



Vermont Energy & Climate Summit

*“Meeting Vermont’s 2025 Energy and
Climate Goals”*

Policy Pitches Report Volume 1 – Pitches Presented at the Summit

November 8, 2017

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Vermont Energy & Climate Summit: Executive Summary

About the Summit

Energy Action Network (EAN) and the Vermont Climate Pledge Coalition co-hosted the Vermont Energy & Climate Summit on November 8, 2017. This full-day gathering of Vermont energy and climate leaders was designed to:

- Assess where Vermont stands now in relation to our fast-approaching 2025 energy and climate goals
- Share pledges to take action from businesses, non-profits, municipalities, and institutions as part of the Vermont Climate Pledge Coalition
- "Pitch" concrete policies to ensure Vermont meets its energy and climate goals in ways that most benefit Vermont and Vermonters

Purpose

Vermont has bold goals in energy and climate. Our Comprehensive Energy Plan calls for meeting 90% of our energy needs through increased efficiency and renewable energy by 2050. Vermont also joined leading states across the country in a bi-partisan commitment to adhere to the Paris Climate Accord goals. Where are we now on achieving those goals and what can we do to bend the curve toward 2025 milestones along that path?

- **Energy:** The first milestone of Vermont's Comprehensive Energy Plan is to meet 25% of Vermont's total energy needs from renewable sources by 2025. The most recent status estimates put us at around 16% across heat, electricity and transportation (2016).
- **Climate:** The Paris Accord goal seeks a reduction in greenhouse gas (GHG) emissions of 26-28% from 2005 levels by 2025. Vermont's own statutes are even more ambitious: 50% reduction from 1990 levels by 2028. As of 2013, Vermont's GHG emissions decreased 11% from 2005 levels and actually *increased* 4% from 1990 levels.

If we are to meet these important and interrelated goals in the next 8 years, we need to ensure that we have the appropriate policy framework in place today, accompanied by creative and collective action. The Vermont Energy & Climate Summit played a critical role in generating a core set of potential policy solutions that can help us bend the curve toward our State energy and climate goals. These are presented in the following pages.

The initial audience for this report is the Governor's Climate Action Commission and the VT State Legislature. However, we encourage all Vermonters to dig into the ideas and substance, and help us collectively bend the curve toward our energy and climate goals.

Energy Action Network and the Vermont Climate Pledge Coalition

Energy Action Network (EAN) is a diverse group of leading non-profits, businesses, public agencies and other high-level stakeholders seeking to advance Vermont's transition to a sustainable energy future and meet 90% of our 2050 energy needs through efficiency and renewable energy. EAN's mission is to end Vermont's reliance on fossil fuels and to create efficient, clean, affordable and secure electric, heating, and transportation systems for the 21st Century.

The Vermont Climate Pledge Coalition is a statewide network of municipalities, non-profits, businesses, institutions, and individuals dedicated to fulfilling the commitments set by the United States in the Paris Climate Agreement. The Coalition, coordinated by the City of Burlington, is intended to complement State goals established in prior years on renewable energy and greenhouse gas reductions.

Policy Pitches

EAN organized a call for policy “pitches” to be presented at the Summit to generate substantive policies to help Vermont accelerate progress towards our energy and climate goals. The response was tremendous. Nearly 50 pitches were submitted. While all of the submissions were excellent, 13 were selected by EAN to pitch in person at the Summit (5 minutes, 5 slides). Given that some of the pitches were similar, they were asked to collaborate for a combined in-person pitch. This is reflected in the pitches highlighted in this Volume.

The criteria used to select the pitches reflect those used by the Governor's Climate Action Commission, and include:

- Impact on meeting Vermont's energy and climate goals
- Degree to which it spurs economic activity, inspires and grows Vermont businesses, and puts Vermonters on a path to affordability
- Degree to which it leaves no group unduly burdened

Volume 1 of this report provides a compilation of the 13 written policy pitches that were selected to present in person. All of the Summit presentations can be found at <http://eanvt.org/vt-energy-climate-summit-2017/>. **Volume 2** provides a compilation of all the additional pitches that were submitted in written form. All of the additional summit presentations and other supporting documentation can be found at eanvt.org.

Summary of Policy Pitches Presented at the Summit

VT Energy & Climate Summit (Nov 8, 2017) - Final Pitch List for In-person Presentations

Presentation Order	Pitch Title (20 words or less)	Pitcher(s)	One Sentence Summary (50 words or less)
ROUND 1 PITCHES			
1	Charge Ahead Vermont: Electric Vehicle Transformation	Dave Roberts, Vermont Energy Investment Corporation	Plug-in electric vehicles powered by renewable energy will provide major reductions in Vermonters' fossil fuel consumption and associated harmful emissions while lowering household expenses; we can address key barriers to accelerate this transformation by decreasing purchase costs, increasing charging infrastructure and boosting consumer awareness of EVs.
2	Big Buses, Big Opportunity: How Electric Buses Support Cleaner Air, Healthier Kids, and Lower Costs	Abby Bleything, Vermont Clean Cities Coalition & Cara Robeck, Vermont Energy Education Program, representing Transportation for Vermonters	Vermont should leverage investment in replacing inefficient and dirty diesel buses with an electric bus fleet. Taking this action would reduce the impacts of air pollution on our most vulnerable populations, reduce greenhouse gas emissions, and keep more of Vermonters' money in the local economy.
3	Cap, Trade, and Invest: Transportation	Mary Peterson, Tax Attorney & Daniel Gatti, Union of Concerned Scientists	Vermont should extend its successful experience in using emissions trading to its largest emissions sector, transportation; an approach that lowers emissions, lowers costs over the long run, and is an economic driver leveraging a sustainable revenue stream for critical investments.
4	Home-Grown Renewable Heat: Strategies for Achieving Multiple Benefits	Ansley Bloomer, Renewable Energy Vermont & Maura Adams, Northern Forest Center	Making advanced wood heating systems more affordable, supporting supply side infrastructure, and ensuring a well-trained wood heat workforce will help sustain Vermont's most broadly beneficial renewable heating option.
5	Using "Feebates" to Drive Cleaner Energy Choices	Richard Faesy, Energy Futures Group	"Feebates" impose a fee on inefficient equipment while rebating (or tax-exempting) efficient equipment, and can be used as a revenue-neutral approach to provide price signals to consumers to encourage making the right choice when purchasing heating or hot water equipment, vehicles, homes or even mortgages.
6	Renewable Fuels Standard	John Quinney, Energy Co-op of Vermont	A renewable fuels standard would require Vermont's fuel industry to increasingly sell bio fuels (for heating oil, propane and natural gas) and biomass to offset the amount of fossil fuels we burn, eventually achieving 90% bio fuels by 2050.
7	Warm Home Bonds	Neale Lunderville, Burlington Electric Department	"Warm Home" bonds would fund \$100,000,000 in weatherization work for low-income Vermonters over the next three years - or about 10,000 homes. It would use about \$7.5M in Gross Receipts Tax now directed to the Wx program to fund a 20-yr revenue bond. As more low-income homes are weatherized the LIHEAP need should diminish, and Vermont would ask Feds to use 25% of LIHEAP money for Wx (vs current 15%)

VT Energy & Climate Summit (Nov 8, 2017) - Final Pitch List for In-person Presentations

Presentation Order	Pitch Title (20 words or less)	Pitcher(s)	One Sentence Summary (50 words or less)
ROUND 2 PITCHES			
8	Sustainable Energy for Vermonters: Overcoming Barriers to Low-Income Access to Meet VT's 2025 Energy & Climate Goals	Christa Shute, Institute for Energy and the Environment, Energy Clinic, Vermont Law School	Low-income Vermonters comprise over 25% of our population. They deserve to benefit from the financial savings and price stability of net-metered solar and efficiency investments. Vermont can promote participation from this needed sector through low-income adders; consumer protected on-bill financing; green clauses; and education/training/workforce development.
9	Harnessing Energy Storage for Local Clean Energy, Jobs, and Grid Resiliency in Vermont	Nathan Wyeth, Sunrun & Richard Morin, Dynapower	By incentivizing residences, businesses, and utilities to build a network of distributed energy resources that link our grid with renewable energy and energy storage installations throughout the state, Vermont can save ratepayers millions, reduce our carbon footprint and create sustainable jobs that boost Vermont's economy for years to come.
10	Vermont Climate Action Communities	Abby Friedman, Vermont League of Cities & Towns	The Vermont Climate Action Communities program will help municipalities achieve deep energy savings, improve resilience, transition to a clean energy economy and provide locally-supported renewable energy generation for municipalities and the communities they serve.
11	Emphasize and Improve Tier III	Dan Mellinger, Energy Futures Group	Improve Tier III by addressing the implementation challenges between the DUs and the EEU; quantify the Tier III impact on fossil fuel use and electric rates through a 2019 evaluation; and build support towards the Tier III goals.
12	Heat and Transportation Efficiency Utilities	Anne Watson, Montpelier City Councilor	Let's expand the mission of our current efficiency utilities or create new ones to cover #2 Fuel Oil, Propane, and Transportation.
13	The ESSEX Plan: An Economy-Strengthening Strategic Energy Exchange	Ashley Orgain, et al, Seventh Generation and Friends	A Vermont-specific, future-oriented economic development strategy to strengthen the economy, prioritize the most vulnerable, and harness the power of the market to reduce carbon pollution and help the state meet its climate and clean energy goals.

Pitch 1 - Charge Ahead Vermont: Electric Vehicle Transformation

Dave Roberts, Vermont Energy Investment Corporation

1. Pitch Submitted By (Your Name or Organization):

Vermont Energy Investment Corporation

2. Contact Email Address: droberts@veic.org

3. Contact Phone Number: 802.540.7835

4. Pitch Title: Charge Ahead Vermont

5. Pitch Summary:

Plug-in electric vehicles (EVs) are a critical strategy to meeting Vermont's climate and energy goals - they use a fraction of the energy required by gasoline vehicles and when powered from Vermont's grid can cut greenhouse gas emissions by over 50% today, with even greater reductions possible as renewable energy use grows. EVs can reduce household transportation costs, particularly for rural residents who must travel long distances for jobs and services. If strategically deployed, EVs can also help utilities manage peak demand and better integrate renewable energy sources, saving money for all ratepayers. In order to realize these benefits, public programs and policy can help overcome the primary barriers to EV adoption - upfront cost of the vehicle, public awareness of EVs and availability of EV models, and availability of public charging – while ensuring equity and affordability for all Vermonters. We propose:

- State incentives for EV purchases targeted to low and middle income Vermonters and those in areas with high transportation costs; Support for expanding EV charging infrastructure;
- Expanded EV outreach and education activities, including partnerships with auto dealers; and
- Utility policy that encourages EV adoption and incentivizes charging behavior that benefits the grid.

6. What energy sector(s) does this Pitch apply to? (Check all that apply):

- | | |
|--|---|
| <input type="checkbox"/> Energy Efficiency | <input type="checkbox"/> Thermal Heating &/or Cooling |
| <input type="checkbox"/> Electricity | <input type="checkbox"/> All (Total Energy) |
| <input type="checkbox"/> Transportation | <input type="checkbox"/> None: Non-energy related carbon reduction proposal |

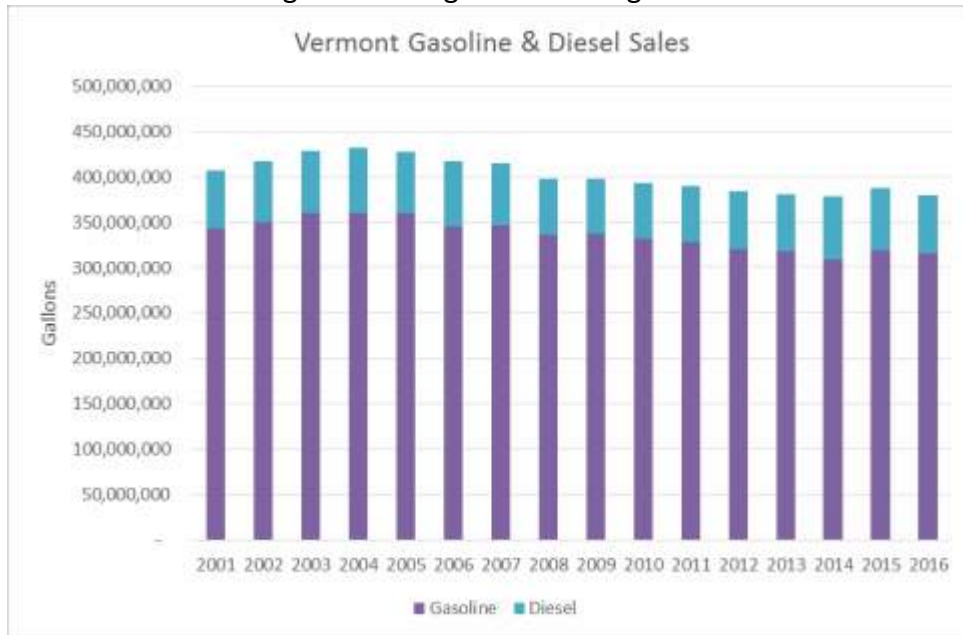
7. Which criteria category(ies) does it address? (Check all that apply):

- | | |
|--|--|
| <input type="checkbox"/> Economic Activity | <input type="checkbox"/> Vulnerable Vermonters |
| <input type="checkbox"/> Affordability | <input type="checkbox"/> Other |

8. Scale of impact on Vermont's energy and climate goals: If this proposal came to fruition, how might it move the needle in helping to meet Vermont's energy and climate goals by 2025 and/or 2050? Please outline assumptions and, if available, provide calculations.

- Transportation is the largest contributor to Vermont's climate emissions, responsible for about 45% of the total and is also the largest end use sector for energy consumption. Gasoline and diesel sales in the state have decreased slightly over the past 15 years,

primarily due to more efficient vehicle technologies, but these incremental gains are not on track to meet our greenhouse gas reduction goals.



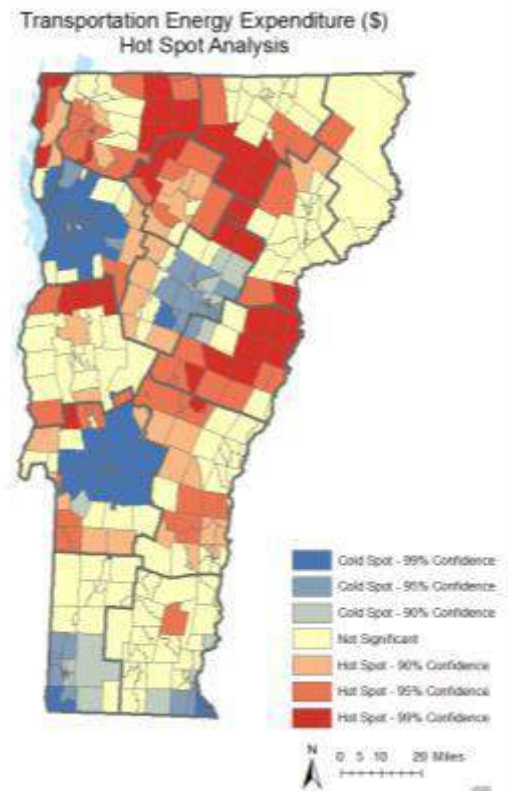
- Meeting the 2025 Comprehensive Energy Plan goal of 10% renewably powered transportation would require about 45,000 EVs – a major increase from the current total of about 2,000.
- EVs are incredibly efficient compared to gasoline powered vehicles. They are able to convert about 70% of the energy supplied from the grid to power the wheels. Typical gasoline vehicles are only about 20% efficient from the tank to the wheels.
- From a climate perspective, an EV powered by the average New England grid mix is currently the equivalent of a 107 mile per gallon vehicle and as more renewable energy enters the mix in Vermont this will accelerate.
- EVs were the only “high impact” transportation pathway identified in the 2013 EAN study as gaining more than 10% toward the overall 90% renewable by 2050 goal.

9. Benefits/costs of this proposal for Vermont and Vermonters: Including, where possible, economic, financial, social, and environmental.

- Vermonters collectively spent over \$1 billion on transportation energy in 2015. Driving on electricity could cut this cost by 65%, to about \$350 million, with more of the electricity dollars staying local to Vermont.
- Auto ownership is high in Vermont. While it’s essential to invest in public transportation and other options to reduce single occupancy driving, we also need to recognize that these options are challenging to deploy in rural areas. The majority of Vermonters will continue to use personal vehicles to meet their mobility and access needs for the foreseeable future. As a result, low income Vermonters often have disproportionate transportation burdens due to costs of owning and fueling vehicles in our rural

landscape. The map to the right shows red hotspot areas where transportation energy burdens are highest – in some cases over 10% of household income¹.

- New EVs currently cost more up front than comparable gasoline vehicles, but provide lifecycle savings by cutting energy and maintenance costs in half or more. Over the next 10 years the price difference is expected to shrink as EV technology achieves greater economies of scale. More used EVs are coming onto the market and provide even greater opportunities for affordable, low carbon transportation.
- The American Lung Association estimates Vermont experienced \$347 in health and climate related costs in 2015 due to fossil fueled transportation. Shifting to EVs could reduce this by more than 90%.
 - EVs also reduce other harmful and toxic tailpipe emissions, leading directly to added health and environmental benefits beyond GHGs.
- The cost of the incentive program will depend on the value of the incentive and level of adoption.



10. Decision-makers necessary for this proposal to be adopted or move forward (e.g.,

Legislature, Governor, a regulatory agency, a business, organization, media outlet, or financing institution, etc.)

- The Governor to champion and direct state agencies to support efforts and identify viable program funding mechanisms;
- Legislature to establish programs and approve funding in consultation with Governor, electric utilities and others;
- Community action agencies and other advocates to inform strategies for low income EV adoption;
- Utilities, regulators and private businesses to support EV charging infrastructure development and policies to realize the greatest benefits to the grid;
- Auto dealers and their sales staff to stock and market EV models and communicate market demand for EV trucks and all-wheel drive models to manufacturers; and
- Drive Electric Vermont to expand EV marketing and outreach in partnership with others.

11. Strategy and key considerations: Outline the overall strategy, including gaps, barriers and opportunities for moving this proposal forward.

¹ Map excerpted from: Justine Sears, *Mapping Total Energy Burden in Vermont* (Efficiency Vermont: 2016), <https://www.efficiencyvermont.com/news-blog/whitepapers/mapping-total-energy-burden-vermont>

Overall Strategy

- Every recent study on climate and energy in Vermont has identified EVs as an important pathway to meeting long term goals. The market cannot move quickly enough on its own to affect the transformation needed in the transportation sector. The following programs and policies are needed in the immediate term to address the primary barriers to EV adoption.

Barrier 1: Upfront Cost of EVs

Solutions:

- Evidence in Vermont and other states show incentives can drastically increase EV purchase consideration. In designing a Vermont incentive program, it is critical that it be tailored to low income populations and those who are impacted by high transportation costs. Program design could include a cash for clunkers component to encourage Vermonters to turn in older, high-emission vehicles. Incentives for used EVs should also be considered. Funding options for an incentive program that would not impact state general fund or transportation fund revenue include:
 - Electric utility tier 3 options
 - Expansion of RGGI cap and trade program to include transportation fuels
 - Joining Western Climate Initiative
 - Carbon Tax
 - Legal Settlements
 - Feebate programs (higher fees for more polluting vehicles paired with rebates for lower emissions)

Barrier 2: Availability of Public Charging and Maximizing Benefits of EV Charging

Solutions:

- Allocate the maximum allowable amount of VW Settlement dollars for EV charging infrastructure and focus on areas of the state that won't be served well by private sector investments.
- Establish regulatory framework to encourage utility investment in EV charging, reward customers for charging during off peak times or allow utility control of charging equipment to increase use of renewable energy and minimize grid impacts.
- Adopt building codes to require EV charging readiness in new multifamily housing construction and work with multifamily housing providers to install charging in existing buildings. Could also consider "right to charge" requirements for these properties to allow drivers to install charging when feasible and/or utility or shared ownership models for charging in these areas.

Barrier 3: Increase Vermonters Awareness of EVs and Their Benefits

Solutions:

- Continue to support Drive Electric Vermont program to coordinate EV stakeholders and implement education and outreach programs that inform people of their options and the programs that can help them purchase an EV that will work for them.
- Adopt dealer incentive programs that educate and engage dealers to sell EVs.
- Educate policy makers, including legislators, about the benefits of EVs, their role in climate strategy and opportunities for addressing needs of low income Vermonters.

Opportunities

- Work with utility regulators and partners to increase beneficial electrification
 - Off-peak charging / demand response programs
 - Increased grid load factor can lower rates for all
 - Explore opportunities to increase harmony between various utility EV incentive programs and coordinate on broader state offering.
- Work with low income advocates to ensure EV programs are designed to meet needs of Vermonters, potentially to include incentives on used vehicle purchases.
- Continue working with auto dealers to increase their sales teams' knowledge of EVs in Vermont context and support incentives at point of sale.

Summary – A sustained program to increase the pace of EV adoption in Vermont will ensure all Vermonters are able to participate in the clean energy transition. EVs will increase affordability, support our economy and put the state on a path to meeting our climate and energy goals.

12. Timeline: To meet our 2025 goals, we need some proposals that can be implemented in the next couple of years as well as some “game changers” that will bend the curve even further out. What timeline do you foresee for your proposal to be developed and implemented?

- 2025 goals call for 10% renewably powered transportation, which would require about 45,000 EVs. Currently at about 2,000 and on track to maybe hit half of this goal without greater intervention.
 - Vehicles are a durable good – their average age in Vermont is over 9 years old. Advancing EV sales in the short term will pay compound benefits over the coming years.
- Several EV incentive programs have already been delivered in Vermont. Once funding is identified it would likely be less than a year to launch a program.

**Pitch 2 - Big Buses, Big Opportunity: How Electric Buses Support Cleaner
Air, Healthier Kids and Lower Costs**

Rebecca Ryan, American Lung Association

Abby Bleything, Vermont Clean Cities Coalition

Cara Robeck, Vermont Energy Education Program

Representing Transportation for Vermonters (T4VT)

Vermont Energy & Climate Summit

Pitch Submission Form

1. **Pitch Submitted By (Your Name or Organization):** Transportation for Vermonters Coalition; Rebecca Ryan (American Lung Association – VT) – Coalition Member
2. **Contact Email Address:** Rebecca. Ryan@lung.org
3. **Contact Phone Number:** (802) 876-6862
4. **Pitch Title:** (one line): Big Buses, Big Opportunity: Electric Buses, Healthier Kids, Lower Costs
5. **Pitch Summary:** Vermont has the opportunity to improve our children’s health and our communities’ bottom lines while reinforcing our commitment to transportation choices, affordability, and clean energy. The large buses that travel our streets – both the colorful transit buses and the timeless yellow school buses – show how our rural state has worked to provide transit and other transportation choices that help people get where they need to go. At the same time, the inefficient, diesel buses that make up most fleets come with real issues: they emit diesel exhaust that is dangerous for children, drivers, and passersby, especially those with chronic disease; are subject to fluctuations in fuel prices, and are inefficient - the average diesel transit bus gets just 4.5 miles per gallon. Fortunately, electric transit and school buses – including buses that have been designed and tested in our cold climate – are now available. We propose two options to catalyze the shift from diesel to electric in our state’s buses. ***The first*** is to use VW settlement funds, pollution pricing revenue, state bonding capacity, and/or leveraged federal funds to help school districts across the state integrate one or more electric buses (and charging infrastructure), into their fleets. ***The second*** is to use these revenue sources to make a focused effort to replace *the majority* of buses in a transit fleet that has access to 100% or near 100% renewable energy. Implementing one or both of these will show how electric buses can work in Vermont, and lay the groundwork for the long-term shift to electric buses in our state.
6. **What energy sector(s) does this Pitch apply to? (Check all that apply):**
 - ☐ Energy Efficiency
 - ☒ Electricity X
 - ☒ Transportation X
 - ☐ Thermal Heating &/or Cooling
 - ☐ All (Total Energy)
 - ☐ None: Non-energy related carbon reduction proposal
7. **Which criteria category(ies) does it address? (Check all that apply):**
 - ☒ Economic Activity X
 - ☒ Affordability X
 - ☒ Vulnerable Vermonters X
 - ☒ Other X (HEALTH)
8. **Scale of impact on Vermont’s energy and climate goals:**
 - ☐ Currently, 47% of Vermont’s greenhouse gas emissions come from transportation, and gasoline and diesel represent more than 35% of all of the energy consumed in Vermont (CEP,

p. 135). Switching from low mileage, high emitting buses to electric vehicles will help us meet our goals by reducing greenhouse gasses and overall energy consumed.

- Achieving this goal assumes that electric buses are powered with renewable energy. Currently, approximately 55% of Vermont's electricity is considered renewable, with utilities required to increase the percent of renewable electricity in their portfolio annually until 75% is achieved. In some jurisdictions, the percentage is higher: for example, both the Burlington Electric Department and Washington Electric Co-op have portfolios that are 100% renewable, while GMP's portfolio has forecasted 60% renewable energy by the end of next year.
- School buses have predictable routes and times as well as predictable downtimes, providing ample opportunities for charging. In grid constrained areas, having school buses use power from the grid will help ease these constraints.

9. Benefits/costs of this proposal for Vermont and Vermonters:

- *Financial benefits and costs* – As of 2016, about 5% of the VTrans budget went toward transit. We commend the Agency's efforts to use its funds flexibly to support transit across the state, and urge decision makers to maintain and increase this baseline funding even as they work to supplement it to invest in new technologies. If the state can commit to funding the up-front cost differential for electric transit and school buses (which we estimate currently being between approximately \$200K to \$350K per bus, depending on the technology and the region), the charging infrastructure, and a maintenance training program, Vermont stands to gain long-term financial benefits. For example, the long-term financial benefits of fuel savings from electric school buses will accrue to school districts – a welcome savings for taxpayers already struggling with school budgets.
- *Economic benefits* – Since Vermont doesn't produce any petroleum products, money spent on petroleum based fuels leaves the state. According to the 2016 Comprehensive Energy Plan, in 2013 "over \$1 billion left the state to buy fuel" (p. 9). By providing Vermonters with more renewably powered electric vehicle and bus options, we can help keep far more of the dollars we currently send out of state for transportation energy - approximately 8 out of 10 dollars - in state, circulating in our economy. In addition, establishing a fleet of electric buses helps start to build maintenance expertise within Vermont's automotive sector, helping fleet operators and mechanics get a head start on gaining the skills that will ultimately be needed as not only electric buses, but also other electric vehicles, make up more of the state's registered vehicles. This positions Vermont's workers for future opportunities.
- *Social and health benefits* – Communities who have electric buses, whether for transit or school buses, will help reduce the very real impacts of diesel on people's health. According to the Clean Air Task Force's study,¹ the cost of health impacts in Vermont from fine diesel particles was \$29 million dollars in 2005.
- *Environmental benefits* – Savings vary by bus models, but to give an example, switching one diesel transit bus to an electric bus can lead to annual savings of over 50 tons of greenhouse gasses, 445 metric tons of CO₂, and nearly 300 lbs of CO, 628 lbs of NO_x. Multiplied over the estimated 12 year lifespan of a bus, and multiple buses across a fleet, Vermont stands to gain real environmental benefits and make progress toward its goals.

