Energy Challenges and S.119

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Basic Vermont Energy Data

- 400 MW of distributed solar in Vermont
- 456 MW of additional in-state generation (hydro, wind, biomass, landfill gas, anaerobic digesters, large-scale solar)
- Vermont is 4% of New England load and 10% of region's distributed solar
- $85 million paid to distributed solar in Vermont in 2019
- Distributed solar = 10% of energy, 3.4% renewability, and >20% of power supply costs
  - This also reflects early higher-priced projects

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Vermont's Energy Challenges

- Addressing the climate crisis
- Shifting expectations regarding distributed generation
- Lack of clarity regarding approach
- Shifting burden of risk
- Differing ideas of democratizing energy
- Vermont's antiquated distributed generation policy

Energy and the Climate Crisis

- ¾ of Vermont GHG emissions are from transportation and thermal sectors
- Electrification is a key element in transforming these sectors
- Vermonters should be better off economically when switching to heat pumps and electric vehicles

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Shifting Expectations re: distributed generation

2005: DG should be prioritized to defer or obviate the need for transmission and distribution infrastructure

2021: Vermonters should pay for storage/upgrade transmission and distribution infrastructure to enable increased amounts of DG (Is this really the expectation?)

Lack of Clarity re: approach

Least-cost planning

- Meet GHG reductions and renewable energy requirements and maintain reliability at the lowest reasonable cost

Or

“Vermont First”

- Prioritize in-state energy development in meeting GHG requirements with minimal consideration of cost

Shifting Burden of Risk

- Statutory requirements to procure specific products, in specific quantities or from specific suppliers, erodes least-cost principles and tends to increase costs to Vermonters
  - Locks in business models and limits innovation
- Should Vermonters be paying to minimize economic risk of unregulated for-profit companies?
  - If company risk is mitigated at one end, what about Vermonters at the other?

