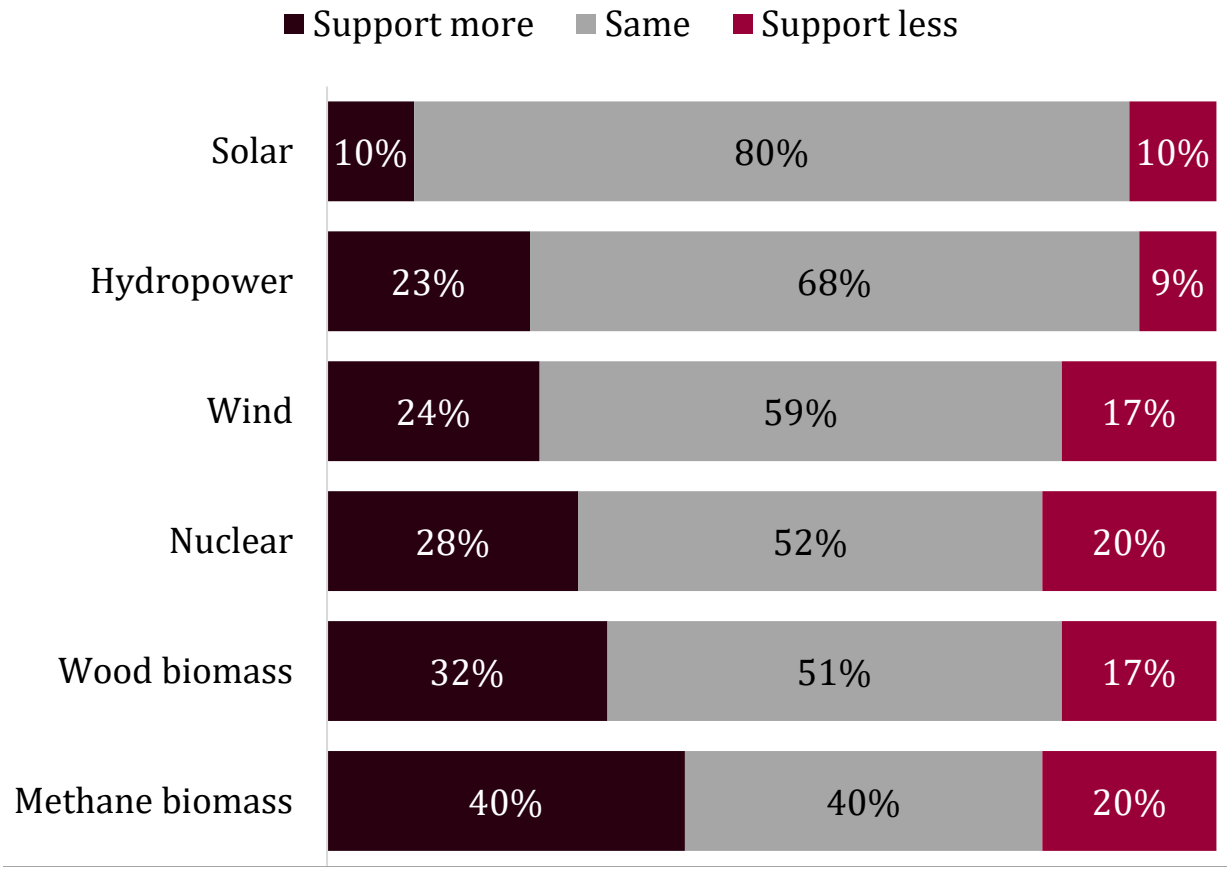


Q: Going forward, how much would you support or oppose Vermont getting its electricity from the following sources?

Biomass also saw an uptick in the follow-up survey, particularly methane biomass, which was more popular than nuclear with this group of participants. Both biomass sources had the highest "unsure" ratings in the initial survey. Explaining how biomass works and that Vermont considers both to be renewable seems to have made participants more comfortable with these options. To be clear, there was definitely push back against biomass in the groups, as reflected in the open-ended responses in the follow-up survey. One participant wrote that they were surprised "that biomass is still considered renewable. We are currently choking on Canadian wildfire air." But the follow-up survey ratings suggest that, overall, the discussion was a net positive for views of biomass.

Comparing initial versus follow-up responses at the individual level shows that a majority of respondents did maintain their ratings of each electricity source from the initial survey, with the exception of methane (Figure 22). Apart from solar, which maintained its popularity from the initial survey, more participants shifted towards supporting each source than moved away from it. This is most notable with the biomass sources, particular methane biomass.

Figure 22: Most sources made net gains between initial, follow-up survey
% of follow-up responses that shifted / stayed the same compared to the initial survey



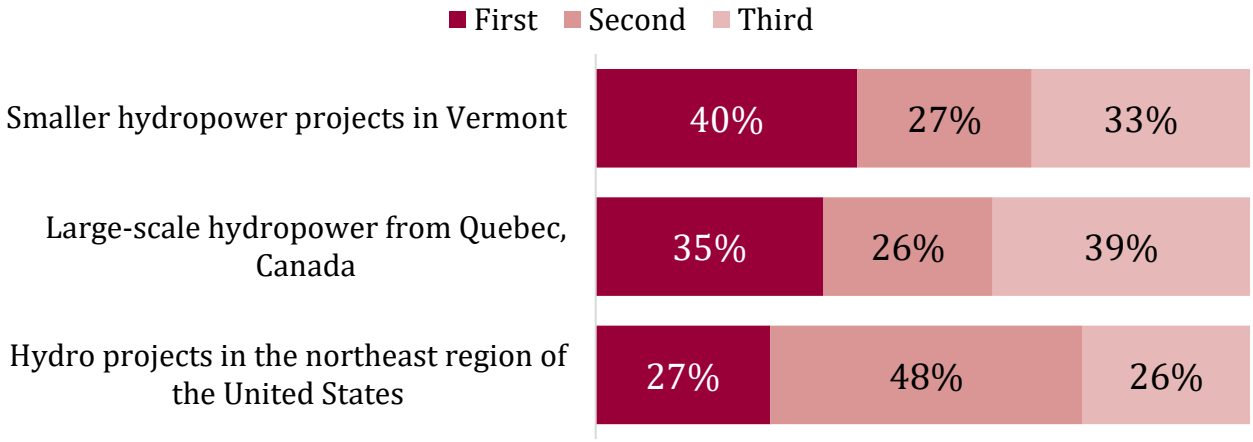
Q: Going forward, how much would you support or oppose Vermont getting its electricity from the following sources?

Right-sizing hydropower and solar

The follow-up survey also asked some original questions, including a series going deeper on hydropower and solar. Participants were asked to rank different scale hydropower and solar sources and then were asked to explain their top choice. On both, there was a preference for smaller scale projects, although the preference was more pronounced for solar than on hydropower. On hydropower, 40% ranked smaller-scale projects in Vermont first (Figure 23). Hydro-Quebec, which was mentioned in the slide presentation and came up in every group, was the most divisive: 35% ranked it first, but 39% ranked it third. Other hydropower projects from the northeast were the most popular second choice (48%), with roughly equal numbers ranking it first (27%) and third (26%).

Figure 23: Preference for smaller hydropower projects in-state

% who ranked each item first, second, or third



Q: Please rank the following types of hydropower, where first is the one you would most like Vermont to use, and third would be the item would you least like Vermont to use.

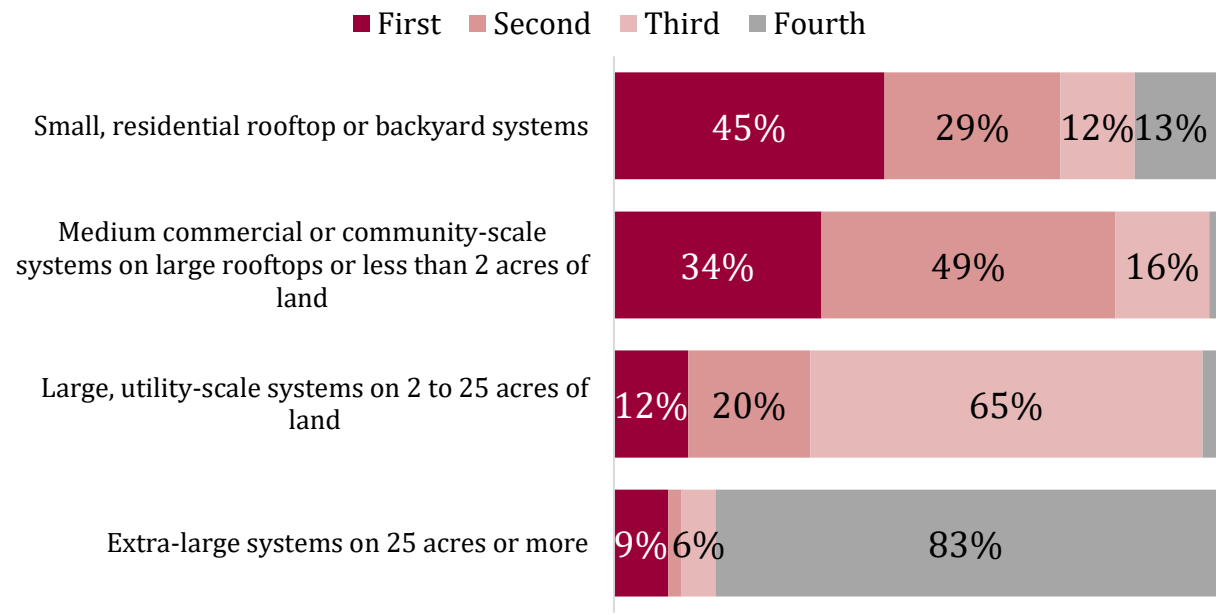
The follow-up comments are helpful in understanding participants' thinking on this question. "Hydro-Quebec is longstanding and important but not without controversy. If we could build out more hydropower in medium scale in the Northeast that would be good," wrote one participant. "A variety of local sources seems more reliable and resilient for the grid," wrote another. Others preferred to keep hydropower at arm's length for environmental reasons: "Because I do not know of the damage/risks small hydro plants would cause to our wildlife and environment in Vermont. Sorry, Quebec!"

For solar, there is a clearer pattern. Participants favored small and medium-sized systems and clearly ranked the larger and largest projects third and fourth, respectively (Figure 24). Aesthetics and resilience were recurring themes in the comments. One participant wrote: "Distributed power has least chance of major failure, least environmental and aesthetic impact. Many rooftops and small installations are better than taking over farm fields or cutting down forests for major installations." "Community shared solar panels are less intrusive in a state that relies on the beauty of its landscape for tourism," wrote another.

Another theme was siting solar on already developed areas: "I like the idea of solar power over parking lots. I do not like using open land for solar power - unless we know the impact on the temperature of the surrounding area (ground level) and animals that use that environment." But others were more open to solar fields if done well: "25+ acres seems impossible to hide. Beneath that scale, the larger the farm, the more efficient and easy to plan/manage/anticipate generation and infrastructure needs."

Figure 24: Preference for smaller-scale solar

% who ranked each item first, second, third, or fourth



Q: Please rank the following types of solar power, where first is the one you would most like Vermont to use, and fourth would be the item would you least like Vermont to use.

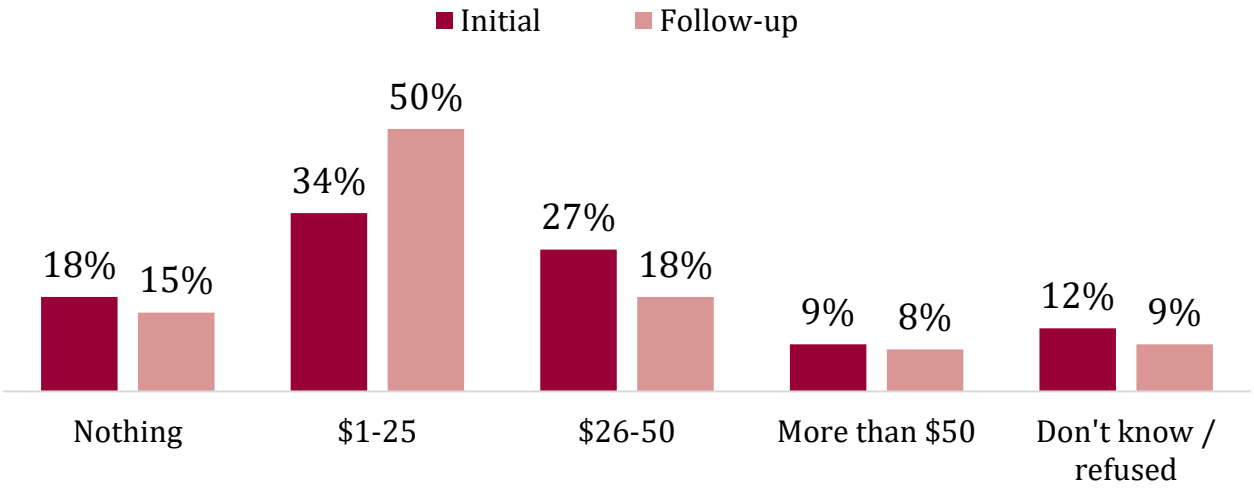
Willingness to pay more

The focus group discussion increased the priority of both affordability and emissions, but affordability seems to have been on participants' minds when they were asked if they would be willing to pay more for renewable or low-carbon electricity (Figure 25). While slightly fewer were willing to pay nothing, the median amount among participants who were willing to pay something actually went down compared to these participants' initial responses, from $30 to $25.