¹ http://www.catf.us/methane/black_carbon/diesel/dieselhealth/state.php?site=0&s=50

10. Decision-makers necessary for this proposal to be adopted or move forward

To ensure success, utilities, transit agencies, VTrans, and school districts must be involved in crafting how Vermont acquires, funds, and charges electric buses. Planning for this transition together will ensure that the specific solutions work at a variety of scales in Vermont. In addition, under Act 56 electrical utilities have a “Tier III” requirement to offset the use of fossil fuels in their service areas. Electric buses offer utilities the opportunity to meet these statutory obligations and provide benefits to the grid, such as load deferment. In addition, we look to the Legislature for leadership in committing to increasing amounts of funding over time to aid in this shift.

11. Strategy and key considerations

Overall strategy: We propose to electrify a transit fleet, school buses throughout the state, or both. We recommend selecting only one in order to make a transformative energy impact in that sector. For school busses, to maximize the benefits to people and the grid: 1) Geographic diversity should be achieved to provide the savings and learning opportunities throughout the state and 2) Communities where bus charging may help relieve grid constraint issues should be prioritized. For transit buses, the availability of renewable energy for charging and the immediacy of replacement needs should be prioritized. Implementation should be monitored through performance metrics (charging costs, miles traveled per charge, etc.) and qualitative review (rider and driver satisfaction, maintenance considerations, etc.) to help improve the deployment of electric buses.

Gaps:

- ☐ To maintain momentum, it will be necessary to identify significant additional sources of funding for subsequent phases. This will ensure that investments in charging infrastructure and driver and mechanic training are maximized. Subsequent funding could include gradual reallocation of VTrans dollars (with careful consideration of tradeoffs relative to state goals) and federal funding such as the LONO (Low or No Emission vehicle funding) program.
- ☐ Another gap is the lack of a regulatory framework for electric vehicle charging that reflects state goals. Policies could include time of use charging, incentives for charging at times that help stabilize the grid, and using revenue from EV charging to support further deployment.

Barriers:

- ☐ Uncertainty about technology, impact on service, and the bottom line.
- ☐ Up front cost of technology.
- ☐ Lack of awareness.

Opportunities:

- ☐ Educate kids about renewable energy and bus technology.
- ☐ Peer to peer learning between transit agencies, municipalities, and school bus operators.
- ☐ Capitalize on the experience and success of the Clean Energy Development Fund (CEDF) as potential catalyst for electrification of this sector.

12. Timeline

VTrans will help transit providers put a limited number of electric buses on the road in the next year. Additional investment will help build a critical mass of electric buses, with the immediate benefits of taking old diesel buses off the road. Transit and school bus electrification *will* be game changing; by making these initial investments, Vermont will build the infrastructure, knowledge, and confidence we need to clean up our buses.

Pitch 3 - Cap, Trade and Invest: Transportation

(includes two separate written pitches combined into one presentation)

Cap, Trade and Invest for Transportation – Mary Peterson

Regional Cap and Invest for Transportation – Daniel Gatti, Union of
Concerned Scientists

Vermont Energy & Climate Summit

Pitch Submission Form

1. Pitch Submitted By (Your Name or Organization):

Mary Peterson

2. Contact Email Address:

mnp@rathlaw.com

3. Contact Phone Number:

802-310-4191

4. Pitch Title:

Cap, Trade and Invest for Transportation

5. Pitch Summary:

Vermont should extend its successful experience in using emissions trading to its largest emissions sector, transportation, and neighboring Quebec, together with its Western Climate Initiatives (WCI) partners, offers the quickest lane to do so. The Regional Greenhouse Gas Initiative (REGGI) has proven a valuable tool, embraced over time and across the political spectrum, to drive down carbon emissions from the electricity production sector. At its foundation are three levers – a cap that sets the emissions goal, an allowance and offset trading market to achieve that goal most efficiently, and revenue that can be invested strategically to spur economic development and further drive down emissions in an equitable way. Cap and trade is carbon pricing applied at the point where businesses make investment and innovation decisions involving the atmosphere, a public asset. Allowances are auctioned, like airwave spectrum, and offsets can include farming and forestry enterprises. Revenue is distributed as a common benefit, incenting businesses and reducing costs to consumers over the long term through efficiency, alternatives and infrastructure. There is an overall net positive impact on the economy. Cap, trade and invest can work in parallel with other tools, such as fuel standards or a carbon tax, and even could help address limitations of the current gas tax. Application of the cap, trade and invest approach to the transportation sector is overdue.

6. What energy sector(s) does this Pitch apply to? (Check all that apply):

- ☐ Energy Efficiency
- ☐ Electricity
- ☒ Transportation
- ☐ Thermal Heating &/or Cooling

- ☐ All (Total Energy)
- ☐ None: Non-energy related carbon reduction proposal

7. Which criteria category(ies) does it address? (Check all that apply):

- ☒ Economic Activity
- ☒ Affordability
- ☒ Vulnerable Vermonters
- ☐ Other

8. Scale of impact on Vermont's energy and climate goals:

Vermont must address transportation to achieve its goals; according to the 2016 Comprehensive Energy Plan (CEP) it accounts for 45% of CHG emissions. (Section 4.1.3.) The CEP has a thorough discussion of how Vermont might meet its 2025 goal, including the role of transportation and market based strategies (Sections 4.4.2.2 and 4.5). Analyses of REGGI detail emission reductions, long term savings to consumers, and net positive impact on the economy. (See the Analysis Group Review of REGGI, 2012-14, and the Department of Conservation, REGGI 2016 Program Review Stakeholder Meeting, 11-29-16.)

A cap in the transportation sector can be designed to move as quickly as Vermont chooses on its goals, with flexibility in allowance features calibrated to accommodate other concerns, such as thresholds to limit impacts on smaller businesses, and discounted allowances if necessary to address unique competition concerns. Vermont's agricultural and forestry sectors can be engaged to provide offset as another tool for businesses to comply with the cap. Decisions around the use of the revenue can likewise be tailored to address any number of objectives, including further emission reduction, economic development, equity and potential supplement to current transportation funding. As REGGI has demonstrated, design features intentionally are subject to revision periodically and as circumstances change, ensuring that the cap, trade and invest program stays current to Vermont's needs.

Vermont could continue in REGGI for electricity production, and develop a separate emissions trading program to cover the transportation sector. Vermont could seek linkage for this sector to the WCI, at least in the short term, which would not preclude working with REGGI partners to extend its trading program to this sector in the long term.

The experience of Quebec is instructive. Quebec originally enacted a tax on the carbon content of fuel, and then established an emissions cap program. "The government realized that a stronger, more robust tool than a carbon levy was needed to integrate the hidden economic, social and environmental costs related to GHG emissions into the economy as well as the decision-making of businesses and citizens."

<http://www.mddelcc.gouv.qc.ca/changements/carbone/documents-spede/historical-overview.pdf>. Legislation was passed enabling the program to be enacted through regulation.

For the first two years, the cap was applied to electricity and industry over a certain threshold, it was then extended to include transportation, building and smaller industry. Quebec carefully

crafted its allowance program in collaboration with business and other stakeholders. It also worked with California and the WCI to harmonize its design and operating rules for a regional trading program. For one year, it operated a domestic allowance market, and then formally linked with WCI. Quebec can point to emissions reduction achieved and investments made with its Green Fund, including in transportation infrastructure. Perhaps most impressively, electric vehicles comprise 45% of Quebec's car market. Notably, Quebec's economy has achieved impressive growth during the time the program has been in effect.

9. Benefits/costs of this proposal for Vermont and Vermonters:

In terms of economic and financial costs, this proposal applies those costs in the first instance at the point where investment and innovation happens. Businesses can make economic decisions that reflect use of commonly held assets. For any given business, economic efficiency might dictate revisiting their production or supply methods, or buying allowances from other businesses that can more economically lower emissions, or offsets from agriculture and forestry enterprises. Linking to an existing market platform such as WCI will give businesses more options from the get go. The revenue generated from public auction gives government the ability to invest to further environmental goals and address any economic, financial or social disruption – at the business, community or individual level. Revenue can be invested in appropriate transportation solutions for rural communities and individual citizens, including housing and development, electric vehicles and charging stations, modern mass transit etc. REGGI shows that over time consumer prices drop, and there is a net economic gain.

10. - 12. Decision-makers; strategy and key considerations; timeline:

This approach involves the Administration and Legislature engaging stakeholders including businesses, consumers, and advocates on legislation and regulations. Lead regulatory agencies would include the Agency of Transportation, Agency of Natural Resources and the Department of Public Service. The strategy can be divided into three areas. First, the cap, allowances and offsets are designed. The cap is derived by determining the entities covered, the current emission levels, and the desired pace of meeting goals, while the allowance and offset modeling allows for considerable accommodations within the cap to meet economic objectives. Long-term process should be set to adjust these design parameters over time. Second, the valuable advantages of linkage are explored. With a larger market, Vermont entities have more opportunities to obtain or sell allowances and offsets; more liquidity and stability. The WCI partners have developed compliance and trading tools in the transportation sector, and over time, market protections such as price floors and ceilings; it is an attractive option at least for the interim. If linkage is contemplated, Vermont would develop its system with an eye to harmonizing. The final area involves the decisions around investing revenue, to further reduce emissions, smooth disruption, incent innovation and ensure equity. The framework could be enacted in the short term with legislation authorizing regulation. The regulation setting process, implementation and linkage could proceed as quickly as Vermont wanted to move, with speed tempered by building in robust engagement of stakeholders and potential partners, and allowing for future flexibility.

1. Pitch Submitted By (Your Name or Organization): Daniel Gatti, Union of Concerned Scientists

2. Contact Email Address: dgatti@ucsusa.org

3. Contact Phone Number: 617 797-2125

4. Pitch Title: **Regional cap and invest program for transportation**

5. Pitch Summary:

Transportation is the largest source of pollution in Vermont, but new technologies and transportation strategies give us the potential to build a better, cleaner transportation system for Vermonters.

Electric vehicles are now available in many different models and classes, from passenger cars to SUVs to buses and trucks, and when plugged in to the relatively clean New England grid EVs get the [emissions equivalent](#) of a 100+ mpg conventional vehicle. Ridesharing services have the potential to help link people to public transportation, even in relatively rural communities. And use of public transportation, cycling and walkable neighborhoods are all on the rise. But to scale up these solutions, we need to find new resources for clean transportation investments.

One critical step would be for Vermont to join with states in the Northeast region, California, Ontario and Quebec to create a cap and invest program covering transportation emissions. Such a program would build on the success of the Regional Greenhouse Gas Initiative (RGGI), which has helped significantly reduce pollution from electricity in Vermont while saving consumers money and increasing economic growth. Overall, [independent analysis](#) has shown that RGGI has produced over \$10 billion in health benefits for the Northeast region while reducing climate emissions by 37% and expanding economic growth by \$2.9 billion. Here in Vermont, RGGI has helped fund some of the states most successful efficiency programs, such as Efficiency Vermont's Home Performance program, which has helped weatherize thousands of homes across Vermont.

An expansion of this model to cover pollution from transportation fuel would allow the state to address critical transportation needs, from expanding public transportation services, to electrifying our vehicle fleet, to protecting our transportation infrastructure from the impact of a changing climate.

6. What energy sector(s) does this Pitch apply to? Transportation

7. Which criteria category(ies) does it address? (Check all that apply): Economic Activity, Affordability, Vulnerable Vermonters

8. Scale of impact on Vermont's energy and climate goals: If this proposal came to fruition, how might it move the needle in helping to meet Vermont's energy and climate goals by 2025 and/or 2050? Please outline assumptions and, if available, provide calculations.

Vermont must address transportation to achieve its energy and climate goals. "Transportation accounts for 45% of GHG emissions, and is the state's largest contributing sector". Vermont's 2016 Comprehensive Energy Plan (CEP), Section 4.1.3. The CEP has a thorough discussion of how Vermont

might meet its 2025 goal, including analysis from the Total Energy Study (Section 4.4). The CEP discusses the role of transportation change (Section 4.4.2.2) and considers the role for market based strategies (Section 4.5).

The Georgetown Transportation and Climate Initiative issued a [report](#) in 2015 that showed that a cap and invest program modelled after RGGI, in conjunction with existing vehicle standards and a clean fuel standard, could reduce emissions in transportation in the Northeast by up to 40% by 2030.

More broadly, the investments that we make in electric vehicles and clean transportation today have the potential to trigger more profound changes in the market for electric vehicles, as increasing sales create a virtuous cycle of increasing volume and reduced costs through greater economies of scale. Achieving Vermont's climate goals will ultimately require the near complete turnover of our vehicle fleet from the internal combustion engine to electric vehicles or other zero-emission vehicle technologies.

9. Benefits/costs of this proposal for Vermont and Vermonters: Including, where possible, economic, financial, social, and environmental.

New investments in clean transportation will have significant economic, social, and environmental benefits for Vermont.

Vermont businesses and workers need a transportation system that people can rely on to get them where they need to go. Vermonters who can't drive, either because they are low-income, or too elderly or disabled to drive desperately need better mobility choices. The state should do more to help Vermonters who do drive be able to afford the cleanest and most fuel-efficient vehicles possible, from electric vehicles to the most efficient hybrid and conventional cars, SUVs and pickup trucks. And all Vermonters need transportation infrastructure that is resilient and in good repair, particularly as climate change threatens to bring more frequent storms and flooding.

As Vermont produces no oil of our own, almost all of the money that Vermont drivers spend on gasoline and diesel fuel ultimately leaves the state for other countries or oil-producing regions. Reducing our consumption of oil therefore has broad positive economic benefits for the region and for Vermont. According to Georgetown, this policy could help create up to 125,000 jobs in the Northeast while saving consumers up to \$14 billion by 2030. This program would also provide significant health benefits for the Northeast region, preventing over 35,000 asthma attacks, 633 premature deaths and \$4.9 billion in health costs by 2030.

Further, increasing the number of electric vehicles in Vermont will have significant benefits for ratepayers, and if administered correctly, could facilitate the integration of renewables onto the grid. One [recent study](#) of Northeast states demonstrates that increased use of electric vehicles could reduce electric bills for all customers by between \$104 and \$144 per year.

This program would also address another critical issue facing the transportation system in Vermont, which is the loss of funding from gas tax revenues. Over the next decade the increasing fuel efficiency of our vehicle fleet and the introduction of electric vehicles will erode the real revenues from the state's

gas tax. This is a critical source of funding for transportation in Vermont. This policy will provide some critical resources that can help the state address part of this larger funding challenge.

Of course, none of these investments are free. Under this program transportation fuel distributors will be required to purchase allowances from the state based on their overall emissions. Some of the cost of allowance sales will inevitably be passed on to consumers. If all costs are passed on to consumers, a program similar to the policy enacted by California, Ontario and Quebec would add about 12 cents to the price of gasoline. But as RGGI has shown, by investing the funds from the sale of allowances into energy efficiency initiatives, consumers will overall save money by purchasing less fuel.

10. Decision-makers necessary for this proposal to be adopted or move forward (e.g., Legislature, Governor, a regulatory agency, a business, organization, media outlet, or financing institution, etc.):

The first step will be for Vermont to work with other states, including New York, Massachusetts, and California to develop a Memorandum of Understanding calling for a cap and invest program covering transportation emissions. This could be achieved by having states join California's economy-wide program, or by creating an independent program for the Northeast transportation sector similar to RGGI. Once the MOU is established, the next steps will require legislative action and agency implementation. Gubernatorial support will be critical to program success.

11. Strategy and key considerations: Outline the overall strategy, including gaps, barriers and opportunities for moving this proposal forward.

We believe that a cleaner, better transportation system will improve the lives of all Vermonters, and we encourage the state to reach out to people in all areas of the state to ensure that we are designing solutions that are most relevant to their lives. So we encourage the state to hold listening sessions and do the stakeholder outreach that will help us develop an investment proposal that will help as many people as possible switch to cleaner transportation. Ultimately, we want to build a coalition in support of this policy that is more powerful than the oil companies that will oppose it, and we believe that coalition can include: environmental advocates, utilities, business leaders, local government, environmental justice advocates, public transportation supporters, labor and consumer advocates.

12. Timeline: To meet our 2025 goals, we need some proposals that can be implemented in the next couple of years as well as some "game changers" that will bend the curve even further out. What timeline do you foresee for your proposal to be developed and implemented?

2017: States announce expanded regional effort to address transportation emissions.

2018: States hold regional and state-based stakeholder process to develop best ideas on program design, implementation and investment opportunities. Ultimately states agree to an MOU indicating support for the policy.

2019: States implement the policy through executive and legislative action, program launches.

**Pitch 4 - Home Grown Renewable Heat: Strategies for Achieving
Multiple Benefits**

Ansley Bloomer, Renewable Energy Vermont
Maura Adams, Northern Forest Center

Plus

5-Year Action Plan: Increasing Advanced Wood Heat in Vermont (2017)



Vermont Energy & Climate Summit
Pitch Submission Form

1. Pitch Submitted By (Your Name or Organization):

Renewable Energy Vermont & Northern Forest Center

2. Contact Email Address:

ansley@revermont.org
madams@northernforest.org

3. Contact Phone Number:

Ansley Bloomer - 802-229-0099
Maura Adams - 603-229-0679, ext. 114

4. Pitch Title: (one line)

Home-Grown Renewable Heat: Strategies for Achieving Multiple Benefits

5. Pitch Summary: (one paragraph)

Advanced wood heat yields more simultaneous benefits than any other renewable energy technology. It mitigates carbon emissions, stimulates economic development, and preserves and enhances our working forest landscape while helping Vermont achieve its energy goals. The advanced wood heating market has been slow to develop, for several reasons: high capital costs and the low price of fossil fuels often make the economics unappealing, and few heating technicians - usually the people in the basement telling consumers what kind of new heating system to buy - are familiar with this technology, and recommend a standard oil or propane system instead. We recommend several ways to increase adoption of advanced wood heating: (1) sustain robust consumer incentives and supply-side grants through the Clean Energy Development Fund and Working Lands Enterprise Board, (2) exempt sales of these systems and wood fuel from state sales tax, and (3) develop a comprehensive training program for heating technicians to increase their awareness, confidence, and skill in installing and servicing these systems. Together these strategies will demonstrate Vermont's continued support for advanced wood heat as an essential component of its renewable energy strategy and increase adoption of these broadly beneficial heating systems.

6. What energy sector(s) does this Pitch apply to? (Check all that apply):

- Energy Efficiency
- Electricity
- Transportation
- **X Thermal Heating &/or Cooling**
- All (Total Energy)
- None: Non-energy related carbon reduction proposal

7. Which criteria category(ies) does it address? (Check all that apply):

- **X Economic Activity**
- **X Affordability**
- **X Vulnerable Vermonters**
- Other

8. Scale of impact on Vermont's energy and climate goals:

REV and the Biomass Energy Resource Center, with input from local and regional non-profits, businesses, and government officials, developed a roadmap in 2017 for expanded use of advanced wood heat to meet 35% of Vermont's thermal energy needs by 2030. Analysis found that achieving this goal would reduce oil consumption by 58,600,000 gallons per year (over 60% reduction) and reduce greenhouse gas emissions by 305,000 tons per year.* It would also utilize 900,000 green tons of low-grade wood per year - an amount that Vermont's forests can more than sustain over time, as BERC found in a [2007 study](#) - helping sustain the forest economy that keeps Vermont's forested landscape intact.

**GHG reduction assumptions: One way to reach the 35% threshold is by increasing the number of wood heating appliances to 70,000 pellet stoves, 11,000 residential pellet boilers, 2,700 commercial and institutional pellet boilers, and 280 woodchip boilers. BERC based the GHG reduction estimate on the basis of lbs CO₂ per MMBtu for each fuel type being displaced by wood. The methods by which they determined CO₂ emissions for wood are outlined in [this 2016 document](#).*

9. Benefits/costs of this proposal for Vermont and Vermonters:

Benefits of the advanced wood heat sector include:

1. **Displacing fossil fuels.** As described earlier, every advanced wood system that comes online eliminates oil consumption and reduces greenhouse gas emissions by over 50%.
2. **Retaining wealth in the state.** Vermont's fossil fuel dependence sends over \$81 million out of state every year, according to a [Biomass Thermal Energy Council analysis](#). Local wood heat keeps heating investments within the state, supporting local businesses and communities.
3. **Sustaining and creating jobs in the forest economy.** Foresters, loggers, and associated businesses are challenged by a significant decline in regional markets for low-grade wood. Expanding advanced wood heating provides a new use for that wood and helps sustain related businesses, e.g. logging contractors and sawmills.
4. **Keeping forests as forests.** Related to the point above, landowners need revenue from all types of wood coming off their land in order to implement healthy forest management that benefits forests long-term and makes harvests economical. Weak markets compromise forest health and make land conversion (i.e. losing forests indefinitely) more likely.

5. **Increasing affordability.** The capital cost of advanced wood heating systems is a significant barrier to residential and small business deployment. Incentives from Efficiency Vermont and the Clean Energy Development Fund are very important, and the CEDF will have exhausted all funds in the first quarter of 2018, unless we find a funding stream. Additionally, a sales tax exemption similar to that offered to other renewable energy solutions would help make advanced wood heat and cost-effective wood fuel accessible to more Vermonters - not only homeowners, but also housing providers, and local businesses. Looking to decrease ongoing heating and operating costs and make heating decisions that benefit their community.

Benefits specific to our recommendations are as follows:

1. **Identify a permanent funding stream for Clean Energy Development Fund incentives.** These incentives are critical to growth of the advanced wood heat sector. 80% of CEDF's incentive funds have been reserved just three months into the fiscal year, putting CEDF on pace to exhaust its funds by the end of the calendar year. Currently there is no known source of revenue to sustain CEDF after fiscal year 2018. Without a new source of incentive funding, the advanced wood heating sector is going to stall completely.
2. **Exempt advanced wood heat equipment and fuel from state sales tax.** Sales tax exemption is a simple, additional way to nudge the systems toward wider affordability and help reach the number of units needed to reach the 35% of thermal energy benchmark, which directly supports the state goal of 90% renewable energy.
3. **Sustain funding for the Working Lands Enterprise Board and continue to invest in the supply side of the advanced wood heat economy.** Previous investments have been crucial to encourage bulk wood pellet delivery and Vermont pellet mill development. This funding helps entrepreneurs get a foothold in the burgeoning advanced wood heat market and expand their services, bolstering consumers' confidence in the supply chain and increasing the volume of Vermont-made wood pellets available to consumers.
4. **Develop a dedicated workforce training program.** Efficiency Vermont estimates that there are only 30 trained advanced wood heating installers in Vermont, and the number of active installers is much lower. Since most people rely on their heating technician to recommend a new heating system when their old one needs to be replaced, this means that only a handful of those technicians are recommending renewable heat - the vast majority are still recommending fossil fuel replacements. Expanding training opportunities and broadened curriculum in HVAC training programs will expand the workforce and help the advanced wood heat sector scale up as it needs to.

The recommendations discussed here are several important pieces of a broader suite of activities designed to expand the market for advanced wood heating systems, which are described in the collaboratively developed *5 Year Action Plan* (attached). Every system installed and every ton of local wood pellets or chips used supports Vermont's climate goals of reducing GHG emissions and transitioning to renewable energy. Advanced wood heat is an essential component of Vermont's climate economy, and the financial incentives and workforce training recommended here are several modest measures the legislature can take next year to demonstrate its support.

10. Decision-makers necessary for this proposal to be adopted or move forward
Vermont Legislature & Governor

11. Strategy and key considerations:

Securing funding streams for both the Working Lands Enterprise Board and Clean Energy Development Fund will require careful consideration beyond the scope of this pitch, but should be an immediate priority of the legislature and governor's climate change commission. Likewise, details of the workforce development program - including funding requirements and potential revenue sources - should be developed promptly by a team of state agency staff and industry leaders.

For the sales tax exemption, legislation was introduced in 2017 by Rep. Robert Helm (R-Rutland-2) and received an introductory bill hearing in the House Ways & Means Committee (see H.357 - An act relating to exempting indoor commercial and residential advanced wood boilers from the sales and use tax). Additional strategies for advancing local wood heating are described in the attached *5 Year Action Plan*.

12. Timeline:

We aim to enact legislation in support of the activities described here within this biennium, i.e. by the end of 2018. The need for CEDF funding is most urgent.

5 Year Action Plan

**Increasing Advanced Wood
Heating in Vermont**

2017

Endorsements:

*The following organizations and agencies endorse the 5 Year Action Plan:
Increasing Advanced Wood Heating in Vermont*

**Biomass Energy Resource Center
Bourne's Energy
Calfee Woodland Management LLC
Cutting Edge Energy Systems
Forward Thinking Consultants LLC
Gagnon Lumber
Green Mountain Club
Hardwood Forestry Services, Inc.
Housing Vermont
Innovative Natural Resource Solutions LLC
LandVest Timberland
Long Meadow Resource Management LLC
Lyme Green Heat Inc.
New England Wood Pellet LLC
North Woods Forestry
Northern Forest Center
Maine Energy Systems
Meadowsend Timberlands, LTD**

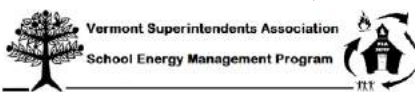
**Pellergy
Renewable Energy Vermont
Sunwood Biomass
Tarm Biomass
USDA Forest Service
Vermont Agency of Commerce and
Community Development
Vermont Conservation Voters
Vermont Department of Buildings &
General Services
Vermont Department of Forests Parks &
Recreation
Vermont Energy Investment Corporation
Vermont Natural Resources Council
Vermont Renewable Fuels
Vermont Sustainable Jobs Fund
Vermont Woodlands Association
Watson Research**

About REV:

Renewable Energy Vermont represents businesses, non-profits, utilities, and individuals committed to reducing our reliance on dirty fossil fuels by increasing clean renewable energy and energy efficiency in Vermont. Vermont's clean energy economy supports at least 19,080 jobs at 3,751 businesses, representing approximately 6% of Vermont's workforce. Together, we will achieve 90% total renewable energy (electric, thermal, transportation) by 2050.

