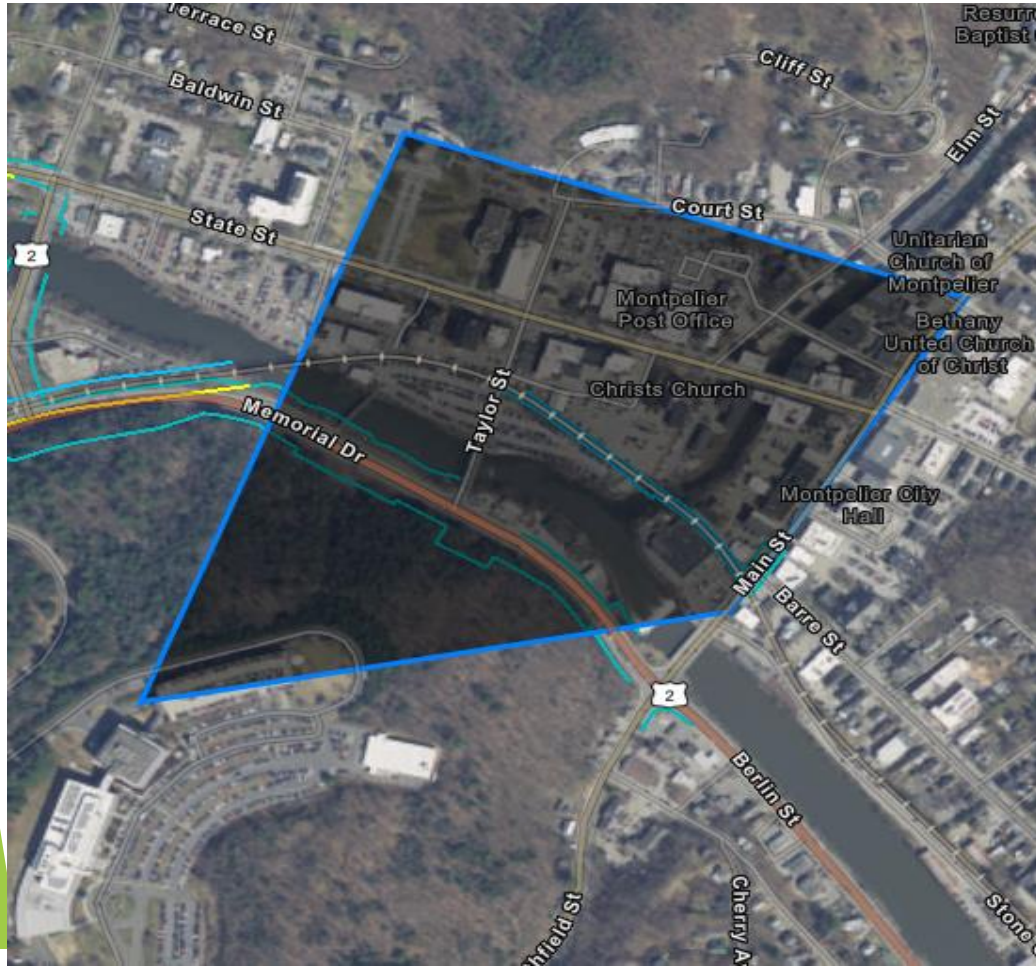


Vermont's Renewable Energy Standard and the Climate Crisis

Jonathan Dowds,
Renewable Energy Vermont



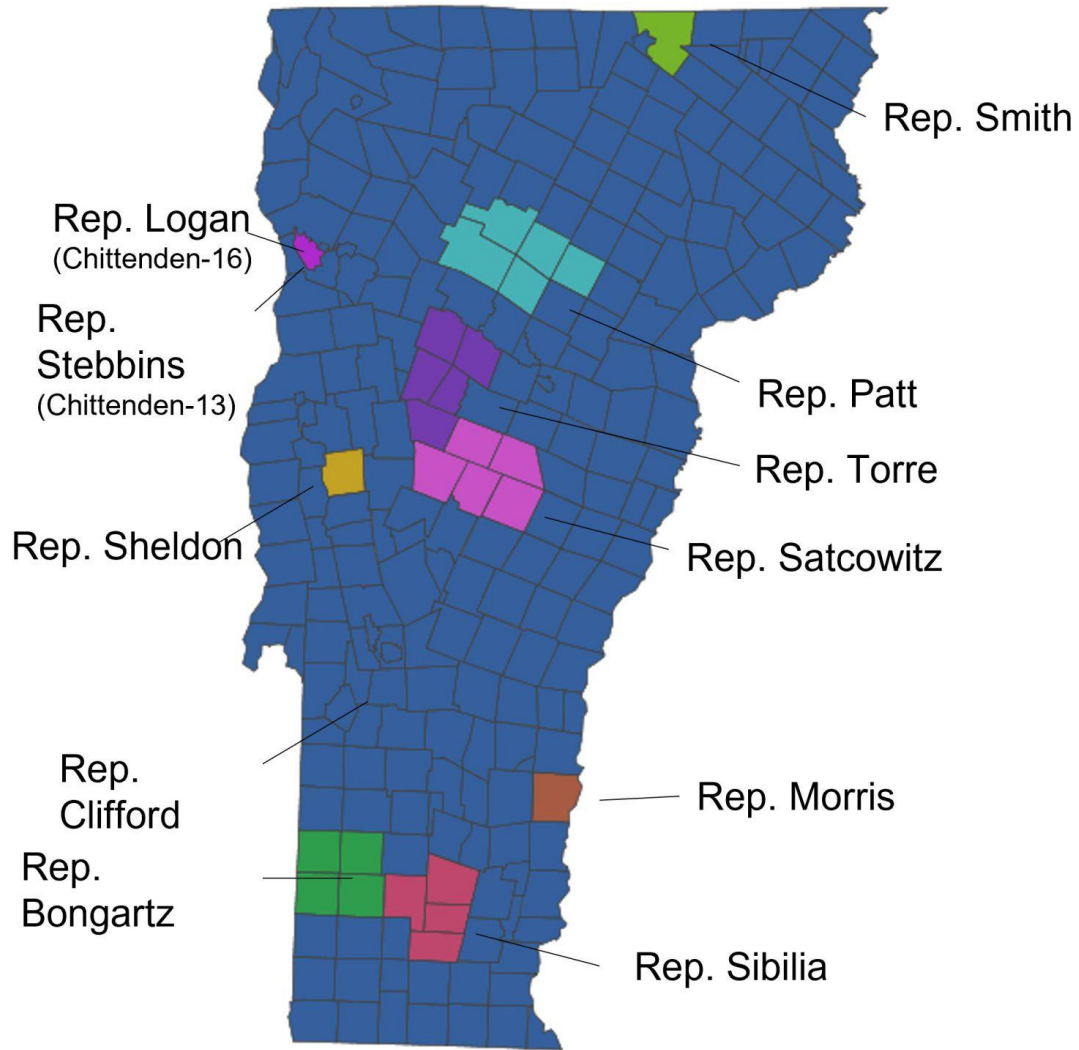
Why Vermont Needs RES Reform