It could be that learning Vermont is making good progress towards its renewable goals caused some to adjust downward the amounts they thought it would cost to achieve fully renewable electricity. The policy brief and slides emphasized that regulatory policy, new technology, and increasing supplies of renewables are all driving down the prices of renewables. It's possible that some participants took that to mean that they might not need to pay as much more for renewables as they had thought prior to the focus groups.

Figure 25: More were willing to pay after focus groups, but the amount willing to pay declined

% of follow-up participants willing to pay each amount for renewable / low carbon electricity, initial survey versus follow-up survey



Q: If it were to cost more, how much more would you be willing to pay for electricity if it meant that all of Vermont's power came from renewable sources?

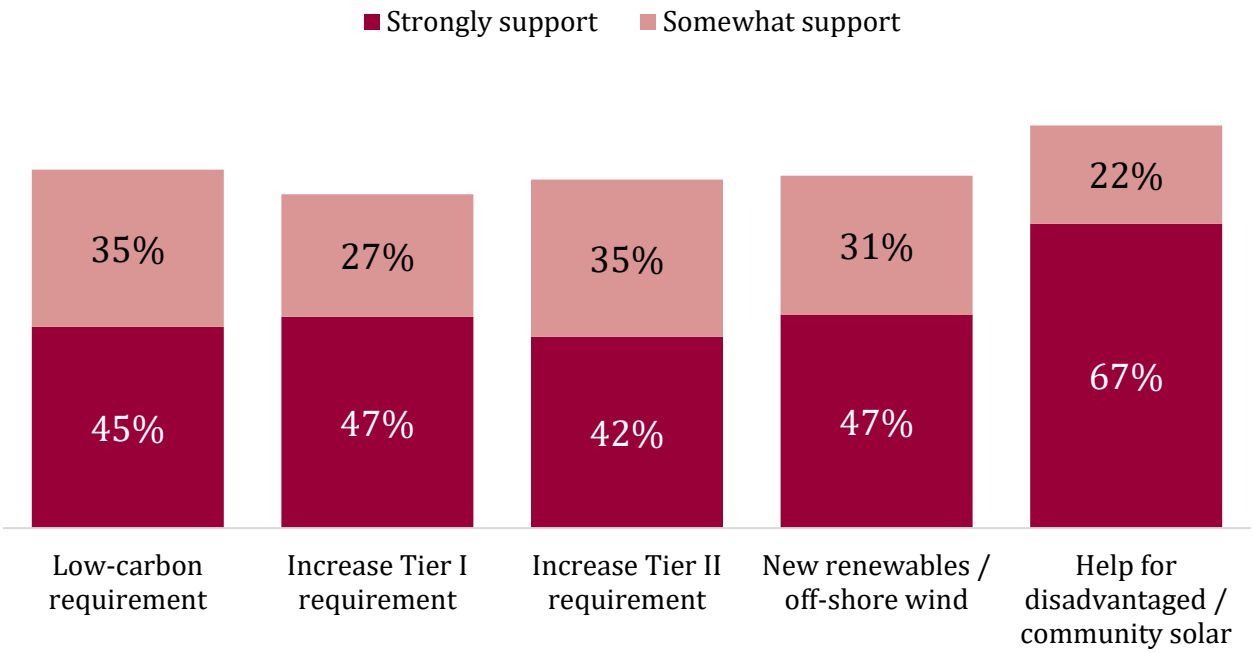
Policy preferences going forward

Finally, participants were asked how much they would support or oppose Vermont going further on several renewable electricity policies. All of them were enthusiastically supported (Figure 26). Most popular was helping disadvantaged Vermonters afford renewable energy through community solar; 67% of participants *strongly* supported that idea. Equity was a large portion of the discussion in virtually all the focus groups, and it was tied to affordability. This policy seems to have resonated deeply with residents concerned with that issue.

But there was majority support for all the other policies tested, with strong support over 40% for each. These included expanding the Tier I Renewable Energy Standard beyond 75% (74% support) expanding Tier II local requirement beyond 10% (77%), adding a low-carbon requirement (79%), and pursuing new renewable sources like off-shore wind (78%).

It's important to note that these participants are somewhat self-selected – they are more likely to be Democrats, have higher levels of education, and more of them had solar panels than the average in the initial survey. This group may have been particularly primed to push harder on clean energy. Nonetheless, many participants were learning for the first time that Vermont is already at 72% renewable electricity. Rather than being satisfied with that progress, these Vermonters were ready to go further.

Figure 26: Clear majority support for going further on renewables, equity.
% of follow-up respondents who strongly or somewhat support each policy



See Topline (Appendix C) for full questions wording.

Appendix A: Methodology

Initial Survey

MPG conducted a survey of 700 Vermont residents, including an oversample of 100 residents of color. Fielding was conducted by KGS Research with supervision from MPG. Responses were collected from June 7-15, 2023, via three modes: live telephone interviews to landlines (210 responses) and cell phones (210 responses), and via text-to-web online surveying (280 responses).

The survey was offered in English, French, and Spanish, and 677 respondents took the survey in English, 12 in French, and 11 in Spanish.

After fielding, responses from white and non-white respondents were weighted by race and ethnicity, age and gender, geography, and educational attainment using targets from the latest available 5-year American Community Survey. White and non-white respondents were then combined proportionally and weighted by the parameters above, plus party identification, using targets from the Pew Research Center and Gallup.

The margin of error for the entire sample, including the design effect, is +/- 4.3 percentage points at the 95% confidence level.

On the following page is a table comparing the population targets used for weighting versus the final weighted demographics from the initial survey. Most of the variation, if any, is due to some respondents not sharing certain demographic information in the survey.

		Vermont residents 18+	Final Weighted Results
Race and Ethnicity	White alone	93%	92%
	Black alone	1%	1%
	Hispanic	2%	2%
	AAPI alone	2%	2%
	Other / more than one race	3%	3%
	Don't know / refused		1%
Gender	Men	49%	48%
	Women	51%	51%
	Non-binary / other		1%
Age	18-29	20%	20%
	30-44	22%	21%
	45-59	24%	24%
	60+	34%	34%
	Don't know / refused		1%
Education	HS or less	36%	35%
	Some college	28%	28%
	BA	23%	22%
	Advanced	14%	14%
	Don't know / refused		1%
County	Addison	6%	6%
	Bennington	6%	7%
	Caledonia	5%	5%
	Chittenden	26%	25%
	Essex	1%	1%
	Franklin	7%	8%
	Grand Isle	1%	1%
	Lamoille	4%	4%
	Orange	5%	5%
	Orleans	4%	4%
	Rutland	10%	10%
	Washington	9%	8%
	Windham	7%	7%
	Windsor	9%	9%
	Don't know / refused		1%
Party ID (w leaners)	Democrat	55%	52%
	Republican	30%	27%
	Independent / Other	16%	15%
	Don't know / refused		5%

Focus Groups

The initial survey served as the primary source for recruiting participants into the in-person and virtual focus groups. From the initial survey of 700, 321 respondents (46%) expressed interest in attending an event, but not all of these were available for one of the dates and times offered.

To supplement the recruiting, MPG had KGS obtain an additional 131 responses. The respondents were asked first whether they were interested and could attend an online event, and then they were given the initial survey. A few of these respondents were included in the virtual events. However, because these additional respondents were not a fully random or representative sample, MPG decided not to incorporate their responses into the final weighted initial survey results reported here. (We did use their responses for comparison to the follow-up survey.)

MPG selected participants for the focus groups based on availability and then to achieve a demographic mix within each group. We prioritized including non-white voices to the extent possible. For some more rural geographies, every participant who was available was invited.

Invitees were asked whether they needed any accommodations such as language translation or ASL interpretation to participate in the group. Invitees to the in-person groups were asked if they had any allergies or dietary restrictions to aid in purchasing food for the events.

Invitees received emails confirming their interest, and then another email containing the policy brief document as a PDF. For the virtual groups, MPG conducted "tech checks" to confirm that participants were comfortable using Zoom.

Both the in-person and virtual groups followed the same format, in which the discussion was structured around a slide presentation summarizing policy brief. The MPG moderators showed this presentation in three sections with breaks for group discussion following each section. One member of the PSD staff was available remotely at each event to observe and answer any technical questions that required expertise beyond the moderators' knowledge of the subject matter. Each group last 90 minutes, with some time allotted at the end for participants to complete a follow-up survey.

The original plan for this project was to hold two, larger-format online forums where the slides would be presented, followed by breakout discussions moderated by MPG staff. The hope was to increase the number of participants and the responses to the follow-up survey. A total of 180 respondents who had signaled their willingness to participate were invited to these two events, with the option of attending either event. Unfortunately, turnout for these forums was lower than hoped. The first forum was run as planned, with a full presentation of the slides followed by breakout discussions. For the second forum, we decided to revert to the same format used for the focus groups. We have incorporated the findings from these two events as additional virtual focus groups in the report.

Follow-up survey

The follow-up survey was administered at the end of each in-person and virtual focus group. Completing the follow-up survey was the final step before focus groups participants were given the $100 incentives for participating in the project. Respondents were given a unique ID code to enter into their follow-up survey. This code allowed MPG to link the follow-up surveys back to that individual's responses in the initial survey anonymously. In total, 92 follow-up responses were collected. Because the focus groups participants were self-selected and differed in some important demographics from the initial survey respondents as a whole, MPG decided to analyze the follow-up responses versus these participants' responses to the initial survey, rather than the initial survey as a whole. Unlike the initial survey, which was weighted to match all Vermont residents, The follow-up survey data was left unweighted, reflecting the demographics of the participants in the focus groups.

Appendix B: Initial Survey Results

The MassINC Polling Group
Vermont Department of Public Service
Vermont Electricity Policy Survey
Survey of 700 Vermont residents
Field dates: June 7 – 15, 2023

How important should each of the following be when considering how Vermont gets its electricity? *Order rotated per respondent; sorted by "very important" for display.*

	Very important	Somewhat important	Not too important	Not at all important	Don't Know / Refused
Reliability of electric service	87%	10%	2%	1%	1%
Affordability for consumers	82%	16%	1%	<1%	1%
Impacts on natural resources like forests, rivers, and wildlife	67%	24%	5%	3%	1%
Supporting jobs and economic development in the state	66%	25%	6%	1%	1%
Reducing carbon emissions that cause climate change	55%	21%	9%	13%	2%
Whether the source is renewable	55%	24%	11%	8%	3%
Giving all Vermonters the opportunity to generate their own electricity on-site	41%	35%	14%	6%	3%
Whether the source is produced in-state	21%	39%	26%	10%	3%

And of the items you just rated, which do you think should be the **single most important** factor in how Vermont gets its electricity?

Affordability for consumers	29%
Reducing carbon emissions that cause climate change	19%
Reliability of electric service	17%
Impacts on natural resources like forests, rivers, and wildlife	10%
Whether the source is renewable	8%
Giving all Vermonters the opportunity to generate their own electricity on-site	6%
Supporting jobs and economic development in the state	4%
Whether the source is produced in-state	1%
Don't know / Refused	6%

If you had to guess, what percentage of the electricity Vermont uses comes from renewable sources?

0-10%	15%
11-20%	19%
21-30%	19%
31-40%	14%
41-50%	15%
51-100%	19%

If you had to guess, what percentage of Vermont's electricity comes from low-carbon sources?