Acknowledgements:

This plan was prepared as part of the Vermont Statewide Wood Energy Team (SWET) partnership. The partnership provides outreach and technical support to schools and providers of affordable housing, for the successful conversion to advanced wood heating systems as a strategy to help lower energy costs, boost the Vermont economy, sustain the forested working landscape, and reduce net carbon emissions.



Disclaimer:

The views expressed and recommendations made in this report are those of the authors and stakeholder group, consistent with the commissioning of this plan. While the plan includes actions that require legislation, no federal funds will support any lobbying actions to implement the plan's recommendations.

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Governor Phil Scott and Ribbon Cutting at People's Academy, Morrisville, Vermont

Introduction:

“Wood fuel is an affordable option that stimulates the economy by supporting local businesses.”

Governor Phil Scott | Northeast Biomass Heating Expo 2017

Vermont is committed to supporting working landscapes, revitalizing our economy, and achieving total renewable energy and climate pollution reduction. Vermont’s leadership to advance local wood heating is a key component to meeting these commitments. The recommendations presented in this action plan, when adopted, strengthen our economy by: 1) maintaining and growing our wood energy and forest products industries at a time of otherwise declining markets; and 2) adding jobs by keeping more our heating dollars in the state. The action plan will further position Vermont as a leader in climate change mitigation.

The action plan is a deliverable of Vermont Statewide Wood Energy Team (SWET) grant. Vermont’s Wood Energy Team was created to support the installation of high efficiency wood energy systems to help achieve Vermont’s Comprehensive Energy Plan goal of obtaining 90% of our total energy from renewable sources by 2050. The Vermont SWET team is a collaborative group of stakeholders with expertise in wood energy utilization. Renewable Energy Vermont (REV) convenes quarterly industry stakeholder roundtables. The team met five times on the following dates: March 10, 2017, September 12, 2016, April 8, 2016, January 15, 2016 and October 9, 2015. The actions within this plan reflect from recommendations of the industry stakeholder group.

The group met to discuss obstacles and opportunities and created a list of actions. From those discussions, the workgroup established an overarching goal and milestone: **Obtaining 35% of Vermont’s thermal energy needs from wood heat by 2030, through increased adoption of advanced wood heating systems.**



People’s Academy, Morrisville, Vermont

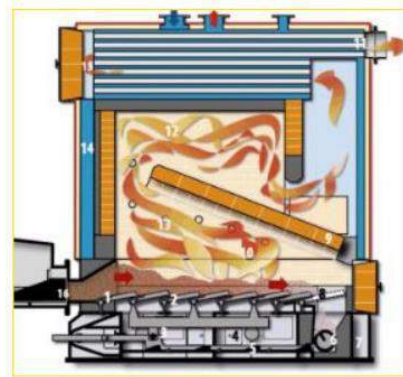
Advanced wood heating: 1) utilizes highly efficient combustion technology, 2) produces low levels of emissions, 3) supports healthy forest ecosystems, and 4) consumes local wood.¹



Cordwood system



Pellet system



Woodchip system

Of note, two other terms also used synonymously with advanced wood heat, which are modern wood heat and automated wood heating.

To obtain 35% of Vermont's thermal energy needs from wood heat by 2030, through increased adoption of advanced wood heating systems, and to achieve the goals of the Comprehensive Energy Plan, the following guiding principles, as outlined in the Northern Forest Biomass Energy Action Plan, are to be regarded in each of the actions addressed in this plan:

Sustainable Forestry - to keep the forest healthy and ensure that harvest management supports the overall ecological function and integrity of the forest ecosystem.

Maximized Efficiency - to ensure the energy value of wood harvested for fuel is utilized as fully and cleanly as possible.

Local Energy - to use local wood resources for community and regional needs at the appropriate scale.

Energy Security - to provide communities and businesses with a stable, uninterrupted, affordable, clean energy supply using local resources.

Climate Change Mitigation - to reduce net carbon emissions over time and increase carbon sequestration.²

The timing of an action plan is critical not only in light of the climate change impacts already negatively affecting the agricultural, skiing, and wildlife sectors of our economy, but also with Vermont's goal of reaching 90% total energy by renewables by 2050. With the milestone of achieving 35% thermal heating with wood heat by 2030, we have less than 15 years to get from point A to point B. The purpose of the roadmap is to create a shared vision, and to develop concrete

¹Clean Energy Development Fund Annual Report, FY 2015

²Northern Forest Biomass Energy Action Plan, 2007

and specific strategies and tactics for the state and industry to follow right now, with benchmarks throughout the next 5 years. We estimate that if we achieve 35% by 2030:

- ✓ Displace **40** million gallons of fossil fuel, saving **\$120,000,000** on fuel a year
- ✓ Create **580** new jobs in Vermont³
- ✓ Achieve measureable progress towards State Energy Goal of **90%** total energy from renewables
- ✓ Instead of sending **\$131 million** out of state every year on heating oil, delivery, and jobs, we will be reinvesting **\$70 million** annually back into our local economy with local jobs and local fuel sources⁴
- ✓ Maintain and expand jobs in forestry, logging, pellet manufacturing and trucking

35% X 2030

Moving toward 35% of our thermal heating needs from wood heating will not only displace fossil fuel, but will help our local economy by using local fuel sources. The majority of wood harvested from Vermont's forests today (two-thirds, according to the latest state harvest study⁵) is considered low grade, which traditionally found healthy regional markets at pulp mills, electric biomass facilities, and to a lesser degree, with pellet and chip producers for thermal heating systems. A sharp decline in the region's pulp industry, combined with a move away from new electric biomass in the region has contributed to a significant decline in markets for low grade wood. The low price of oil has also contributed to a lack of demand for pellet and chip heating systems and fuel, another prime consumer of low grade wood.

Without healthy markets for low grade wood, Vermont is likely to see continued decline in the industry's in-state infrastructure such as logging contractors and sawmills, as well as the local jobs they sustained. The environmental and economic viability of Vermont's working landscape depends on a healthy forest products industry to sustainably manage, harvest and utilize Vermont's forests.

³ Biomass Energy Resource Center

⁴ Biomass Energy Resource Center analysis using EIA and regional fuel price 2016 data

⁵ 2015 Vermont Forest Resource Harvest Summary

Expanded use of advanced wood heat is the single most efficient way to simultaneously meet our renewable energy goals, mitigate carbon emissions, stimulate economic development and enhance the working landscape.

Thermal biomass from cordwood, chips and pellets is a critical ingredient in Vermont's renewable energy strategy, and the sustainability of Vermont's environment and economy.

Local, renewable wood heat cuts the economic drain of energy dollars leaving the state and reinvests in the local Vermont economy with direct connection back to sustaining and enhancing Vermont's forested working landscape (forests account for 75% of Vermont's land area). Since approximately 80% of Vermont's forests are privately owned, it is imperative that there are markets to enable landowners to realize some economic value from their forest stewardship. Without markets for low-grade wood, not only does healthy forest management become more difficult, but some landowners will be pushed into having to sell the land for development.

To get to 35%, it is important to have a baseline to measure and define current conditions. Mapping out the path forward with measures will create a more viable future for the advanced wood heating industry in Vermont. Today in Vermont, there are approximately:

1,550 Employees⁶ **300** Pellet systems installed **120** Woodchip systems installed



By late 2017, the Biomass Energy Resource Center (BERC) will issue a report detailing the current adoption of wood heat in Vermont. Preliminary results of this study indicate an abundant amount of wood fuel supply, established infrastructure and current optimal technology to achieve the goal. Unfortunately, other hurdles are growing. Competing technologies, current market conditions, warm winters, and low fossil fuel prices are all forces stifling thermal renewable energy progress and utilization of advanced wood heating. Setting an achievable benchmark and clear actions will help to achieve Vermont's commitments. To help guide us to 35%, the workgroup established objectives.

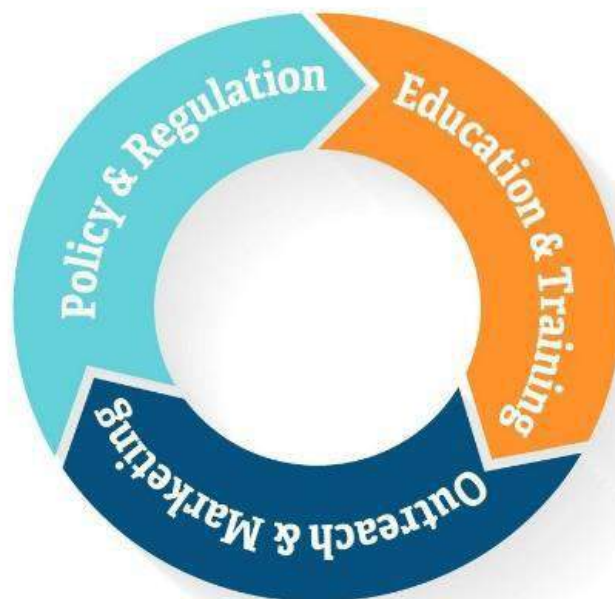
⁶ Vermont Department of Public Service, Vermont Clean Energy Industry Report, 2016

Objectives:

- Develop and identify solutions to overcome current challenges and hurdles
- Outline a clear path with measurable progress
- Create solutions that reflect the needs of the industry
- Define strategies to catalyze the market and accelerate adoption
- Provide context for where we stand today
- Set the stage for a larger, more in depth roadmap

Recommended Actions:

The following recommended actions are the top ranked ideas evaluated by the workgroup. The “who” for each action reflects the decision-making authority(s). Additionally, for each action, there is a problem statement, how it can be achieved, and a deadline by which the action should be achieved. Using the very successful Upper Austrian support mechanisms model, the recommendations fall into three tranches: policy & regulation, outreach & marketing, and education & training.



Policy & Regulation

Action: Codify goal of achieving 35% of Vermont's thermal energy needs through wood heat by 2030, with increased adoption of advanced wood heating systems. The state should incorporate plans to achieve the goal through the comprehensive energy plan, carbon mitigation efforts, working landscape, and economic development plans and strategies.

Problem Statement: Codifying the measureable goal creates accountability and increases likelihood of progress. It also increases support for inclusion within the State, regional, and local energy plans, and health plans, etc.

How: Create a diverse coalition of supporting organizations and stakeholders to advocate for the benefits of local, renewable wood heating to government officials.

Who: Vermont State Legislature, Agency of Commerce and Community Development, Building and General Services, Department of Public Service, Green Mountain Care Board, Health Department, Regional Planning Commissions, Towns, Vermont Department of Forests Parks and Recreation

When: By the end of the 2018



Bourne's Energy, North Hyde Park, Vermont

Action: Align Efficiency Vermont’s thermal energy performance metrics to account for both fossil fuel displacement and energy savings.

Problem Statement: Efficiency Vermont offers incentives on fossil fuel equipment. With the current metrics used, there are “thermal energy savings” when an older boiler is replaced with a new, more efficient fossil fuel boiler, and Efficiency Vermont incentivizes the fossil fuel boiler. State goals are to dramatically reduce the use of fossil heating fuels. There needs to be better policy alignment with State law governing greenhouse gas pollution, (reduction of 75% by 2050⁷) and to reduce fossil fuels consumed by their customers and the emission of greenhouse gases attributable to that consumption.⁸ There needs to be alignment of indicators from Efficiency Vermont, Public Service Department, and Public Service Board. Also, these metrics need to be incorporated into the Energy Excellence Network.

How: The Efficiency Vermont Quantitative Performance Indicator (QPI) needs to account for fossil fuel displacement. Conduct meetings with Efficiency Vermont to discuss recommendations. And participate in the EEU 2016-03 DRP proceeding at the Public Service Board to advocate for this action.

Who: Efficiency Vermont, Public Service Board, Public Service Department

When: Before the end of 2018 – corresponding with Efficiency Vermont’s 3 Year Planning process



⁷ 10 V.S.A. § 578

⁸ 30 V.S.A. § 8002

***Action:* Implement a state sales tax exemption on the purchase of qualifying advanced wood heating equipment and fuel.**

Problem Statement: Short term low fossil fuel prices discourage Vermont homeowners, businesses, and institutions from utilizing local, renewable wood heat. Reducing the capital costs of an advanced wood boiler and commercial wood fuels assists customers with overcoming these cost and market barriers. Every dollar in reductions will be reinvested in the Vermont economy instead of leaving the state.

How: Enact Legislation.

Who: Vermont State Legislature

When: By the end of the 2020 biennium



Wood Pellet Fuel

Outreach & Marketing

***Action:* Create a coordinated marketing team focused on aligned communications and messaging.**

Problem Statement: A lack of awareness about advanced wood heating impedes market growth. Current efforts to increase awareness are not aligned. These problems result in missed opportunities to maximize marketing efforts. Additionally, there needs to be greater investment into marketing advanced wood heating in Vermont and the region.

How: Create a coordinated marketing workgroup to evaluate all of the efforts currently underway and look for areas of collaboration to make sure efforts are complimentary. This team will help coordinate wood heat marketing efforts in Vermont and ensure regional consistency and leveraging. The group should map out all current activities, devise a plan for coordination (where coordination is possible), and meet regularly.

Who: Agency of Commerce and Community Development, Biomass Energy Resource Center, Clean Energy Development Fund, Efficiency Vermont, Industry Members, Non-profit supporters, Northern Forest Center, Renewable Energy Vermont, Renewable Energy Resource Center, Jeff Rubin, Vermont Energy Investment Corporation, Vermont Sustainable Jobs Fund and marketing professionals.

When: 2017 and ongoing

Status Update: In February of 2017, the Vermont Wood Heat Marketing Action Team was created. The purpose of the group is to:

- Provide a forum for marketers, businesses and other organizations involved in wood heat consumer education and outreach to share information, pool resources and collaborate where appropriate; and
- Provide a structure for collaborative marketing efforts, such as message testing, outreach to target markets or other marketing activities.

The goal is for the action team to be comprised of business representatives, non-profits, agencies and others involved in marketing wood heat to consumers. They should include people with expertise in a particular wood heat market segment (residential, commercial, institutional, municipal) and/or marketing experts with background or knowledge of the industry or the target demographics.



Photo Credit: Biomass Energy Resource Center

Education & Training

***Action:* Increase the number of HVAC installers that can install and maintain advanced wood heating systems. Create a more robust training program, and advanced wood heat needs to be included in HVAC vocational curriculum. Additionally, promote businesses that are practicing a high quality of work.**

Problem Statement: There is a shortage of HVAC installers trained on advanced wood heat - Efficiency Vermont estimates a total of 30 trained advanced wood heating HVAC installers in Vermont. No benchmarks or standards for the quality of work exist.

How: Establish a working group/coalition to encourage advanced wood heating be included in HVAC training programs. The coalition will confer directly with trade schools and other institutions that offer HVAC training programs.

Renewable Energy Vermont will utilize its Vermont Renewable Energy Business Listing (VREBL) to track trainings/workshops that installers attend with advanced wood heat in the curriculum. This will act as the second genesis of Renewable Energy Vermont's Partnership Program. The Partnership Program helped create a standard for work. A panel of experts reviewed projects, and then businesses were approved to be a part of the program. The Partnership Program has transitioned into a listing of qualifications and is now called the Vermont Renewable Energy Business Listing.

Vermont Renewable Energy Business Listing

Show 10 entries

Search:

Business Name	Technology Type	Type of Installer	County, State	REV Member	Former "Partnership Program Participant"	Number of years in Business	Number of systems installed	Amount of MW, kW, BTU's Installed	Business Structure (LLC, S-Corp etc.)	Credentials
Bourne's Energy	Wood Pellet Boilers	Commercial	Washington, VT	Yes	No					
Cutting Edge Energy	Wood Pellet Boilers	Residential	Caledonia, VT	Yes	No	5	100		LLC	
Sunwood Systems	Wood Pellet Boilers	Residential	Washington, VT	Yes	Yes					
TARM USA	Wood Pellet Boilers	Commercial	New Hampshire	Yes	No					
VT Renewable Fuels	Wood Pellet Boilers	Commercial	Washington, VT	Yes	No					
Watson Research	Wood Pellet Boilers	Residential	Franklin	Yes	No	12	43	7,012,000 BTU's	Sole Proprietor	

www.revermont.org/vrebl

As the number of installers increases, the number of workshops and trainings should increase in frequency and/or in the number of attendees. Success will be measured on the percentage increase of installations, number of trainings, and number of installers attending the trainings.

Who: Agency of Commerce and Community Development, Clean Energy Development Fund, Efficiency Vermont, Renewable Energy Vermont, Vermont Fuel Dealers Association, Vermont Technical College

When: 2017 and continuing growth over the course of the next 5 years

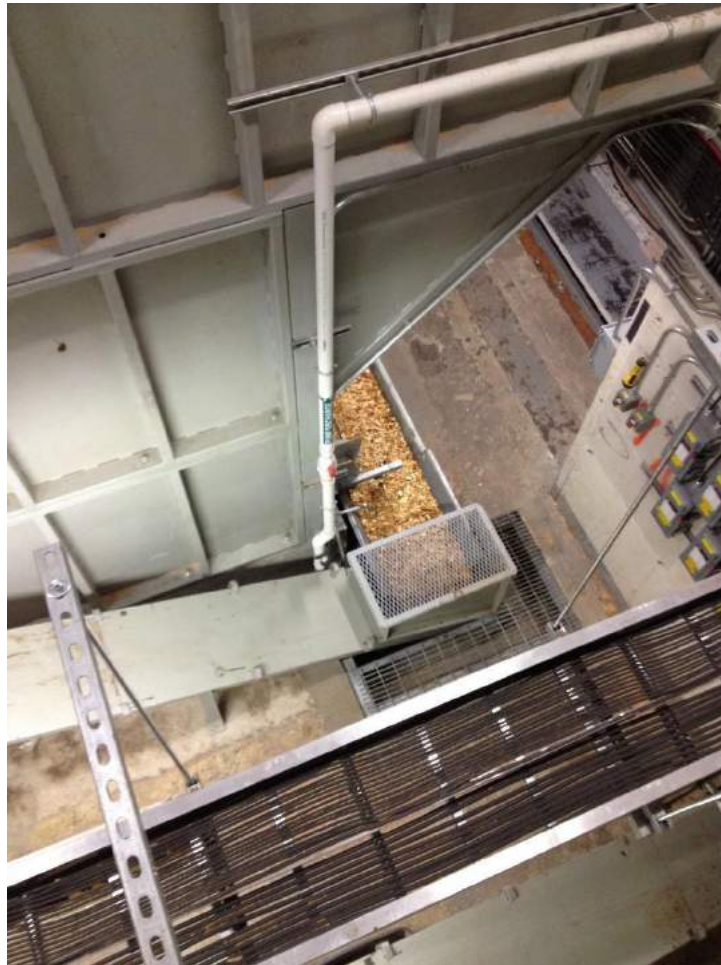
Action: Streamline financing and incentives.

Problem Statement: Improved and expanded financing for advanced wood heating and streamlined incentives are needed so potential customers and providers can more easily access and utilize them. Incentives need to be competitive to encourage adoption. Additionally, there needs to be a hub of this information for consumers. Maintaining funding for the Clean Energy Development Fund is also necessary.

How: Identify a lead who can oversee coordination and strategy. Identify all of the financing options and programs currently available. Work with the Clean Energy Development Fund and Efficiency Vermont to make sure the incentives available are competitive and promoted appropriately. Look for gaps and overlap in current resources. Identify where/how this information should be displayed, and create a one-stop-shop that outlines all of the resource for consumers.

Who: Public Service Department, Efficiency Vermont, Financiers, Non-profit supporters/advocacy organizations, Renewable Energy Vermont, Thermal Heating Taskforce, Clean Energy Development Fund

When: 2017 and continuing growth over the course of the next 5 years



Montpelier District Heating Plant, Montpelier, Vermont

Next Steps:

In addition to the actions of this plan, there were a number of other recommendations discussed by the stakeholder group which are represented as Appendix A. Additionally, there will be a review of the Vermont Renewable Energy Standard Tier III requirements – at which time, the possibility of Thermal Renewable Energy Credits should be evaluated. Ongoing evaluation of the 35% benchmark should occur to ensure that this metric is still accurate and proceeding progressively.

Vermont needs a plan to achieve the goal of obtaining 35% of Vermont's thermal energy needs from wood heat by 2030, through increased adoption of advanced wood heating systems. A guide that will help provide policy and regulatory framework for state agencies to ensure measurable progress. The importance of a local, good paying market for low grade wood is essential for good forest management and will enhance the working landscape. With actionable items in all three key areas: policy & regulation; outreach & marketing; and training & education; positive environmental and economic impacts will result, including reducing our carbon footprint while scaling up the industry and increasing local jobs.

“Modern wood heating is vital strategy that can help us make measurable progress toward our renewable energy, working landscape, and economic development goals in Vermont. But with a few consecutive years of low fossil heating fuel prices and warm winters, our home-grown modern wood heating industry in Vermont is struggling. There are numerous programs and policies that are working to expand the use of modern wood heating, but now is the time to put together all of the pieces – we need a coherent strategy that lays out a roadmap to guide us in the years ahead.”

Adam Sherman | Biomass Energy Resource Center

REV and the BERC will be working on a longer, more in depth roadmap in 2017: Achieving 35% of Vermont's thermal energy needs from wood heat by 2030, through increased adoption of advanced wood heating systems. Embedded in that plan will be the action items from this plan, and a more robust guide mapping out all of the steps of the next 13 years.

Appendices:

Appendix A – 5 Year Industry Action Plan Recommendations List

5 Year Industry Action Plan Recommendations List

The group was asked to independently rank each item from 1 to 10 (10 being highest/most important). Group Rank Average is the score from each participant, divided by total responses (average score). The group then was asked to score their top 3 recommendations (the higher the score, the more votes). The outcome of the top recommendations is the Final Ranking.

Final Ranking	Action Item	Group Rank Average Ranking 1 - 10	Group Score (3 most important)
1	Officially adopt/incorporate the goal of reaching 35% Modern Wood heating by 2030 into State energy, carbon mitigation, working landscape, and economic development plans and strategies.	9.20	6
2	More trained installers and robust training program.	8.22	5
3	Realign Efficiency Vermont thermal energy performance metrics to count as fossil fuel displacement in addition to energy savings. Under the current metrics used, there are “thermal energy savings” when an older boiler is replaced with a new, more efficient oil boiler – so they offer incentives on fossil fuel boilers. State goals are to dramatically reduce the use of fossil heating fuels so there needs to be better policy alignment.	9.11	4
4	Implement a state sales tax exemption on the purchase of qualifying modern wood heating equipment.	8.78	3
5	Streamlined financing and incentives.	9.4	2
6	Naming conventions/messaging alignment and a marketing campaign.	6.89	2
7	Reconsider Act 56 and the Tier 3 program. The current program design will result in 100% compliance by the utilities installing electric powered heat pumps to displace fossil fuels. This is not the intent of the original legislation.	6.80	2
8	Creation of a heating fuel tax that only kicks in when oil prices drop below a certain level.	5.63	2
9	Increased incentives and programs that incentivize adoption.	7.63	1
10	Legislative Package	9.25	
11	Certification program for installers/code of conduct.	7.78	
12	Seek out more government investment grants/grant programs.	7.38	
13	More supporting partners (banks, financiers, environmental groups etc.).	7.13	
14	Request Vermont Department of Public Service to track and report cordwood, woodchip, and bulk wood pellet prices in the same way they do with fossil heating fuels in the monthly fuel price report.	7.00	
15	Residential building code adopt some standards.	7	
16	State school construction aid program for modern wood heat.	7	
17	Develop Act 250 review criteria requiring commercial/institutional developments to consider energy efficiency and renewable energy – not just automatically install fossil heating systems.	6.30	
18	Establish grades/standards for pellets.	6.29	
19	introducing renewable energy targets with building efficiency benchmarks. (i.e. all new construction after 2020 will have 90% renewable energy heating and electric).	6.20	
20	Develop a state building mandate of 90% renewable heating by 2040.	5.89	
21	Green Mountain Care Board to consider modern wood heat in all Certificate of Need (CON) processes.	5.5	
22	Use x% of air pollution permit fees from Department of Energy Conservation (DEC) Air Pollution Control Division (APCD) toward funding a low-income focused woodstove change out program.	5.44	
23	Recognize European boiler safety standards in addition to American Society of Mechanical Engineers (ASME) standards for boilers under 1.0 million Btu/hr.	5.44	
24	Redirect more LHEAP funding away from directly subsidizing heating oil and put a portion of those funds toward installing modern wood heating systems.	5.22	
25	Expand Regional Greenhouse Gas Initiative (RGGI)	5	
26	Integrate biomass retention guidelines into Accepted Management Practices – (develop the pie wheel like used in Austria).	4.89	
27	Support a carbon tax.	3.67	
28	Funding for research and development.	2.80	
29	Develop lower cost, higher performance appliances.	2.78	

*10 highest/most important

Glossary:

Advanced Wood Heat: 1) utilizes highly efficient combustion technology, 2) produces low levels of emissions, 3) supports healthy forest ecosystems, and 4) consumes local wood.

Boiler: a fuel-burning apparatus or container for heating

Cordwood: wood that is cut into short lengths, usually measured in cords and commonly used for pulp or fuel

Quality Performance Indicator: performance measurement for an organization to gauge success

Thermal: relating to heat

Wood Chips: medium-sized solid material made by cutting, or chipping, larger pieces of wood for fuel

Wood Pellets: biofuels made from compressed organic matter or biomass



Milton Elementary School, Milton, Vermont

Renewable Energy Vermont

June 2017

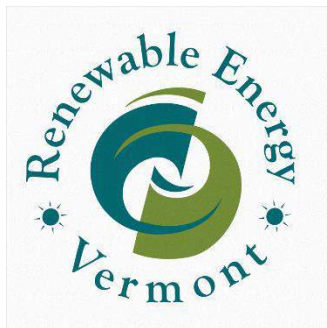
Author: Ansley Bloomer

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Pitch 5 - Using “Feebates” to Drive Cleaner Energy Choices

Richard Faesy, Energy Futures Group

Vermont Energy & Climate Summit

Pitch Submission Form

Guiding Criteria: EAN’s mission is to end Vermont’s reliance on fossil fuels *and* to create efficient, clean, affordable, and secure electric, heating, and transportation systems for the 21st Century. The VT Climate Pledge Coalition is seeking pledges to reduce GHG reductions that will help Vermont meet Paris climate commitments. Together, we support the criteria outlined in Gov. Scott’s Executive Order creating the **Vermont Climate Action Commission**, specifically that solutions must:

- Spur economic activity, inspire and grow Vermont businesses, and put Vermonters on a path to affordability;
- Engage all Vermonters, so no individual or group of Vermonters is unduly burdened; and
- Collectively provide solutions for all Vermonters to reduce their carbon impact and save money.