60 acre 360MW Natural Gas facility in Dayville, CT

Who can make it happen

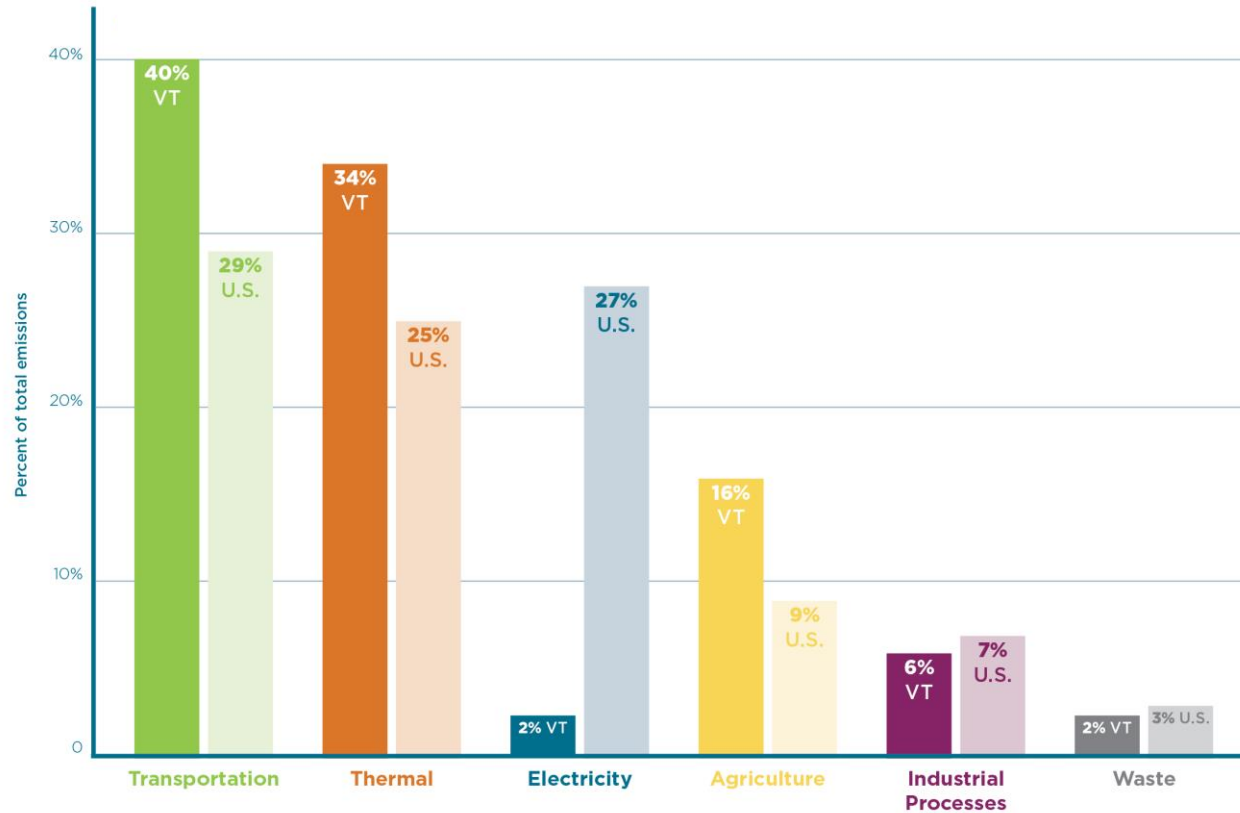
Are you a **climate change power voter?**
House Committee on Environment and Energy



