Overview of Vermont Renewable Energy Programs

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History of Renewable Requirements

2005 – Sustainably Priced Energy Enterprise Development (SPEED) Program

- Required utilities to enter into long-term stably priced contracts for renewable resources
- Did not require retirement of RECs

2009 – Standard Offer Program

- Created a single, statewide procurement process for small (2.2 MW or less) renewable resources
- Initially 50 MW, expanded to 127.5 MW in 2012
- Initially, administratively determined price, moved to reverse bid process in 2012
- Did not require retirement of RECs

Net metering

- 2008 – allowed group net metering, expanded overall cap from 1% to 2%; increased project size cap to 250 kW
- 2011: Project cap expanded to 500 kW; registration process for small systems begins; overall cap expanded to 4%; solar adder introduced
- 2014: Cap expanded to 15%; NM 2.0 process initiated
- 2017: NM 2.0 starts; compensation based in part on whether RECs are given to utility

Renewable Energy Standard

Enacted in 2015, compliance started 2017

Tiers 1 and 2 require retirement of renewable energy credits (RECs)

- Brings Vermont into line with the rest of the region

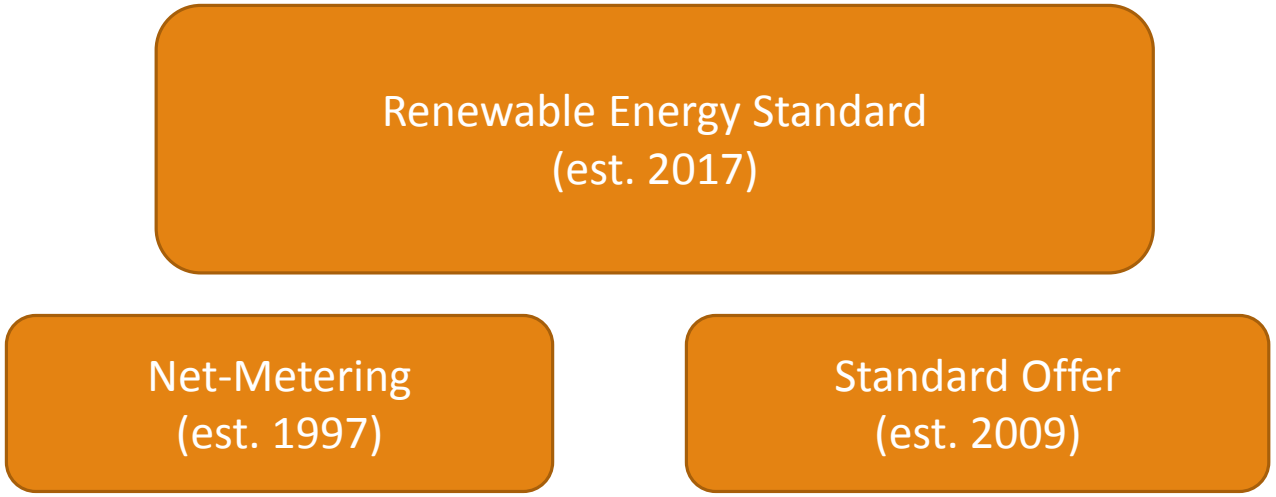
Tier I: Total Renewables – any renewable resource that can deliver into New England, regardless of when resource was constructed. Includes resources from NY and Quebec.

Tier II: Distributed Generation- renewable resources commissioned after June 30, 2015; connected to a distribution or subtransmission line in Vermont; nameplate capacity of less than 5 MW

Tier III: Energy Transformation- requires utilities to provide programs that reduce fossil fuel use by customers or retire Tier 2 RECs

- Examples of Tier 3 measures include:
  - Cold climate heat pumps
  - Electric vehicles and charging stations
  - Weatherization
  - Custom projects- line extensions to electrify saw mills and maple sugaring

Renewable Programs



RES is the overarching renewable policy, with net-metering and standard offer complimenting it and helping to satisfy its goals.