0-10%	16%
11-20%	20%
21-30%	18%
31-40%	12%
41-50%	13%
51-100%	20%

If you had to guess, what percentage of Vermont's electricity is produced in-state, as opposed to out-of-state?

0-10%	18%
11-20%	14%
21-30%	16%
31-40%	11%
41-50%	17%
51-100%	24%

Going forward, how much would you support or oppose Vermont getting its electricity from the following sources? *Order rotated per respondent; sorted by "strongly support" for display.*

	Strongly support	Somewhat support	Somewhat oppose	Strongly oppose	Don't Know / Refused
Solar	62%	22%	8%	5%	2%
Hydropower	59%	31%	5%	2%	4%
Wind	49%	28%	9%	11%	2%
Nuclear	30%	25%	14%	24%	8%
Burning methane gas from landfills or farms	28%	36%	12%	12%	12%
Burning wood and other plant material	22%	40%	22%	10%	5%

Switching to renewable or low carbon electricity might cost more. How much more would you be willing to pay for electricity if it meant that all of Vermont's power came from renewable or low-carbon sources? Please answer, in US dollars, the amount you would be willing to pay in addition to what you pay now per month for electricity.

Nothing	31%
$1-25	24%
$26-50	16%
More than $50	12%
Don't know / refused	17%

Do you own or rent your home?

Own	70%
Rent	20%
Some other arrangement (live with family, etc.)	9%
Don't know / refused	1%

Do you own or do any of the following?

A heat pump hot water heater	20%
A heat pump for home heating or cooling	19%
A fully electric vehicle	4%
A hybrid gas and electric vehicle	12%
Have solar panels on your property	17%
Participate in community solar or group net metering	4%
None of these	54%

Do you work in a job related to clean energy?

Yes	7%
No	90%
Don't know / refused	3%

Last year, what was your total family income from all sources, before taxes?

Below 25,000 dollars	9%
25 to less than 50 thousand	19%
50 to less than 75 thousand	17%
75 to less than 100 thousand	14%
100 to less than 150 thousand	14%
150 thousand or more	15%
Don't know / refused	13%

Demographics:

Gender:

Woman	51%
Man	48%
Non-binary	1%
Agender	<1%
Gender fluid	0%
Gender queer	0%
Some other way	0%
Don't know / refused	<1%

Age:

18-29	20%
30-44	21%
45-59	24%
60+	34%
Don't know / refused	1%

Race:

African American, Black, or African	1%
American Indian, Alaska Native, or Indigenous	2%
Asian or Asian American	2%
Hispanic, Latinx or Spanish Origin	2%
Middle Eastern or North African	<1%
Native Hawaiian or Pacific Islander	<1%
White	92%
Another race or ethnicity not listed above or prefer to self-describe	<1%
Don't know / refused	1%

Education:

11th grade or less	2%
High school graduate	33%
Some college, no degree	18%
Associate degree	10%
Bachelor's degree	19%
Graduate courses	3%
Advanced degree	14%
Don't know / refused	1%

Party Identification with Leaners:

Democrat / Lean Democrat	52%
Republican / Lean Republican	27%
Independent /Other	15%
Don't know / refused	5%

Appendix C: Follow-up survey results

The MassINC Polling Group
Vermont Department of Public Service
Vermont Electricity Policy Survey
Initial and follow-up survey response from 92 focus group participants

In a few words, what were one or two pieces of information that you took away from the event that you perhaps did not know before?

See Appendix D for verbatim responses.

During the event we discussed how Vermont gets its electricity. To the best of your knowledge, what percentage of the electricity Vermont uses comes from renewable sources?

	Initial	Follow-up
0-20%	26%	4%
21-40%	40%	2%
41-60%	20%	4%
61-80%	11%	73%
81-100%	3%	16%

And what percentage of Vermont's electricity comes from low carbon sources?

	Initial	Follow-up
0-20%	32%	12%
21-40%	33%	10%
41-60%	21%	8%
61-80%	11%	25%
81-100%	4%	45%

Finally, what percentage of the electricity Vermont uses is produced in-state, as opposed to out-of-state?

	Initial	Follow-up
0-20%	35%	23%
21-40%	23%	66%
41-60%	22%	5%
61-80%	12%	6%
81-100%	9%	0%

How important should each of the following be when considering how Vermont gets its electricity? *Order rotated per respondent; sorted by "very important" for display.*

		Very important	Somewhat important	Not too important	Not at all important	Don't Know / Refused
Reliability of electric service	Initial	88%	11%	1%	0%	0%
	Follow-up	78%	21%	0%	0%	1%
Affordability for consumers	Initial	78%	17%	2%	2%	0%
	Follow-up	80%	16%	2%	0%	1%
Impacts on natural resources like forests, rivers, and wildlife	Initial	84%	15%	0%	1%	0%
	Follow-up	74%	24%	1%	1%	0%
Supporting jobs and economic development in the state	Initial	63%	23%	10%	1%	3%
	Follow-up	48%	41%	10%	1%	0%
Reducing carbon emissions that cause climate change	Initial	67%	23%	4%	3%	2%
	Follow-up	68%	23%	7%	1%	1%
Whether the source is renewable	Initial	65%	23%	9%	2%	1%
	Follow-up	54%	36%	6%	3%	1%
Giving all Vermonters the opportunity to generate their own electricity on-site	Initial	48%	34%	13%	3%	2%
	Follow-up	36%	42%	15%	4%	2%
Whether the source is produced in-state	Initial	17%	47%	23%	13%	0%
	Follow-up	10%	53%	30%	4%	2%

And of the items you just rated, which do you think should be the **single most important** factor in how Vermont gets its electricity?

	Initial	Follow-up
Affordability for consumers	13%	32%
Reducing carbon emissions that cause climate change	12%	30%
Reliability of electric service	25%	16%
Impacts on natural resources like forests, rivers, and wildlife	1%	12%
Whether the source is renewable	10%	5%
Giving all Vermonters the opportunity to generate their own electricity on-site	27%	3%
Supporting jobs and economic development in the state	0%	0%
Whether the source is produced in-state	5%	0%
Don't know / Refused	7%	1%

In a few words, why did you select that as the most important factor?

See Appendix D for verbatim responses.

Going forward, how much would you support or oppose Vermont getting its electricity from the following sources? *Order rotated per respondent; sorted by "strongly support" for display.*

		Strongly support	Somewhat support	Somewhat oppose	Strongly oppose	Don't Know / Refused
Solar	Initial	76%	14%	7%	3%	0%
	Follow-up	73%	20%	4%	2%	1%
Hydropower	Initial	59%	33%	3%	1%	4%
	Follow-up	73%	21%	5%	0%	1%
Wind	Initial	59%	26%	4%	10%	1%
	Follow-up	60%	23%	9%	5%	2%
Nuclear	Initial	23%	28%	20%	23%	7%
	Follow-up	24%	34%	12%	21%	9%
Burning methane gas from landfills or farms	Initial	26%	38%	12%	9%	15%
	Follow-up	36%	46%	9%	2%	8%
Burning wood and other plant material	Initial	9%	52%	24%	10%	5%
	Follow-up	16%	54%	16%	5%	8%

Hydropower uses the energy in flowing water to turn a turbine and generate electricity. Please rank the following types of hydropower, where **first** is the one you would **most** like Vermont to use, and **third** would be the item you would **least** like Vermont to use.

	1st	2nd	3rd
Large-scale hydropower from Quebec, Canada	35%	26%	39%
Hydro projects in the northeast region of the United States	27%	48%	26%
Smaller hydropower projects in Vermont	40%	27%	33%

Briefly, why did you rank the item you selected first?

See Appendix D for verbatim responses.

Solar power uses special panels to convert light from the sun into electricity. Please rank the following types of solar power, where **first** is the one you would most like Vermont to use, and **fourth** would be the item you would least like Vermont to use.

	1st	2nd	3rd	4th
Small, residential rooftop or backyard systems	45%	29%	12%	13%
Medium commercial or community-scale systems on large rooftops or less than 2 acres of land	34%	49%	16%	1%
Large, utility-scale systems on 2 to 25 acres of land	12%	20%	65%	2%
Extra-large systems on 25 acres or more	9%	2%	6%	83%

Briefly, why did you rank the item you selected first?

See Appendix D for verbatim responses.

Switching to renewable or low carbon electricity might cost more. How much more would you be willing to pay for electricity if it meant that all of Vermont's power came from renewable or low-carbon sources? Please answer, in US dollars, the amount you would be willing to pay in addition to what you pay now per month for electricity.

	Initial	Follow-up
Nothing	18%	15%
$1-25	34%	50%
$26-50	27%	18%
More than $50	9%	8%
Don't know / refused	12%	9%

How much would you support or oppose Vermont requiring utilities to purchase low carbon electricity, in addition to its renewable requirements?

Strongly support	45%
Somewhat support	35%
Somewhat oppose	11%
Strongly oppose	3%
Unsure	7%

As we discussed tonight, Tier I of the Renewable Energy Standard requires that Vermont utilities purchase at least 75% of their electricity from renewable sources by 2032. How much would you support or oppose increasing that requirement beyond 75%?

Strongly support	47%
Somewhat support	27%
Somewhat oppose	11%
Strongly oppose	10%
Unsure	5%

Tier II of the Renewable Energy Standard requires that 10% of electricity must come from new renewable sources within Vermont by 2032. How much would you support or oppose increasing that requirement beyond 10%?

Strongly support	42%
Somewhat support	35%
Somewhat oppose	11%
Strongly oppose	7%
Unsure	5%

How much would you support or oppose Vermont using electricity from new renewable sources outside of the state, like off-shore wind?

Strongly support	47%
Somewhat support	31%
Somewhat oppose	10%
Strongly oppose	5%
Unsure	7%

How much would you support or oppose Vermont helping historically disadvantaged Vermonters better afford renewable electricity, for instance by helping them participate in community solar programs that would lower their electric bill?

Strongly support	67%
Somewhat support	22%
Somewhat oppose	8%
Strongly oppose	0%
Unsure	3%

Finally, we'd like your feedback on this event. On a 0-10 scale, where 0 is completely disagree and 10 is completely agree, how would you rate the event on each of the following factors:

	Mean Rating
The information presented was clear and understandable	9.26
I was happy with the amount of information offered in the event	9.12
The information presented in a balanced and unbiased manner	9.36
The group discussion was engaging	8.97
The moderator managed the group discussion in a respectful and unbiased way	9.71
I felt that my opinions were heard and valued	9.66

Is there anything else that you would like to share? *See Appendix D for verbatim responses.*

Demographics:

Gender:		
	Woman	49%
	Man	49%
	Non-binary	2%
Age:		
	18-29	12%
	30-44	24%
	45-59	23%
	60+	41%
Race:		
	African American, Black, or African	2%
	American Indian, Alaska Native, or Indigenous	8%
	Asian or Asian American	2%
	Hispanic, Latinx or Spanish Origin	9%
	Middle Eastern or North African	0%
	Native Hawaiian or Pacific Islander	0%
	White	86%
	Another race or ethnicity not listed above or prefer to self-describe	0%
Education:		
	High School or less	21%
	Some college, no degree	26%
	College graduate (BA/BS)	35%
	Advanced degree	17%
	Don't know / Refused	1%
Party Identification with Leaners:		
	Democrat / Lean Democrat	68%
	Republican / Lean Republican	18%
	Independent /Other	12%
	Don’t know / refused	1%
Region:		
	Chittenden	26%
	Central (Addison, Orange, Washington)	17%
	North (Caledonia, Essex, Franklin, Grand Isle, Orleans)	25%
	South (Bennington, Rutland, Windham, Windsor)	29%
	Don't know / refused	2%

Appendix D: Follow-up survey open-ended question verbatim responses

Note: MPG reviewed these comments to remove any information which might identify a respondent. Otherwise, they are presented as they were received.

In a few words, what were one or two pieces of information that you took away from the event that you perhaps did not know before?