- Rep. Amy Sheldon
asheldon@leg.state.vt.us
- Rep. Laura Sibia
lsibia@leg.state.vt.us
- Rep. Seth Bongartz
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- Rep. Brian Smith
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- Rep. Dara Torre
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Maybe you've seen this about our GHG emissions

GHG emissions by sector, U.S. vs VT (2018)

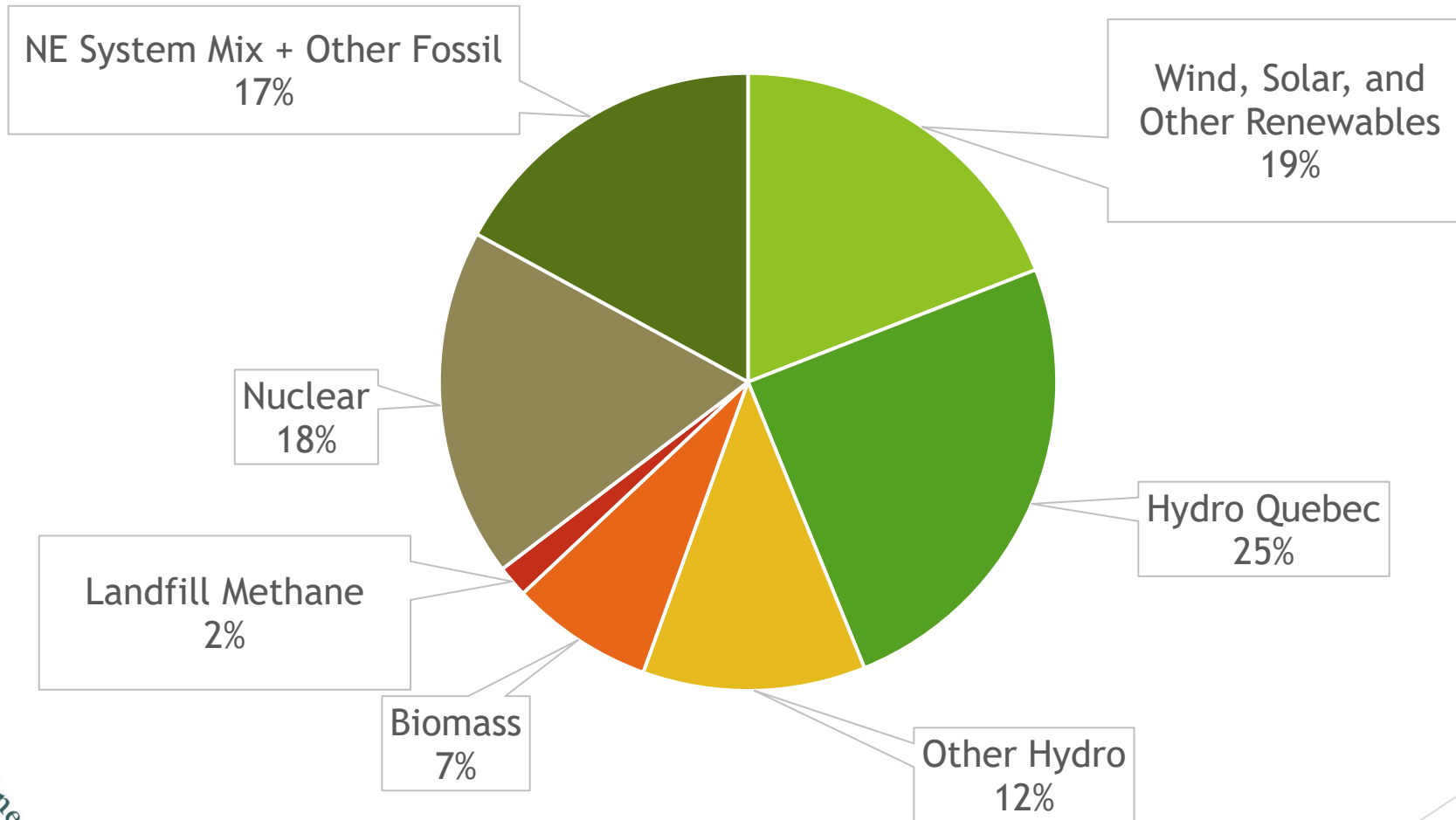


Source: Vermont Agency of Natural Resources, Vermont Greenhouse Gas Emissions Inventory and Forecast (1990-2017), 2021.; U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018, 2021. Note: Due to time lags in state and federal data reporting, 2018 is the latest data available.



It's not the full story

Our electricity isn't as sustainable as you'd think



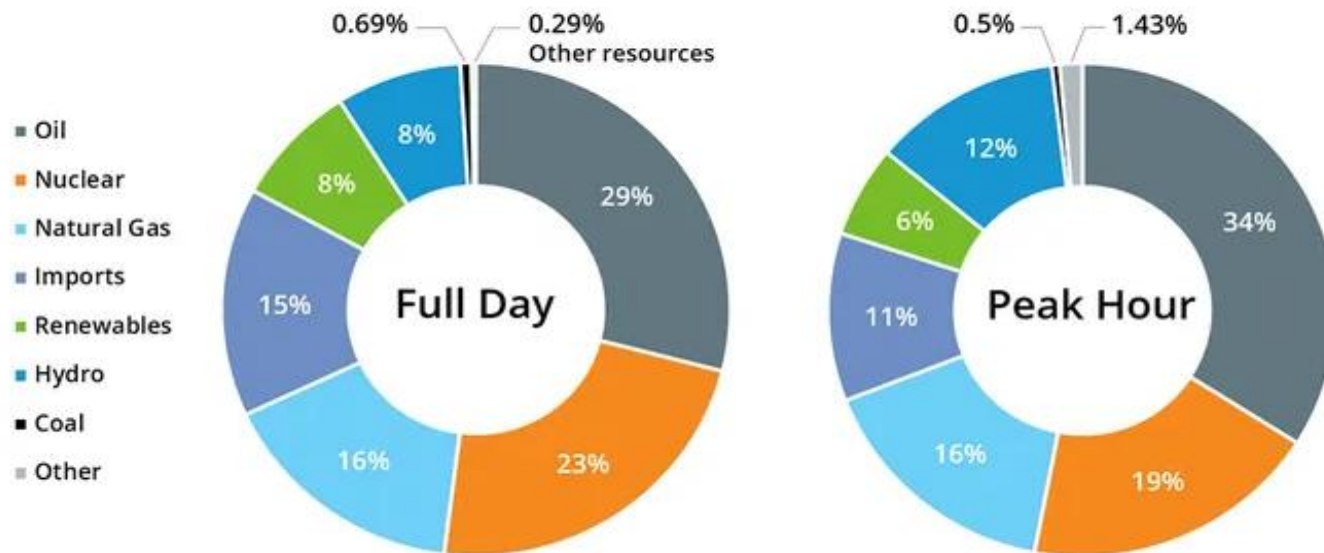
Vermont's Physical Electricity Supply Portfolio 2021

Source: VT Department of Public Service
REV2022 Presentation, 10/27/2022



Accounting of RECs Masks Fossil Fuel Used in Electricity Generation

Sources of New England's electricity on December 24, 2022



This chart from ISO-New England, the region's electric grid operator, shows the region's leading fuel source during the Christmas Eve storm was oil. *Courtesy/ISO New England*



VT's requirement for *new* renewables is the worst in the region

2035 Clean/Renewable Electricity Requirement



Sources: Database of State Incentives for Renewable Energy (DSIRE)
CT SB 10, Session Year 2022

How did we get here?

Vermont's Renewable Portfolio Standard: The 2015 Renewable Energy Standard (RES)

Passed in 2015, the RES set two renewable energy targets for 2032:

- ▶ **Total Renewable Energy (Tier I)**

- ▶ 75% of retail sales from renewable facilities that can deliver power to the New England grid

- ▶ **In-State Renewable Energy (Tier II)**

- ▶ 10% of annual retail sales from in-state sources <5MW

- ▶ Met through net-metering, Standard Offer & PPAs



The VT Legislature must pass Renewable Energy Standard (RES) reform legislation to bring sufficient new renewables on line to help Vermont meet its greenhouse gas reduction goals by:

1. Replacing the current renewable energy purchasing requirement with one capping energy purchases from existing renewable sources at 40% by 2035
2. Increasing the existing 10% in state renewables purchasing requirement to 20% by 2030 and 30% by 2035
3. Creating a new "new renewable energy" purchasing requirement of 30% new renewables of any size from within New England by 2035.

