

Cost and Benefit Analysis of Policies to Reduce Greenhouse Gas Emissions in Vermont

Comments to RFF

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Allen, Ted

Montpelier

Comments: Decarbonization is a must. A carbon tax is probably the best strategy for achieving it,, but we need to find a way to make it cost neutral to users to the greatest extent possible. Please include modeling of any proposed solution to show its effect on transportation and heating costs for a range of income levels in Vermont.

Anderson, Leslie

Propane Gas Association of New England

Comments: The Propane Gas Association of New England (PGANE) is a regional trade association representing nearly 800 members of the propane industry in the 6 New England States. We exist to serve the propane industry by promoting safety, education and public awareness of the uses of propane. Our membership includes the nation's largest propane companies and many small companies who are often family owned and operated, many for several generations. PGANE does not support a carbon tax and believes that because propane is a bi-product of natural gas, propane should be exempt from any carbon tax. Carbon taxing systems should look at the entire live cycle analysis of emissions from a source, including creation emissions and those lost in distribution by electricity.

Propane is an Environmental Protection Agency designated certified clean fuel and can contribute in many ways to reducing pollution. Propane is a bi-product that is left over when natural gas is processed. As long as our electric mix in New England contains natural gas, it makes no sense not to utilize the propane that is produced in the same natural gas processing. Capturing this bi-product and using propane as a fuel source reduces greenhouse gas emissions that would otherwise be produced if propane was simply burned off at the processing plant. Reduce, Reuse, and Recycle goals are furthered by utilizing propane, as propane is produced in natural gas processing. Reusing a waste bi-product is the responsible thing to do. Vermont's energy plan should include and promote the use of propane as a beneficial bi-product of our major source of electric generation.

Propane is a non-toxic gas and does not contain the greenhouse gas methane like natural gas. Propane's molecular structure has a low carbon content compared to electricity. Propane is an essential energy that can be used for: space heating, water heating, cooking, clothes drying, fireplaces, and standby generators. Propane is backup power source for wind and solar installations, it is the most reliable backup power in times of natural disaster and it is a critical component of Vermont's energy security.

Propane cooking equipment produce 30% fewer carbon emissions than electric units. Tankless propane water heaters produce nearly 40% fewer carbon emissions than electric storage tanks, and propane water heating is best for a zero net energy home. Propane dryers heat faster than electric models, reducing energy use and produce up to 2,000 pounds less carbon emissions than electric dryers over the life of the unit, by producing 42% less greenhouse gas emissions.

Energy Security

One of the central goals of Vermont is to ensure reliable power availability. Propane is used throughout Vermont as a backup power source for winter storms and it is the fuel of choice for responding to natural disasters, both in the New England, and around the world. Propane is a green fuel, and its use is not limited by atmospheric conditions. When it is dark and the wind doesn't blow, propane systems still work. When the electricity goes out, propane generators kick on and propane stoves and fireplaces still function. Propane can be used by citizens to heat and boil water during emergencies, and it can be used by hospitals to fuel their generators when they have no power. Propane is vital for the security of the State of Vermont, and because it is a standalone system it is not subject to cyberterrorism attacks. Propane provides reliable power availability. Propane was used to feed the first responders who have moved into areas to assist in the hurricane rescues and cleanup. The mobile kitchens used to feed these responders, military personnel, and displaced citizens use propane as their energy source. Citizens whose electricity and natural gas lines are down cook on propane grills and camp stoves. In order to have the supply of propane available in Vermont to respond to a natural disaster, it is critical that the existing propane infrastructure continues to grow and to be part of the energy plan.

PGANE asks that the carbon pricing study recognize the economic contribution of propane businesses.

Fuel companies employ thousands of Vermonters and pay hundreds of millions of dollars in taxes to the state of Vermont. These taxes, on both motor and heating fuel, pay for road construction, pollution mitigation and low income weatherization, as well as contribute to the general fund.

PGANE asks that the carbon pricing study recognize the economic challenges outside of Chittenden County.