Report on Vermont Renewable Energy Programs

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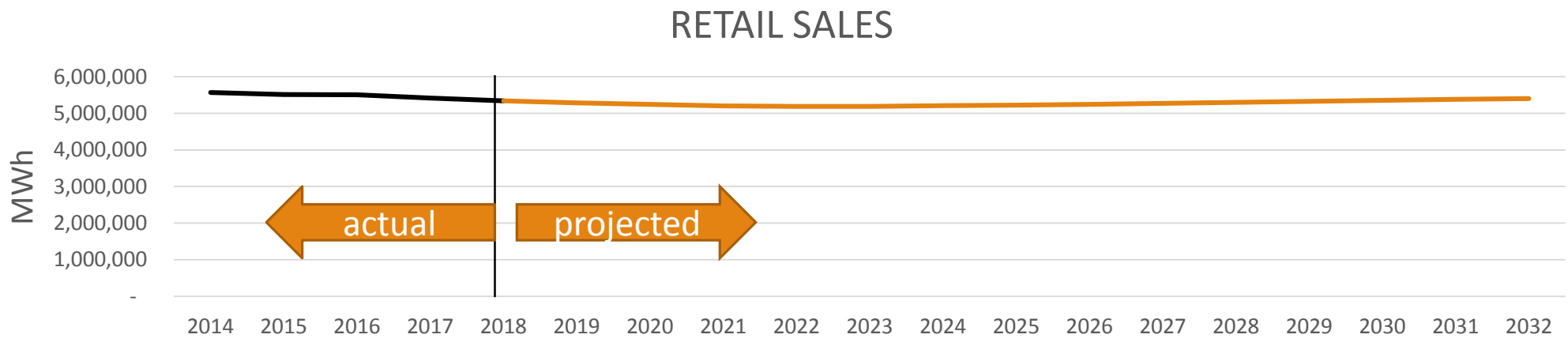
SECTION 1: RETAIL SALES