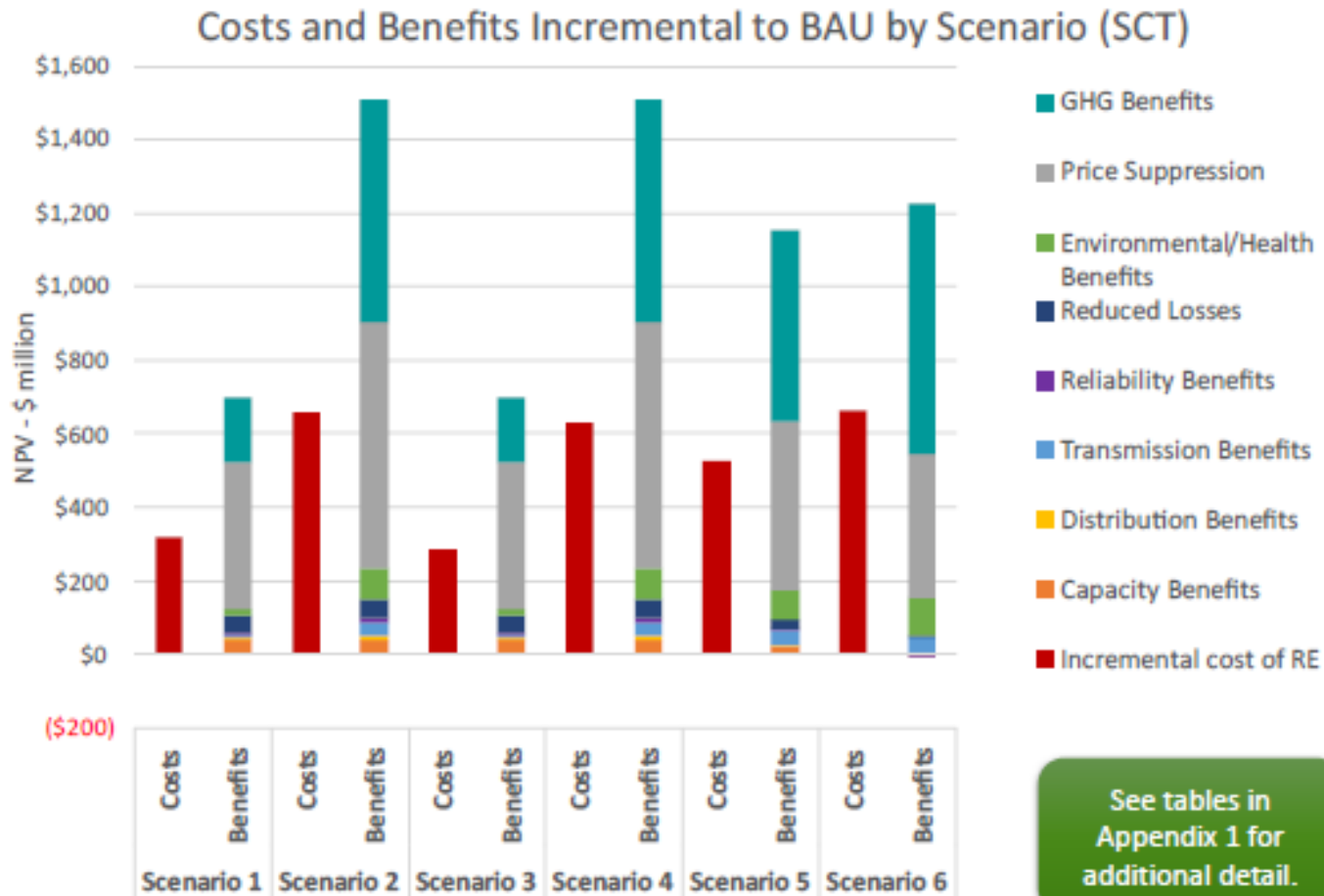


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DPS Analysis of RES Reform: New Renewables Provide Significant Societal Benefits

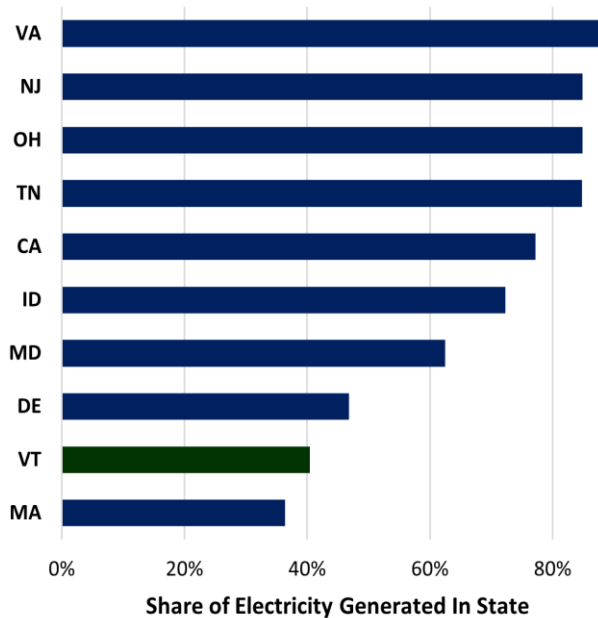


- Using a 1% discount rate (\$393/ton as a recent Synapse study conducted for MA suggested) more than triples the valuation of GHG benefits