A carbon tax is regressive, particularly in rural areas of Vermont, where people are more dependent on gasoline to get to work and propane to stay warm. Earlier iterations of carbon pricing legislation in Vermont focused on taxing CO₂ and not other greenhouse gases, such as methane. This is problematic because methane is 20 to 30 times more damaging as a greenhouse gas than CO₂. Earlier iterations of carbon pricing legislation in Vermont also measured carbon at the burner, rather than the wellhead. This exacerbates the inequitable method of carbon pricing in Vermont as it makes it economically advantageous for homeowners and businesses in urban areas of Chittenden County where natural gas is prevalent.

PGANE asks that the carbon pricing study recognize that most of the propane sold in Vermont comes from Canada and most of the heating fuel retailers in the state are owned by Vermonters. Switching from oil to electricity does not "keep money local" when most of our electricity (just like our fossil fuels) comes from Canada and the largest electric utility in Vermont is owned by a corporation in Quebec.

PGANE asks that the carbon pricing study recognize that Vermont may need to rely on more power from ISO NE as Vermont electric companies build load as a result of carbon pricing policies. The ISO NE mix was 70% coal/oil/gas in 2017 and is expected to be 76% coal/oil/gas in 2025. This past winter, heating oil proved critical to ensuring that ISO NE had enough power. New England power generators used 84 million gallons of heating oil between December 25th and January 9th. *This is about the same amount of residential heating oil sold in Vermont during an entire year.* In other words, New England electric utilities needed a year's supply of Vermont's heating oil to ensure the region had enough electricity for two weeks.

PGANE asks that the carbon pricing study recognize the loss of state revenue if sales of heating fuel were to decline as a result of carbon pricing policies. Vermont has a 2-cent per gallon fuel tax and a 1-cent per gallon pollution fee on all sales of heating fuel, as well as a 6% sales tax on heating fuel consumed by Vermont businesses.

PGANE asks that the carbon pricing study recognize that energy intensive businesses will be less inclined to expand or move to Vermont. Due to the sales tax, pollution fee, and fuel tax, Vermont businesses already pay 7% more per gallon than our neighbors in New Hampshire (based on \$3 gallon heating oil). A carbon pricing policy that levies a \$100 per metric ton tax would make the same fuel 50% more expensive. Raising the cost of energy purchased in our state will provide an economic advantage for businesses to operate outside of Vermont's border.

PGANE asks that the carbon pricing study recognize that half the population of Vermont lives near the border of New Hampshire, Massachusetts, or New York and that economic leakage could become a significant problem in the unregulated fuel market. Liquid fuels are easily transportable, delivered directly to a tank at a home or business. Tax avoidance, for fuel sellers and consumers, will become more of a problem as the tax increases if it is applied at the retail sale and not further upstream. In order to prevent delivery trucks from outside of Vermont delivering tax free fuel inside our borders, Vermont will need more resources for enforcement. However, there is no prohibition on consumers purchasing untaxed fuel outside of Vermont and transporting fuel in cans or portable tanks in their personal vehicle. Out of economic necessity, there will be widespread carbon tax avoidance. However, this method of transporting fuels is inherently unsafe.

Thanks you for the opportunity to comment on this study.

Barlow, Daniel

Vermont Business for Social Responsibility [Public Policy Manager]

Comments: Thank you for the opportunity to discuss the forthcoming decarbonization methods study in a small group setting last month, and for the chance to submit further comment.

Vermont Businesses for Social Responsibility (VBSR) is a statewide, nonprofit business association with a mission to foster a business ethic in Vermont that recognizes the opportunity and responsibility of the business community to set a high standard for protecting the natural, human, and economic environments of our citizens. Our network of nearly 800 member businesses and professionals take a triplebottom-line approach to business that values people, planet and profit.

Through our own research and the experience of our member companies that have instituted internal carbon charges, we have come to understand the wisdom of using a carbon price to strengthen the Vermont economy, create jobs, support Vermonters with low incomes in the transition to a cleaner energy future, improve public health and reduce the pollution causing global warming. You can read VBSR's fact sheet in support of carbon pricing here: <https://bit.ly/2PBnFFB>.