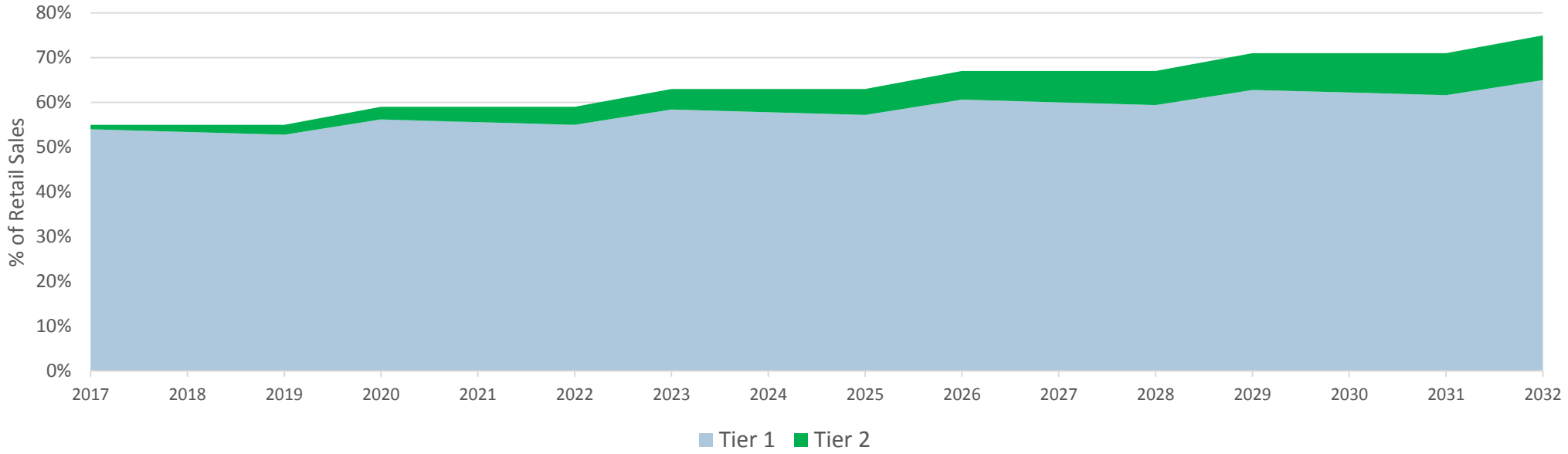


Statewide retail sales have been had modest year-over-year decreases

- 1.7% decrease from 2016 to 2017
- Out of the state's 17 utilities, only 2 small municipalities experienced load growth

Load projections are flat to declining in the for the next 5 years, then increase modestly

SECTION 2: RES Requirements



2017 Tier I requirement of 55% was 2,978,646 RECs

Tier I increases by 4% every 3 years up to 75% in 2032

2017 Tier II requirement of 1% was 54,157 RECs

Tier II increases by 0.6% every year up to

2017 Tier III requirement of 2% was 99,839 Mwhe

Tier III increases by 0.67% every year

The requirement for small utilities begins in 2019

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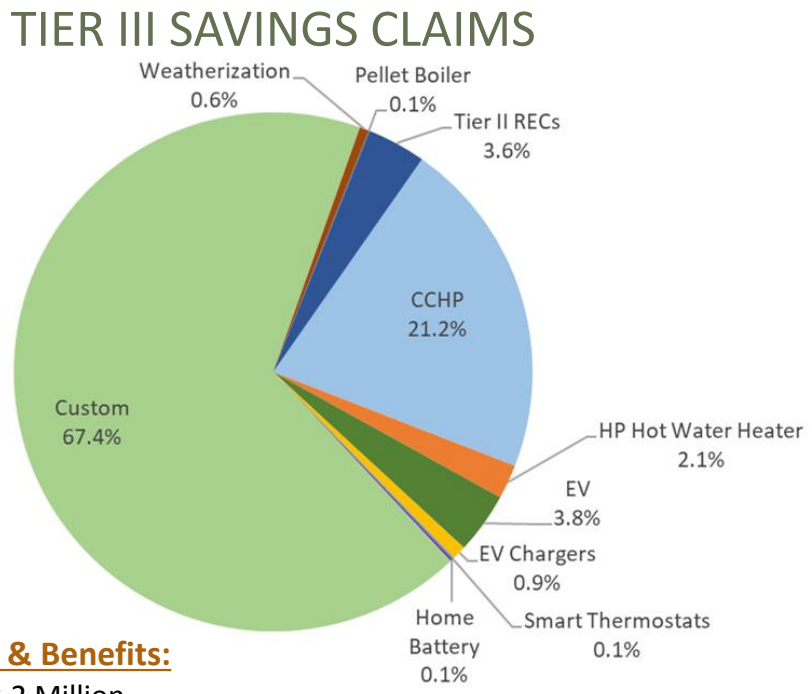
SECTION 3: REC Retirements and Tier III costs & benefits

2017 REC Retirements as a Percent of Retail Sales

Utility	Tier I	Tier II	Tier III
Barton	56%	1%	0%
Burlington	104%	0%	2%
Enosburg Falls	56%	1%	0%
GMP	60%	1%	2%
Hardwick	56%	1%	0%
Hyde Park	56%	1%	0%
Jacksonville	56%	1%	0%
Johnson	56%	1%	0%
Ludlow	56%	1%	0%
Lyndonville	56%	1%	0%
Morrisville	56%	1%	0%
Northfield	56%	1%	0%
Orleans	56%	1%	0%
Stowe	55%	1%	0%
Swanton	100%	0%	0%
VEC	55%	1%	2%
WEC	100%	0%	2%
Vermont Total	**63%**	**1%**	**2%**

[1] Tier I percentages reflect total renewable percent, inclusive of Tier II (i.e. in 2017 served 63% of the retail load with renewable resources). Several utilities elected to retire RECs in excess of their statutory requirement.