Cost of Carbon Abatement, by Scenario

- CO2 abatement reflects carbon emission reductions resulting from Tier II and Regional Tier resources (there is no reduction from Tier I resources)

Why increase in-state renewables: Vermont is 49th in the U.S. in share of energy produced in state



Source: EIA *State Electricity Profiles* Data for 2020

This matters for:

► Environmental Justice

- * NE has 81 oil & natural gas plants that operate at >10% capacity
- * VT has no natural gas plants & 5 oil plants that each run <9hrs/yr

► VT Energy Security & Resiliency

- * Global warming means wet, freezing snow storms more the norm
- * WEC has a \$300,000 budget for emergency storm mgmt.- the Xmas snowstorm cost \$1.3m

► Economic Development

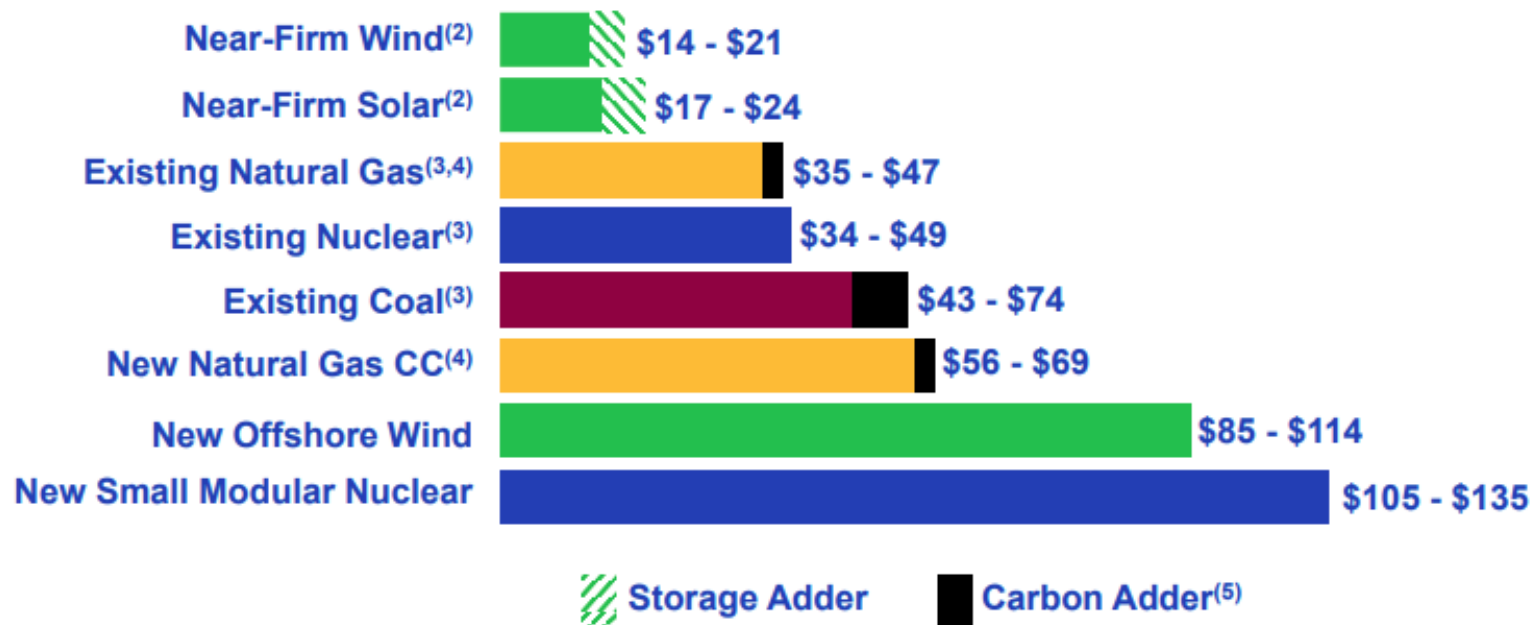
- * 6,965 jobs in the RE energy sector in 2017, 5,656 jobs in 2022- a 19% decrease in 5 years
- * For a 500kW NM array it's not uncommon for it to generate \$120,000 in grid upgrades, \$2,000/yr state taxes, \$3,000/yr in municipal taxes and \$10,000/yr to landowner