As a sustainable business association, we hope your analysis will explore the costs and benefits of this approach to limiting pollution, as well as the results from other jurisdictions that already do so, including:

- Economic measures such as change in Gross State Product, job growth/loss, shifts in employment between industries, impacts on wages and potential to make Vermont more affordable;
- Quality of life indicators such as physical and mental health; education; and
- Environmental benefits of reduced climate and particulate emissions.

In particular, we believe it is important for the study to estimate the health care savings from reduced air pollution; to detail the full economic benefits of transitioning away from imported fossil fuels and to locally-generated renewable energy; and to discuss the opportunity to use carbon fee revenues to make Vermont more affordable for working families and those currently without the resources to participate in the clean energy economy.

If we can be of any assistance as you compile your report, please be in touch.

Barstow, Rick

Comments: It has become evident to me that we need to build a regional approach here in the north east, including neighboring Canadian Provinces. With Gov. Scott's comments from the Tumbidge fair that he would not look at it at all because of the negative impact to low income folks - clearly he continues to ignore that our number one priority has always been to make sure that is not the case - we would need to either defeat him, elect a veto proof legislature or both and develop a regional coalition. Meanwhile, time marches on.

Beck, Scott

Representative, Caledonia - 3

Comments: I am interested in reducing electric rates, and thereby incentivizing everyone to minimize or eliminate carbon fuel usage. What would it take for Vermont to divorce itself from the New England grid and join the Quebec grid? Also, what is the potential and consequences of moving toward bio-mass electricity generation as a base load supplier in Vermont.

Burde, James

Jericho

Comments: I am writing to add my comment to the decarbonization study as it relates to reducing climate pollution and growing the economy in an equitable way. Please consider the following points in the study:

Climate change is already impacting Vermonters' health, and in some cases lives. This study should include the costs of inaction as well as the health benefits of reduced air pollution.

To make the report feel relevant to all Vermonters, please include case studies that illustrate each policy's impacts in a variety of scenarios and demographics, including on Vermont families and businesses.

What are the economic benefits of sourcing more of our energy locally from renewable energy resources rather than importing it from states and countries outside of Vermont?

While climate pollution in the USA is falling, in Vermont it is on the rise. What policies and programs could effectively and efficiently reverse that trend?

In what ways can a decarbonization policy help low-income and rural Vermonters get a leg up in the transition to less-expensive clean energy?

Thank you for taking these points into consideration.

Burke, Matthew

Charlotte

Comments: Thank you for your efforts in helping to understand pathways and mechanisms for decarbonization.

A carbon pricing analysis must be based on pathways that lead to the required reduction in greenhouse gas emissions. To achieve this goal, the carbon price must be consistent with the Paris Agreement targets. As stated in the 2017 Report of the High-Level Commission on Carbon Prices, "this Commission concludes that, in a supportive policy environment, the explicit carbon-price level consistent with the Paris temperature target is at least US\$4080/tCO₂ by 2020 and US\$50100/tCO₂ by 2030...The Commission believes that the carbon-price ranges suggested above would be able to deliver on the temperature objective of the Paris Agreement, provided the pricing policy is complemented with targeted actions and a supportive investment climate--in the absence of these elements, the carbon-price range required is likely to be higher." (p. 50). The report goes on to suggest that "(i)t is also important to monitor and regularly review the evolution of emissions, technological costs, and the pace of technological change and its diffusion so that carbon prices can be adjusted, particularly upward, if existing prices fail to bring about the required changes" (p. 51). My takeaway: Given uncertainties, the science shows that aiming toward the higher end seems appropriate, meaning a policy goal of at least \$60-80/tCO₂ by 2020 with a trajectory toward at least \$100/tCO₂ by 2030 with measures in place to monitor and adjust. Please therefore include in your study the following:

1. Science-based pricing - Include scenarios based on the above carbon-price ranges, or more recent studies that base carbon prices on scenarios for meeting the Paris targets, rather than or in addition to lower "social cost of carbon" prices. Include also contingency price adjustments scenarios should targets not be met.
2. Supporting policy measures - Include an assessment of the necessary supporting set of policies. If these supporting measures are not in place, adjust the above carbon-price scenarios upward. For scenarios that use even lower carbon prices, please specify the set of policy instruments needed to achieve the Paris Agreement targets.