[2] If a DU demonstrates that it is 100% renewable through Tier I REC retirements, then the DU is not required to meet the annual requirements set forth in Tier II but is required to accept net-metering systems and retire the associated RECs



2017 Tier III Cost & Benefits:

COSTS: ~ $2.2 Million

BENEFITS: ~15 million pounds of CO_2 avoided

~82,000 MMBtu of reduced fossil fuel consumption

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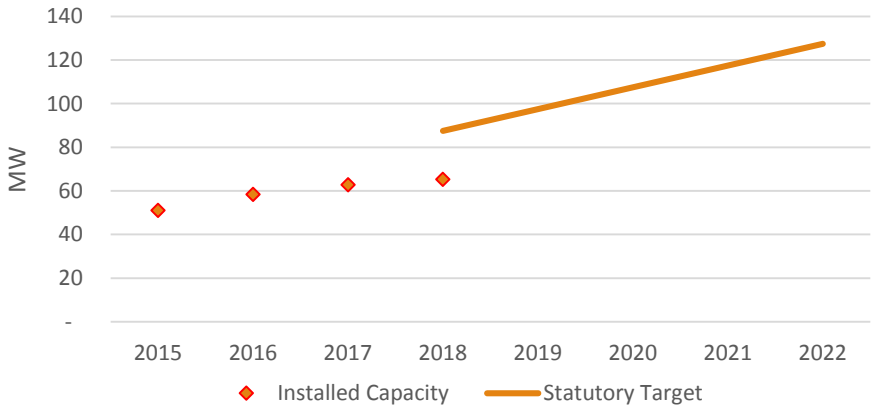
SECTION 4: Standard Offer Program

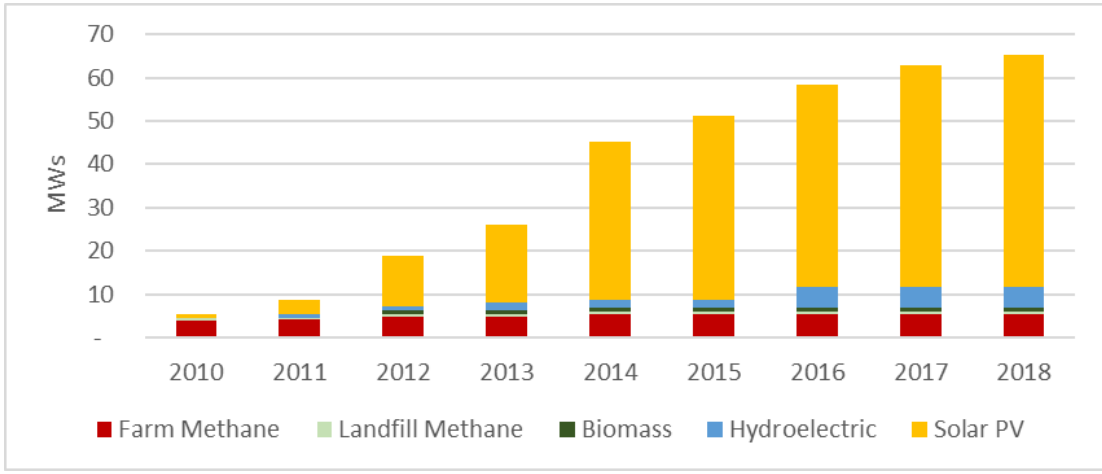
- Program was established in 2009 to stimulate small, in-state renewable energy development
- Total program capacity of 127.5 MW is expected to be awarded by 2022
- Program is structured to encourage technology diversity, but has proved hard to achieve
- Currently, there are 65 MW online with a total of 92 MW that have been awarded contracts
- In 2018, the program cost was $21.3 million, for an average price of $205/MWh
  - The average cost per MWh has been decreasing as new contracts are awarded at more competitive prices

→ *The PSD recommends phasing out the program as soon as practical due unnecessary wheeling costs, the unpredictability of online dates, and the administrative burden*