- A somewhat better understanding of RECs.
- Vermont uses mostly all renewable energy
- The percentages of renewables in VT
- How the grid works and how much renewables VT actually uses.
- We burn wood chips - Buy hydro electricity from Quebec
- 1. Our increasing power costs paired with renewable requirements and the dynamic of RECs could impact affordability moving forward. 2. Vermont sells a notable amount of renewable energy to other places.
- Ratio of nuclear we use in Vermont
- Vermont has a priority on renewable sources (which is good, although I wish it was also on life cycle emissions) and although there is a focus on affordability there is not a focus on equity. Equity needs to be taken into account with such a rural state when access in different areas is limited.
- Not much. Perhaps that most people don't know how VT went from highest electricity rates in NE to tied for the lowest in a 20 year period, and how electricity used had fallen in 20 years.
- I am pleasantly surprised by how much of the energy is renewable or low carbon, I had honestly expected more fossil fuel use.
- Percent Vermont still gets from nuclear power
- There are many ways to get power, some are easier and harder, some are more renewable and some are not
- Understanding a bit more about RECs and how they work. Also deeper understanding where our electricity comes from.
- VT uses more renewable than I thought
- VT makes a lot of green energy
- That 99.8% of electricity produced in VT is considered renewable, and the other impressive figures about how much, from all sources, was renewable and carbon-free. Also, didn't realize how much came from out of state.
- I did not know much about selling solar energy back to the utility.
- Nuclear could be an option
- We really need to do more research on the renewable part. For example the waste the batteries leave behind, solar panels, wind turbines, etc
- The amount of renewable energy made in Vermont was higher than I thought it would be.
- I learned some things about the power grid infrastructure and how we're moving toward sustainability.
- I didn't know about RECs or about the goals for renewable power.
- How much VT has in renewable energy
- It was interesting to understand how much renewable energy Vermont uses and where we get our energy from.
- Renewable energy credits that are transferrable are a large part of the system we use for measuring our renewable targets - We are very close to achieving 75% renewable energy already

- Didn't know about how RECs were used with roof-top Solar. Didn't know that VT was already at around 60+% renewable.
- Nuclear not be Renewable - Offshore wind generation possibilities - Affordability and equity and how to get both?
- Production of electricity is progressing well with 2/3 renewable and working towards 75% with credits and that we are going to be in a different place with increased electrification of cars and whatnot.
- Maybe how much the states bought and sold their green power. I know how valuable it is and I generate it a lot but do not reap all the benefits.
- Almost everyone was concerned about affordability
- Vermont's electricity is 90% low emissions
- It seems like the state is not considering lowering overall energy usage.
- That my solar may be costing other rate payers extra.
- That Vermont doesn't consider Nuclear power as not renewable.
- It's unfortunate that several participants have had problems with renewable energy firms. It was good to see people with awareness of various energy alternatives.
- The amounts and %s of where our power comes from. Also that we get power from Quebec.
- How the grid works. I understand it better now. How there are so many factors to consider - and they're all important and they are all connected.
- Lots of energy from Canada. Lots of energy from renewables. Great!
- I learn a lot about the production of electricity from methane that I didn't know before. I had more thoughts about how equity figures into electric strategy.
- I did not know how much energy came from renewable sources already in VT. I also did not know that the state was planning to introduce legislation about renewable energy. I was surprised that the state did not consider equity in the legislation.
- The goals of Vermont to be at 75% renewable by 2032 was unknown to me before this.
- How much renewable energy is generated in Vermont... The whole of emissions from individual energy sources, including the effects on social equity, are generally not, but should be included in these calculations.
- I didn't understand the methane electricity.
- Most of VT's energy comes from Quebec Hydro.
- Info about RECs and trading to make renewable goals - info about sourcing % from other states - 2/3 from other states/Quebec
- That you could lease solar panels and that if you try to sell your home that you must fund a buyer willing to take on that lease. Also that those without solar panels are charged 'extra' for energy to cover administrative and logistical costs.
- More energy is produced in state and is renewable than I realized.
- The system of RECs and how it works.
- Off-shore wind is coming. Vermont only generates 33% of what it uses.
- The renewable energy credit usage and the prospect of off-shore wind projects.
- How much electricity Vermont generates on its own and how much is renewable and Which is carbon generated.
- I was not familiar with Hydro Quebec or where Vermont's renewable energy currently comes from.
- How much we actually get from our state
- How the grid works and what percentages we get from different sources. How REC's are used and traded. What the goals look like for renewables going forward.
- Total overall electricity is not all made here, but glad to see strides in renewables
- Vermont is on track for meeting its renewable energy.
- I learned I need to learn more about how energy is produced in VT

- learned a bit about biomass fuel
- REC's - buying and selling VT's affordability of electricity has improved relative to other New England states.
- From the pie chart, I learned that Vermont utilities buy nuclear power. I would prefer they replace that with hydro, wind or solar.
- A lot of different stories about solar panels
- How much power Hydro Quebec generates for Vermont. I had not thought about the waste from solar and wind turbines previously. How much Vermonters were struggling financially
- That VT has too many technical idiots who think power comes from the air. That few understand that power must be generated when needed and solar and wind don't work that way.
- The REC system is complicated - the 'powers that be' are thinking about system resiliency
- Didn't know about RECs, glad we're doing that. 72 vs 75% of RECs is a close gap - raise the bar.
- The % premium that is paid in order to comply with RES
- So many important categories from Renewable to Affordability to Equity...it's much more complicated than one would think.
- That Vermont uses far more nuclear power than I knew. That Vermont does get most of its energy from low carbon and renewable sources
- Did not know about the regional off-shore New England project going on.
- I actually am not sure that I learned anything new because I work in the environmental policy space, but it was good to hear others' opinions.
- We live in the most financially challenged area of VT, so hearing others share about their energy concerns was enlightening. I was surprised that VT utilities are doing as well as they are with renewable sources.
- The affordability and metering aspect and the overall rebate thuts (??) received.
- I found out the general costs of solar panels and heat pumps, which was helpful. I also found out about where VT gets its power from.
- 98% of electricity produced in Vermont is renewable
- Complicated issue. My focus group seemed to be in agreement about environmental impact and financial impacts.
- I didn't realize that utilities can help put in your solar panels by loaning you money to buy it and you pay it back when you generate the electricity. I also learned some cars (electric) can you 300 miles before you have to charge it.
- I found out that 72% is the goal for renewable by2032. I also heard from most of the people are concerned with the affordability
- The amount of imported energy that is purchased by VT. The amount of energy produced in state.
- The amount of power coming from Canada and the amount of renewable energy being used
- That the REC only pays a certain amount depending on needs in your area
- That biomass is still considered renewable. We are currently choking on Canadian wildfire air.
- I learned more about what RECs are and how they are used.
- Vermont's in state generation is higher than I thought it was. Net metering plays a large part of the state's renewable porfolio.
- Very little of our produced electricity comes from solar
- The percentages for each source of energy used in Vermont. The shared concern for affordability and equity.
- Better information re the RES credits
- What's all involved in power
- That Green Mountain Power sells Recs for a profit to other states. That Green Mountain Power does not invest those profits into renewable energy sources in Vermont.
- How little electricity is produced in VT and how much of it is renewable.

- The charts showing the sources of electricity produced in and out of state were new to me and different from others I've seen. It would have been good to see how much of the in-state energy is used within the state. And also good would be showing more clearly where the credits ultimately go.
- The percent of VT energy derived from renewable energy sources. How VT is doing meeting renewable energy goals.

In a few words, why did you select that as the most important factor?

- VT and the world must address the ever-growing increase in emissions.
- Your water pipes will freeze here without energy
- Because there are many negative factors that accompany renewable sources
- Climate change is the single most important issue facing humanity!
- Because we can't use electricity if we can't afford it.
- We do not have time to wait to reduce emissions. Some might argue it's too late.
- Carbon emissions do nothing but compound upon themselves
- The more we negatively impact our environment, the more negative impacts there will be for humans. The environment is already out of balance due to human population growth and damage to natural areas. A close second is emissions and decreasing impact -however to do either we need to gain buy-in through affordability and equity.
- Back to equity and affordability. Vermont is not an overly affluent state and many of the maps seem inaccurate due to the full-time Vermonters v. second-homers.
- If renewables become more affordable to consumers, it will be good for the climate. The marketplace will go towards what's more affordable.
- With inflation, I dont have extra money to spend on utilities
- Given the impacts for climate change on our state we must boldly step up the reduction of carbon emissions. But it must be done with specific emphasis on supporting working class and middle class folks.
- VT has a very high cost of living so anything to lessen that is appreciated
- We are electric reliant
- Renewable sources produce fewer greenhouse gas emissions, and also would help us be less dependent on fossil fuels and create more ways to generate electricity
- Because our natural habitats in Vermont are and always have been our greatest asset. I hope that never changes.
- Emissions, climate change or we do not have to worry about the rest of it - we will not be here
- A lot of Vermonters are struggling to afford to live here. A lot are leaving due the expensive cost of living.
- Making sure everyone can afford the upfront costs of renewable energy is in my opinion very important
- If we don't address climate change effectively and quickly then it's pretty much game over.
- I am retired and on a fixed income so affordability is always a first consideration
- Because I am on fixed income and I don't want to be faced with the choice of not having a home because I can't afford it.
- Because if you have to generate your own electricity, then you will use it more cautiously.
- Too many ideals get in the way of people being able to live comfortably and in dignity.
- Nothing is more expensive and devastating than global warming.
- I trust that affordability and the importance of mitigating climate change will produce the best eventual outlook e.g. local nuclear.
- Onsite generation with hopeful advancement with battery storage is where my hope lives.

- If the lights are not on then why are you paying for the company to supply the service.
- Because climate change is an enormous global problem. Trying to be on the leading edge as a tiny state puts us at a cost and economic disadvantage and has literally no impact (measurable/material) on global emissions. We will raise costs to cut emissions and exacerbate our economic and demographic issues.
- Everything else we can correct later. Climate change is an emergency/crisis probably irreversible.
- Vermonters don't take responsibility for producing the (cheap non-renewable) out-of-state energy we use, so we have become addicted to using way more electricity every day than we actually need. According to optimistic and realistic predictions, it's already too late to prevent the effects of global warming over the next few decades from causing incredible suffering and devastation to hundreds of millions of the worlds poorest humans, nor from causing the deaths of tens of millions of people. In other words, it takes a long time to find ways of producing more energy that doesn't cause global warming, but we're already out of time. It takes almost no time, a lot less work for, some good old fashion peer pressure (and sometimes maybe some coercion from our leaders) for individual communities to use less electricity while making sure everyone is ok.
- Because without a planet that supports life, all of the rest is moot!
- I live in one of the poorest counties in Vermont. Economies flourish when energy is cheap.
- It doesn't matter where or what generates your electricity if you can't get the product to the consumer.
- We've just been hit with a freakish weather event; globally, this was the hottest week in recorded history. We will face -- are facing -- catastrophic consequences if we don't face into the challenge.
- Because with a growing overall interest in EVs and other electric devices, we need to keep up with the demand without burdening everyone in an already failing economy.
- Because we are REALLY seeing the effects of climate change here in Vermont (floods) and around the world - heat.
- It is our home and we cannot destroy it. Safety matters.
- Without that nothing else matters. If the climate collapses none of the rest will matter.
- Affordability is the top priority for me; no matter how renewable a source of energy is or how great it might be for conservation and climate change action, it doesn't matter if I cannot afford or use it. I am a new homeowner and cannot afford $15,000 heat pumps in my home, I certainly cannot afford $25,000+ solar panels or more expensive wind energy resources.
- If the source is renewable, lower emissions tags along - and the more renewable development will bring the cost and make it more affordable. And more jobs in Vermont if renewables happen in the state.
- The planet's climate could make living on it virtually impossible.
- First, they are so intertwined by choosing impact on natural resources, the others fall in line.
- What little habitat and natural resources is left is severely under threat. In the end, we are nothing without the environment. Also, tourist economy relies on environment and climate.
- Affordability is the number one concern of many elderly and low-income families in most of rural Vermont.
- Vermonters (life-long Vermonters) are being priced out of living in their homes. We as a general population cannot afford to live and thrive in VT anymore. Prices are exorbitant in every aspect from groceries to property taxes to energy. Plainly put, if I don't get a third job my family will need to sell our home and move within 10 years.
- I am looking at the long game. I pay taxes through the nose and expect they be invested for those who may come after me.
- The natural world in Vermont is a precious resource and should be conserved wherever possible.
- For the environment. If we want humanity to continue we must make less of a climate impact.
- Paying your electricity bill is a constant balancing act that competes with rent or mortgage and other necessities.