With these goals and criteria in mind, please answer the questions below. Questions 8-12 can be answered individually or in one comprehensive narrative. (Total pitch submission **no more than 3 pages**).

1. **Pitch Submitted By (Your Name or Organization):** Richard Faesy, Energy Futures Group
2. **Contact Email Address:** rfaesy@energyfuturesgroup.com
dmellinger@energyfuturesgroup.com
3. **Contact Phone Number:**
4. **Pitch Title:** (one line): Equipment vs. Fuel: A “Feebate” Program to Make VT Heating More Renewable
5. **Pitch Summary:** (one paragraph)

What if there was a way to reduce greenhouse gas emissions; displace fossil fuels with local, renewable energy; improve the health of Vermonters; and grow our State economy, all at the same time – and all without increasing the overall tax burden of Vermonters? There is: implementing a “fee and rebate” or “feebate” program for heating appliance purchases -- providing rebates that lower the cost for consumers who make purchases of renewably fueled or powered heating appliances (including advanced wood heat boilers and furnaces, efficient wood or pellet stoves, cold climate heat pumps, solar or heat pump water heaters, etc.). These rebates would be paid for by revenue from fees applied to the purchase of fossil fuel heating appliances (ex. fuel oil, propane, and coal boilers, furnaces, and stoves). The total value of the rebates would be equal to the total amount of fee revenue collected, making the whole “feebate” program revenue-neutral. Rebates and fees on the purchase of heating equipment would have a double-benefit of discouraging socially and environmentally harmful choices, while also providing funds to further incentivize and reward socially and environmentally beneficial choices that will help Vermont meet its statewide energy, emissions, health, and economic goals.

6. What energy sector(s) does this Pitch apply to? (Check all that apply):

- ☒ Energy Efficiency X
- ☒ Electricity X
- ☒ Transportation X
- ☒ Thermal Heating &/or Cooling X
- ☒ All (Total Energy) X
- ☐ None: Non-energy related carbon reduction proposal

7. Which criteria category(ies) does it address? (Check all that apply):

- ☒ Economic Activity X
- ☒ Affordability X
- ☒ Vulnerable Vermonters X
- ☐ Other

8. Scale of impact on Vermont's energy and climate goals: If this proposal came to fruition, how might it move the needle in helping to meet Vermont's energy and climate goals by 2025 and/or 2050? Please outline assumptions and, if available, provide calculations.

The fee and rebate levels could be set based on State goals for renewable energy adoption. For instance, if we wish to double our use of advanced wood heating by 2025 and see similar growth in cold climate heat pumps, fees could be set with the intent of sufficiently incentivizing/ disincentivizing market activity to achieve those goals.

9. Benefits/costs of this proposal for Vermont and Vermonters: Including, where possible, economic, financial, social, and environmental.

Crucially, since Vermont does not produce any fossil fuel and because 80 cents on every dollar spent on fossil fuel drains out of our state economy, every purchase of renewable heating equipment will keep more money in state, resulting in a virtuous economic development cycle that will create more local jobs and grow Vermont wealth. **Insert health data re: costs of fossil fuel...** Furthermore, unlike a gas/fuel/ or carbon tax, a "feebate" on purchases of buildings and *equipment* does not penalize low-income Vermonters who may be stuck with a fossil fuel vehicle or heating system for the time being. The fee or rebate only applies when a consumer has already decided to make a new purchase. The rebate would make renewable heating options more affordable for every Vermonter (including low-income Vermonters). And since renewable heating options generally cost more up front (at least, in the absence of a feebate) than fossil fuel options but since they *also* generally save consumers much more money over their lifetime (maintenance and fuel costs are generally lower and/or more stable with renewable options), reducing the up-front cost of renewable options has a double benefit: helping low-income Vermonters save money both at the point of purchase and on an annual basis for years to come. Finally, since a feebate would discourage fossil fuels and encourage renewable energy, it does not "pick winners" among various renewable technologies (electric vs. solid and liquid renewable fuels) -- rebates can equally be used for efficient wood stoves or for cold-climate heat pumps.

10. Decision-makers necessary for this proposal to be adopted or move forward (e.g.,
Legislature, Governor, a regulatory agency, a business, organization, media outlet,
or financing institution, etc.)

This proposal would likely require action by the Legislature and the Governor. It could likely be implemented by the Clean Energy Development Fund.

11. Strategy and key considerations: Outline the overall strategy, including gaps, barriers and opportunities for moving this proposal forward.

The fee and rebate structure could be designed simply, for ease of implementation, or in a more tiered/ refined manner that would charge higher fees for more inefficient heating equipment and/or give larger rebates for efficient renewable heating equipment that use a higher percentage of renewable energy. Certain exemptions could also be made for heating equipment in the rare cases where there is not yet a renewable alternative. Also, while this proposal focuses on heating

Focusing on equipment vs. fuel makes sense for many reasons. Vermonters generally don't have a goal of purchasing fossil fuel – we purchase fossil fuels simply because it is what the equipment that we currently have demands in order for us to heat our homes and to get around. Changing the price of fuel will likely not change behavior in the short run, since *fuels* have a very inelastic price elasticity of demand (i.e. the amount of fossil fuel people buy generally stays the same even in the face of higher fuel prices)... and since people's fuel choices are driven by the *assets* they have: vehicles, heating systems, etc.). Incentivizing people to buy renewable equipment at time of purchase can avoid decades of locked-in fossil fuel demand ... and not penalize (in the way that a fuel tax can) low-income VT'ers who may be, for the time being, stuck with fossil fuel heating systems, vehicles, etc. without much recourse.

12. Timeline: To meet our 2025 goals, we need some proposals that can be implemented in the next couple of years as well as some “game changers” that will bend the curve even further out. What timeline do you foresee for your proposal to be developed and implemented?

Pitch 6 - Renewable Fuels Standard

John Quinney, Energy Coop of Vermont

Richard Faesy, Energy Futures Group

Dan Mellinger, Energy Futures Group

Vermont Energy & Climate Summit **Pitch Submission Form**

1. Pitch Submitted By (Your Name or Organization):

Submitted by Richard Faesy & Dan Mellinger, Energy Futures Group
Pitched by John Quinney, Energy Coop of Vermont

2. Contact Email Address:

rfaesy@energyfuturesgroup.com
dmellinger@energyfuturesgroup.com
john@ecvt.net

3. Contact Phone Number:

EFG - (802) 482-5001
John - (802) 860-4090

4. Pitch Title: Renewable Fuels Standard (RFS)

- 5. Pitch Summary:** Similar to a “renewable energy standard” (RES) that requires increasing the mix of renewable sources on the electric grid, a “renewable fuels standard” (RFS) would impose a similar requirement on the fossil fuels industry. Biofuels and biomass are recognized as renewable fuels in Vermont’s Renewable Energy Standard (Act 56 of 2015), and the fuel dealers and their regional and national organizations have embraced biofuels as a way to move off of fossil fuels. Vermont should establish an increasing standard of biofuels as a percentage of all fuels delivered in Vermont going forward. Define “renewable fuels” to include liquid biofuels, biogas, biopropane and wood products. Establish a baseline year from which to increase market share of renewable fuels and then measure compliance at the statewide level. Establish a non-compliance penalty that would fund incentives (through the CEDF) for efficient and renewable-fired equipment. Allow the market and Vermont Fuel Dealers Association to innovate to determine the best means of implementing, but establish an Alternative Compliance Payment (ACP) mechanism similar to the RES as an incentive for compliance. Consider establishing a seat on the CEDF board for a fuel dealer representative to help direct use of these funds.

6. What energy sector(s) does this Pitch apply to? (Check all that apply):

- ☐ Energy Efficiency
- ☐ Electricity
- ☒ Transportation
- ☒ Thermal Heating &/or Cooling
- ☐ All (Total Energy)
- ☐ None: Non-energy related carbon reduction proposal

7. Which criteria category(ies) does it address? (Check all that apply):

- ☒ Economic Activity
- ☐ Affordability
- ☐ Vulnerable Vermonters

❑ Other

8. **Scale of impact on Vermont's energy and climate goals:** If this proposal came to fruition, how might it move the needle in helping to meet Vermont's energy and climate goals by 2025 and/or 2050? Please outline assumptions and, if available, provide calculations.

Bio-fuels offset fossil fuels and help meet our climate goals. With an aggressive standard set at the statewide level that increases annually, this approach can provide an alternative and complimentary strategy to electrification while supporting our existing fuel dealer infrastructure and forest product industry.

9. **Benefits/costs of this proposal for Vermont and Vermonters:** Including, where possible, economic, financial, social, and environmental.

(Input results from analysis).

10. **Decision-makers necessary for this proposal to be adopted or move forward (e.g., Legislature, Governor, a regulatory agency, a business, organization, media outlet, or financing institution, etc.)**

- Establishing a RFS will require an act of the Legislature
- Collaboration with the Vermont Fuel Dealers Association and their members and the Northern Forest Alliance and other biomass organizations will be important

11. **Strategy and key considerations:** Outline the overall strategy, including gaps, barriers and opportunities for moving this proposal forward.

- Other states surrounding Vermont are either considering or have already implemented bio-fuels standards, and there is already a bio-blending plant in Vermont so the infrastructure is readily available to support this standard;
- The wood products industry in Vermont is poised to increase production, and is already tuned-in to sustainable forestry practices as part of their business operations, which need to be an important consideration;
- Research the other 13 states' experience with renewable fuels standards to learn lessons;
- Collaborate with the VFDA and biomass groups as standards are developed and implemented.

12. **Timeline:** To meet our 2025 goals, we need some proposals that can be implemented in the next couple of years as well as some "game changers" that will bend the curve even further out. What timeline do you foresee for your proposal to be developed and implemented?

This concept would likely take a few years to develop, but could be implemented by 2020.

13. **Additional Material** – From VFDA

Biodiesel

Made from an increasingly diverse mix of resources such as soybean oil, recycled cooking oil, and animal fats, biodiesel is a renewable, clean-burning diesel replacement that can be used in existing diesel engines and in oilheat burners. Biodiesel contains no petroleum, but it can be blended at any level with petroleum diesel to create a biodiesel blend. It can be used in heating oil equipment without modification. Biodiesel is simple to use, biodegradable, nontoxic, and essentially free of sulfur and aromatics. Biodiesel is registered as a fuel and fuel additive with the U.S. Environmental Protection Agency (EPA) and meets clean diesel standards established by the California Air Resources Board (CARB). B100 (100% biodiesel) has been designated as an alternative fuel by the U.S. Department of Energy (DOE) and the U.S. Department of Transportation (DOT).

Food vs. Fuel Debate

More biodiesel production helps the food supply, despite what some incorrectly claim. Unlike corn based ethanol, biodiesel is made from fats and oils that are an agricultural byproduct. The soybean is the most common example of a crop that produces both food and fuel. To produce the oil needed to make just one gallon of biodiesel, the soybeans grown by farmers make 30 pounds of protein and 22 pounds of carbs and dietary fiber for the food supply at the same time.

Energy Balance

Biodiesel is the only commercial-scale fuel produced across the U.S. to meet the EPA's definition as an Advanced Biofuel, meaning the EPA has determined that biodiesel reduces greenhouse gas emissions by more than 50 percent when compared with petroleum diesel. Biodiesel has the highest "energy balance" of any transportation fuel, alternative or conventional. The DOE/USDA lifecycle analysis shows for every unit of fossil energy it takes to make biodiesel, 5.4 units of energy are gained. This takes into account the planting, harvesting, fuel production, and fuel transportation to the end user.

BioHeat: Biodiesel and Heating Oil

BioHeat fuel is any blend of petroleum heating oil and biodiesel. The use of biodiesel in home heating equipment results in reductions of unburned hydrocarbons (ozone precursors), carbon monoxide (poisonous gas), and particulate matter (black smoke) compared to emissions from petroleum fuel. In addition, emissions of sulfur oxides and sulfates (components of acid rain) from biodiesel are essentially eliminated. Research and testing confirm that biodiesel exhaust have less harmful impacts than petroleum diesel fuel. Biodiesel emissions have decreased levels of polycyclic aromatic hydrocarbons (PAH), which have been identified as potential cancer causing compounds. Test results indicate PAH compounds were reduced 90 to 95 percent. Biodiesel also reduces carbon monoxide (CO) by up to 45 percent and Nitrogen Oxides (NOx) by up to 25 percent.

Greenhouse Gas Emissions

Biodiesel and BioHeat can achieve significant savings in greenhouse gas emissions in thermal applications compared to both oil-fired and natural gas-fired combustion systems. A study by ICF International compared the greenhouse gas emissions of biodiesel with conventional fossil fuels and shows that B100 biodiesel can achieve an approximately 70% reduction in greenhouse gas emissions compared to natural gas and a greater than 80 percent reduction compared to traditional heating oil. A B20 blend with traditional heating oil will achieve greenhouse gas emission levels equivalent or below that of natural gas.

Sources: American Society of Agricultural and Biological Engineers, Brookhaven National Laboratory, Informa Economics, Energy Information Administration, National Biodiesel Board, National Oil Heat Research Alliance, Vermont Fuel Dealers Association

Pitch 7 - “Warm Home” Program: Bonds for Expanded Weatherization

Neale Lunderville, Burlington Electric Department

VERMONT “WARM HOME” PROGRAM

Weatherization Surge Using Revenue Bonds

Neale F. Lunderville
General Manager
Burlington Electric Department



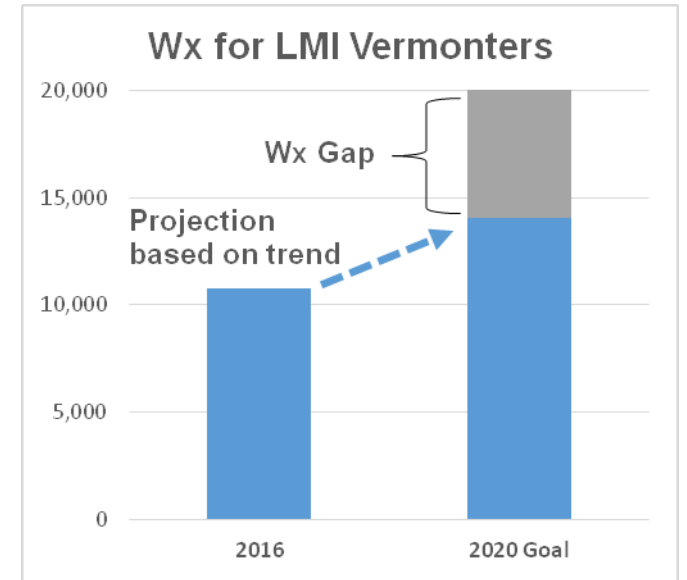
The Primer

- **Weatherization** is a whole home approach looking at a building's systems: envelope, heating and cooling, electrical, and baseload appliances. The process usually starts with an energy consult.
- The Weatherization Assistance Program (Wx) supports Vermonters 80% of median income, plus those in SSI & LIHEAP.
- Wx services are provided by five community-based nonprofit organizations.



The Challenge

- Estimated that 1 in 5 Vermonters spends 10% of monthly income on energy = “fuel poverty”.
- In 2007, State set goal of weatherizing 20,000 low income homes by 2020. As of March 2016, there was still a gap of 9,200 homes.
- Based on current trajectory, 6,000 low-income families will have to wait past 2020 to start accruing Wx benefits.

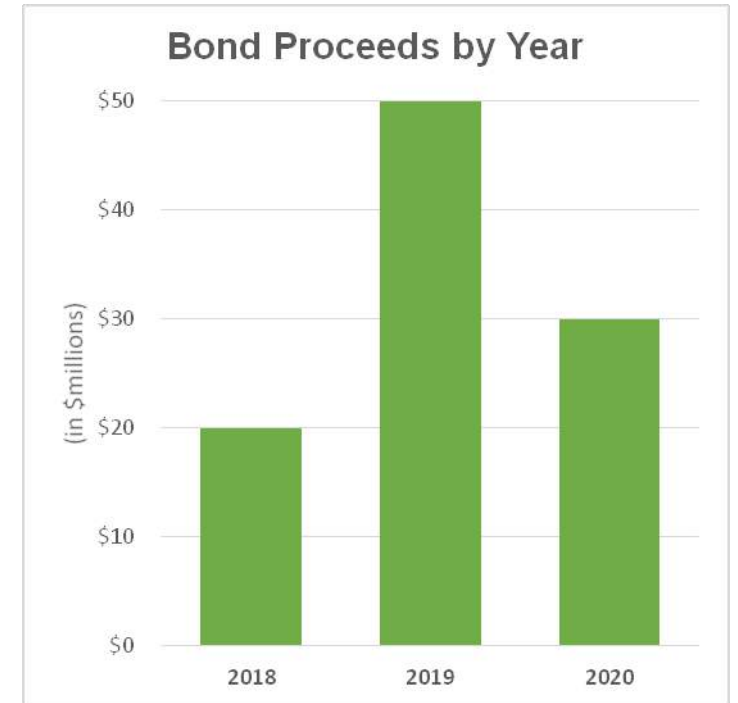


The Proposal

- Current annual spending on Wx (net of admin expenses) is \$9.5M, which equates to ~1,000 homes per year.
- Fundamentally, weatherization is a capital investment with a quick rate of return. Instead of dripping in annual appropriations, State should use Wx funds to bond for a weatherization surge between now and 2020.
- **“Warm Home” bonds would fund \$100,000,000 in weatherization work for low income Vermonters over the next three years – or about 10,000 homes.**

How It Works

- **Warm Home** bonds would use \$7.25M in Gross Receipts Tax now directed to the Wx program to fund a 20-year revenue bond.
- Modeled after successful \$35M Housing Bond proposal from 2017 Leg. session.
- Bond proceeds are flexible to allow weatherization organizations and contractors to ramp up in 2018, with bulk of work in 2019, and ramp down in 2020.



What's Next for Weatherization

- Since Warm Home bonds use future Wx revenues to deliver benefits earlier than otherwise able, the ongoing Wx appropriation would be reduced starting in 2021.
- However, as more low income homes are weatherized, the LIHEAP need should diminish. State should ask Feds to use 25% of LIHEAP money for Wx (versus current 15%).
- Also, State should work with Congressional delegation to allow up to 50% of LIHEAP to be used for Wx. Using 50% LIHEAP funds, Wx revenues would nearly be back to pre-bond levels.

**Pitch 8 - Sustainable Energy for Vermonters: Overcoming Barriers to
Low-Income Access to Meet VT's 2025 Energy & Climate Goals**

Christa Shute, Institute for Energy and the Environment, Energy Clinic,
Vermont Law School



Vermont Energy and Climate Summit

Pitch Submission Form

1. **Pitch Submitted By (Your Name or Organization):**

*Christa Shute; Energy Fellow for Climate Justice
Vermont Law School: Energy Clinic*

2. **Contact Email Address:** *cshute@vermontlaw.edu*

3. **Contact Phone Number:** *802-793-7077*

4. **Pitch Title:** (one line): *Sustainable Energy/Community Solar for Low-Income Vermonters*

4.a Pitch Sentence: *Sustainable Energy/Community Solar for Low-Income Vermonters*

Low-income Vermonters comprise over 25% of our population. They deserve to benefit from the financial savings and price stability of net-metered solar and efficiency investments. Vermont can promote participation from this needed sector through low-income adders; consumer protected on-bill financing; green clauses; and education/training/workforce development.

5. **Pitch Summary:** (one paragraph)

*Twenty-five percent (25%) of Vermonters are considered low income – living at or below 200% of the poverty rate. This segment of the population also carries the highest energy burden – spending, as a percentage of income, 3 to 5 times as much as other Vermonters. Low-income Vermonters deserve to benefit from the financial benefit of net-metering and the resulting price stability. Perhaps as important, Vermont NEEDS this segment of the population to participate in order to meet its goals. The development of sustainable energy policies that encourage participation of our low-income populations is critical to meeting Vermont's energy and climate goals. These incentives should help low-income Vermonters take advantage of the opportunities that higher income Vermonters have benefited from. Low-income Vermonters live in a variety of housing situations and our policies, incentives and regulations should address the range, not just one segment. Benefits could include: 1) adders for community solar projects that have a minimum percentage of participation from either Vermonters that qualify as low-income or non-profits that primarily benefit low-income Vermonters; 2) adders for individual low-income solar ownership; 3) legislation that makes **on-bill financing** possible so that utilities can lend to the meter (this is different from on-bill collection where money is lent to the individual and collected on the bill); 4) promote **“green lease” clauses** to address split incentives between owners and tenants; 5) a **training program** to help community members educate each other and implement weatherization, efficiency and renewables measures (with free measures to volunteers after a certain number of measure installed in their community); 6) fund to support loan guarantees to facilitate existing loan programs for weatherization, efficiency, biomass and solar; 7) lobby HUD to allow Section 8 Housing entities to retain the costs savings generated by sustainable energy investments rather than allow it to decrease the subsidy received; 8) correction of legislation that creates a six cent penalty for individuals to keep the REC's. Addressing this portion of the population comes with specific challenges and takes time. Policies need to be put in*

place for a long term so that programs and education can be built up, adopted, and expanded.

6. What energy sector(s) does this Pitch apply to? (Check all that apply):

- | |
|---|
| <input type="checkbox"/> Energy Efficiency - X |
| <input type="checkbox"/> Electricity - X |

7. Which criteria category(ies) does it address? (Check all that apply):

- | |
|---|
| <input type="checkbox"/> Economic Activity - X |
| <input type="checkbox"/> Affordability - X |
| <input type="checkbox"/> Vulnerable Vermonters - X |

Policies to encourage and assist participation by low-income populations must address the variety of housing situations:

1. *Owned homes – that have solar opportunity: While this segment is probably the smallest it often includes older, retired individuals living on fixed income.*
 - a. **Low-income Net-Metering Adder:** *We can help these Vermonters lower their costs and create energy price stability by allowing them qualify on the basis of income for a net-metering adder available when the individual owns the solar. While third party ownership can be a way to avoid the upfront cost of solar, it often puts the majority of the benefit in the third party pocket.*
 - b. **Financing Options:** *Creating a legal mechanism for utilities to lend to the meter, rather than to the individual, provides a mechanism to address the upfront cost of efficiency and renewables without creating a personal debt that may prevent the individual from purchasing a car in the future or moving due to job loss, disability, or other circumstances. It is critical to not overleverage low-income Vermonters in a way that could prevent access to vital necessities. Vermont should put in place the regulatory changes that: 1) allow the utility to lend to the meter and then collect by way of tariff on the utility bill; 2) create consumer protections guidelines that provide a return on investment equivalent to the then current capital market rates so that a higher portion of the savings benefits the home-owner. Utilities and third party leasing companies have often used the argument that they are saving the customer money. However, it is fundamentally unfair for the portion of our population that most needs savings to realize only a fraction of savings and price stability of their wealthier counterparts.*
2. *Owned homes – that are structurally compromised or do not have solar opportunity.*
 - a. *Community solar is a great opportunity for those that cannot put solar on their own home. At a state level we can create incentives for projects that have a minimum percentage of participation from either Vermonters that qualify as low-income or non-profits that primarily benefit low-income Vermonters. Incentives can be in the form of specific adders or loan guarantees through VEDA. At a municipal level, communities can be encouraged to put policies in place that require a certain percentage of low-income/non-profit participation in order to receive preferred siting preferences or the use of scarce municipality land for community solar projects. Community solar projects can be structured so that investors with a tax credit appetite are able to invest in an LLC formed for a solar project and then sell that LLC to the other participants without the appetite for tax credits and accelerated depreciation (such as municipalities, non-profits, and*

- low-income residents. By purchasing the LLC after 7 years the community participants are able to more fully receive the long-term benefits of the project.*
3. *Rental homes – where the electric bill is in the tenants name:*
 - a. *Community solar can benefit this group as well. However, statistically owners tend to stay in homes for 10 years whereas renters tend to stay for 2 years. So a mechanism has to be in place for the renter to get out of the community solar investment. This can be made possible by larger flexible consumption tenants that can absorb more or less energy produced depending on the number of users on the system – allowing members to drop off.*
 - b. *Many Vermonters are in this split incentive situation. One mechanism is to promote or require “green lease” or “energy aligned” clauses. Green lease clauses encourage landlords to install solar or invest in energy efficiency measures by providing a mechanism to collect the difference. A successful program would need a neutral third party such as Efficiency Vermont to set example terms for specific investments (for example an efficient appliance might save on average \$25 dollars a month – so perhaps the landlord collects \$15-\$20 per month. The net to the tenant is a lower cost per month and the landlord has the potential for a return on the investment. ((New York City developed an Energy Aligned Clause: “Base owners’ cost recovery on predicted savings, but limit owners’ capital expense pass-through to 80% of such predicted savings in any given year. This is called the 20% “Performance Buffer.”¹)*
 4. *Rental homes/rooms – where the landlord is responsible for the electric/fuel bills*
 5. *HUD sponsored; Section 8 Housing*
 - a. *This is a critical aspect of low-income housing and the sustainable energy question.² It is complicated and is not addressed per se in this pitch.*

Workforce Development: *There is a percentage of the population that sits on the benefits cliff – where it makes more sense not to work than to get a job and lose all aspects of the safety net. But those individuals still want to contribute – many want to work if they could do so in a way that would not jeopardize the health insurance for their family or the food on the table. If we trained people in these communities (as part of an exchange for some benefits) there are multiple benefits: the community members may be more willing to listen or trust someone from their community; the individual gains a skill that might translate to a higher paying job; the incentive (say through Efficiency Vermont) for the individual to get training and then encourage their neighbors to participate is free measures in their home. There are so many more people in Vermont that need energy weatherization and efficiency – lets train the people that need it and provide incentives that won’t push them over their benefits cliff. This training could also provide them with the skills to actually get a job where they soar over the benefits cliff to land on the other side. As we look at investing in training let’s recognize that women are severely underrepresented in the technical employment fields of weatherization/efficiency (as well as renewable installations such as biomass and solar). Providing a gender lens on this measure can also help with acceptance and implementation in their communities.*

Many of these proposals can be implemented within this legislative season. Some may require additional development time but could occur within the year.

¹ http://www.nyc.gov/html/gbee/downloads/pdf/121115_eac.pdf

² <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4819331/>

**Pitch 9 - Harnessing Energy Storage for Local, Clean Energy, Jobs, and
Grid Resiliency in Vermont**

(includes two separate written pitches combined into one presentation)

*Energy Storage: State Sponsored Incentives Program for Coupling Energy
Storage with Renewables - Richard Morin, Dynapower
&
Residential Solar + Storage - Nathan Wyeth, Sunrun*

Vermont Energy & Climate Summit

Pitch Submission Form

Guiding Criteria: EAN's mission is to end Vermont's reliance on fossil fuels *and* to create efficient, clean, affordable, and secure electric, heating, and transportation systems for the 21st Century. The VT Climate Pledge Coalition is seeking pledges to reduce GHG reductions that will help Vermont meet Paris climate commitments. Together, we support the criteria outlined in Gov. Scott's Executive Order creating the **Vermont Climate Action Commission**, specifically that solutions must:

- Spur economic activity, inspire and grow Vermont businesses, and put Vermonters on a path to affordability;
- Engage all Vermonters, so no individual or group of Vermonters is unduly burdened; and
- Collectively provide solutions for all Vermonters to reduce their carbon impact and save money.