ACTUAL AND TARGETED CAPACITY



INSTALLED CAPACITY BY TECHNOLOGY



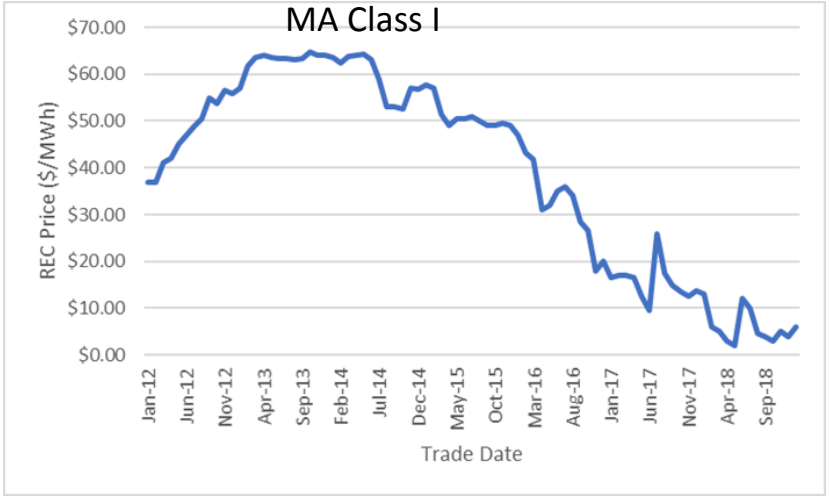
SECTION 5: Energy Efficiency and REC market Assessment

ENERGY EFFICIENCY

- Robust energy efficiency efforts will drive down RES compliance costs
- 20 year maximum achievable potential is 16.6% of energy as a percent of forecasted 2037 sales
- More realistic achievable potential is 14.4%
- Energy efficiency can play a significant role in the states energy resource mix going forward