- Because they are all factors we face and I'm not sure which one is more important than the other.
- We need electricity to be reliable so it's available when we need it.
- The land is important for everything from farming to gardening
- With the increased electrification of our society, the cost of electricity is logically going to increase given the laws of supply and demand. I think incentivizing efficiency and increasing reliable production will lower the cost burden for the average consumer, and businesses, going forward and create a more stable energy future for all.
- It ties in to the overall picture of other important factors and moving forward into the future
- The burden of the consumer whether to invest in solar or have to suffer the effects of solar on their bill.
- Because I'm on SS fixed income
- Because climate change will destroy us all and nothing else will mean anything. Looms over all of us
- Our goals are impossible to achieve if people can't afford to live here, and if people who can't afford to generate power resent those who can, we have created a community with deep divisions.
- I used to work to protect the environment, but our environment has seriously decayed over just my lifetime. to save our environment and to breath we need renewable sourced energy
- I believe it does the most harm.
- Because I believe that if we as humans continue to deplete the earth we will cease to be.
- If the grid goes down - everyone is in the dark.
- As climate gets more unpredictable, we need reliable, resilient, and low-maintenance systems to reduce system downtime/outages.
- The world is dying.
- Limited resources, I live in one of the least affluent areas in state and people have problems paying their electric bills
- Without natural resources the topic ends there.
- Without an affordable option the natural resources of our area will be taken advantage of and used without regard for sustainability
- All of our environmental problems that stem from climate change are due to man-made excessive emissions accumulating and increasing over time.
- I think it has the broadest impact and the most trickle-down benefits.
- Right now, many will be deterred from making sustainable changes in their energy use due to affordability. In our area, I have sought to use cleaner heating alternatives which are not available here (Bourne biodiesel) or too costly (Solar panels). I have an electric vehicle, and a heat pump hot water heater. We heat with wood and use minimal heating oil. But, still struggle with what is next, as we age.
- Climate change
- Many Vermonters are struggling financially.
- We're getting destroyed by climate change
- Climate change is an existential crisis. It impacts all of us but especially the most vulnerable.
- Humans are destroying the earth and we need to stop it!
- I have contact daily of a wide variety of people because of my job in a local convenience/gas station. I also live in one of the poorest counties in Vermont. People are scared because it has become very difficult to survive financially due to the high costs of electricity and the expectation of higher taxes because of the government mandates to get to their lofty expectations and not listening to the Vermonters. Many Vermonters who have generational ties are being forced out of the state because of the costs to the 648,000+ population.
- I have worked with low-income populations in the past. Therefore, affordability for consumers is important.
- If energy isn't reliable then the cost of damaged goods will skyrocket

- If your power isn't reliable, the other factors don't really matter
- If its not reliable you're in big trouble
- Electricity is required for many functions that pertain to the safety and wellbeing of people in the state. Reliability therefore must be the most important factor in my mind.
- Climate change is our biggest challenge as a community, state and nation.
- The most important thing is that service is not interrupted for essential needs like heat during the winter, especially if we are pushing heat pumps to use more electricity as fuel source for heating
- Many Vermonters struggle economically, and I would like to avoid a split between those with economic resources and those without them.
- VT is a very high-cost state in which to live. Taxes are high, cost of utilities are high. More emphasis is being placed on going electric and thus I feel that it is critical we keep it as affordable as possible.
- Making power affordable for all Vermonters
- Without electricity, there's no water, no heat, air conditioning and in Vermont, that can be life threatening.
- Life without electricity just sucks and I am old enough to remember the days when we would be without power for a week at a time. I still have my collection of oil lamps.
- We can't 'save' the world by destroying it.
- Climate change is and will affect our lives, our economy, our safety, our environment, etc... If we don't take action, the Vermont of 2023 will be a distant memory for my kids when they are my age.

Hydro follow-up: Briefly, why did you rank the item you selected first?

- This is hard to do. I assume larger projects like Hydro Quebec are cheaper, thus preferable from an affordability perspective, but I think the decision should weigh all factors.
- Reliable as close to home for repair
- I want to see hydropower developed regionally
- A variety of local source seems more reliable and resilient for the grid
- Because Quebec already gives us a lot of energy
- I think it would be preferred to have more control of our own large-scale hydro project.
- Large scale hydro is always my preference
- Closer and more localized is better. However, we need enough power to support the need. I also do not fully support hydropower because of the impact on the environment.
- It seems potentially sketchy to get electricity or anything really from another country. Borders aren't real but legal regulations are. 'Energy independence'.
- Large scale is preferred. Rather not hurt VT wildlife or disrupt.
- That one is already big and has a great record
- Hydro Quebec is longstanding and important but not without controversy. If we could build out more hydropower in medium scale in the Northeast that would be good.
- Hydro has some negatives such as increased evaporation and build up of heavy metals. So the less amount of hydro plants the better.
- Hydro Quebec is reliable and already running
- Because I do not know of the damage/risks small hydro plants would cause to our wildlife and environment in Vermont. Sorry, Quebec!
- Because at present, it is the largest and most reliable. Would love to see Vermont and a New England co-operative.
- It seems to be working
- There is a small hydroelectric plant in my town, while I don't know the amount of power it is producing it has been running for years and continues to provide power.
- I chose this as I feel it's important to create and be energy independent. By producing our own hydropower it would also need to be cost effective too as that is important factor to me in the grand scheme of things.
- It's kind of the 'devil you know'. Less cost to convert to something else. No further damming of rivers locally.
- Hopefully there would be multiple hydropower generates so VT can diversify
- Because that is where VT gets the majority of our electricity.
- Keep it local
- We're already connected to them and they're very reliable.
- Available, affordable, existent, and low carbon
- I feel we should be stewards of our own power generation.
- I don't think that large hydro is so good. The flooding of Hydro Quebec 2 is all done but it was still an unfortunate event. Local and sustainable with generation as close to home as possible is the way to go, and why I ranked as I did
- VT doesn't have the place for the dam of the size that is needed nor the water flow.
- It's existing and reliable and huge
- In general local power is preferred for energy independence and keeping our money local.
- Each community should be responsible for producing as much of its own resources as possible.
- I don't know how to answer this.
- Smaller is better for Vermont. No need for reservoirs like Shasta or Mead.
- It's the largest scale and already established
- I'd like to see ecologically-sound use of the natural movement of larger waterways, within the northeast region, and would like regulation to be controlled by our government. Vermont's smaller rivers and streams are generally smaller (less potential) and very variable in flow and behavior.
- We should first always strive to be self-reliant!

- I think it would be super, more efficient, etc to have it in the US and smaller scale.
- Regional teamwork!
- HydroQuebec seems most reliable, but could be convinced.
- It's important to have our own reliability in energy sources and use out of state sources as a back up. VT ought to maintain control and power over our energy sources and how they are used, rather than letting Quebec or a regional energy provider decide for state residents. My opinion is based on my experience living in AZ, where water comes from the CO River and is shared by 4 states that are predominantly desert or dry-climates. There are water rations imposed on residents in AZ to ensure equitable access to water for residents of all 4 states sharing the CO River water. Based on this model, I think it's important for VT and state residents to provide our own renewable sources of energy rather than relying on international or regionally based sources.
- With all the water in Vermont from the mountain tops we could produce electricity while diverting water sources from causing flooding, like recently.
- Keep it local, deal with the impacts on our terms.
- I note what happened to Indigenous people's land which was taken to create Hydro Quebec. I would not want to enlarged and more taken.
- Boost VT economy, self-reliance, utilization of proximal untapped resources.
- Affordable electric power is already in place from Hydro-Quebec.
- I'd like to see VT make enough power to support itself. We have rivers, we used them to create power for decades. Let's get them functioning again and add more! Hydro is least invasive to the environment, has the smallest footprint and would increase jobs for Vermonters.
- I would love to see more production inside Vermont. our economy could use the help. The region could use the help. We should have invested in HydroQuebec.
- The impact to the environment of small streams should be considered; Hydro generated in large scale projects can limit impact to less areas. Although I'm not sure how many dams Hydro Quebec has given their excess of available power - it seems to be a large project.
- We currently get a lot of hydropower from Quebec, and it works. It doesn't necessarily need to come from us to use it.
- Supporting our fellow Northeastern states supports our economy
- The reliability of Vermont's hydro dams are not large enough to supply our power and are subject to flooding like we just had
- Hydro Quebec seems like it would be most reliable.
- I think we need to stay local but also need to be able to rely on others.
- I think if small Hydro were to be implemented in the proper way, it could, hopefully, be done in such a way as to have a very small impact on the local environment relative to its size.
- Seems to be reliable (which was another factor?)
- It seems to be the most abundantly available resource at the moment for Vermont.
- Jobs for US market
- Importance of being self sufficient
- I don't know enough about hydropower, so I went with small is beautiful
- Equity: if we use Hydro, we must put it in our own neighborhoods
- Jobs
- Using hydropower from Vermont encourages self sufficiency and supports Vermont jobs
- We should not depend on power from another country.
- It's established and with a friendly neighbor.
- Supporting VT and New England resources ahead of Canadian resources, reduce our dependancy on Canadian resources
- The displacement of wildlife not to mention humans would be impacted greater with larger scale projects.
- It is the current biggest provider of power and all the infrastructure is there to support its use
- Because decentralized power production is usually better for the customer but VT doesn't have enough small hydro to provide for our needs (I think)
- Because Vermont needs to increase its in-state energy production

- Areas that formerly used hydropower in Vermont are no longer utilized. We have an unlimited supply of hydro power here in VT. to tap into.
- Vermont is local
- In state seems to be part of the goal - generating more electricity in state.
- I hope that we'll be able to create minimally disruptive, small scale hydro projects
- With lack of other info, it seems the source is working and is reliable.
- I like our hydropower to come from a local sources. Since we don't produce enough power, we have to get some from other sources, such as Hydro Quebec.
- Quebec has the most experience and as such let's don't abandon them. There should be a process to develop other hydro sources in a sensible pace to get the right mix not harming environment and being cost effective to the companies as well as the customers.
- Keeping dollars in the national economy.
- Local power will create jobs and create less draw from father away
- Keeping it local is important
- Large scale reliability
- I like the idea of producing energy in-state. This contributes to our economy and is not tied up with the priorities of an outside entity.
- To maintain affordability, and meet the growing needs, scale is important.
- In state is most reliable
- Likelihood that it might be a real long term option.
- I believe it is probably the lowest cost per KW
- Source it out of your own state
- Hyrdro Quebec already has the facility in place so the environmental damage has already been done.
- With the impact of climate change and severe weather I think smaller but more of them might mitigate losses when these weather events happen.
- Local energy if wisely produced is most efficient and has the potential for being the least destructive of the options.
- Vermont has many rivers and streams that have not been utilized for power generation for over a century. If we can use local hydro in ways that don't damage our ecosystems (ie, migratory fish), then we should do this.

Solar follow-up: Briefly, why did you rank the item you selected first?