With these goals and criteria in mind, please answer the questions below. Questions 8-12 can be answered individually or in one comprehensive narrative. (Total pitch submission **no more than 3 pages**).

1. **Pitch Submitted By (Your Name or Organization):** DYNAPOWER

2.

3. **Contact Email Address:**
Rmorin@dynapower.com

4. **Contact Phone Number:**
802.999.1566

5. **Pitch Title:** Incenting Solar Plus Energy Storage to Reduce the State's Carbon Footprint and Power Vermont's Economy

6. **Pitch Summary:** By financially incenting the widespread installation of energy storage with utility-scale solar installations, commercial and industrial buildings and in residences across the state Vermont could reimagine its aging grid, rapidly ramp up renewable energy integration and distribution, save ratepayers and business owners tens of millions of dollars and help accelerate and transform Vermont's economy.

7. **What energy sector(s) does this Pitch apply to? (Check all that apply):**

- ☐ Energy Efficiency
- ☒ Electricity
- ☐ Transportation
- ☐ Thermal Heating &/or Cooling
- ☐ All (Total Energy)
- ☐ None: Non-energy related carbon reduction proposal

8. **Which criteria category(ies) does it address? (Check all that apply):**

- X Economic Activity
- X Affordability
- X Vulnerable Vermonters
- X Other

9. **Scale of impact on Vermont's energy and climate goals:** If this proposal came to fruition, how might it move the needle in helping to meet Vermont's energy and climate goals by 2025 and/or 2050? Please outline assumptions and, if available, provide calculations. See below
10. **Benefits/costs of this proposal for Vermont and Vermonters:** Including, where possible, economic, financial, social, and environmental. See below
11. **Decision-makers necessary for this proposal to be adopted or move forward (e.g.,** Legislature, Governor, a regulatory agency, a business, organization, media outlet, or financing institution, etc.) See Below
12. **Strategy and key considerations:** Outline the overall strategy, including gaps, barriers and opportunities for moving this proposal forward. See Below
13. **Timeline:** To meet our 2025 goals, we need some proposals that can be implemented in the next couple of years as well as some "game changers" that will bend the curve even further out. What timeline do you foresee for your proposal to be developed and implemented? See below.

DYNAPOWER PROPOSAL

The state of Vermont has a tremendous opportunity to meet the goals set forth by 10 V.S.A 580a to both spur economic growth and reduce greenhouse gases within the state by prioritizing and financially incenting the development of utility scale solar plus energy storage installations as well as commercial & industrial sited solar plus energy storage.

California has adopted such an approach to reach its goals of 60% renewables by 2030 and 100% renewables by 2045. To date, the results have nothing been short of remarkable with both tens of GWs of renewable energy and hundreds of megawatts of energy storage deployments being installed across the state in residential, commercial and industrial and utility scale applications across the state. Between 2010 and 2015 solar

energy generation increased by over 1,700 percent and renewable electricity accounted for almost 22 percent of all of California's electricity generation in 2015. From 2014 to 2015, renewable energy generations increased by over eight percent overall with solar power rising by over 40 percent in California.

Importantly, the California Green Innovation Index Report also shows that with a push towards renewable energy, job and economic growth aren't hampered. In fact, it's quite the opposite. Since [California's](#) climate law was passed in 2006, the state's GDP has increased by nearly \$5,000 per person — which is double the increases the US achieved as a whole. Job growth in California was also stronger than the rest of the country by about 27 percent. These achievements were accomplished all while reducing per capita emissions by 12 percent and carbon-intensity by 4.5 percent.

If supported through proven forward-thinking legislation in Vermont — reducing our greenhouse gas emissions and powering our economy — could be achieved similarly to California through incenting solar plus storage installations across Vermont. State legislated incentives could take the form of subsidies, tax credits, low interest loans or pursued through a combination of means that make installing solar plus storage highly attractive to the end user.

Such installations would harness the energies of the sun to power facilities statewide as well as safely and reliably integrate that energy into the grid to power homes and facilities across Vermont. Furthermore, these same systems could provide invaluable back up power at critical facilities throughout the state during times of grid interruption as is the case with Green Mountain Power's Stafford Hill Solar Plus Storage installation.

Increasing penetration of solar installations in Vermont at scale will require energy storage. A key limiting factor for large scale PV deployment in California has been curtailment, or the PV energy that would need to be rejected by system operators due to the supply/demand balance of the state's grid. As California has ramped up production of PV generated energies moving toward its goals of renewable penetration, curtailment — limiting or eliminating the injection of solar generated energies into the grid for periods of time — has increased. Energy storage can help better balance the grid, according to NREL (National Renewable Energy Laboratory).

[A recent NREL study](#) modeled several scenarios for the amount of energy storage needed in California to reliably integrate increasing solar power on the grid. The report noted to meet a 50 percent photovoltaic threshold economically will require California to added 15 gigawatts of energy storage by 2030. Adding this additional storage not only helps minimize curtailment, in doing so it keeps solar cost competitive with other forms of energy generation most notably thermal peaker plants. According to NREL, without adding storage, PV penetration potential reaches its limit at 32 percent whereas adding the 15 GW storage extends safe and reliable solar penetration to the 50 percent levels.

Vermont's efforts to shift from fossil fuels to renewable energy are already paying dividends, leading to a No. 2 ranking in the United States for transforming to clean power, according to the Union of Concerned Scientists Report. Today Vermont has 10 times the amount of solar it did in 2010 and 20 times the wind energy. It has been ranked second in the nation for solar jobs per capita.

Vermont is on its way towards its goals of greenhouse gas reductions but much more can and needs to be done. Because of the intermittency of solar (and wind power) energy storage must play a role in ensuring the safe and reliable integration of renewables into the grid.

Today, energy storage is widely accepted as the enabler to the successful integration of renewables into the grid by utilities and government agencies. Renewable energies generated during the day can be stored in safe, reliable lithium-ion batteries to be utilized at night when demand is the greatest. In addition to harnessing and distributing energy at needed and appropriate times, it would enable Vermont to reimagine its grid while weaning the state off of fossil-fueled generated energies. Strategically placed energy storage both utility and commercially and industrial sited will allow for the state to not only integrate more renewables within its grid but to reimagine our grid in ways that make it more resilient and flexible while costing hundreds of millions dollars less to modernize than traditional transmission and grid upgrades that would be required over the course of the next decade.

Green Mountain Power – the state’s largest utility — is recognizing this future with the installation of its second utility scale energy storage installation in Panton Vermont in 2018. Dynapower in addition to supplying over 375MW of energy storage inverters worldwide has its own commercially sited energy storage system at our South Burlington, Vermont facility. Our system, designed and manufactured in Vermont, not only reduces our energy consumption from the grid, it reduces our energy bill and provides critical back up power when needed. Such Dynapower systems can and will be sited at commercial and industrial buildings around the globe.

The installation of such solar plus storage systems could be quickly increased through statewide legislations that financially incentivize utilities, commercial and industrial building owners and state residents to install such carbon reducing systems.

Unlike traditional grid infrastructure upgrades that will be required to integrate the ever increasing load of renewables on our grid, energy storage is extremely flexible and can be quickly deployed at a fraction of the cost.

- Energy Storage Systems (ESS) have minimal impact property values and are often installed at substation and existing grid facilities as well as commercial and industrial facilities.
- Storage systems can be designed, built and operational in under six months.
- ESS can be deployed in modular capacity increments to allow for additional sizing to accommodate growing renewable integration
- In addition to allowing for the safe and reliable integration of renewables into the grid, ESS can generate revenues by providing frequency regulation, voltage support, spinning reserves, and other value-added services.

By adopting a system of energy storage systems at industrial facilities, hospitals, schools, public buildings, etc. all tied to renewables and connected by distribution software, virtual plants of energy can be created throughout Vermont — allowing rate payers to reduce their energy bills and the state to aggregate its renewables penetration for the larger good — further reducing the state's reliance on greenhouse gas emitting fossil fuels. (Last year, Green Mountain Power ratepayers were saved over \$200,000 in a single hour through by the Stafford Hill Solar Plus Storage Installation reducing peak power demand.)

Recent studies by NREL (National Renewable Energy Laboratory) indicates that currently over 10,000 commercial and industrial buildings within Vermont would benefit from the installation of energy storage to reduce peak demand charges.

As outlined above to hasten the integration of energy storage and renewables with the state's grid, it is proposed the state incentivize the integration of renewable energy and energy storage as California has done with its [Self-Generation Incentive Program](#). The program rewards developers of renewables and energy storage aimed to reduce the state's carbon emissions with financial incentives. The incentives under California law are allocated to renewable and energy storage projects across the state through a rigorous application program.

Such a program would not only help reduce the state's greenhouse gas emissions, it would be a boost to the Vermont economy. In addition to reducing use of fossil fuels and greenhouse gas emissions energy storage combined with solar installations would create jobs in Vermont. As is the case of California law, companies located in Vermont are given favor in the application process for incentivized proceeds. Several companies in Vermont — Dynapower, Northern Reliability and Northern Power, currently design, build and install utility scale and commercial and industrial energy storage worldwide. Additionally, there are numerous solar developers, designers and manufacturers throughout the state who would benefit from such an incented program for the deployment of renewable energies and energy storage throughout the state.

Such a proposal to mandate and incent the installation of renewable energies and energy storage, would require the support of the legislature, the governor's office, and the state's utilities. But if achieved, technologies developed within the state by Dynapower and others, could quickly couple energy storage with existing utility scale solar and wind installations to increase energy production, efficiency and integration of renewables with our grid; and provide turn-key solutions for commercial and industrial facilities looking to add energy storage to reduce electricity bills, bring on invaluable back up power and reduce their carbon footprint.

Furthermore, these same technologies could be exported beyond Vermont potentially generating hundreds of millions of dollars in annual revenues for Vermont businesses, and expanded taxable monies for the state. Such innovation and activity would attract new residents to the state to fill necessary jobs looking to tackle not only Vermont's energy transformation, but the world's as well. More importantly, the technology of energy storage must and will be a part of Vermont's push for a more sustainable and less environmentally impactful power grid.

Vermont Energy & Climate Summit

Pitch Submission Form

Guiding Criteria: EAN's mission is to end Vermont's reliance on fossil fuels *and* to create efficient, clean, affordable, and secure electric, heating, and transportation systems for the 21st Century. The VT Climate Pledge Coalition is seeking pledges to reduce GHG reductions that will help Vermont meet Paris climate commitments. Together, we support the criteria outlined in Gov. Scott's Executive Order creating the **Vermont Climate Action Commission**, specifically that solutions must:

- Spur economic activity, inspire and grow Vermont businesses, and put Vermonter on a path to affordability;
- Engage all Vermonter, so no individual or group of Vermonter is unduly burdened; and
- Collectively provide solutions for all Vermonter to reduce their carbon impact and save money.

With these goals and criteria in mind, please answer the questions below. Questions 8-12 can be answered individually or in one comprehensive narrative. (Total pitch submission **no more than 3 pages**).

1. Pitch Submitted By (Your Name or Organization):

Nathan Wyeth, Director, Grid Solutions, Sunrun

2. Contact Email Address:

nathan.wyeth@sunrun.com

3. Contact Phone Number:

301-221-5675

4. Pitch Title: (one line)

Residential Solar+Storage: Platform for Local Clean Energy Transition

5. Pitch Summary: (one paragraph)

Distributed energy enables Vermonter to generate local clean power from their own rooftops. Increasingly affordable home batteries offer backup power. Given the option to go nearly or all the way off grid and have backup power, many may choose to do so. But we can't afford to

build both centralized and distributed renewable infrastructure - we need smart coordination. Sunrun proposes to bring BrightBox residential solar+storage to Vermont to create a local clean energy platform to support Vermont's utilities. This platform will help balance the grid to maximize integration of clean energy. It will make room for and can eventually incorporate other distributed energy like connected water heaters and EVs. Balancing the grid with local clean energy will unlock the ability to convert dirty fuels to electricity - such as converting heating from heating oil to efficient heat pumps and adding electric vehicles - while minimizing spikes in electricity demand that create the need for importing power from polluting peaker plants or building new transmission lines crossing Vermont. This localized clean energy platform will create community energy resiliency in the event of storms or extended grid outage, and utilize private investment to bring down costs for all.

6. What energy sector(s) does this Pitch apply to? (Check all that apply):

- **Electricity**
- **Thermal Heating &/or Cooling**

7. Which criteria category(ies) does it address? (Check all that apply):

- **Economic Activity**
- **Affordability**
- **Vulnerable Vermonters**

8. Scale of impact on Vermont's energy and climate goals: If this proposal came to fruition, how might it move the needle in helping to meet Vermont's energy and climate goals by 2025 and/or 2050? Please outline assumptions and, if available, provide calculations.

- Sunrun endorses Green Mountain Power's assertion that in the future every home will have a form of energy storage, and we believe that a large percentage will also have solar generation.
- We estimate there are 150,000 solar-ready single family homes in Vermont. We believe that in 2018-2020, 10,000 homes can adopt solar+storage as costs drop and utilities learn how to draw on local solar stored in batteries instead of distant power plants. This will set the stage for 40,000 homes to adopt solar+storage in 2021-2025, or 33% of potential homes. This is approximately the same solar penetration that Hawaii has already achieved, demonstrating it is possible.
- This would represent 350 MW of local solar and up to 800 MWh of storage. Annual clean electricity production would be approximately 372,000 MWh, or 7% of Vermont's total electricity consumption. Storage enables local renewable power to be stored until it is needed locally, meaning that this could be drawn on strategically by utilities to offset the 7% most polluting electricity that Vermont would otherwise import from the NE-ISO grid.

9. Benefits/costs of this proposal for Vermont and Vermonters: Including, where possible, economic, financial, social, and environmental.

- Because the availability of solar power stored in batteries across Vermont in the above example would be certain, utilities would not need to reserve as much out-of-state power plant capacity in NE-ISO's auctions - bringing the cost down for all users in New England.
- Because stored power could be used flexibly to cover peak load no matter when it occurs, space and water heating can be converted from heating oil and gas over to efficient heat pumps, creating large customer savings, without worrying that it will just cause more imports of fossil fuel electricity from out of state or utilities will need to upgrade power lines.
- Smart solar+storage shaping residential load lays the groundwork for adding EVs without causing the need for new power plant and transmission line capacity, preserving Vermont's rural character.
- By passing along this value to customers, Sunrun can bring down the cost of batteries to the point that Vermonters could access solar+storage including backup power in the event of grid outages for less than the current cost of their electricity bill - meaning that even the most remote Vermonters could be assured of lifeline electricity in storms.
- Further dialogue is needed to quantify the multi-sector benefits of flexible, dispatchable local clean energy.

10. Decision-makers necessary for this proposal to be adopted or move forward (e.g., Legislature, Governor, a regulatory agency, a business, organization, media outlet, or financing institution, etc.)

- Energy sector regulators
- Utility leaders

11. Strategy and key considerations: Outline the overall strategy, including gaps, barriers and opportunities for moving this proposal forward.

- Vermont can leapfrog to a local clean energy system with the right mix of new technology, private investment and holistic thinking that enables Vermont to maximize local clean energy production and consumption.
- Two things are needed:
 - Regulatory environment enabling customer choice to adopt and interconnect solar+storage and create an open platform to bring solar+storage value to utilities where it offers lower costs to ratepayers than centralized solutions.
 - Utilities partnering with their customers and third parties to enable distributed resources to be brought to the table as an aggregated resource / platform to help solve the utilities' challenges.
- The technology is ready, but is too expensive to be rolled out affordably for a large number of Vermonters unless there are efficient structures to send price signals and

pass revenue from the utility to the homeowners on the local clean energy platform for the services it provides.

12. Timeline: To meet our 2025 goals, we need some proposals that can be implemented in the next couple of years as well as some “game changers” that will bend the curve even further out. What timeline do you foresee for your proposal to be developed and implemented?

- Part 1 - 10,000 deployments 2018-2020 * 7 kW solar + 10-12 kWh storage
- Part 2 - 40,000 deployments 2021-2025 * 7 kW solar + 15-20 kWh storage

Pitch 10 - Vermont Climate Action Communities

Karen Horn and Abby Friedman, Vermont League of Cities and Towns

Vermont Energy & Climate Summit
“Meeting Vermont’s 2025 Energy & Climate Goals”

*****Pitch Submission Form*****

1. **Pitch Submitted By (Your Name or Organization):** Vermont League of Cities and Towns
2. **Contact Email Address:** Khorn@vlct.org
3. **Contact Phone Number:** 802 229 9111 x1912
 - a. **Pitch Title:** Vermont Climate Action Communities
 - b. **Pitch Summary:** Vermont League of Cities and Towns (VLCT), in partnership with the Vermont Climate Pledge Coalition, Energy Action Network, and Efficiency Vermont, proposes to implement a program to drive deep efficiency savings, reduce local emissions and participate in the transition to a clean energy economy, improve resilience in the face of climate change, and provide locally supported renewable energy generation for municipalities and the communities they serve. Under the Vermont Municipal Energy and Climate Pledge Partnership, municipalities would be encouraged to undertake actions in broad categories: municipal energy use, local policy development, energy and climate change resiliency planning, and residential/business engagement. This proposal envisions a 2-phase process: 1) Pull together a framework of existing resources and provide guidance to municipalities on how to achieve climate pledge goals, and 2) Develop a more comprehensive program that sets clear goals and provides grants to municipalities to achieve climate reductions goals. Municipalities would track their progress toward these goals over time through the EAN Community Energy Dashboard. Program success will be based upon achieving measurable improvements increased efficiency and renewable energy generation.
4. **What energy sector(s) does this Pitch apply to? (Check all that apply):**
 - Energy Efficiency
 - Electricity
 - Transportation
 - Thermal Heating &/or Cooling
 - All (Total Energy) -- xx
 - None: Non-energy related carbon reduction proposal
5. **Which criteria category(ies) does it address? (Check all that apply):**
 - Economic Activity - xx
 - Affordability - xx
 - Vulnerable Vermonters - xx
 - Other
6. **Scale of impact on Vermont’s energy and climate goals:** If this proposal came to fruition, how might it move the needle in helping to meet Vermont’s energy and climate goals by 2025 and/or 2050? Please outline assumptions and, if available, provide calculations.

Municipal officials are in a unique position to drive efficiency, resiliency and renewable energy improvements – not only for their own energy use but through their influence on future development

and their on-going relationships with the residents and businesses within their community. Municipalities consume energy for buildings, treatment facilities, street lighting, and vehicles. Municipalities have significant influence over all new development through both municipal planning and the permitting process. Municipal officials can provide examples of addressing the climate challenge, efficiency and energy use through their actions relative to municipal infrastructure. Finally, they have on-going relationships with every resident and business within their jurisdiction through the provision of a wide-range of municipal services.

This program would build off of the comparable efforts in other states and organizations, including [Massachusetts Green Communities](#), California's [Local Government Partnership Program](#), the [NH Local Energy Working Group](#), and the American Council for Energy Efficient Economy's [Local Energy Efficiency Self-Scoring Tool](#).

7. **Benefits/costs of this proposal for Vermont and Vermonters:** Including, where possible, economic, financial, social, and environmental.

This proposal can be considered in two phases. Phase 1 would consist of pulling together existing resources and providing guidance to municipalities on how to participate to achieve their climate pledge goals. Phase 2 would involve developing a more comprehensive program that sets clear goals and provides grants to municipalities to achieve climate reductions goal – similar to the Massachusetts Green Communities program. Under an expanded program, municipalities who achieve specific milestones would receive grants to implement climate mitigation and adaptation strategies.

This program would be cost-efficient as it would draw upon existing resources to engage and assist municipalities. Specific costs and benefits have not been determined as yet.

8. **Decision-makers necessary for this proposal to be adopted or move forward (e.g., Legislature, Governor, a regulatory agency, a business, organization, media outlet, or financing institution, etc.)**

Phase 1 could be done by drawing upon existing resources from participating partners. Under Phase 2, financial support would be needed to provide program coordination and grants to municipalities.

9. **Strategy and key considerations:** Outline the overall strategy, including gaps, barriers and opportunities for moving this proposal forward.

Goals

- Work with municipalities to implement a comprehensive and locally generated approach to drive efficiency, climate change resiliency, and renewable energy for municipalities, incorporate those attributes in economic vitality initiatives they undertake, and with the constituencies they serve;
- Provide a range of support services and technical assistance to ensure that municipalities have the tools they need to succeed; and
- Track and evaluate community progress toward achieving municipally stated goals.

Overview

- Encourage municipalities to undertake actions to reduce climate impacts through efficiency and renewable energy toward meeting goals of Vermont Comprehensive Energy Plan of 90% renewables by 2050;
- Focus on improvements in 1) municipal energy use, 2) policy development, 3) energy and climate change resiliency planning, and 4) residential/business engagement.

- Train municipal officials and local energy committee members on developing local action plans that establish goals and implementation priorities, and identify concrete steps for achieving these goals.
- Track progress toward these goals over time through the Community Energy Dashboard
- Reward municipalities through statewide recognition and/or grants.

Scope of Municipal Efforts

- Municipalities develop comprehensive energy plans that set measurable goals, establish priority actions, and address energy planning guidelines
- Plans would address all energy sectors, including electrical, thermal, and transportation energy use, and climate action resiliency within the context of other land use and planning priorities.
- Municipalities implement strategies/actions identified in action plan – selecting a range of actions addressing each of the four buckets of: municipal energy use, policy development, energy and climate change resiliency planning and action, and residential/business engagement.

Scope of Assistance

Assistance to municipalities can include:

- **Guidance:** Menu of efficiency, renewable energy and climate resiliency options, a clear process for setting priorities, and a detailed catalogue of available technical and financial resources.
- **Technical assistance:** One-on-one assistance on specific technologies, policies, and options
- **Training and workshops:** Organize regional forums to train municipal staff/energy committee members and provide a forum for exploring potential opportunities for regional collaboration.
- **Community Energy Dashboard:** Municipalities pledge and track progress toward achieving their goals, as well as recording actions taken.
- **Recognition:** provide recognition to municipalities that meet their goals (and potentially goals)

Metrics

Some potential metrics for evaluating program impacts include, but are not limited to:

- Municipal (and school) energy savings - MWH and MMBTU
- Building energy code compliance and participation in EVT's above-code programs (RNC and CNC)
- Residential kwh savings
- Business kwh savings
- # of towns adopting innovative financing mechanism
- # of Home Performance and Building Performance jobs completed
- Adopted municipal energy plans
- Endorsed siting for community based renewable/clean energy projects

Key Partners (*to be asked)

- | | |
|--|--|
| <ul style="list-style-type: none"> • VLCT – lead • VECAN • EAN • Efficiency Vermont • Vital Communities | <ul style="list-style-type: none"> • New England Grassroots Environmental Fund • Vermont Planning and Development Agencies* • Vermont Council on Rural Development* |
|--|--|

10. Timeline: To meet our 2025 goals, we need some proposals that can be implemented in the next couple of years as well as some “game changers” that will bend the curve even further out. What timeline do you foresee for your proposal to be developed and implemented?

Phase 1 could start in Q1 2018. If funding was approved in the 2018 session, Phase II could start in 2019.

Pitch 11 - Emphasize and Improve Tier III

Dan Mellinger and Richard Faesy, Energy Futures Group

Vermont Energy & Climate Summit

Pitch Submission Form

1. **Pitch Submitted By (Your Name or Organization):**
Richard Faesy & Dan Mellinger, Energy Futures Group
2. **Contact Email Address:**
rfaesy@energyfuturesgroup.com; dmellinger@energyfuturesgroup.com
3. **Contact Phone Number:**
(802) 482-2812
4. **Pitch Title:** Emphasize & Improve Tier III
5. **Pitch Summary:** Renew commitment to the Vermont Renewable Energy Standard Tier III goals. Improve clarity regarding roles, boundaries, and savings credit among the distribution utilities (DUs) and the energy efficiency utilities (EEUs). Revise the Tier III language and goals to include savings realized through the EEUs to better encourage partnerships instead of competition. Provide an analysis documenting the business case for distribution utilities. Provide education to ratepayers on the system-wide benefits of Tier III electrification.
6. **What energy sector(s) does this Pitch apply to? (Check all that apply):**
 - ☐ Energy Efficiency
 - ☒ Electricity
 - ☒ Transportation
 - ☒ Thermal Heating &/or Cooling
 - ☐ All (Total Energy)
 - ☐ None: Non-energy related carbon reduction proposal
7. **Which criteria category(ies) does it address? (Check all that apply):**
 - ☒ Economic Activity
 - ☒ Affordability
 - ☐ Vulnerable Vermonters
 - ☐ Other
8. **Scale of impact on Vermont's energy and climate goals:** If this proposal came to fruition, how might it move the needle in helping to meet Vermont's energy and climate goals by 2025 and/or 2050? Please outline assumptions and, if available, provide calculations.

If implemented effectively, Tier III has the potential to save more fossil fuels and electrify more Vermont buildings and transportation than any other concept. Quantification has been provided by the Public Service Department previously.
9. **Benefits/costs of this proposal for Vermont and Vermonters:** Including, where possible, economic, financial, social, and environmental.

- Significant benefits across the board
- Will provide downward pressure on rates due to spreading fixed costs over more kWh sales, so ratepayer benefits
- Economic benefits to utilities as they sell more electricity
- Significant environmental benefits as we shift to an increasingly renewable grid

10. Decision-makers necessary for this proposal to be adopted or move forward (e.g., Legislature, Governor, a regulatory agency, a business, organization, media outlet, or financing institution, etc.)

- No additional legislation needed
- PUC and PSD should consider revising the Tier III language to include credit for savings realized through EEs. DU goals should be increased accordingly. Doing so could encourage collaboration between the DUs and EEs, potentially increasing the Tier III impact
- Regulators (PUC) and the PSD need to play a strong role overseeing the implementation and in clarifying the roles of the DUs and EEs
- DUs should plan and budget for full implementation up to the Alternative Compliance Payment (ACP) amount
- EEs and DUs will need to collaborate on how to maximize impact and minimize duplication and implementation expenses

11. Strategy and key considerations: Outline the overall strategy, including gaps, barriers and opportunities for moving this proposal forward.