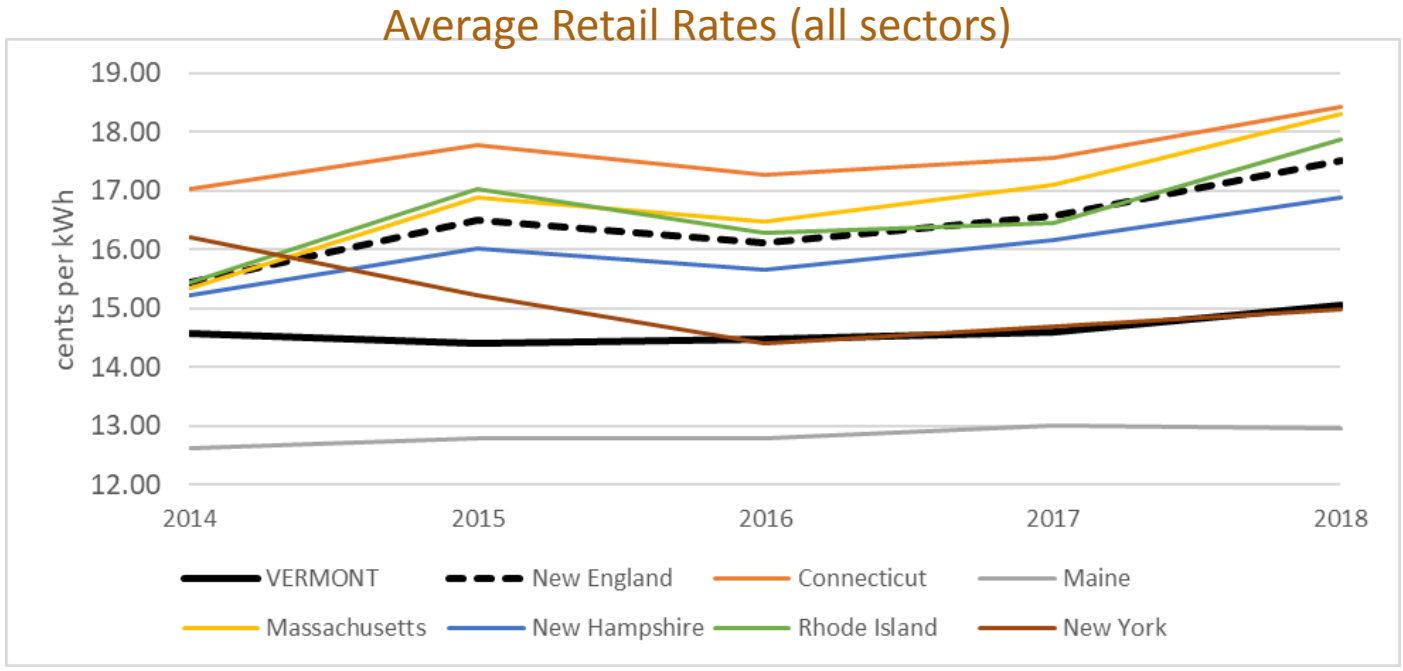
RENEWABLE ENERGY CREDITS

- One MWh of renewable generation = one REC
- RECs are used to demonstrate renewability
- Creates uniform system for ensuring that there is no double counting and clear ownership
- Value of REC
  - •Theory is that REC value should represent the difference between the revenues a resource receives from wholesale markets and the cost to build
  - •Reality is that value is based on supply and demand
  - •Different state Tier/Class eligibility and annual requirements means different prices



SECTION 6: VT retail rates comparison

- In 2018, Vermont retail rates were third lowest in the region
- Vermont rates tend to be more stable than other states, largely because Vermont is vertically integrated and the other states deregulated in the late-90s
    - Vermont utilities are able to enter into long-term contracts and own generation, which locks in prices
    - Vermont utilities have limited exposure to extreme market fluctuations– both high and low– because they are mostly hedged



SECTION 7: Rate Impact of RES

- In the past 2 years, there have been five rate increases by three utilities
- No recent rate cases have been a direct result of RES compliance costs or standard-offer
- Tier II of RES can be met with RECs from the following sources, ranked in order of cost:
    1. net-metering ~ $60/REC (equal to the ACP)
    2. standard-offer ~ $25/REC (contracts are for bundled energy, capacity and RECs– utilities assign the cost to each product)
    3. utility owned projects or long-term purchases ~ $20/REC
    4. short-term REC only ~ $7/REC *there is limited availability of Tier II RECs in Vermont
- Net-metering costs have put upward pressure on rates (other declining costs often offset these increases and a rate case is deferred)
    - Some small utilities with high net-metering adoption rates are facing rate increases in the near future
    - In addition to the high cost, net-metering reduces the utility's kWh sales, so the same fixed costs are spread over fewer kWh resulting in higher rates

  → The current compensation structure of net-metering is out of sync with RES and broad ratepayer interests. The program should be reconfigured to reduce the burden on non-participating ratepayers while still advancing Vermont renewable goals.

SECTION 8: Statutory Recommendations

- NO RECOMMENDED STATUTORY CHANGES

Overall Conclusions

RES is the single most impactful statute with respect to putting Vermont on a path to meet climate and renewable energy policy goals

RES sets the pace for renewable development within Vermont

- To the extent that projects are constructed beyond the RES requirements, unlikely that the output will count toward meeting Vermont renewable and climate goals

Vermont's renewable programs are helping the sate achieve its renewable goals, all while retail rates remain among the lowest and most stable in the region.

With only one year of experience, it's difficult to estimate the likely future economic impacts

Reports to the Legislature

2019 Annual Report on the Renewable Energy Standard

https://legislature.vermont.gov/assets/Legislative-Reports/2019-Annual-Report-on-the-RES-w-cover.pdf

Biennial Report on Renewable Energy Programs

https://legislature.vermont.gov/assets/Legislative-Reports/2019-Renewable-Programs-Report-w-cover.pdf