- People think large solar or wind arrays are ugly, but I don't find them uglier than miles of transmission towers and power lines. Energy generation will be visible, just do it with as light a footprint as possible.
- Need a lot of it to work
- I want them large enough to have an impact, but not too large as to ruin the beauty of the state
- Every roof in the state with exposure is an opportunity for clean energy
- Large scale is good but not too large.
- It utilizes existing space avoiding additional development.
- I would prefer we avoid dedicating land solely to solar generation.
- I like the idea of solar power over parking lots. I do not like using open land for solar power - unless we know the impact on the temperature of the surrounding area (ground level) and animals that use that environment.
- Less obtrusive, less line loss, more investment by citizenry.
- Less ecological impact
- Solar belongs on structures. Residential builds equity. Concerns over vegetations with larger scale solar
- Larger land is more bang for your buck
- I think there is a robust market and profitable business pushing residential solar. I think the state should do more to build medium commercial solar on existing rooftops, etc.
- Honestly because of resilience of the grid would be better with more small scale systems
- I think small fields are a good way to produce solar at a level that actually helps
- I am not sure, but I believe that for those who can afford it, it can reduce their carbon footprints and costs. But it would be great if more homeowners were able to afford it, and also if more people, including renters, could have the ability to affordably tap into community solar
- 2 acres maybe gives opportunities to renters. The rest seems sensible to a larger group of homeowners.
- I believe we have a lot of these types of roofs - perhaps the state would be willing to subsidize and these businesses can encourage their colleagues and neighbors.
- Solar needs to be made affordable so that we can continue to be able to afford to live in VT
- My choices could be different based on being more knowledgeable about the change with usage of land used for solar fields.
- Least obtrusive. Most potential for equitable division of benefits.
- To get the most bang for your buck and hopefully not ruin VT's beauty.
- I can't answer this because I live in a large apartment complex.
- Less of an eyesore
- 25+ acres seems impossible to hide. Beneath that scale, the larger the farm, the more efficient and easy to plan/manage/anticipate generation and infrastructure needs.
- Big is efficient and consolidates the needed infrastructure .
- Community solar makes sense on equitable / transmission line / grid reliability level
- We don't have big large areas and feel that local generation would also be good for conservation
- If you are going to make power you need to build the plant. Residential is good for the homeowner but GMP is going to squeeze the worth of the expense and eventually upkeep.
- Solar has a lot of negative externalities
- Energy independence, aesthetics
- If we only used the electricity that we needed then we wouldn't need to produce much electricity at all.
- Least impactful - keep it local

- Less impact on environment
- Distributed power has least chance of major failure, least environmental and aesthetic impact. Many rooftops and small installations are better than taking over farm fields or cutting down forests for major installations.
- It's my opinion that everyone should be self-sufficient and can be linked to help community in the event of an outage.
- Because of scale - we need more!
- Efficient for all Vermonters, not just those who can afford it.
- Would rather use already developed space than convert green space
- I love the landscape of VT and individual homes having access to roof solar is less visually intrusive than a solar panel farm, which I live quite close to and find gross to look at against the mountains and farms.
- Allow Vermonters as individuals to have options for solar and show how it can work in a large setting
- Keep it local, but be efficient about it.
- To me, when it makes sense, small is preferable, and one has more control over the results.
- There is real estate not being used. Parking lots!!! Put panels on them. Commercial buildings! (roofs)
- Small residential arrays are less intrusive.
- If solar is what the state chooses - not my first choice - the smaller the better. House panels are the least invasive option. I have installed medium solar fields with my husband. He is a master electrician. The simple habitat that was destroyed made me cry. The acreage was fenced off and many animals and species were displaced. In VT we are supposed to value our land and environment. These installations are eyesores and damaged the habitat.
- I have concerns about the environmental impacts of large projects and do not know enough about them at this time to be comfortable supporting them. My house, however, and parking lots, are already there to use.
- Community supported and located power production can bring renewable energy to all consumers, not just those who can afford or choose to put rooftop solar.
- Structures that are already in place should be prioritized. Keep the land empty.
- Small scale systems I believe are a much more achievable goal
- I don't like to see the large scale solar arrays on large tracts of land
- I feel the small systems would more benefit homeowners and renters.
- I know people who have them and love them and it's not taking away land
- If you use large rooftops you are utilizing land that is already being used. I think that putting solar panels over parking lots would be the optimal use of space, and it would serve a dual purpose. I hate seeing large-scale solar projects taking up fields that were once used for grazing or crops...
- considering realistic order of things
- It can be the most effective for families to lift the burden of utility bills
- Local people have access
- Protecting our natural resources and open space
- To allow more people who want to participate in buying renewable power access to it.
- Equity: we need to live with the impacts and generation of the energy we personally use.
- It's the most doable
- Because everyone plays a part and cuts down on the eyesore
- Vermont will not be pretty with all the fields filled with solar panels.
- Vermont has lots of land to hold these larger systems and 25 - 100 acres is small in grand scheme of things.
- Economy of scale has the greatest impact on equity and affordability.
- Economy of scale and environmental impact
- Again, smaller environmental impact.

- I think a small diversified plan impacts the land less and spreads out the generation to where it is used
- Solar would be distributed more equitably and use up less valuable open land.
- I think solar farms are an important way for Vermont to keep lands open and produce commodities. We need to think about solar in the same way we think about soybeans or corn or other crops. Plus, the infrastructure is much less impactful in the long-run than a Walmart on that land.
- Community shared solar panels are less intrusive in a state that relies on the beauty of its landscape for tourism.
- Keep the green space
- Because it seems like it's something that is not expected of an individual consumer.
- Balancing economies of scale and ecological disruptions. I also think there are a lot of underutilized large rooftops
- Not sure I can justify my choices and have an info gap / defect.
- I like them on rooftops where they are out of the way.
- Should be a personal choice. Vermont is a beautiful natural state the solar farms take up land and are unattractive. We also don't have enough information on the effect they have on the land and we definitely don't have a solution of recycling the into non toxic trash. We should be helping solve one issue only to create another environmental issue
- Centralized energy has possibility of lowering cost.
- Panels on homes and businesses will double use an area
- It would be more bang for your buck, but not putting all of your eggs in one basket
- Large scale reliability
- Using panels on rooftops seems to be the most efficient, as they are not taking up space on land that could be used for something else.
- Community scale is more appropriate to meeting increasing demand due to Vermont geography, climate, and available sunlight. .
- Solar power is not a great source of renewable given the amount of sun we get year-round, our land can be put to better use, smaller on site generation is less intrusive
- Least impact on the environment and surrounding community
- Not sure, but I think it would help with consumers' electric bills
- Look at the affordable sources for all Vermont
- Large enough to produce energy but small enough for area to be used for complimentary purposes; i.e., sheep grazing
- I would love to see these large flat top buildings put to this use,
- Community is the best scale for a small rural state because it allows for local control and greatest efficiency. The problem with a question like this is that the answer might be different for larger than for smaller populations, urban areas and rural areas.
- Commercial roofs are usually completely wasted... Solar would be ideal on most of these large buildings.

Is there anything else that you would like to share?

- There was a good mix of opinions
- I am glad I did this. I enjoyed hearing from other Vermonters and I learned a lot in the process.
- Vermonters helping out other Vermonters is what Vermont is all about.
- Vermont is having an affordability crisis, I would be willing to pay more but many may not be able to do so. Every additional cost is pushing people out of the state. In order to really have this discussion there needs to be information on life cycle emissions and costs.
- 10 out of 10
- Great job. Fun. Thanks!
- Thanks for your work
- Thank you
- Very interesting, well presented. Great group of Vermonters. Thanks for the opportunity!
- Thank you! I learned a lot and look forward to our future - Vermont is on the right track and it makes me feel good.
- I think this was great. It offered a lot of info from a variety of people. I would love to be able to follow up with this info
- Thanks for doing this.
- Nicely done. Masha and Rich are top-notch.
- Profit should not determine our options and non-profit utilities would be healthy for the State of Vermont to approve
- The overwhelming consensus of the group was that affordability is the primary concern, yet the presentation and balance of the discussion was steered toward renewables...by design. Perhaps it should have been more dynamic, to follow the thread of the group
- You need more participants to have a more engaging, informative discussion.
- I did not like how unbiased the presentation was. People who are responsible for presenting info to and getting feedback from the public regarding state policies that affect the planet should be very invested in making ethics a priority.
- Appreciation - great discussion!
- Thanks for the opportunity
- I enjoyed the discussion. I wish there had been time to consider efficiency/conservation and geothermal in greater detail.
- If there could be a way, turn carbon [emissions] into fuel and use it. Carbon engineering is rumored to have done this.
- Add safety (ecological, and human) to list, put affordability under equity.
- This was a great experience!
- Create a more unified group so Vermont truly has all the different agencies, community groups and individual utilities work together to get a more effective result. Encourage all people to be involved and individually responsible.
- Again, the entire picture of how energy is produced and sourced must be included in making policy decisions.
- I was a well-run and informative session.
- More weatherization for renters! Paid for not by renters. But mostly, build solar panels on unused non-natural habitat locations.
- Affordability is the #1 issue. #2 issue - upgrade the grid. Then we can move on to set deadlines for improving carbon emissions and attaining renewable energy. Honestly everything is moot if the grid gets overloaded. That should be the highest priority and that needs to be balanced against the socioeconomic status of taxpayers as a whole. I cannot afford higher utilities. I get disconnect notices every few months because I can't pay my full electric bill as it is. I can't afford upgrades to appliances or my home or my heating or my transportation. Most of my community feels the same. We are in

[REDACTED], VT. Our neighboring town of Randolph which we share a zip code with is also struggling economically. I utilize the Food Shelf there and my family and I volunteer there as well. I can tell you the number of families that regularly 'shop' there has increased almost 100% over the past 3 years. VT is in bad shape financially - or rather the lifelong locals are in bad shape. We can't afford increases in utilities.

- I appreciate the space and tone with which an extremely fraught conversation was hosted and facilitated. Thank you for listening.
- I appreciate the diversity of opinion amongst the panelists and that there are others that share my concerns.
- I would like to see a program that would help make solar much more affordable to all homeowners.
- Thank you for the opportunity to learn some of this stuff
- Was a wonderful and lively discussion. Glad to be apart of this.
- Thanks
- Who does our feedback go to? I think I wasn't clear about that.
- I would have liked more information about the grid - its limitations, new technology, etc. And battery access. I don't live in GMP catchment area.
- I'd like for people that use more than a baseline amount of energy to pay significantly more per unit of power. Income disparity should be leveled out by demand. Energy Conservation was not mentioned and low-income people conserve energy and should reap some benefit
- I would be one of those folks who would switch to solar if it was affordable and I understood the process
- Would've been better for group to be in a circle where we could see each other and nametags - printed packets vs the ppt slides so we can take notes along the way - encourage an icebreaker discussion during mealtime - moderator to encourage the quiet ones more
- Thank you for the opportunity!
- By participating in tonight's form, it's given me the push to become more involved in the topic of energy, not just within my community but regionally if not statewide.
- I appreciate that the views of citizens are being considered.
- Amazing experience
- No, thanks so much. I learned a lot!
- I found the information presented was very informative and gave me alot to think about.
- I support finding a way to be kind to the environment but we cannot push too fast. The power grid in Vermont and the United States are not there yet. It is a great political and activists talking point but we must be smart on what we are doing.
- Energy efficiency should be considered along side of generation electricity. It would be interesting to see how much electricity we are not using due to energy efficiency compared to the energy we are using. Can efficiency be increased? What is the potential going forward?
- No. thank you for asking
- My question wasnt answered
- I have learned a lot from this experience and feel lucky to be involved
- The best use of gathering these opinions would be to take them as a guide for increased general education on these topics. The state needs to encourage community discussion of these topics, and it needs to invite the public into the planning of solutions for our energy, climate and environmental problems.
- Thanks for the opportunity to share my thoughts.

Appendix E: Policy Brief

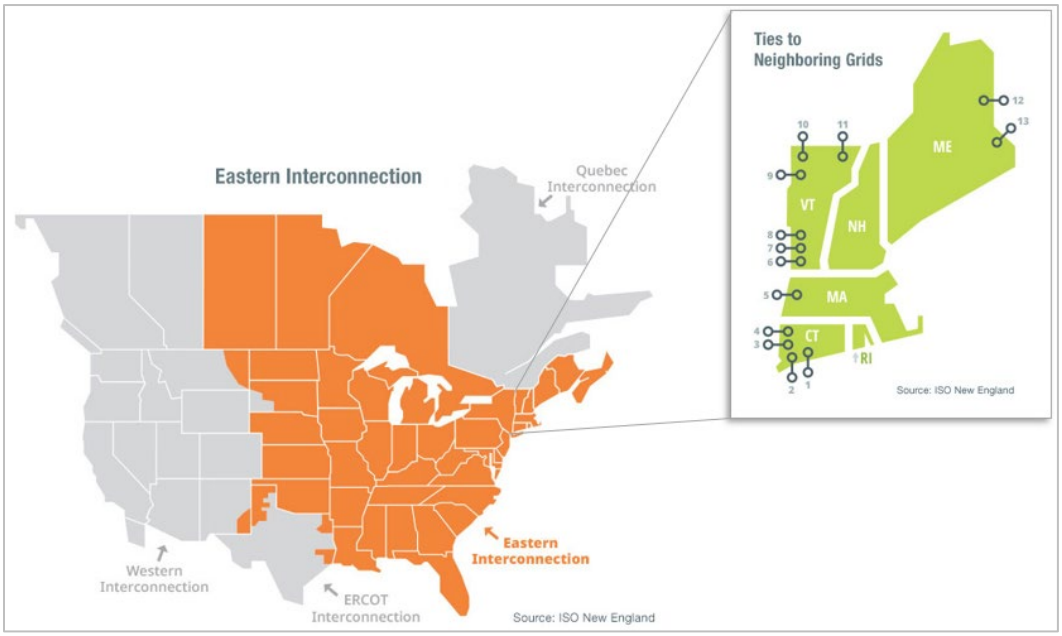
Vermont Electricity 101

Thank you for signing up for one of our public discussion events! We have prepared the following primer about how Vermont gets its electricity. We have organized it as a series of answers to questions about the state's electricity supply.