- Develop an analysis that demonstrates the financial, business and ratepayers benefits to the utilities for fully funding and implementing
- Show the DUs the benefits of budgeting to the full ACP amount
- Develop a marketing campaign to justify and show ratepayers the benefits
- PUC and PSD fully enforce the existing standards and provide guidance and oversight to ensure success
- EEs and DUs partner for maximum impact

12. Timeline: To meet our 2025 goals, we need some proposals that can be implemented in the next couple of years as well as some “game changers” that will bend the curve even further out. What timeline do you foresee for your proposal to be developed and implemented?

This concept is in place currently and should be implemented as specified in legislation.

Pitch 12 - Heat and Transportation Efficiency Utilities

Anne Watson, Montpelier City Councilor

Vermont Energy & Climate Summit

Pitch Submission Form

Guiding Criteria: EAN's mission is to end Vermont's reliance on fossil fuels *and* to create efficient, clean, affordable, and secure electric, heating, and transportation systems for the 21st Century. The VT Climate Pledge Coalition is seeking pledges to reduce GHG reductions that will help Vermont meet Paris climate commitments. Together, we support the criteria outlined in Gov. Scott's Executive Order creating the **Vermont Climate Action Commission**, specifically that solutions must:

- Spur economic activity, inspire and grow Vermont businesses, and put Vermonter on a path to affordability;
- Engage all Vermonter, so no individual or group of Vermonter is unduly burdened; and
- Collectively provide solutions for all Vermonter to reduce their carbon impact and save money.

With these goals and criteria in mind, please answer the questions below. Questions 8-12 can be answered individually or in one comprehensive narrative. (Total pitch submission **no more than 3 pages**).

1. **Pitch Submitted By (Your Name or Organization):** Anne Watson
2. **Contact Email Address:** anneofvermont@gmail.com
3. **Contact Phone Number:** 802-595-1734
4. **Pitch Title:** (one line) Create Energy Efficiency Utilities for Heating and Transportation
5. **Pitch Summary:** (one paragraph)

Just like Efficiency Vermont helps Vermonter reduce their electricity consumption, parallel organizations (or an expansion of Efficiency Vermont's mission), could do functionally the same thing for both the heating and transportation sectors. I know such a utility has been discussed in the past for heating oil and liquified petroleum, and that would be a good starting place, but the same sort of structure could be applied to fossil-fuel based transportation as well. These utilities could offer incentives, education, and services just like Efficiency Vermont does, but for these other sectors. There is no one-size-fits-all solution for heating nor transportation, but it needs to be someone's job to work on reducing the demand and helping people switch to renewables. A fee could be added to everyone's heating oil and propane bills, gasoline or diesel costs, that could go towards funding the utility and helping the most vulnerable in our community with weatherization, bus passes, electric vehicle incentives, etc.

6. **What energy sector(s) does this Pitch apply to? (Check all that apply):**
 - Energy Efficiency <-Yes

- Electricity
- Transportation <-Yes
- Thermal Heating &/or Cooling <-Yes
- All (Total Energy)
- None: Non-energy related carbon reduction proposal

7. Which criteria category(ies) does it address? (Check all that apply):

- Economic Activity <-yes
- Affordability <-yes
- Vulnerable Vermonters <-yes
- Other

8. Scale of impact on Vermont's energy and climate goals: If this proposal came to fruition, how might it move the needle in helping to meet Vermont's energy and climate goals by 2025 and/or 2050? Please outline assumptions and, if available, provide calculations.

Heating Oil Utility

[60% of Vermonters heat with heating oil or LP gases](#). There are about 330,000 homes in Vermont, so almost 200,000 homes heat with oil. The average Vermont home requires about 90 MMBTU/year. So that's about 18,000,000 MMBTU/year of diesel or LP heating for Vermont homes. Assuming all of that is the #2 Fuel Oil, the cheaper of the two to make it a conservative estimate, that's about 130 million gallons of heating oil per year used in Vermont homes. At [\\$2.3/a gallon](#) for fuel oil, that means that Vermont is spending at least \$300 million dollars on heating oil and LP per year.

Based on [Efficiency Vermont's 2015 Report](#) (page 72), their natural gas regulation department costs about \$5 million/year, so the equivalent department dedicated to oil would require a 1.7% fee per gallon of heating oil. One might argue that because more Vermonters use oil, the cost per year of such a department would go up, it could also be argued that many of the same programs available to natural gas-burning homeowners would be applicable for fuel oil. So there may be some efficiencies with the department as it already exists. So I'm leaving the assumption that the department would cost about \$5 million/year.

The same report showed that Efficiency Vermont was able to reduce the natural gas demand by 47,000 MMBTU. If 12% of Vermont's heating comes from natural gas, and Efficiency Vermont's efforts in heating oil were proportionally successful, that would save 235,000 MMBTU, or roughly 1.7 million gallons of diesel. That's the equivalent of \$4 million saved annually by Vermonters.

Unlike a natural gas utility, a heating oil utility would have lots of opportunities to help homeowners or businesses transition heating source to renewable sources. As furnaces need to be replaced, there could be incentives to switch to pellet technology, heat pumps, etc. LIHEAP offers money for low-income Vermonters to purchase a new heating system, but it doesn't

necessarily incentivize replacing old furnaces with renewable energy heating systems or electrified heating systems.

Assuming that heating oil furnaces or kerosene heaters must be replaced every 12 years, if each of these was replaced with a renewable source, 60% of Vermont's thermal load would be converted to renewable energy or reduced through efficiencies by 2030. That represents almost 20% of Vermont's total energy load. Even if such a program were only 50% successful, that would still be 10% of Vermont's goal.

A heating oil and LP gases utility would be the responsible agent for that sector of the state's climate and energy goals. Right now there is no one who's directly responsible for this.

Transportation Utility

According to [the Burlington Free Press](#), Vermonters drove 7.2 billion miles in 2015. Assuming [the average gas mileage is 25 mpg](#), that's 288 million gallons of gasoline. At [\\$2.35/gallon](#), that's \$677 million dollars worth of gasoline. This represents nearly one third of Vermont's total energy load. If a gasoline utility existed as an extension of Efficiency Vermont, and was comparable to the natural gas department, running an operation budget of \$5 million, that would require a 0.74% fee on the price of gasoline, or 1.7 cents per gallon. With better figures, it would probably be less than that, because, that just assumes that only Vermonters are paying for this utility.

The types of programs this department would offer, would likely be very different from the electricity or heating programs, but it could look like incentivizing bus passes through employers, increasing electric vehicle charging stations, or increasing biodiesel production and consumption. Again, assuming that it's as modestly (and proportionately) successful as the natural gas side of Efficiency Vermont, that would produce a reduction of 3.8 million gallons used per year, or savings of \$8.8 million dollars annually. This is a very conservative estimate, though, because, again, it does not include the revenue from out-of-state drivers.

9. Benefits/costs of this proposal for Vermont and Vermonters: Including, where possible, economic, financial, social, and environmental.

The same costs and benefits of such utilities are already born out by Efficiency Vermont. Politically speaking, it's easier to defend than a tax, because it's just an expansion of something that already exists and has a proven, successful track record.

Of course the downside is the question of how it will impact low-income Vermonters, but one could point at programs that Efficiency Vermont runs specifically for low-income Vermonters. Or you could make exceptions for those Vermonters who receive LIHEAP funds.

As shown above, my back of the envelope calculations suggest that Vermonters could save \$4 million/year or more with a heating oil and LP gas utility.

As for a transportation efficiency utility, all the same arguments apply, with the exception that you have the added benefit of capturing out-of-state funds to contribute towards the work. As stated above, this program has the potential to save Vermonters almost 9 million dollars annually.

10. Decision-makers necessary for this proposal to be adopted or move forward (e.g., Legislature, Governor, a regulatory agency, a business, organization, media outlet, or financing institution, etc.)

This would probably take an act of the legislature, approval of the Governor, and Efficiency Vermont and Burlington Electric Department would obviously need to be involved.

11. Strategy and key considerations: Outline the overall strategy, including gaps, barriers and opportunities for moving this proposal forward.

This change may not be as big a lift as a carbon tax, because it's an efficiency fee, not a tax. But it could be a nice compliment to a carbon tax, growing Vermonters' capacity to reduce the amount of carbon tax they would need to pay. Even if a carbon tax does not happen, this proposal would still be worthwhile to help save carbon and consumer dollars.

I would have someone with better qualifications do a more proper study of the economics of it. Then I would get Efficiency Vermont and Burlington Electric Department on board and have them help pitch it to the Governor.

12. Timeline: To meet our 2025 goals, we need some proposals that can be implemented in the next couple of years as well as some "game changers" that will bend the curve even further out. What timeline do you foresee for your proposal to be developed and implemented?

These two efficiency utilities could be approved over the next legislative session, by May of 2018. It could be put out for an RFP in the summer of 2018, awarded in the fall, and then implemented beginning July 2019. We might begin to see the first results by July of 2020.

**Pitch 13 - The ESSEX Plan: An Economy Strengthening Strategic Energy
eXchange**

Ashley Orgain, et. Al. Seventh Generation and Friends

THE ESSEX PLAN

AN ECONOMY STRENGTHENING
STRATEGIC ENERGY EXCHANGE



NOVEMBER 2017

MARK CURRAN, JON D. ERICKSON, RICK HAUSMAN, DAN HOXWORTH, REBECCA M. JONES, JEN KIMMICH,
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1. **Pitch Submitted By (Your Name or Organization):** Ashley Orgain, on behalf of Seventh Generation and friends
2. **Contact Email Address:** AshleyOrgain@seventhgeneration.com
3. **Contact Phone Number:** (802) 658-3773
4. **Pitch Title:** The ESSEX Plan: An Economy-Strengthening Strategic Energy eXchange
5. **Pitch Summary:** The ESSEX Plan is a Vermont-specific economic development strategy which will: 1) Provide *the cleanest electricity at the lowest rates* in New England, 2) Prioritize the most vulnerable and the middle class, and 3) Deploy the most efficient and effective tool to drive carbon pollution reductions: the market. The plan proposes a partnership between state government and Vermont's electric utilities whereby all of the proceeds of a gradually rising fee on carbon pollution are returned to Vermonters and Vermont businesses on a monthly basis in the form of lower effective electric rates and per-person rebates. The ESSEX Plan is perfect for Vermont because the state is a national model for electric efficiency, already has one of the lowest-carbon electric portfolios in the nation, has utilities leading on a clean energy transformation and is on pace to decarbonize further due to the Renewable Energy Standard and the Regional Greenhouse Gas Initiative. Few, if any, other states could consider such a strategic energy exchange. Under ESSEX, as the cost to pollute rises, conservation, efficiency and renewables all become spectacularly attractive. In addition, the ESSEX Plan defies labels; it can be considered both "revenue neutral" and a 100% investment in clean energy. Economic analyses of similar carbon pricing proposals completed by the Department of Public Service, Regional Economic Models, Inc., and the Congressional Budget Office indicate that the ESSEX Plan would create up to 6,000 new jobs, "make whole" Vermonters on the lowest rungs of the economic ladder, and reduce carbon pollution by 15%-25% by 2025 and 30%-50% by 2050.
6. **What energy sector(s) does this Pitch apply to? (Check all that apply):**
 - ☐ Energy Efficiency
 - ☐ Electricity
 - ☐ Transportation
 - ☐ Thermal Heating &/or Cooling
 - X All (Total Energy)
 - ☐ None: Non-energy related carbon reduction proposal
7. **Which criteria category(ies) does it address? (Check all that apply):**
 - X Economic Activity
 - X Affordability
 - X Vulnerable Vermonters
 - ☐ Other

8. Scale of impact on Vermont's energy and climate goals.

Few climate policies have been studied as rigorously as carbon pricing. In 2014 the Department of Public Service and Regional Economic Models, Inc. (REMI; a service used by the Joint Fiscal Office and the Agency of Commerce and Community Development) both forecast the impacts of a Vermont-only price on carbon pollution. While those studies used different baseline years, tax rates, and trajectories than The ESSEX Plan – which calls for a \$5/ton carbon fee beginning in July 2018 and rising by \$5/ton/year until reaching \$40/ton in 2025 – they are illustrative of the power of the policy.

- REMI is the more conservative of the two models. It used a fee of \$5/ton starting in 2016 and rising at \$5 per year before peaking at \$50/ton in 2026. In that scenario REMI forecast a 16% reduction in emissions from the baseline by 2040.
- The Total Energy Study (TES) conducted by the Department of Public Service modeled a revenue neutral scenario beginning at \$50/ton in 2015. Depending on the cost of biofuels in the future, the TES forecast that carbon pricing would reduce carbon pollution between 49-51% by 2028 and 73-78% by 2050.

It is reasonable to predict that The ESSEX Plan would outperform the scenarios modeled by both REMI and the Department of Public Service due to its reinvestment of all proceeds into clean energy rather than unrelated tax cuts and rebates. The ESSEX Plan sends twice the market signal for the same carbon fee as previous plans and will therefore reap more climate benefits.

Based on REMI and the TES, a sensible forecast of The ESSEX Plan would be that it would achieve a 15-25% reduction in carbon pollution below 1990 levels by 2025 and a 30-50% reduction by 2050.

9. Benefits/costs of this proposal for Vermont and Vermonters.

There is a reason that economists from across the political spectrum support carbon pricing: It is smart economics. The TES and REMI studies bear this out. They forecast:

- Increased Gross State Product (0.25%-0.5% - REMI; 0.23%-0.69% - TES)
- New Jobs (1,000 – 3,000 – REMI; 2,260 to 6,400 – TES)
- More Real Disposable Income (\$75-250 million/year – REMI)
- Population Growth (1,000 – 5,000 new Vermonters – REMI)

In addition to the above advantages, The ESSEX Plan also delivers:

- Equity and justice by prioritizing low-income and rural Vermonters,
- Significant health benefits and savings through reduced air pollution,

- Incentive to innovate and spur new low-carbon technologies, jobs and services,
- Accelerated deployment of weatherization and renewable energy,
- The cleanest electricity at the lowest effective rates in New England, and
- A cohesive economic and environmental policy for other states to emulate.

10. Decision-makers necessary for this proposal to be adopted or move forward:

The ESSEX Plan proposes a partnership between Vermont state government and the state's regulated electric utilities. Authorizing legislation would have to be enacted.

11. Strategy and key considerations:

Strategy: The ESSEX Plan takes advantage of Vermont's low-carbon electric portfolio. By discouraging fossil fuels, all low-carbon alternatives (conservation, efficiency and renewables) flourish. The policy uses market forces to signal that it is in Vermonters' financial interest to transition off of fossil fuels to the clean energy future.

Priorities: Low-income and middle class Vermonters are prioritized in The ESSEX Plan, with graduated rebates for rural Vermonters below 400% of the federal poverty level.

Gaps: None. More than a decade ago Governor Jim Douglas' Commission on Climate Change plenary studied carbon pricing, identified no feasibility issues, and unanimously recommended the policy as a funding mechanism for emissions reduction programs.

Barriers: More than 65 jurisdictions already price carbon pollution, including Vermont through RGGI. The technology and legal authority exists for the ESSEX Plan to succeed. The only barrier to adopting what World Bank president Jim Yong Kim calls "by far the most powerful and efficient way to reduce emissions" is political will.

Opportunities: There are advantages to being a proactive innovator on climate action. 1) This plan would drop Vermont's electric rates over other states in the region, becoming an attractive place for 21st century businesses. 2) The policy will drive technology and service innovation inside Vermont that can then be marketed to other states and countries in the years ahead, as well as expand our successful and increasingly critical clean energy sector. 3) Vermont's brand identity will be enhanced and our rhetoric will match reality.

12. Timeline:

The climate crisis demands urgency and unity. By working together to strengthen the economy, prioritize the most vulnerable, and address climate change, the Vermont General Assembly and Governor Phil Scott can enact The ESSEX Plan to commence at the beginning of fiscal year 2019.

How a Vermont-specific, FUTURE-ORIENTED economic development strategy can:

- Create jobs, attract new businesses, spur strategic electrification and provide the cleanest electricity at the lowest rates in New England,
- Prioritize the most vulnerable and the middle class by lowering utility bills for every Vermonter and Vermont business and provide fully-refundable rebates for low-income and rural Vermonters, and
- Harness the power of the market to reduce carbon pollution and help the state meet its climate and clean energy goals.

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Karen Lafayette is the Public Policy Advocate for the Vermont Low Income Advocacy Council and a former state legislator who served on the House Ways & Means Committee.

David Mears is the Associate Dean for Environmental Programs and the Director of Environmental Law Program at Vermont Law School in South Royalton. He is a former Commissioner of the Vermont Department of Environmental Conservation.

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Affiliations are for identification purposes and do not connote organizational endorsement.

introduction

The ESSEX Plan is a Vermont-specific, future-oriented economic development strategy designed to:

- 1) Provide Vermonters *the cleanest electricity at the lowest rates* in New England,
- 2) Prioritize working families and rural Vermonters in the transition to the lower-cost/lower-carbon energy future, and
- 3) Harness the power of the market to reduce carbon pollution and help the state meet its climate and clean energy goals.

The ESSEX Plan is unprecedented in its scope and commensurate to the challenge and opportunity that climate change presents.

It proposes a partnership between state government and Vermont's regulated electric utilities whereby all of the proceeds of a gradually rising fee on carbon pollution are returned to Vermonters and Vermont businesses on a monthly basis in the form of lower effective electric rates.

The ESSEX Plan prioritizes working-class Vermonters through additional per-person rebates for families earning less than 400% of the federal poverty level (about \$90,000/year for a family of four). And rural Vermonters earning less than \$75,000 annually (\$150,000 per couple) will receive additional monthly rebates to cover their necessary travel expenses.

The ESSEX Plan builds on two existing programs. It expands carbon pricing in Vermont beyond the limited reach of the Regional Greenhouse Gas Initiative (RGGI) by requiring the Petroleum Cleanup Fund to cover climate pollution as well as ground and water spills. It uses Green Mountain Power's existing and successful Energy Assistance Program partnership with the state as a model for additional rebates to Vermont's most vulnerable.

Because Vermont already has one of the lowest-carbon electric portfolios in the nation and is on pace to decarbonize further due to the state's Renewable Energy Standard and the Regional Greenhouse Gas Initiative, The ESSEX Plan is both "revenue neutral" and a 100% investment in clean energy.

The ESSEX Plan is comprehensive. It covers approximately 94% of the carbon dioxide pollution emitted from Vermont's heating and transportation sectors.

Economic analyses of similar carbon pricing proposals completed by the Department of Public Service, Regional Economic Models, Inc., and the Congressional Budget Office indicate that the ESSEX Plan would create up to 6,000 new jobs, hold harmless Vermonters on the lowest rungs of the economic ladder, and reduce carbon pollution by 15%-25% by 2025 and 30%-50% by 2050.

THE VERMONT ENERGY CONTEXT

More than sixty nations and states around the world put a price on carbon pollution – and every jurisdiction does it differently. In addition to charging a fee for climate pollution, the one thing that unites the various policies is that each is designed to fit its local energy context.

The ESSEX Plan is designed specifically to fit the Vermont energy context.

Fossil Fuels in Vermont: As the *Comprehensive Energy Plan* notes, “In 2013, the state spent nearly \$2.3 billion annually — about 8% of Vermont’s GDP — on petroleum products...” At the tail end of the distribution chain, Vermonters have little control over extraction techniques, refining practices, transportation safety, or price.

Fossil fuels in Vermont are a low-margin industry with 80% or more of revenues leaving the state’s borders. With no value-adding industry in state, what fossil fuel jobs there are in Vermont are mostly low-wage end-distribution roles. The industry has been struggling for years to attract and retain employees. Because of these factors and more, Vermont’s successful home heating fuel dealers are rapidly diversifying their equipment offerings beyond propane and oil and becoming energy service providers that deliver complementary conservation and efficiency measures.

In addition to their drain on the economy, fossil fuels used for heating and transportation are the primary cause of the Vermont’s 4% increase in greenhouse gas emissions since 1990.

Electricity in Vermont: For all the strategic weaknesses on the fossil fuel side of its energy portfolio, Vermont’s electric sector is one that other states should emulate. For decades the state’s utilities and policy makers have been working to reduce carbon pollution. The outcomes of this effort are evident in:

- Efficiency Vermont – the nation’s first electric efficiency utility – which has made Vermont one of the most efficient consumers of electricity in the nation;
- A Renewable Energy Standard (RES) that requires electric utilities to source an ever-increasing supply of renewable energy;
- The Regional Greenhouse Gas Initiative (RGGI) that prices what carbon pollution there is in electric generation, and is poised to reduce CO₂ emissions a further 30% by 2030;
- Robust renewables, with Vermont leading on many per-capita metrics for solar PV and wind deployment;
- A clean energy industry that employs about one in 16 working Vermonters;
- Progressive utilities eager to lead the transition to renewable energy; and
- The highest percentage of low-carbon electricity generation and some of the lowest-carbon electricity consumption in the nation.

It is this energy context that makes the strategic energy exchange at the core of The ESSEX Plan possible.

THE three pillars of the essex plan

1. A GRADUALLY INCREASING FEE ON THE POLLUTION CAUSING GLOBAL WARMING

The first leg of The ESSEX Plan is a gradually rising fee on the carbon content of fossil fuels paid by the companies that distribute these fuels in Vermont. The proposal begins at \$5 per ton of CO₂ in 2018 and increases by \$5/ton annually until reaching \$40/ton or the Social Cost of Carbon (an estimate of the monetized damages caused by greenhouse gas emissions) as calculated by the U.S. Environmental Protection Agency during the Obama administration.

The Department of Public Service should be tasked with determining the percentage of carbon pollution fees that come from the sales of fossil fuels to the residential sector (primarily home heating and personal transportation fuels) and the percentage of fees from the sale of fuels to Vermont's commercial and industrial sectors.

2. DRAMATIC ELECTRIC RATE REDUCTIONS FOR EVERY HOUSEHOLD AND BUSINESS

All carbon pollution fees derived from Vermont's commercial and industrial sectors will be returned to those sectors of the economy through lower effective electric rates. All fees derived from the residential sector will be returned to Vermont households. There is no cross-sector subsidization under The ESSEX Plan.

Fully implemented, The ESSEX Plan will reduce Vermont's commercial and industrial rates 27% below current levels, allowing Vermont businesses to enjoy effective electric rates 25%-40% below the New England average.

Similar to Vermont businesses, the ESSEX Plan would allow all Vermont households to benefit on a monthly basis from the lowest electric rates in the region.

3. ADDITIONAL REBATES FOR WORKING-CLASS FAMILIES AND RURAL VERMONTERS

The ESSEX Plan dedicates 50% of all carbon pollution fees derived from the residential sector to working class and rural Vermonters through additional per person rebates.

- Low & Moderate-Income Rebate: Working-class Vermonters earning less than 400% of the federal poverty level will receive an additional monthly rebate
- Rural Rebate: Rural Vermonters earning less than \$75,000 per year (\$150,000 per couple) will qualify for an additional monthly rebate.

These rebates would expand an existing and successful public/private partnership: the Green Mountain Power/Department for Children and Families Energy Assistance Program which reduces monthly charges for the most vulnerable. The ESSEX Plan would utilize a similar model, extended to all utilities and with a higher qualification threshold of 400% of the poverty level.

If a customer's rebates exceed their electricity charges, they will receive a check instead of a bill.

outcomes

CREATING JOBS

By reducing electricity rates to the lowest in the region, The ESSEX Plan helps retain and attract the low-carbon businesses and industries of the 21st Century.

By steering Vermonters to lower-carbon options for heating and transportation, The ESSEX Plan will increase demand for weatherization, renewable energy, and travel efficiencies while simultaneously spurring business innovation in these sectors. The transition to a clean energy economy will be a generational effort, and there is at least a generation's worth of work to be done.

The Public Service Department's Total Energy Study of 2014 estimated that a similar carbon pollution policy would create 2,000 – 6,000 new jobs in the state.

STRENGTHENING VERMONT'S ECONOMY

While greenhouse gas emissions in Vermont are up since 1990, since the turn of the 21st century Vermont's economy has begun to “decouple” from fossil fuels. In other words, the state has reduced its carbon pollution emissions by almost 13%, while Vermont's real GDP has grown by almost 23% – the fastest rate in New England.

It is easy to see why decoupling is good for Vermont's economy – all fossil fuels used in Vermont are imported. The state has no known petroleum reserves. We don't mine for coal, drill for oil or frack for gas. There are, however, nearly 20,000 Vermonters working in clean energy – and the industry is growing at a rate ten times faster than the workforce as a whole. It makes economic sense to build on that success.

According to the 2016 Comprehensive Energy Plan, “In 2013, the state spent nearly \$2.3 billion annually — about 8% of Vermont's GDP — on petroleum products that are extracted and refined elsewhere.” This is a significant drain on the Vermont economy, particularly when there are

abundant, low-carbon and comparably-priced sources of energy available locally.

Consider this economic phenomenon in terms most Vermonters understand implicitly: maple syrup. It makes little sense for Vermont to import maple syrup when we produce the best product and all the



**Before & After:
BUY Local**

quantity we need. Buying Vermont maple syrup creates jobs and boosts our local economy. The same applies to energy. Our economy is stronger when we use locally generated energy instead of imports from distant states and countries.

Since all electricity is generated regionally instead of imported from distant states and countries, the ESSEX Plan in its first decade is a billion dollar “Buy Local” campaign.

HELPING WORKING-CLASS AND RURAL VERMONTERS

In addition to boosting the competitiveness of Vermont businesses, The ESSEX Plan prioritizes those most vulnerable to the financial and physical impacts of climate change: working-class and rural Vermonters. The plan accomplishes this by expanding an existing public/private partnership: the innovative Green Mountain Power Energy Assistance Program.

Under The ESSEX Plan, every Vermont family earning less than 400% of the federal poverty level will be eligible for additional refundable rebates on their electric bill. If a household's rebates exceed their electricity costs, then they will receive a check instead of a bill.

Rural Vermonters earning less than 400% of the federal poverty level will be eligible for rural rebates to cover the additional costs of rural driving.

Unlike other carbon pricing proposals, The ESSEX Plan distributes rebates on a monthly basis – alleviating cash-flow concerns for those living paycheck-to-paycheck.

An additional, indirect benefit of The ESSEX Plan is that it benefits Vermont's Low-Income Weatherization Fund. That Fund is currently supported by a combination of a cents/gallon charge on heating fuels and a percentage charge on electricity sales. By encouraging the rapid adoption of electric vehicles, The ESSEX Plan expands the sources of Low-Income Weatherization funding to include transportation energy – a source of revenue not currently contributing to efforts to help the most vulnerable save money by saving energy in their homes.

To address weaknesses in Vermont's transportation sector, The ESSEX Plan should be one component of a comprehensive transportation plan to increase efficiency, reduce carbon emissions, and provide all Vermonters with alternative means of transport including but not limited to walking, cycling, carpooling, and public transit.