Cost advantages of new renewables are projected to grow significantly in this decade

Estimated Costs of Generation Resources Late-2020s⁽¹⁾

(\$/MWh)



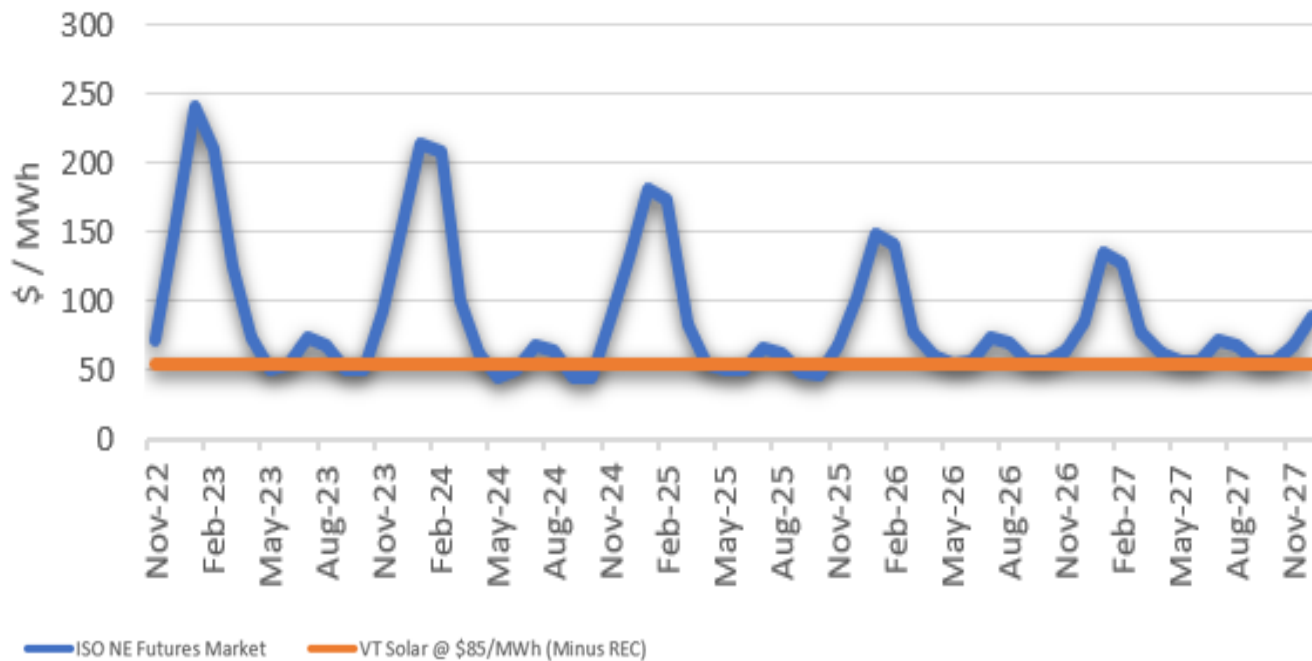
- 1) NextEra Energy Resources' estimate, based on current law (i.e. including the expected impacts of the IRA)
- 2) Near-firm assumes a 4-hour battery to achieve roughly equivalent reliability during peak hours for comparison with dispatchable generation sources
- 3) Represents all-in cash operating cost per MWh including fuel and ongoing capital expenditures
- 4) Range assumes \$4-\$5/MMBtu gas prices
- 5) Reflects modest CO2 cost consistent with existing state and regional CO2 policies and IOU planning conventions



Economic impacts of doubling in-state renewables

- ▶ Minimize ratepayer exposure to expensive and volatile market electricity
 - ▶ Larger solar projects provide electricity more cheaply than natural gas

ISO NE & VT MW-scale Solar



Source: Thomas Hand, MHG Solar
REV2022 Presentation



Land use impacts of doubling in-state renewables

2030 Load Forecast Assumptions & Tier II Requirements	
2030 Load Forecast Source	DPS 2022 RES Compliance Model
Tier II Requirement	20%
2030 Load Forecast (MWh)	5,984,438
Current Tier II Generation (MWh)	330,028
Other In-State Generation (MWh)	-
Required New Generation (MWh)	866,860

New Renewable Project Scenario Modeler							
Project Type	Average Project Size (kW)	Average Capacity Factor	Tier II Generation	Capacity (MW)	Annual Output (MWh)	Number of New Projects	Approximate Acres Utilized
Traditional NM (<50 kW)	10	0.13	33%	251	286,064	25,120	395
New Solar Tarriff (50kW - 1 MW)	750	0.15	22%	145	190,709	194	1,103
Standard Offer 2.0 (1 MW - 5 MW)	4000	0.18	45%	247	390,087	62	1,484
Total			100%	644	Tier II requirements met		2,983