Please read this document before your event. It will help everyone have some basic information for the discussion. Thank you!

How does electricity get to Vermonters' homes and businesses?

Electricity is delivered to homes and businesses through a network called **the electric grid**. The grid includes the poles and wires that you likely see outside of your home or as you are driving around your community. Vermont's electric grid is nested within New England's electric grid, and in turn connected with a much bigger grid serving communities in the U.S. and Canada from just east of the Rocky Mountains to the East Coast.



Regional grid operators are responsible for keeping the entire grid in constant balance: the supply of electricity from various sources needs to equal the demand for electricity from consumers at all times. In New England, the regional grid operator is known as **ISO New England**. ISO New England keeps track of the amount of electricity being produced and consumed in the region and manages how electricity is transferred between surrounding regions, including Canada.

ISO New England works with local **electric utility companies** in Vermont, such as Green Mountain Power or Vermont Electric Cooperative. We as electric customers buy our electricity from these utility companies, which deliver electricity over the poles and wires to our home or business and send us a monthly bill for what we consume.

State government also has a role. The **Vermont Public Utility Commission** regulates electric utilities, approving projects to generate new electricity, making rules that govern how electricity should be produced or purchased, and overseeing how much electricity costs.

How is electricity generated, and what are the differences between different sources of electricity?

There are many energy sources that can be used to generate electricity, and each has different features. One way to categorize electricity sources is by their impact on the environment. One factor is whether or not the sources are renewable – whether they are replenished naturally faster than they are used to produce electricity. Another factor is how much carbon is emitted by converting the fuel source into electricity.

Non-renewable sources include fossil fuels (like coal, oil, and natural gas) and nuclear power. Historically across the country, fossil fuels have been the largest source for generating electricity, but this is changing. Burning fossil fuels produces harmful emissions, including carbon which contributes to climate change. Current federal and state environmental policies are aimed at reducing these emissions. Nuclear power does not directly produce carbon emissions, but it is not considered a renewable form of electricity.

Renewable sources include solar, wind – which can be produced "onshore" or "offshore" – and hydropower. Biomass – burning wood or other plant materials, or methane gas from farms or landfills – is considered renewable under some definitions, including in Vermont. Most of these energy sources do not emit greenhouse gases when transformed into electricity, although biomass does. Renewables are growing as a source of electricity in part because of government and commercial interest in them to solve climate and other environmental problems.

Another way to characterize electricity is by *what times* a resource can produce electricity. This is important because of the need to balance supply and demand for electricity in the electric grid to make sure electricity is available to use on a reliable basis. Some resources only produce electricity at certain times of the day or year, while others can produce electricity at any time.

Fossil fuels, biomass, large-scale hydropower, and nuclear power are available around the clock to provide electricity. These are sometimes called **baseload** sources of electricity. Solar, wind, and smaller-scale hydropower are only available at certain times (e.g., when the sun is shining, or the wind is blowing). These sources are called **intermittent.**

New sources and technologies could help stabilize the electric grid as more intermittent renewable sources are added. Offshore wind captures more constant wind off the coast, allowing it to generate electricity more often and at different times than onshore wind or solar. New types of batteries that allow for storing intermittent electricity until it is needed are being developed. These will enable sources like solar and wind to be used at more times of the day.

Another key factor about different electricity sources is where they are *located*. For example, electricity could be produced in Vermont ("in-state") or in neighboring states and countries. Sources of electricity located in-state could come with many benefits, such as helping create local clean energy jobs for Vermonters or helping to provide power during extreme weather events if also sited with batteries. Alternatively, some resources may not be available within Vermont, such as off-shore wind.

The table below compares different types of resources against some of these key considerations.

	Timing	Renewable?	In-state?	Carbon Emissions?
Fossil Fuels	Baseload	No	Yes	High
Solar	Intermittent	Yes	Yes	Low
Onshore Wind	Intermittent	Yes	Yes	Low
Offshore Wind	Baseload	Yes	No	Low
Hydro (large)	Baseload	Yes	No	Low
Hydro (small)	Intermittent	Yes	Yes	Low
Biomass	Baseload	Yes	Yes	Low
Nuclear	Baseload	No	No	Low

Each source of electricity has a relative **cost**. Cost is an important consideration in making sure all Vermonters can afford electricity equitably. Burning fossil fuels has been the cheapest way to make electricity, but that is changing. The environmental costs of burning fossil fuels are beginning to be accounted for, and prices for renewable sources have begun to decline. Larger renewable projects can often produce electricity at lower costs because they can take advantage of economies of scale.

Another **equity** consideration is making sure all Vermonters have access and ability to participate in renewable and clean energy opportunities. Where we site future electricity projects is also an equity issue. In deciding where to build new wind and solar or transmission lines, Vermont considers the trade-offs between the need for clean or renewable electricity and other potential uses for the land where a potential project might be built, and the impact that the project would have on those who live nearby.

How are all these different sources of electricity tracked and accounted for?

The New England Power Pool Generation Information System (NEPOOL GIS) is in charge of keeping track of how all the electricity fed into the ISO-New England grid. NEPOOL GIS tracks how all this electricity is produced, including the type and quantity of emissions that were created in order to produce the electricity. Each unit of electricity generated is assigned an "environmental attribute". This tracking is similar across the country.

In New England, all states have policies that define what types of resources are considered renewable. Each unit of renewable electricity generated is allocated a type of environmental attribute called a Renewable Energy Certificate (REC), based on these definitions. These RECs can be traded between generators, utility companies, and even the end consumers of electricity, to meet renewable energy goals or requirements. A utility company might purchase RECs from a generator of solar, wind, or hydro power to get credit for providing renewable power to its customers and to meet the renewable

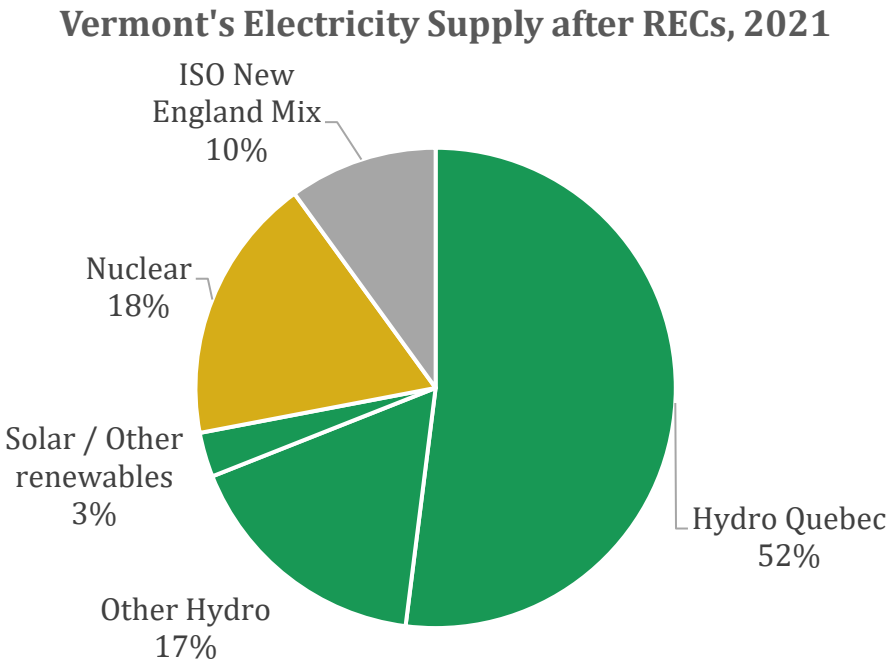
energy requirements of the state it is operating in. In some states, attributes from nuclear resources can also be used to meet certain clean energy requirements.

The trading of RECs among generators, utilities, and even customers means that a utility or customer may receive credit for the generation of renewable electricity even if the electricity wasn't generated where the electricity was consumed.

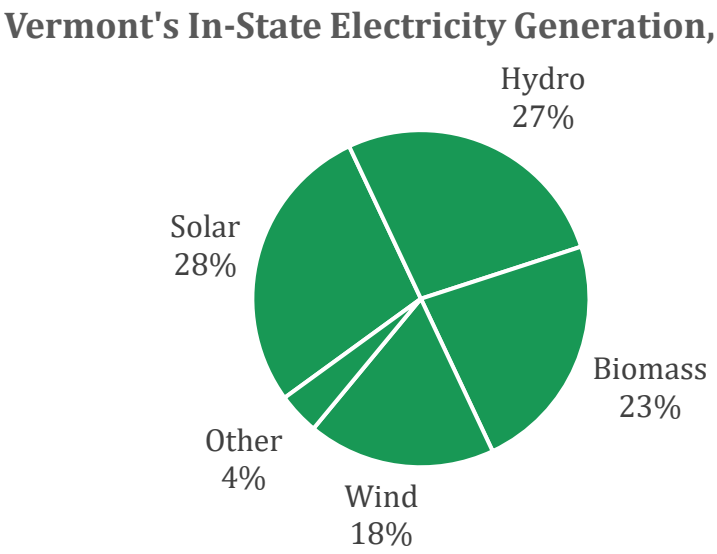
How is Vermont doing on renewables right now?

Both in terms of what Vermont purchases to meet demand in-state and what it gets credit for after the trading of RECs, Vermont is already well on the way towards renewable electricity. In 2021, after accounting for REC purchases, **72% of the electricity used in Vermont came from renewables** (shown in green in the chart below); **90% of it was carbon-free** (show in green and yellow in the chart below).

Hydropower makes up 69% of Vermont's electricity, mostly from Hydro-Quebec in Canada, resources in New York, and small hydropower resources in Vermont. Nuclear power makes up 18% of Vermont's electricity, and 10% came from a mix of resources located within the New England region, largely natural gas and other fossil fuels. Solar accounted for 3% of Vermont's electric supply, and other renewables, including wind, made up less than 1%.



The electricity that is generated within the state of Vermont is also largely renewable. The largest sources of electricity located in Vermont include solar (28%), hydro (27%), biomass (23%), and wind (18%). These are all considered renewable, and all but biomass is considered low-carbon. Landfill gas (3%), farm methane (<1%) and a tiny amount of oil make up the balance.



The electricity produced in Vermont only covers about one-third of the state's electricity needs. As a result, Vermont imports electricity from other sources, and the mix of sources that Vermont uses to meet its electricity needs differs from the mix electricity that is generated in the state.

How does Vermont regulate how much electricity comes from renewables?

The **Renewable Energy Standard** is the single biggest policy currently driving Vermont's renewable electricity future. The Renewable Energy Standard, which started in 2017, requires electric utilities to purchase **75% of their electricity from renewables by 2032**. This renewable electricity can come from any resource in Vermont, the other New England states, New York, and Quebec, Canada, no matter what size, when it produces electricity, or when it was built.

The Renewable Energy Standard also requires that utilities purchase electricity from new renewable electricity **built locally in Vermont**. This unique local requirement increases each year until it reaches **10% of the state's electricity in 2032**. These new local projects can be no larger than 5 Megawatts. A Megawatt is a measure of power – how much electricity something needs to turn on or generate instantaneously. For reference, a 5 Megawatt solar project operating at its maximum output during a sunny day could help turn on 500,000 light bulbs at the same time. It would cover 30 acres.

The other central policy encouraging renewable energy development in Vermont is "net metering". Net metering allows customers to generate electricity either on their own property or by contributing to a community renewable energy program. This most often applies to solar power – for example, putting solar panels on the roof of a home. Net metering gives customers an incentive to do this by providing them a credit on their electric bill. That credit is larger if the consumer transfers the REC for the electricity they produce to their utility company.

So far, net metering has accounted for nearly all of utilities' local generation requirement described above. But there are some issues. Letting individual customers generate electricity tends to be more expensive for Vermont than building larger solar farms on open land, even if it results in lower electricity bills for the individual installing renewable energy. Any credits to individual customers above and beyond the value of the generation are paid for by other customers of a utility. Also, the

credits that net metering customers receive on their bills can mean that other customers are paying more for electricity, especially if utilities increase their rates to cover the cost of delivering electricity.