THE CLEANEST ELECTRICITY AT THE LOWEST RATES IN NEW ENGLAND

Two of Vermont's largest utilities – Burlington Electric Department and Washington Electric Co-op – are 100% renewable already. Green Mountain Power is 55% renewable and 90% carbon-free, and all of Vermont's electric utilities have a requirement to reach 75% renewable by 2032. Vermont has the highest percentage of low-carbon electric generation in the country, and our electric consumption is among the cleanest.

It is time to build upon Vermont's low-carbon strategic advantage by making the cleanest electricity the least expensive. Fully implemented, The ESSEX Plan would reduce effective commercial and industrial electric rates by an estimated 27% - attracting and retaining the low-carbon businesses of the future. For example, a carbon pollution fee of \$40/ton would generate approximately \$120 million in commercial and industrial rebates. Vermont utilities collected approximately \$440 million for commercial and industrial electricity sales in 2015.

$$\$120,000,000 \div \$440,000,000 = 27\% \text{ Rate Reduction}$$

A rate reduction of this magnitude would slash energy bills at some of Vermont's most dynamic businesses and largest employers.

Further, the benefits would not be limited to commercial and industrial enterprises. The ESSEX Plan spurs strategic electrification by dramatically reducing the operating costs of electric heating and transportation options. Every Vermonter will benefit from the lowest residential electric rates in New England, which will make it spectacularly attractive to replace oil-fired furnaces and gasoline-powered cars and trucks with low-carbon technologies like heat pumps and electric vehicles.

ADVANCING CONSERVATION, EFFICIENCY AND RENEWABLE ENERGY

By including the true cost of carbon pollution into the cost of fossil fuels, conservation and efficiency measures becomes more financially attractive.

The "negawatt" (the kilowatt hour not needed because of conservation and efficiency) remains the least expensive energy, while the pay-back period shortens for low-carbon investments and the financial benefits of using less fossil fuel accrue more quickly.

Under ESSEX, renewable generating programs and facilities become more financially attractive. Programs like Cow Power, Burlington Electric Department's wind and hydro facilities, the Cassella/Washington Electric Co-op landfill gas station, and Vermont Gas System's Renewable Natural Gas will benefit relative to the fossil fuels outside the electric sector they displace.

The ESSEX Plan exempts the non-fossil fuel portion of bio-fuel blends of home heating and transportation fuels. Biomass is similarly exempted, giving a new boost to Vermont's forests and wood products industry as pellets and advanced wood heating become an even better financial proposition relative to heating with fossil fuels.

Demand for distributed solar will climb as Vermonters transition to electric heating and transportation and seek ways to displace that additional load with new renewables.

SAVING LIVES AND MONEY

In addition to the damage carbon dioxide pollution is causing our climate, the co-pollutants generated by the burning of fossil fuels are deadly to human health. One recent study conducted by MIT estimated that more than 200 Vermonters suffer premature deaths annually due to air

pollution attributable to the burning of fossil fuels. These cases of heart and lung disease put even more burden on Vermont's already strained health care systems.

The ESSEX Plan can help reduce these health and financial costs.

A comprehensive study of the health benefits of the RGGI program released earlier this year found that it has helped save over 300 lives and over \$5 billion in health care costs in the region over the last decade. A second study conducted by the Harvard School of Public Health forecast additional lives and dollars saved if Massachusetts enacted a similar price on carbon pollution.

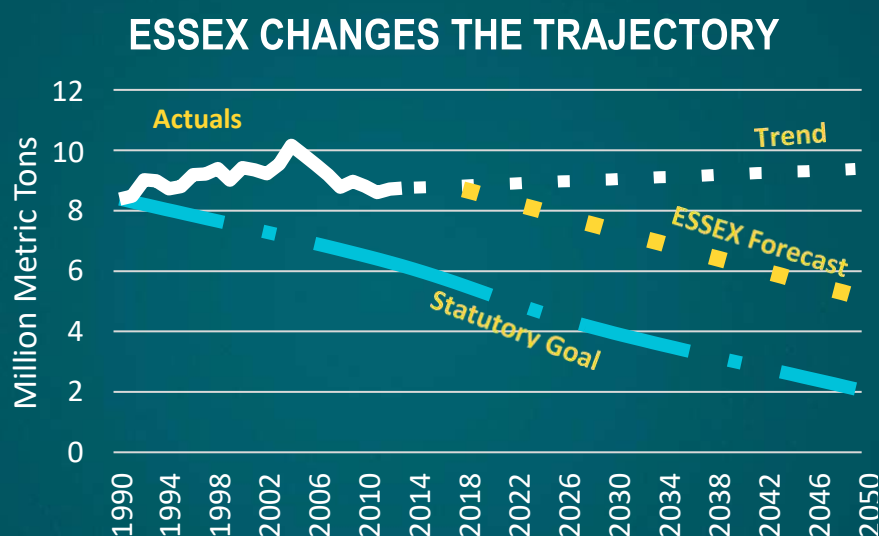
By attacking the major drivers of Vermont's carbon pollution – transportation and heating – the ESSEX Plan would also help save lives and money in our state's health care system.

A CLEANER CLIMATE

Carbon pricing is both essential and inevitable. To achieve Vermont's climate and clean energy goals, some form of carbon pricing will need to be implemented. Until the state begins to address the source of the problem – carbon pollution – we will only be dealing with the symptoms of climate change, rather than seeking ways to prevent the problem.

The ESSEX Plan addresses Vermont's carbon pollution issue head on. By putting a price on pollution, The ESSEX Plan begins to recoup the true costs of fossil fuel combustion. By reducing the cost of the low-carbon alternatives to fossil fuels, The ESSEX Plan speeds the solution climate change.

Based on economic analyses of similar carbon pricing proposals completed by the Department of Public Service and Regional Economic Models, Inc., as well as the experiences in other jurisdictions that price carbon pollution, a sensible forecast of The ESSEX Plan is that it would achieve a 15%-25% reduction in carbon pollution below 1990 levels by 2025 and a 30%-50% reduction by 2050.



The ESSEX Plan is not the only climate and clean energy policy Vermont needs to achieve its goals, but it is an essential component of the suite of policies Vermont needs.

attributes

WHY BEGIN AT \$5/TON? WHY CAP AT \$40/TON?

The ESSEX Plan recommends starting at \$5/ton of carbon pollution because that is close to what a ton of pollution has been selling for through the RGGI auction process for the last several years. Five dollars per ton of pollution is too low a price to significantly affect behavior. It is, however, a reasonable starting point and gives businesses and homeowners nearly a decade to implement strategies to reduce carbon pollution before the program rises at \$5/ton/year to its maximum \$40/ton.

A \$5/ton fee on carbon pollution equates to three cents on a gallon of propane or CCF of natural gas, four cents on a gallon of gasoline, and five cents on a gallon of diesel or home heating oil. In Year 1, The ESSEX Plan would generate about \$30 million dollars in electric rate reductions for Vermont rate payers.

The ESSEX Plan recommends capping the carbon pollution fee at \$40/ton for three reasons:

PUT A PRICE ON CARBON POLLUTION

FY19 FY20 FY21 FY22 FY23 FY24 FY25 FY26

SLASH ELECTRIC RATES FOR ALL VERMONTERS

1. That is the approximately the “Social Cost of Carbon” as calculated by the Environmental Protection Agency during the Obama administration,
2. It is the same level that other states in the region (MA, RI, CT) are considering in their carbon pricing legislation, and
3. It is the same level the *Conservative Case for Carbon Dividends* (proposed by Reagan and Bush administration cabinet secretaries) suggests as a starting price. The ESSEX Plan is more conservative than the *Conservative Case for Carbon Dividends*.

REVENUE NEUTRAL AND A 100% INVESTMENT IN CLEAN ENERGY

Other climate and clean energy proposals often flounder in arguments over revenue neutrality versus investments in clean energy, with conservatives demanding no net change to government budgets and liberals advocating for spending on the technologies that reduce carbon pollution. The ESSEX Plan resolves this standoff.

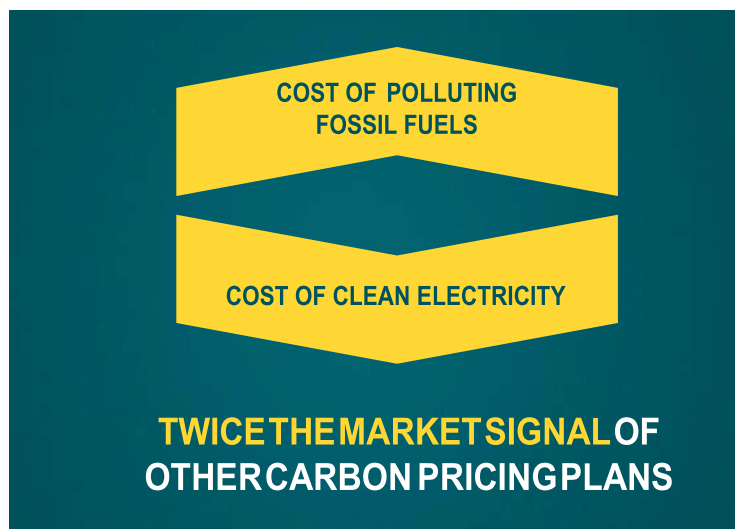
The ESSEX Plan is revenue neutral. 100% of the carbon pollution fees will be returned to Vermont electric ratepayers, and the program will be assessed annually by Vermont's Auditor of Accounts.

The plan is also a 100% investment in clean energy since Vermont's electric portfolio is already low-carbon and is on pace to become even cleaner.

For Vermont as a whole, there is no increase in energy spending – in fact, total spending on energy will decline. For every \$1 more Vermonters pay for polluting fossil fuels they will save \$1 on clean electricity ... if no one reduces their carbon emissions. But thousands of Vermonters will transition to the more efficient, lower-cost and lower-carbon technologies – cutting total energy spending and leaving hundreds of millions of dollars in Vermonters' pockets.

TWICE THE CLIMATE BENEFITS OF OTHER PLANS

Beyond early adopters and committed environmentalists, what drives the purchase of low-carbon technologies like heat pumps and electric vehicles are financial considerations. While many Vermonters would like to “go green” they also must watch their bottom line. All carbon pricing plans raise the operating costs of polluting technologies, making the lower-carbon alternatives more financially attractive. In addition to the price signal of other plans, The ESSEX Plan also reduces the operating cost of the low-carbon technologies. In effect, The ESSEX Plan offers twice the market signal of other carbon pricing concepts.



THE BENEFITS OF LEADERSHIP

There are advantages to being a proactive innovator on climate action.

- 1) The ESSEX Plan will drop Vermont's electric rates below other states in the region, making the Green Mountain State an attractive place for 21st century businesses.
- 2) The policy will drive technology and service innovation inside Vermont that can then be marketed to other states and countries in the years ahead, as well as expand our successful and increasingly critical clean energy sector.
- 3) Vermont's brand identity will be enhanced and our rhetoric will match reality.

SAMPLE VERMONT ELECTRIC BILL
UNDER THE ESSEX PLAN

KILOWATT HOURS USED	500	\$0.1484		\$74.20
CUSTOMER CHARGE				\$12.99
ENERGY EFF. CHG-KWH	500	\$0.0091		\$4.55
SUBTOTAL				\$91.74
CLIMATE RATE SAVINGS	500	\$0.0276		-\$13.80
LOW-INCOME REBATE				-\$21.24
RURAL REBATE				-\$13.92

BALANCE DUE: \$

42.78

See appendix for supporting calculations.

IMPACTS ON FOUR SAMPLE VERMONT INDUSTRIES

One of the reasons that The ESSEX Plan is an ideal fit for Vermont is that there are few carbon-intensive industries in the state. Carbon-intensive businesses long ago recognized that Vermont is at the tail end of the fossil fuel distribution chain with little control over extraction, refining, transportation, supply or price. Those fossil fuel-heavy industries have located closer to fossil fuel producers or have transitioned to electricity.

The Vermont industries that consume a lot of fossil fuels also tend to be heavy consumers of electricity. For them, The ESSEX Plan is an energy shift and encouragement to transition more of their operations to low-carbon electricity.

High-Tech Industrial Manufacturing

In 2014, IBM reported that its energy expenses included \$5.9 million on fossil fuels and \$37 million on electricity. Fully implemented, The ESSEX Plan would save a facility with that energy mix profile would save millions of dollars on energy costs annually.

Agriculture

The ESSEX Plan benefits Vermont's farms – some of which have electricity bills of \$10,000 a month – by reducing electricity costs by over 25% and doing so without raising the costs of driving a tractor. Farm diesel is exempt under The ESSEX Plan because there are no ready low-carbon alternatives available on the market for heavy equipment.

Ski Areas

Vermont's largest ski areas consume as much as 25 million kilowatt hours of electricity a year because many of the lift systems and snow machines are electrified. The ESSEX Plan slashes their bills without adding costs on grooming equipment which, like farm tractors, are exempt under the proposal.

Health Care

Most hospitals in the United States and in Vermont spend more on electricity than they do on fossil fuels. The ESSEX Plan helps reduce their operating costs. Couple these savings with the health benefits of cleaner air, and The ESSEX Plan reduces overall health care costs in Vermont.

Policy fineprint

A gradually rising carbon pollution fee should be steady, transparent and predictable. All rebates and rate reductions should be exempt from Vermont income tax. The State Auditor should review the program annually to assure Vermonters that every dollar in revenue is returned to Vermont rate payers. In addition, the General Assembly should commission a regular, independent 5-year review of the climatic and economic results of this program.

While The ESSEX Plan is as comprehensive as possible, the following fossil fuels should be exempt from the carbon pollution fee for the following reasons:

- Fossil fuels used by Vermont utilities to generate electricity because that carbon pollution is already priced through RGGI,
- Aviation fuels because of a federal law preemption,
- Dyed diesel used for heavy equipment because there are no readily-available low-carbon alternatives on the market at this time, and
- The non-fossil fuel content of bio-blends such as biodiesel and Renewable Natural Gas because The ESSEX Plan is limited to fossil fuel emissions.

To maintain fairness, equity and commitments to existing programs, programs that are based on the retail rate of electricity such as the following should continue to use the retail rate, not the new effective rate in their calculations:

- Energy Assistance Program (EAP)
- Net Metering
- Low-Income Weatherization Fund
- Efficiency Vermont screening

To protect economically vulnerable Vermonters whose rent includes electricity (those at or below 200% of the poverty level) and those whose homes are off the electric grid, a plan to ensure that they will receive the benefits of a The ESSEX Plan will be developed.

APPENDIX: SAMPLE BILL DETAILS

The following assumptions and calculations were used to determine the rate reductions and rebates shown in sample electricity bill on page 12:

- A pollution fee of \$40/ton of carbon dioxide.
- 50% of total ESSEX Plan revenue was dedicated to the residential sector, based on 2015 EIA data and the transportation section of VEIC's energy burden report updated with 2015 VTrans gas price data.
- 50% of residential revenue went to the per kWh rebate, divided by total residential kWh sales (EIA data).
- 25% of residential revenue went to the low income rebate. Households up to 400% of FPL were considered eligible, with households above 300% of FPL up to 400% receiving 25% of the rebate of households from 0-100% of FPL, with a linear slope for households between 100-200% and 200-300%.
 - Data from <https://www.kff.org/other/state-indicator/distribution-by-fpl/> (calculations assumed % population and % household are the same at 57%.)
 - The household in the bill is at 200% of FPL.
- 25% of residential revenue went to the rural rebate. "Ruralness" was based on the Economic Research Service's Rural-Urban Commuting Areas, with codes 1-3 being excluded (roughly 30% of the state). Households with over \$75,000 (single filer) or \$150,000 (joint) in income were also excluded, as were out of state filers, excluding another 21% of the state.
 - Ruralness data: https://www.ers.usda.gov/webdocs/DataFiles/53180/25600_VT.pdf?v=39329
 - Tax data: <http://tax.vermont.gov/research-and-reports/statistical-data/income-tax>

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Vermont Department of Public Service. 2016 Comprehensive Energy Plan. January 2016.

Vermont Department of Public Service. Vermont 2017 Clean Energy Industry Report.

Vermont Department of Public Service. Total Energy Study: Final Report on a Total Energy Approach to Meeting the State’s Greenhouse Gas and Renewable Energy Goals. December 2014.

World Bank. State and Trends of Carbon Pricing 2017. November 2017.

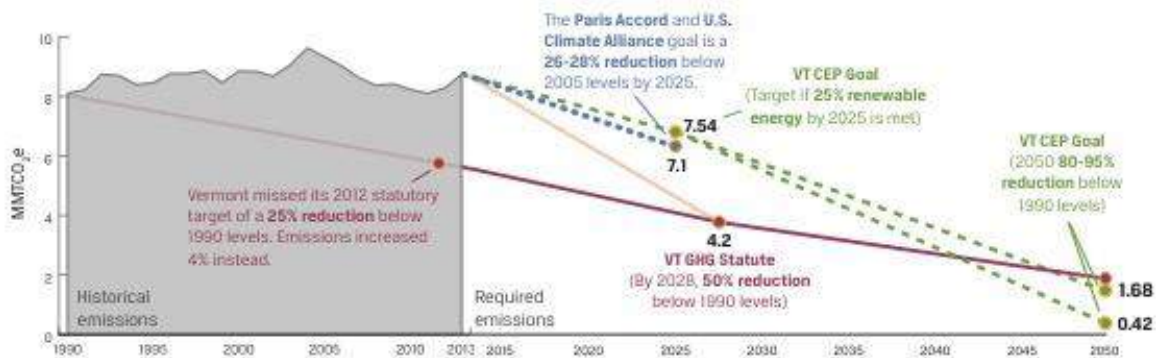
APPENDICES

Appendix 1: Vermont Energy & Climate Summit Key Graphs



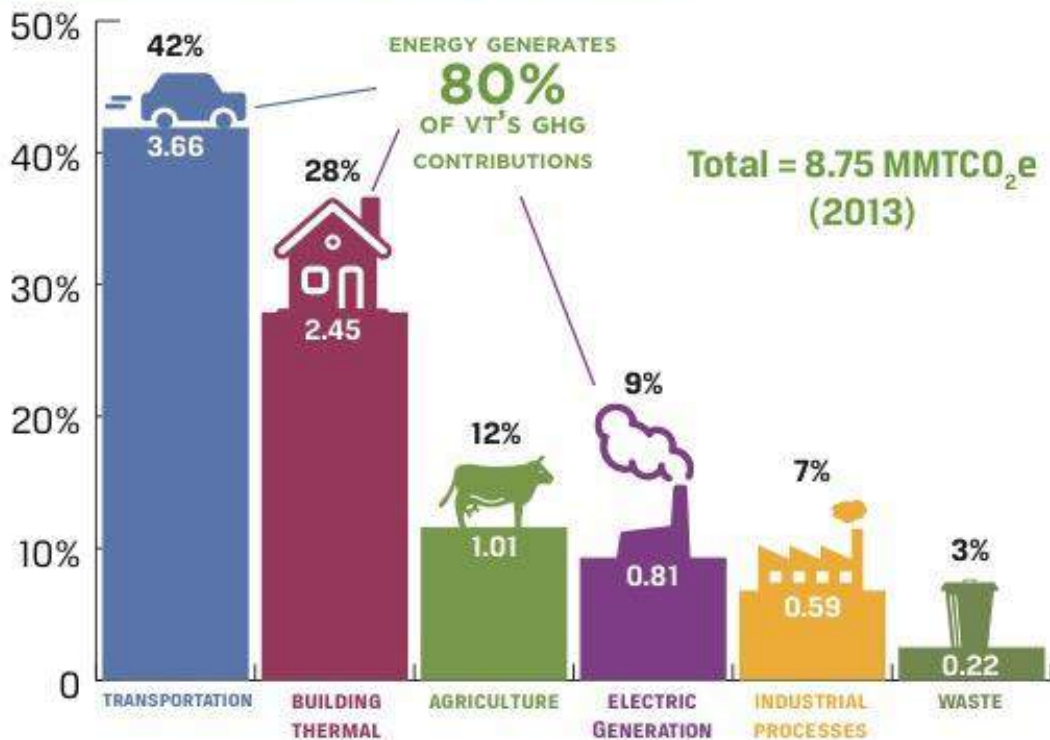
ENERGY ACTION NETWORK

Paris is Possible, But...it Will Require Bending the Curve (CEP, Paris, and Statute)

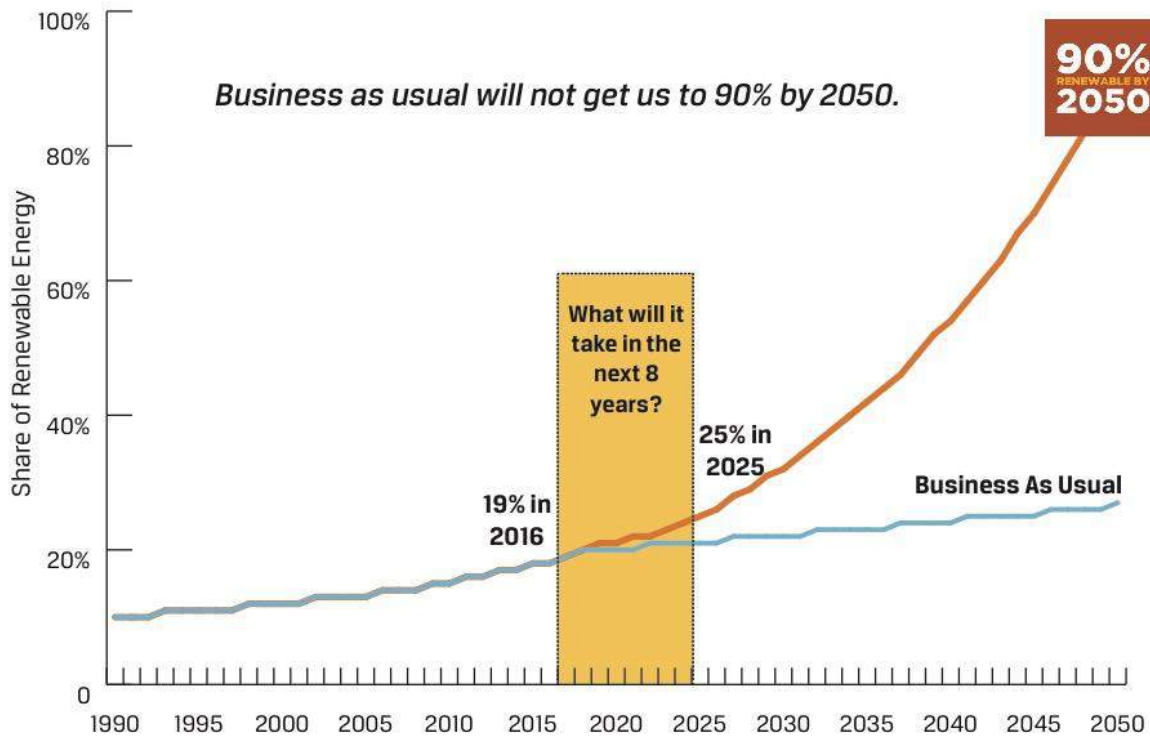


Historical emissions from Vermont Agency of Natural Resources, <http://climatechange.vermont.gov>

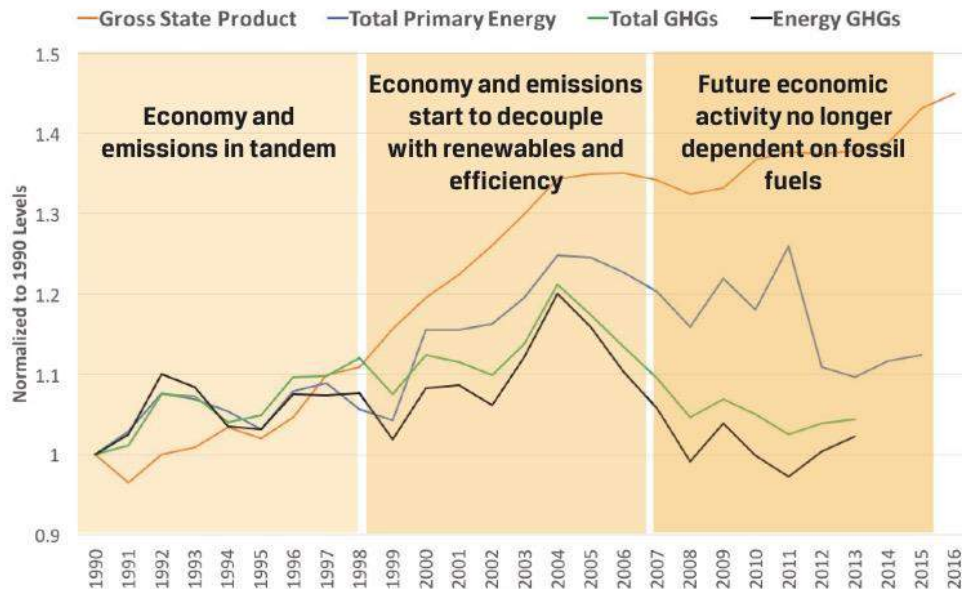
The Climate Conversation is an Energy Conversation



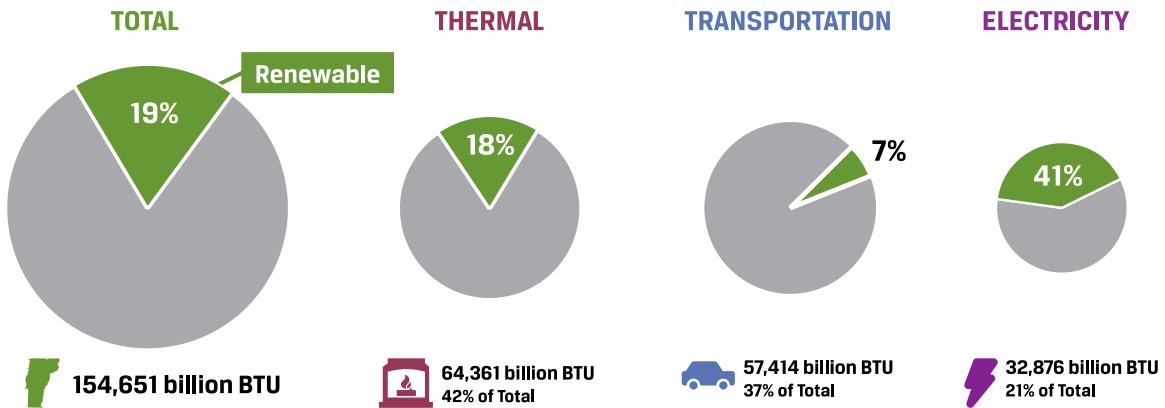
The Long View – Now is the Time to Bend the Curve



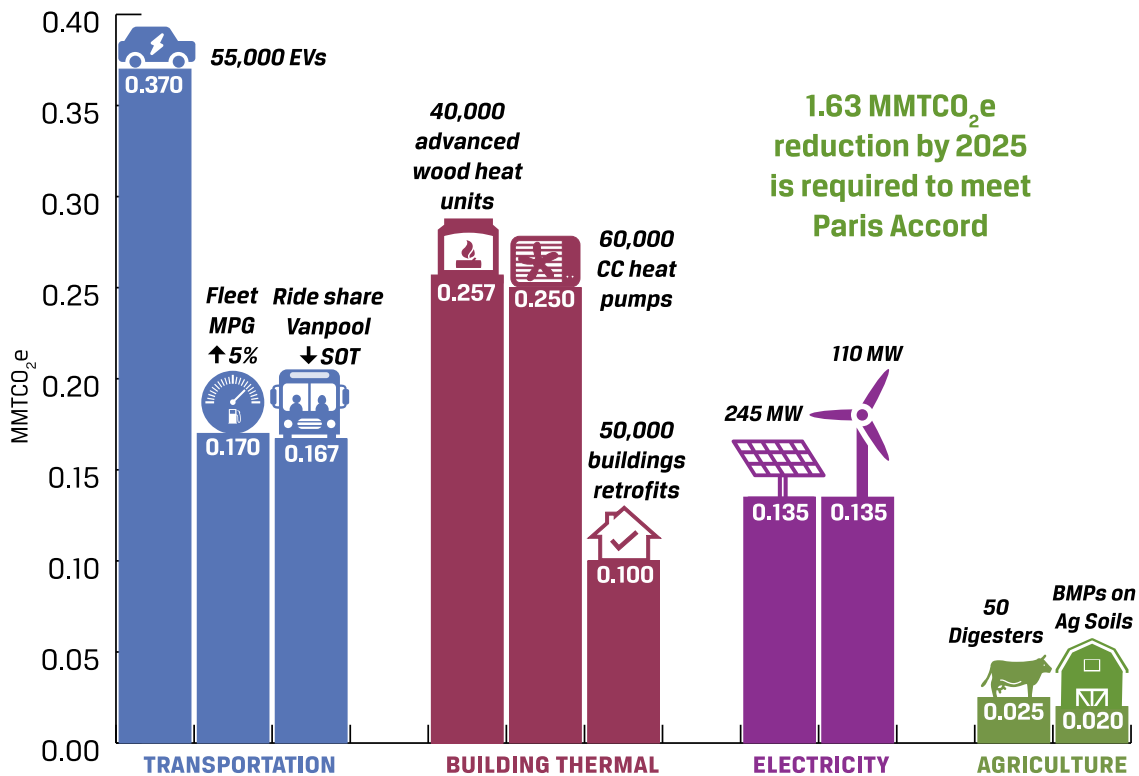
Vermont's Economy Can Become More Vibrant While Reducing GHGs



Renewable Energy is More Than Electricity (2015)



Transportation and Heat are Highest Impact Drivers to 2025...But We Need ALL of Them!



www.eanvt.org



www.vtenergydashboard.org

Appendix 2: VT Energy & Climate Summit Agenda

8:30 – 9:00 Registration, Coffee & Conversations

- Why does our energy and climate future matter to you?
- What motivates you to be here and to engage in this work?