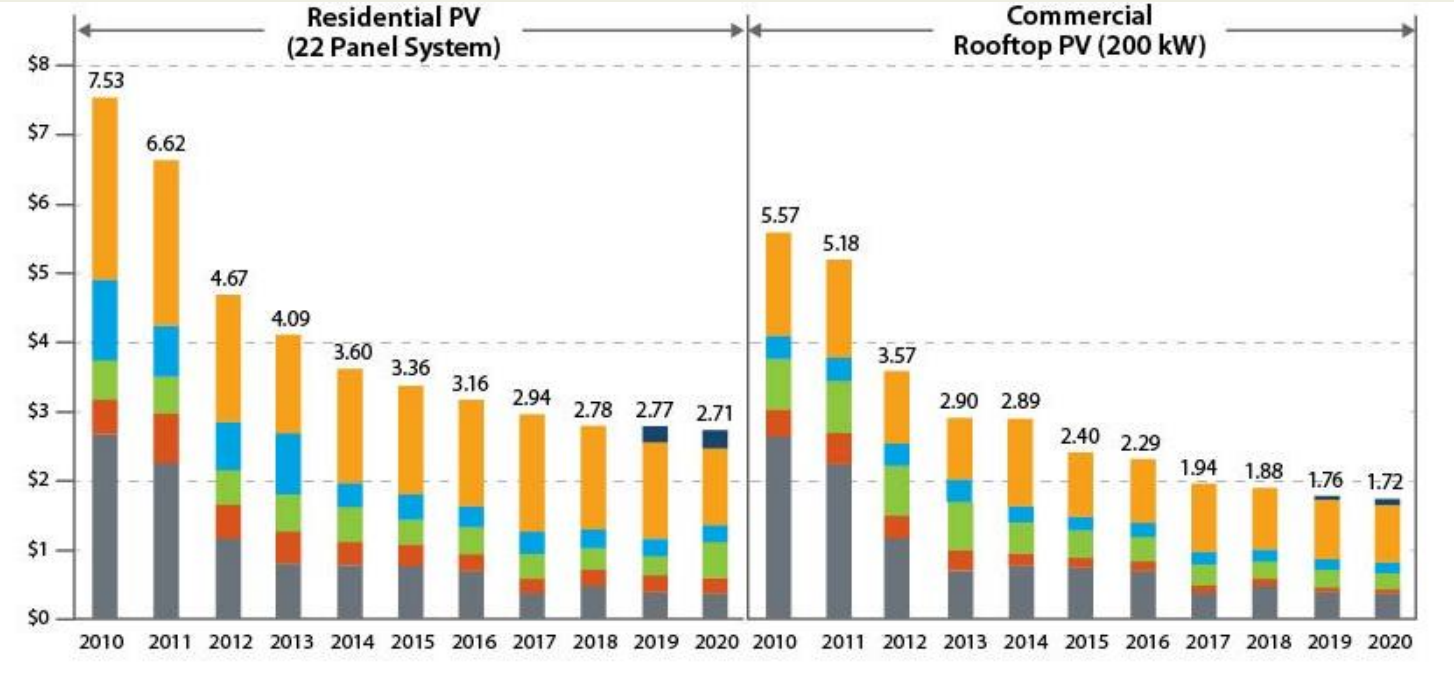
Democratization of Vermont Energy

- Right of Vermonters' self-determination re: energy is conflated with obligation to have all Vermonters pay for individual benefits
- Set broad parameters for renewability that meet GHG reduction requirements and let utilities meet these requirements at least cost
- Require utilities to offer voluntary adders for local attributes if these are not least cost
- Provide transparency and let Vermonters vote with their wallet
  - Borrow from local food movement in agricultural sector

Vermont's Antiquated DG Policies

- Small-scale generation far from load isn't innovative
  - ¾ of net metering is exported to the grid and not used onsite
- Dynamic pricing is necessary to encourage:
  - Location of energy uses and sources (grid impacts)
  - Timing of energy uses and sources (hourly, daily, seasonal)
  - Choreographing load and generation
- Extremely rapid pace of technological and market change – the more specific the policy, the faster it will become antiquated

Mandated prices not dynamic enough to capture changing costs



60% decline in PV installed costs over 10 years

National Renewable Energy Lab: Documenting a Decade of Cost Declines for PV Systems, 2/10/21
https://www.nrel.gov/news/program/2021/documenting-a-decade-of-cost-declines-for-pv-systems.html

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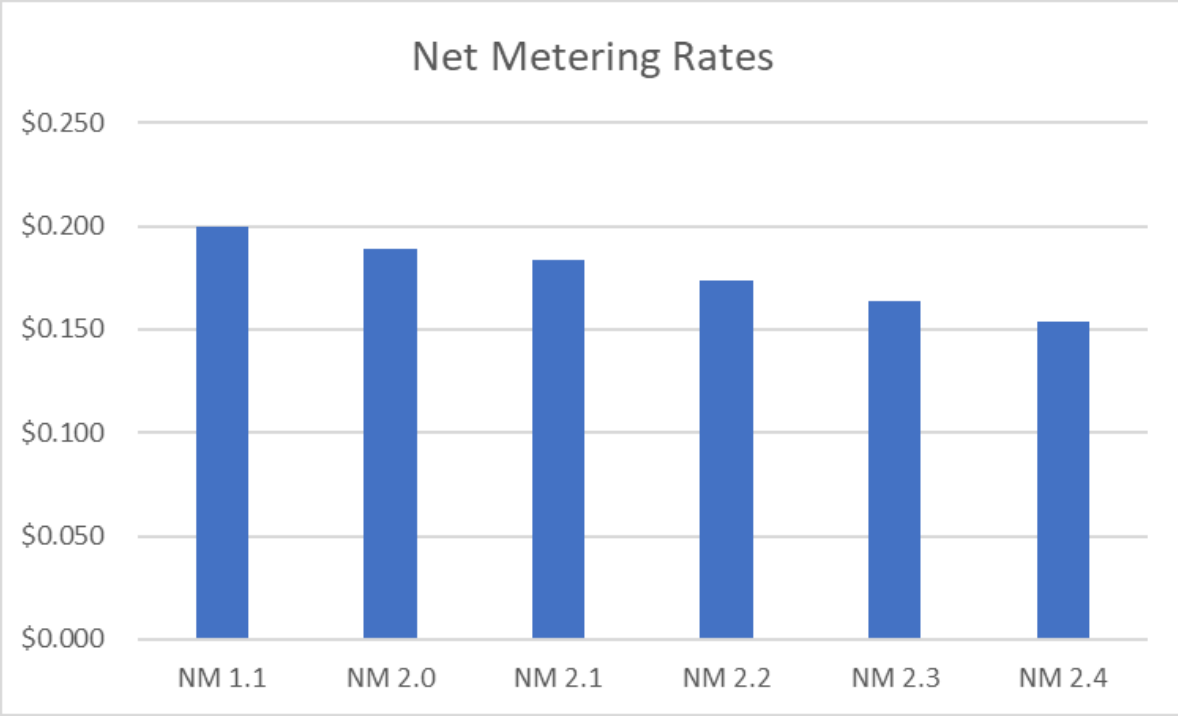
Mandated prices not dynamic enough to capture changing costs (Cont.)