How Does Vermont Compare to its Neighbors?

Many other states in the northeast have targets for increasing their clean or renewable electricity, which range from 25% to 70% by 2030. Maine recently added a 100% renewable energy goal by 2050, and New York has a 100% clean energy standard by 2040.

But comparing percentage targets is a bit like comparing apples and oranges, because each state has different definitions of renewable or clean energy. Vermont has a broader definition of renewable energy than its neighbors, making it easier and more affordable for Vermont utilities to achieve the state's aggressive renewable energy standard target. In practice, this has led to Vermont importing large-scale hydro from Canada for most of its own electricity, while selling large-scale solar, wind and biomass to other New England States to help them meet theirs.

As a region, the northeast is moving to make even more use of renewable electricity. Vermont and other states are pursuing contracts to tap into offshore wind projects slated to be built off the coast of Massachusetts and New York. Vermont, Massachusetts, and New York are also all supporting proposals for large-scale transmission lines to connect to Canadian hydropower.

What are our future options and choices?

As Vermont continues to expand renewable electricity, the state may face a number of challenges. The trend towards **electrification** – replacing fossil fuels for home heating with electric heat pumps and replacing gasoline-powered cars and trucks with electric vehicles – will increase the demand for electricity. Utilities will need to buy more renewable electricity to keep up with demand while meeting the curent renewable requirements.

Amidst this focus on electrification, energy efficiency can help to keep demand down. It is often the cleanest and most cost-effective first option. As we electrify our home heating and our cars, we should make sure to do so efficiently.

As we look to the future, in deciding how best to modify Vermont's renewable energy policies, there are multiple policy choices. Each choice has trade-offs, with implications related to affordability, environmental impact, equity, and the reliability of the electricity supply.

Questions Vermont faces as we consider changes to our energy policies include:

1. Should utilities be required to purchase more than 75% of their electricity from renewable resources?
2. Should Vermont require utilities purchase carbon-free resources, like nuclear, in addition to renewable resources?
3. How can Vermont ensure all customers have access to affordable electricity and the chance to benefit from renewable energy?
4. Should Vermont utilities purchase electricity from new resources in the New England region but outside of Vermont, like offshore wind?
5. Should Vermont aim to produce more of its renewable electricity in-state than it does now?
6. Should Vermont encourage larger, utility-scale renewable projects, or smaller, more distributed projects, like rooftop, ground-mounted, and community solar?

These are just some of the questions we want your input on when we meet at the event. We look forward to hearing what you have to say!

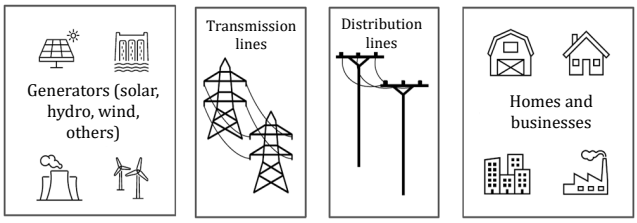
Appendix F: Event Slide Presentation

The Grid and
Electricity Sources

1

How does electricity get to us?

- **The Grid:** the system connecting electricity generators, power lines, and homes and businesses.
- **ISO-New England** manages the grid for all of New England, including Vermont.
- **Utility companies** (Green Mountain Power, Vermont Elect
- ric Coop) make or buy electricity and sell it to consumers.
- **The State Public Utility Commission** regulates how the utilities make or buy electricity and how much they can sell it for.



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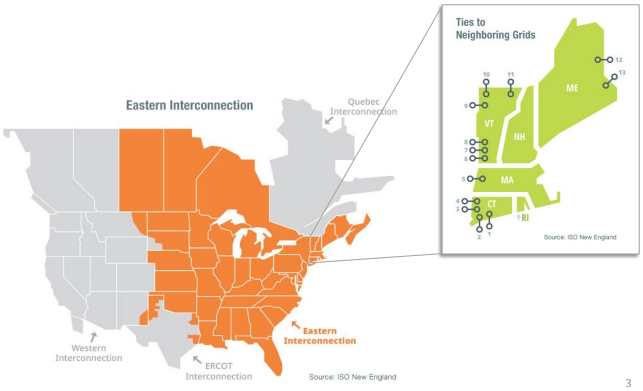
Graphic Source: Vermont PSD

2

Vermont and the regional grid

- The New England grid Vermont is part of connects to a much larger grid stretching across North America to the Rockies.



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Electricity Sources – Key Factors

Renewable	• Is the source replenished naturally faster than it is used?
Emissions	• Does the source release emissions that contribute to climate change or other types of air pollution?
Timing	• Can the source provide power at any time (baseload) or only at some times (intermittent)?
In-state	• Is the source located within Vermont?
Affordability	• Fossil fuels have been cheapest, but this is changing with government policy, more renewables, and new technology.
Equity	• How do we ensure that the benefits and costs of generating electricity are shared equitably by all Vermonters?

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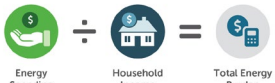
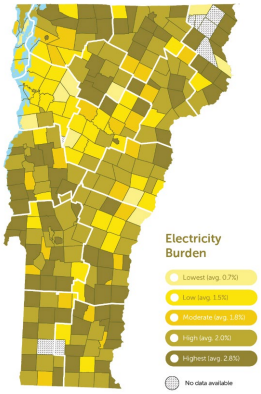
4

Affordability & Equity

- For some Vermonters, the cost of electricity is a bigger share of their budget than others.
- Towns most burdened by electricity costs also tend to have higher transportation and home heating costs. Electrifying cars and home heating could reduce the overall energy burden, but only if electric rates are affordable.
- Wealthier residents spend less of their budgets on electricity and can afford to invest in energy efficiency or even their own solar panels.
- Programs to expand energy efficiency and renewables to lower- income residents can help level the playing field.
- It is also important to think about where electricity resources are in communities, both in Vermont and elsewhere, who can benefit from them, who bears the brunt of any pollution, and who has a say in where they are placed.





Source: Efficiency Vermont 2019 Energy Burden Report

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Electricity Sources Compared

Source	Timing	Renewable?	In-state?	Carbon Emissions?
Fossil Fuels	Baseload	No	Yes*	High
Solar	Intermittent	Yes	Yes	Low
Onshore Wind	Intermittent	Yes	Yes	Low
Offshore Wind	Baseload	Yes	No	Low
Hydro (small)	Intermittent	Yes	Yes	Low
Hydro (large)	Baseload	Yes	No	Low
Biomass	Baseload	Yes	Yes	Low**
Nuclear	Baseload	No	No	Low

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Vermont has a few fossil fuels plants that only run a limited number of hours each year, as needed.
***Vermont's Greenhouse Gas Inventory reports emissions from biomass electric generation as low. However biomass has natural emissions that are reported.*

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Vermont's Renewable Policies

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Tracking renewable electricity

- New England Power Pool Generation Information System (NEPOOL GIS) tracks how all the electricity fed into the New England grid is generated, including the environmental impacts like carbon emissions.
- Electricity from renewable sources is given a Renewable Energy Certificate, or REC.
- Generators, utility companies, and even some electricity consumers buy and sell these RECs to meet renewable energy goals set by states.
- Whoever owns the REC gets to say they are using renewable electricity.

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Renewable Energy Standard (RES)

- Tier I: Requires Vermont utilities to buy 75% of their electricity from renewables by 2032.

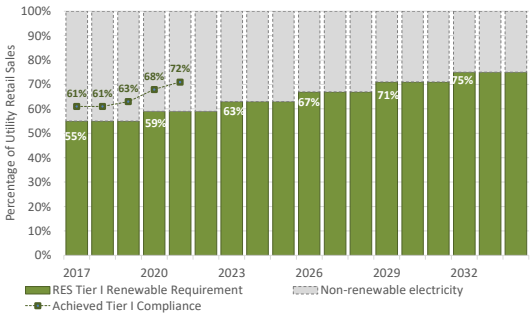


Chart Source: Vermont PSD

Renewable Energy Standard (RES)

- Tier II: 10% of all electricity must come from new, smaller renewable sources within Vermont by 2032.

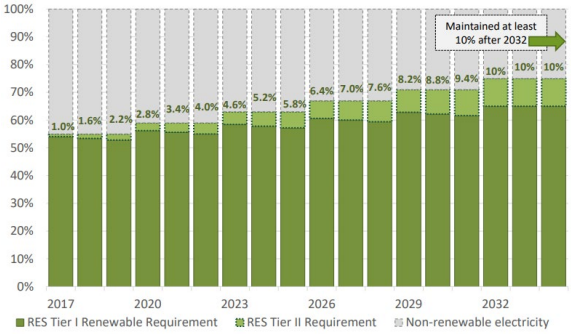
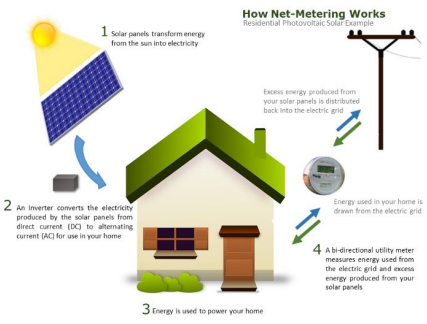


Chart Source: Vermont PSD

Net Metering

- So far, most of utilities' required in-state (Tier II) renewables have come from net-metering.
- Consumers get a larger credit on their electric bill if they give the RECs from the electricity they make to their utility company.



Graphic Source: Vermont Public Utility Commission

How do current policies consider key factors?

Renewable	• Utilities must get 75% renewable electricity by 2032.
Emissions	• Doesn't directly address emissions, but renewable sources tend to have lower emissions.
Timing	• Current policies address whether renewable electricity was produced in a given year, not whether it lines up with electricity use.
In-state	• Utilities must get 10% of their electricity from new in-state renewable sources by 2032.
Affordability	• RES caps what utilities can pay for renewable electricity. Smaller and/or in-state resources can cost more than larger/out-of-state resources.
Equity	• Currently RES doesn't have explicit provisions to ensure equitable access to or distribution of costs of renewable electricity.

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Vermont's Electricity: Present and Future

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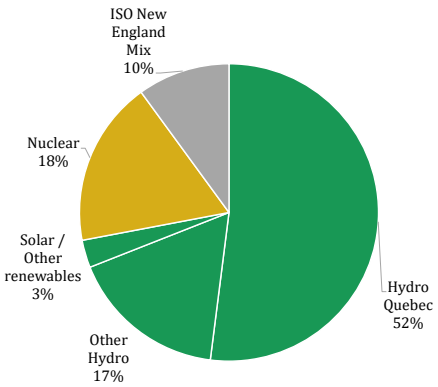
What Vermont uses…

- Accounting for RECs, in 2021 72% of the electricity Vermont used was **renewable (green).**
- Including nuclear, 90% of it was **low-carbon.**

Vermont electricity supply after RECs, 2021



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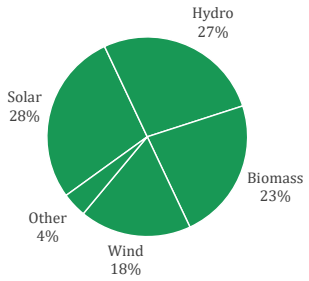
… and what is generated in-state

- 99.8% of the electricity produced in Vermont is considered renewable (green) by state definitions.
- But Vermont generates only **about a third** of what it consumes.

Vermont in-state production, 2021



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Future Trends

Electrification of home heating (heat pumps) and cars and trucks will increase demand for electricity, and for renewables to keep pace.

As we electrify, making buildings more **energy efficient** will become even more important.

New sources of renewables, like **off-shore wind**, will expand the times of day that renewables can generate electricity.

New **battery technology** will enable the storage of solar and wind for when it is needed.

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Key Factors Revisited

Renewable	• Is the source replenished naturally faster than it is used?
Emissions	• Does the source release emissions that contribute to climate change or other types of air pollution?
Timing	• Can the source provide power at any time (baseload) or only at some times (intermittent)?
In-state	• Is the source located within Vermont?
Affordability	• Fossil fuels have been cheapest, but this is changing with government policy, more renewables, and new technology.
Equity	• How do we ensure that the benefits and costs of generating electricity are shared equitably by all Vermonters?

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Follow-up Survey

https://survey.alchemer.com/s3/7408343/VTElectric

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Keep the conversation going

https://publicservice.vermont.gov/renewables

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