9:00 – 9:20 Welcome

- Jared Duval, Executive Director, Energy Action Network
- Neale Lunderville, General Manager, Burlington Electric Department

9:20 – 9:35 Remarks on the Climate Pledge Coalition

- Mayor Miro Weinberger
- Governor Phil Scott

9:50 – 10:50 The Vermont Energy & Emissions Picture

- Moderator: Linda McGinnis, Program Director, Energy Action Network
- Leigh Seddon, Board Chair, Energy Action Network
- Jon Erickson, University of Vermont

10:50 – 11:10 Break & Informal Discussion

- What surprised you about the presentation?
- What type and scale of action do you think it points us towards?

11:10 – 12:00 Climate Pledges & Energy Actions:

- Moderator: Jennifer Green, Vermont Climate Pledge Coalition

12:00 - 12:10 Anne and Arthur Berndt Award

- Presented by Ellen Kahler, Executive Director, VT Sustainable Jobs Fund

12:10 – 1:15 Lunch

1:15 – 2:15 Energy/Climate Pitches Round I

- Moderators: Paul Costello, Co-Chair, Vermont Climate Action Commission & Peter Walke, Co-Chair, Vermont Climate Action Commission

2:30 – 3:30 Energy/Climate Pitches Round II

- Moderators: Paul Costello & Peter Walke

3:30 – 3:50 Pitch Dot Exercise & Short Break

3:50 – 4:45 Bending the Curve: Meeting our Energy Milestones

- Moderator: Darren Springer, COO, Burlington Electric Department
- Mary Powell, President & CEO, Green Mountain Power
- Karen Glitman, Director, Efficiency Vermont
- Riley Allen, Deputy Commissioner, Vermont Public Service Department
- Adam Sherman, Senior Consultant, Biomass Energy Resource Center

4:45 – 5:00 Closing Remarks

- Neale Lunderville, General Manager, Burlington Electric Department
- Jared Duval, Executive Director, Energy Action Network

Appendix 3: Policy Pitch Form



Vermont Energy & Climate Summit ***"Meeting Vermont's 2025 Energy & Climate Goals"***



*****Pitch Submission Form*****

Let your ideas be heard!
This is your chance to get your energy or climate pitch
in front of 200 of Vermont's energy leaders and the Governor's Climate Action Commission

Vermont has a bold goal: to meet 90% of our energy needs through increased efficiency and renewables by 2050. We have also joined leading states across the country in a bi-partisan commitment to adhere to the Paris Climate Accord goals. Where are we now on achieving those goals and what can we do to bend the curve toward 2025 milestones along that path?

- **Energy:** The first milestone of Vermont's Comprehensive Energy Plan is to meet 25% of Vermont's total energy needs from renewable sources by 2025. The most recent status estimates put us at around 16% across heat, electricity and transportation (2016).
- **Climate:** The Paris Accord goal seeks a reduction in greenhouse gas (GHG) emissions of 26-28% from 2005 levels by 2025. Vermont's own statutes are even more ambitious: 50% reduction from 1990 levels by 2028. As of 2013, Vermont's GHG emissions decreased 11% from 2005 levels and actually *increased* 4% from 1990 levels.

Pitch Invitation

We have a lot of work to do over the next 8-10 years. That is why we want to ***hear your pitch*** for promising opportunities to help Vermont meet its 2025 goals. What will help bend the curve?

Selected proposals will be invited to present at the Vermont Energy and Climate Summit co-hosted by [Energy Action Network](http://EnergyActionNetwork.org) (EAN) and the [VT Climate Pledge Coalition](http://VTClimatPledgeCoalition.org) (VCPC) on November 8th at Champlain College in Burlington. Please submit your pitch by using the form below and emailing completed proposals to jduval@eanvt.org by **Wednesday October 18th**.

(NOTE: Regardless of whether you are invited to present on Nov. 8th -- notification will come by Wed. Oct. 25 -- *all submitted and complete proposals will be included in a full compilation to be submitted to the Governor's Climate Action Commission and the Vermont Legislature.*)

Vermont Energy & Climate Summit

Pitch Submission Form

Guiding Criteria: EAN's mission is to end Vermont's reliance on fossil fuels *and* to create efficient, clean, affordable, and secure electric, heating, and transportation systems for the 21st Century. The VT Climate Pledge Coalition is seeking pledges to reduce GHG reductions that will help Vermont meet Paris climate commitments. Together, we support the criteria outlined in Gov. Scott's Executive Order creating the **Vermont Climate Action Commission**, specifically that solutions must:

- Spur economic activity, inspire and grow Vermont businesses, and put Vermonter on a path to affordability;
- Engage all Vermonter, so no individual or group of Vermonter is unduly burdened; and
- Collectively provide solutions for all Vermonter to reduce their carbon impact and save money.

With these goals and criteria in mind, please answer the questions below. Questions 8-12 can be answered individually or in one comprehensive narrative. (Total pitch submission **no more than 3 pages**).

1. **Pitch Submitted By (Your Name or Organization):**

2. **Contact Email Address:**

3. **Contact Phone Number:**

4. **Pitch Title:** (one line)

5. **Pitch Summary:** (one paragraph)

6. **What energy sector(s) does this Pitch apply to? (Check all that apply):**

- ☐ Energy Efficiency
- ☐ Electricity
- ☐ Transportation
- ☐ Thermal Heating &/or Cooling
- ☐ All (Total Energy)
- ☐ None: Non-energy related carbon reduction proposal

7. **Which criteria category(ies) does it address? (Check all that apply):**

- ☐ Economic Activity
- ☐ Affordability
- ☐ Vulnerable Vermonter
- ☐ Other

8. **Scale of impact on Vermont's energy and climate goals:** If this proposal came to fruition, how might it move the needle in helping to meet Vermont's energy and climate goals by 2025 and/or 2050? Please outline assumptions and, if available, provide calculations.

9. **Benefits/costs of this proposal for Vermont and Vermonters:** Including, where possible, economic, financial, social, and environmental.
10. **Decision-makers necessary for this proposal to be adopted or move forward (e.g., Legislature, Governor, a regulatory agency, a business, organization, media outlet, or financing institution, etc.)**
11. **Strategy and key considerations:** Outline the overall strategy, including gaps, barriers and opportunities for moving this proposal forward.
12. **Timeline:** To meet our 2025 goals, we need some proposals that can be implemented in the next couple of years as well as some “game changers” that will bend the curve even further out. What timeline do you foresee for your proposal to be developed and implemented?

Suggested Reference Documents:

[Vermont’s Comprehensive Energy Plan, 2016](#)

[Vermont’s Total Energy Study, 2014](#)

[Vermont Agency of Natural Resources Climate Dashboard](#)

[EAN Annual Report, 2016](#)

[90% Renewable by 2050: Exploring Vermont’s Efficiency & Renewable Energy Pathways, 2013](#)

Appendix 4: Audience Questions on Summit Presentations

Vermont Energy & Climate Summit Nov 8, 2017

Questions to Pitch Presentations Using Sli.do (Note: numbers of “likes” are in parentheses after the question)

POLICY PITCHES – ROUND 1

Pitch 1: Charge Ahead Vermont

1. Is there an aspect of the Act 260 review that can be relevant for EV's?
2. What about cash for clunkers? Has that worked anywhere for EVs?
3. What incentive level do you think is necessary to reach VTs EV goals? (6)
4. Where could incentive funds come from? (6)
5. Where should charging stations be located first? (5)
6. How should autonomous cars fit into an ev future? (4)
7. Maybe ask everyone to keep their handouts but give back their folders as they leave—save paper etc. (2)

Pitch 2: Big Busses, Big Opportunity

1. Can we discuss combining school bus routes with public bus rides? Especially rural routes. We need to integrate.
2. What is your opinion of using these EV school buses during the day for mass transit? (3)
3. How long would it take for operational savings of e-buses from VW to pay for a new fleet of e-buses?
4. Why are school busses more than transit busses?
5. Rather than VW funds, could 0 percent interest financing be used to pay for increased cost (3)
6. What do you think about having a legislative mandate to require that all public transit and school buses be electric at the time of scheduled replacement? (4)

7. Are schools a particularly equitable way to apply penalty money such as the VW fund because they reduce operating costs and therefore reduce property taxes? (3)
8. Can school buses or public transit buses be used as battery storage for the grid or for use in emergencies, and can that value help pay for the buses? (2)
9. What proportion of VTs transportation GHG emissions currently come from public/school buses? (2)
10. What are the lifetime savings of electric busses over diesel busses? How long does it take for the savings to pay for the increased initial cost? (3)
11. How many buses can be bought with VW \$\$ and how should they be allocated? (3)

Pitch 3: Cap, Trade, & Invest: Transportation

1. How would VT's rural landscape hinder implementation of California's public transport investment? What would be a more VT-centric approach?
2. If clean vehicles have a greater opportunity for GHG emissions reductions, why does this plan allocate so much revenue to public transportation? (2)
3. US philosophy on public transport has been "if you build it, they will come." This only works with congestion or higher gas prices. What is the chicken & egg?
4. Has Quebec reached its climate goals? (2)
5. What is needed to join the Western Climate Initiative? Would it be a legislative action? Who manages the program? (6)
6. What would it take for vermont to join WCI? (6)
7. Please explain how this would work In practice? Impact on vermont consumers? (5)
8. Good option for transportation; what about the heating sector? (3)

Pitch 4: Home-Grown Renewable Heat

1. Is there a dangerous of removing too much organic matter from forests?
2. Are 2 chamber boilers like a Tarm considered advanced wood heat. Are there incentives for these boilers.
3. What's the net btu provided by pellets (after subtracting the fossil fuel(?) energy required to make them)? (2)

4. Just an FYI, solar has a sales tax exemption
5. Where would funding for a sales tax exemption come from? Revenue-neutral carbon tax? (3)
6. How will we address the declining number of loggers?
7. What kinds of forests are associated with wood heat? Tree plantations, or more natural managed forests? (4)
8. How can we ensure the price of wood fuels like pellets remain at an affordable level, the price of wood fuel has fluctuated greatly with supply and demand (4)
9. How does wood heat reduce carbon? It does not. Renewable, yes, carbon neutral, no. (4)

Pitch 5: Using “Feebates” to Drive Clean Energy Choices

1. Are there enough, price competitive options of 'good' equipment across most sectors to off set the increase in cost ascribed to 'bad' equipment currently? (2)
2. What is the cost differential between inefficient and efficient equipment? (2)
3. Why take a prescriptive approach to incentive levels, rather than a fee on CO2 emitted? (3)
4. Which of the feebates do you think has the greatest chance of getting passed? (2)
5. Does this shift costs to lower income individuals who can't afford higher efficient homes, equipment, and vehicles? (5)
6. Who decides which equipment or vehicles or buildings fall into which category? (3)

Pitch 6: Renewable Fuels Standard

1. How much research been done on other pollution related to bio fuels. Are they clean? (2)
2. Can biodiesel production keep pace with increased demand?
3. Why is there a need for a renewable Fuel STD? how do you ensure fuel integrity (2)
4. Can we extend the concept of the RFS to the transportation sector, requiring a certain percentage of biodiesel in on-road diesel?
5. Which state agency would administer/regulate this RFS? with no fees, where does the administration funds come from? (2)

6. How do the fuel dealers feel about this? How will you help them make this transition given that a lot of the dealers are very small operations? (7)
7. Can the 'bio' of biofuels be produced in Vermont or at least in New England? (3)
8. How will you get other fuel dealers on board? (2)
9. How to you add renewable content to propane? (2)

Pitch 7: Bond for Expanded Weatherization

1. How many people are on wait lists already for low income Wx? (2)
2. Funding for outreach/handholding?
3. How will this impact other bonding programs like lake cleanup?
4. With the drop off in funding after the bond spend, how do we make sure the newly trained Wx contractors can continue to put those skills to work? (3)
5. How are bond proceeds distributed? Loans, grants? (2)
6. Can/should we offer assistance to middle income as well?
7. Is this more cost-effective for reducing greenhouse gas than the same amount spent on electric vehicles? (5)
8. Is there a labor force to do all this work so quickly? (5)
9. Is this proposed program focused on heat? Or total energy? (2)
10. How do you do outreach to and engage homeowners who might lack financial literacy in this kind of program? (5)

POLICY PITCHES - ROUND 2

Pitch 8: Sustainable Energy for Vermonters: Overcoming Barriers to Low-Income Access

1. Yes! Solar should be accessible to low-income VT'ers! Yes! Education and training, particularly for women and minorities!
2. Great presentation! Maybe a bit more info about "loaning to the meter"?

3. Is connecting finance to the meter sufficient for allowing tenants to make changes to property owned by landlords? Can we incentivize landlords directly? (2)
4. Do you have any specific recommendations to engage low income folks regarding transportation? (3)

Pitch 9: Harnessing Energy Storage for Local Clean Energy, Jobs, and Grid Resiliency

1. Where do California incentives come from? (3)
2. How can storage be supported by retail electric rate designs (time of use, etc)? (2)
3. What training needs to happen to prep Vermonters for these jobs?
4. What's the cost for a residential battery with installation?
5. How does current net metering prevent storage utilization? (3)
6. Does VT's investment in smart meters make us a better candidate for these integrated systems? (2)
7. Where would incentives for storage come from?
8. What incentive is there for home owners to install energy storage?
9. What storage options are available in addition to Tesla batteries?
10. Could these systems be applied to community solar projects?
11. Beyond emergency backup, what's the value proposition to homeowners for storage? (4)
12. What is the time frame of creating a "smart grid" that connects solar-powered homes, especially in rural Vermont? (3)
13. How do you finance storage at the residential scale?
14. What policies are needed to accelerate storage adoption? (4)

Pitch 10: Vermont Climate Action Communities

1. Staffing for effort?
2. How do we encourage schools to get off of fossil fuels?
3. What sort of incentives? Where would that funding come from?

4. How would town energy committees be integrated into this system?
5. How can school districts be included? Especially high schools. Youth climate action!
6. Do MA and CT programs have any quantifiable outcomes?
7. Is this focused on municipal energy use or targeting entire community w an outreach strategy? (4)
8. What do you need in terms of data to measure progress? (3)
9. Will you be working together w the Climate Pledge Coalition and other advocacy organizations?
How are you different? (3)

Pitch 11: Emphasize & Improve Tier III

1. Is it possible for EEU's to take over all responsibility for Tier III? Why split savings between EEU's and DUs at all? (4)
2. What's a better name to replace "Tier III"? (2)
3. How will DUs be held to the same standards as the EEU's in costs/benefits? (2)
4. How can biomass access utility bills through tier iii

Pitch 12: Heat & Transportation Efficiency Utilities

1. 1.7 cents per gallon seems like a very small price to pay for the benefits you outline.

Pitch 13: ESSEX Plan

1. What happens as ghg revenues decline?
2. Why only electric rebates? What about funding modern wood heat? (2)
3. What about a flat per-person dividend?
4. How about the 10,000 Vermonters who have invested in net metered solar?
5. Why reduce electricity bills rather than investing in clean energy?
6. How do you convince the Governor that this is the way to move forward? (2)
7. Some Vermonters have solar sized for their use. How would rebates affect them?

8. Saving electric \$ helps pay extra cost of carbon tax and doesn't necessarily reduce fossil fuel use. where is actual pollution reduction?
9. Why give back all the revenues. We need the revenues! (2)
10. What happens if you're successful in reducing dirty fuels because of the added tax burden in terms of funding reduction in electric rates? (2)
11. Doesn't this ask fuel consumers to pay more so electric consumers can pay less? Hasn't DPS balked at cross subsidies in the other direction? (2)
12. Will decreasing electricity prices encourage reduced electricity efficiency? Would that result in an overall increase in electric carbon intensity? (3)
13. Why would we want to give a rural rebate when we want people to live in more compact developments? (2)
14. I use 10 times more gas than electricity each month, how would this effect me and my budget? (4)
15. Given that Gov Scott has issued a statement saying a carbon tax would be vetoed, isn't this position politically difficult?
16. Does this reduce the incentive to install roof top solar? What about homeowners who already made that investment? (2)
17. When does the 27% come into play 2040? What is the price per gallon at 2040? How do we define rural?
18. Won't lower electric rates reduce the end user's incentive for efficiency and renewable energy investments? (5)

Questions for Other Summit Presentations

Vermont Climate Pledge Session

1. Does VSECU have alternative underwriting standards for EE/RE project loans? How are you working to extend credit to those with high energy burdens? (2)

The Vermont Energy & Emissions Picture

1. It is imperative that emissions reduction are achieved. Has anybody considered limiting imports of fossil fuels into VT, and likewise limiting sales of same?
2. Gov Scott feels VT is underpopulated. 1. What are the population assumptions in your modeling? 2. Is dramatic pop increase for VT realistic or desirable?
3. What about the public health benefits of Weatherization (indoor air quality) & air quality due to reduced emissions? Include in cost benefit analysis.
4. How were the eight drivers selected and how were their relative magnitudes determined? (2)
5. Must we continue to grow our economy indefinitely? (3)
6. The reduced sov trips is a great example of how new innovative tech based business models and services can have a big impact. Can you comment..,
7. Governor Scott has repeatedly said that Vermont is too small of a state to slow global climate change no matter what we do. How do we combat this mentality? (2)
8. How would conversion of heavy duty vehicles to CNg help? (2)
9. Are you looking at all GHG emissions, including methane which is MUCH worse than CO2 and methane releases from fracking make natural gas as bad as coal. (3)
10. What are best ways to incentivize EV vehicle use in our state? If the \$7,500 national incentive is taken away with the proposed tax plan, how do we compensate? (2)
11. Have the new net metering rules hurt increase in solar? How many kw permitted in '16 vs. '17? (2)
12. Wild heat: renewable, yes. Carbon neutral, how can we say that? Carbon goes immediately up the stack. (2)
13. How will driverless cars impact our conversion to evs?
14. What is the role of city/land use/mobility planning in reducing transportation emissions, especially as VTs economy grows? (3)

15. How much energy savings would there be from focusing more development, including jobs, in existing walkable neighborhoods or along existing bus lines?
16. Any way we can get the slides? (3)
17. Are the speakers willing to present ?
18. What happened to walking! It is ten percent of all trips! One quarter of all trips in Vt are less than a mile. Can't there be some non motorized options here. (4)
19. John Erickson's slides show a decline in GHG emissions in Vermont, while EANS show an increase. Can you reconcile this data? (2)
20. Why aren't we talking about bikes and e-bikes? Can easily account for 2%+ of the goal by 2025! Also healthier and way more affordable than motor vehicles. (4)
21. Are all of the pathways equally important, or are some more important than other?
22. What impact will the proposed federal tax bill, which eliminates the \$7,500 federal tax credit for EVs have? (8)
23. What impact could electrifying buses - school and transit - have on our future energy use? (5)
24. What about active transportation and electric bicycles? What would a goal of 50,000 EB's Look like. More than just electricity, but healthy benefits (3)
25. How do we bring people not in the room into these efforts? What are comms strategies that engage people for whom environmental concern is not primary motivator? (5)
26. With autonomous vehicles coming can't we all give up our cars, improve land use, and have all those vehicles be electric? (2)
27. Efficiency of Biomass plants like McNeil increases when distributed thermal energy is used to offset other fuels. (2)
28. What are your thoughts on rotational grazing of cows as a carbon sequestration strategy? (2)
29. Do the renewable electricity "needs" take into consideration the increase in need from electrification of transportation and heat? (5)
30. How can we introduce tax credits to consumers who purchase electric vehicles? (2)
31. Why is public transit not prominent in the scenarios? (11)

32. Don't we need to link sustainable forestry management to modern wood heat to be able to count it as renewable. (4)
33. If goal for EV's is 55,000, what is the current total light duty fleet in VT / what percentage of total vehicles does 55k represent? (5)
34. What's the axis for this chart?
35. What's your assumption about what fuel mix will be powering the 50,000 EVs? (2)
36. We experienced high fuel prices during 2004-2013, contributing to the 12% drop. How do we justify investments in efficiency and renewables in this environment? (4)
37. What can we do without carbon pricing to make progress. (2)
38. Should we include the GHG emissions associated with imported food and manufactured goods when we set our state climate goals and measure progress? (9)
39. Outside of Vermont, are there any examples of local or regional decoupling that we could draw lessons from? (4)
40. In Sept, Mr Hawken said climate work is too focused on energy, that we should focus on land use, healthy soil, and family planning for example. Do you disagree? (9)
41. Don't we need to look at how we reach a steady-state sustainable economy, without economic growth, in order to reach a true balance with our environment? (2)
42. How much of the 42% transportation number is personal transportation vs. transportation of goods? (13)
43. How do we help Vermonters buy electric pick-up trucks and cars? (8)
44. How do we make the renewable energy transition equitable for the poor when many low income people travel great distances using fossil fuel powered vehicles? (15)
45. Will we have access to the presentation materials online after the conference? (7)
46. Our emissions data lags too long to provide insight to decision makers. How do we model emissions or leverage surrogate measures to make effective decisions? (9)
47. Is current progress on renewable electricity sufficient to reach goals in that sector, or does that curve need to bend further as well? (3)
48. How do we track our progress and motivate our communities? (5)

Bending the Curve: Meeting our Energy Milestones

1. How much should we be investigating in transmission infrastructure?
2. The recent carbon pricing proposals start at about 10 cents per gallon on gas? Why is this such a big problem politically and If not now, when?
3. Can we discuss opening markets so customers can choose non-utility providers?
4. In answer to how to involve businesses: I would suggest that the "Catalyzing the Climate Economy Conference" in August focused on business and innovation. (4)
5. There are very few businesses represented here compared to all the non-profits and state agencies / VEIC. How can we bring them into devising solutions? (7)
6. What should the role of utilities be in the roll out of EVs in VT? (4)
7. What is the role of town energy committees? shout out to VECAN conference on Dec 2 Lake Morey Resort in Fairlee! Local leaders implamenting solutions (3)
8. Can we get to point of individuals participating and benefitting from demand side management to help incentivize PV and storage. (3)
9. What are the impediments that need to be eliminated to fuel the expansion of distributed energy generation and integration with the grid? (5)
10. What finance programs for renewable energy and efficiency are working, and what do you think we're missing? (7)
11. Lots of talks about ev being a solution. What about bikes and electric bikes? Maybe not for all Vermont but main metropolis's (4)
12. Can you comment on resiliency of our grid, to buffer us from climate change events, perhaps microgrids, storage? (4)
13. How do we accelerate home and business based energy systems at scale? (3)
14. Not much discussion of land use and development patterns today. Does the rate and pattern of future growth in Vermont influence the other ideas discussed? (7)
15. Doesn't Biomass energy generation increase GHG emissions in the short term and increase the impact on climate change as a result?
16. What types of carbon pricing do you think are the most effective and politically feasible? (7)

17. Should we be encouraging unlimited economic growth or should we also include encouragement to reduce consumption? (5)
18. It's great to be scrappy, but how do we take scrappy to scale? (3)
19. How can we encourage investment by middle income folks in specific renewable projects rather than deep pockets in large scale projects? (5)
20. In the 1990s we Applied a 5% Environmental adder when comparing supply side solutions. Should we apply adders like this to drive deeper renewable investments
21. With biomass combustion, approximately how long does it take for the amount of CO2 emitted "at the stack" to be re-sequestered? (2)
22. Should Vermont aspire to become an energy self sufficient "island" within new England?

Watch all the archived presentations at <http://eanvt.org/vt-energy-climate-summit-2017/>