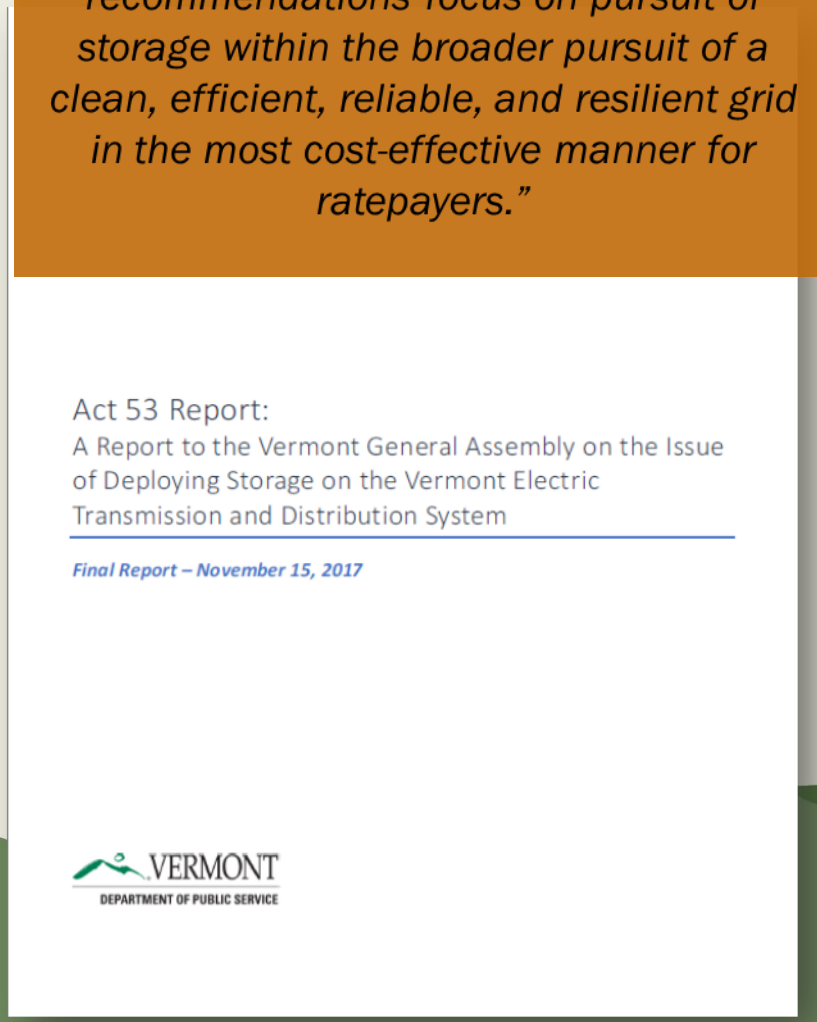
13% decline in net metering compensation over same 10-year period

(rooftop projects)

Storage Mandates

- Set policy based on what Vermonters need, not what companies want to sell
- The need is for characteristics, not specific devices
- Flexible load management has potential to minimize peak costs and shift load to match intermittent resources
  - Beneficial electrification targeted to soak up excess solar is likely a lower-cost, higher carbon-reduction strategy
- Individual customer reliability should be paid by benefiting customer, not all Vermonters

"....we view energy storage as a means to an end – rather than an end in and of itself – and thus many of our recommendations focus on pursuit of storage within the broader pursuit of a clean, efficient, reliable, and resilient grid in the most cost-effective manner for ratepayers."


Act 53 Report:
A Report to the Vermont General Assembly on the Issue of Deploying Storage on the Vermont Electric Transmission and Distribution System

Final Report – November 15, 2017

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Resilience – More than Just a Buzzword

"The ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions, including the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents"

DOE, Grid Modernization: Metrics Analysis (GMLC1.1) – Resilience Reference Document Volume 3.
https://gmlc.doe.gov/sites/default/files/resources/GMLC1.1_Vol3_Resilience.pdf

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Resilience from an Ecological Perspective

- A 100-acre forest with diverse species is more resilient than a one-acre apple orchard

- The New England grid will be more resilient than reliance on in-state solar and storage

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S.119 Specific Comments

- The underlying concepts could be used as a framework to replace pricing for virtual (offsite) net metering
- Recognize that adders for specific groups are paid for by all Vermonters
  - Is a DG requirement that best place to effectuate social policy?
- Recommend clarifying that avoided costs is the generally accepted definition, not the Vermont-specific definition

Additional Information

PSD 2021 Annual Energy Report

Appendix D: Renewable Energy Program Report

Appendix E: Net Metering Report