- Current Tier II requirements will take ~700 acres of solar
- 20% Tier II will require an additional **total of ~2,300 acres of solar**
- UVM study: residential sprawl consumes 1,500 forested acres/year



Source: REV modeling. See more at <https://www.revermont.org/2023-policy-priorities/>

Solar Development is Not a Threat to Vermont's Farmland

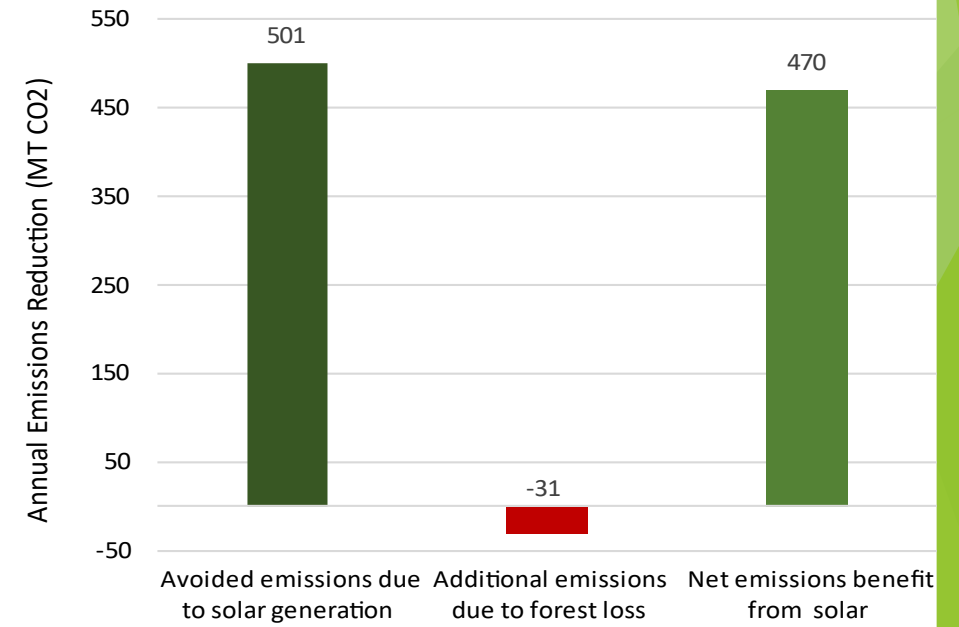
- ▶ Vermont has almost 1 million acres of primary agricultural soils.
- ▶ If all 2,300 acres required to double our 2030 in-state requirement were built on primary ag would constitute less than 0.3% of these soils
- ▶ 21,000 acres of agricultural were developed for urban or low-density residential land uses from 2001 to 2016 and another 41,000 acres are projected to be converted between 2016 and 2040. (Farmland Information Center)
- ▶ The 19 250 kW+ solar projects permitted in 2022 will provide enough energy for more than 3,800 homes and impact fewer than 100 acres of primary ag soils

County	Total Acres	Acres of Primary Agricultural Soils	Percent Primary Agricultural Soils
Addison	516,939	137,905	27%
Bennington	433,119	58,584	14%
Caledonia	420,101	57,750	14%
Chittenden	396,198	84,546	21%
Essex	429,359	12,004	3%
Franklin	440,776	96,945	22%
Grand Isle	126,978	21,078	17%
Lamoille	296,400	81,468	27%
Orange	442,545	64,688	15%
Orleans	462,291	69,680	15%
Rutland	604,394	113,045	19%
Washington	445,194	57,566	13%
Windham	510,962	53,960	11%
Windsor	625,310	89,509	14%
Statewide	6,150,565	998,728	16%



New Solar Power Outpaces Forests for Climate Mitigation

- ▶ Converting 1 acre of typical New England forests to solar takes 15x more carbon out of the atmosphere than forestland (Synapse Energy Economics, 2021)
- ▶ Conversion will result in carbon savings until the marginal emissions rate in New England is reduced by 94%
- ▶ Results are consistent with other analyses including Columbia Climate School findings that converting forestland in VA reduces CO2 emissions by 120-137 tons/yr



A thing so 'shocking and offensive' it literally can't be permitted

"Building clean energy is the project of our era on earth. And at some level, it really is an aesthetic issue. When we look at a solar panel or a wind turbine, we need to be able to see – and our leaders need to help us see, because that's what leadership involves – that there's something beautiful reflected back out of that silicon: people finally taking responsibility for the impact our lives have on the world and the people around us. We are in an emergency, and an emergency calls for imagination, for literally seeing things in a new way. To hide that truth behind a screen of words is – well, offensive and shocking."

Bill McKibben

Rutland Herald op-ed 10/21



For more information see REV's RES policy page:
<https://www.revermont.org/2023-policy-priorities/>

- ▶ Jonathan Dowds, Deputy Director
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