3. Decarbonization scenarios for low, zero, or negative economic growth rate. - There is ample evidence to suggest that economic growth correlates positively with increasing emissions. While scenarios of low, zero, or even negative economic growth may be presently deemed as politically unfeasible, there is also increasing recognition that such possibility may not only be realistic, but in the right context of social policy, may yield other desirable social outcomes. Please therefore include scenarios for low, zero, and negative economic growth, as well as an assessment of supporting set of policies for social wellbeing under such conditions.

4. Total emissions - Include or at least point toward all greenhouse gas emissions not only carbon, especially methane and land use change. These issues are critical for decision makers and the broader public to understand in weighing options. Thank you for your consideration.

Cite: High-Level Commission on Carbon Prices. 2017. Report of the High-Level Commission on Carbon Prices. Washington, DC: World Bank. License: Creative Commons Attribution CC BY 3.0 IGO. Retrieved from <https://www.carbonpricingleadership.org/report-of-the-highlevel-commission-on-carbon-prices>

Christian, Bill

Bennington County Regional Planning Commission Energy Committee

Comments: A carbon tax is the only practical and effective way to reduce carbon use. It should be revenue neutral, giving ALL tax back to citizens of Vermont, in a simple equitable way. Reduction or elimination of sales tax would be one method. Or give equal size checks to all residents, or unequal-progressive size (although that gets complex and unfair very quickly). Bottom line - we cannot and will not save our environment without a carbon tax. I feel certain of that.

Colburn, Selene

Representative, Chittenden 6-4

Comments: Thank you for your important work on the forthcoming decarbonization methods study, and for the opportunity to provide input on this work. We know how critical it is, and the recent report of the IPCC underscores its urgency.

I represent what is perhaps the youngest legislative district in Vermont. Chittenden-6-4 includes much of the University of Vermont campus, student off-campus housing for UVM and neighboring colleges, and many rentals for recent college grads. I am particularly interested in seeing how the various policies you study will impact and improve the lives of young people. We know that without serious and immediate action, climate change will disproportionately impact younger generations. Climate action is a top priority of the students I work with at UVM, both in my work as a legislator and as an Associate Library Professor. Many of the young professionals I meet in my work are employed in Vermont's renewable energy sector. And my own children (ages 12 and 14) and their peers are desperate for climate solutions.

Two years ago, Demos and NextGen Climate released a stark [report](#) on the economic costs of climate inaction. If global warming is left unchecked, some of their key findings of that report include:

- A 21-year-old college graduate in the class of 2015 earning a median income will lose over \$126,00 in lifetime income, and \$187,000 in wealth.
- Without action on climate change, a 21-year-old earning a median income will lose \$100,000 in lifetime income, and \$142,000 in wealth.
- The millennial generation as a whole will lose nearly \$8.8 trillion in lifetime income.
- For the children of millennials, the losses from climate change will be drastically greater.
 - A child born in 2015 with median earnings will lose \$357,000 in lifetime income and \$581,000 in wealth.
 - A child born in 2015 who will graduate college will lose \$467,000 in income over her lifetime, and \$764,000 in wealth. Those findings are based on two-year old data, and as we know, projections have only worsened in that time.

Those findings are based on two-year old data, and as we know, projections have only worsened in that time.

There is a lot of discussion these days about how Vermont can attract and retain young workers and families with children. I'm curious to learn more about how decarbonization methods and efforts to address climate change can contribute to Vermont's workforce, economic development, and demographics, particularly in light of State Auditor Doug Hoffer's [recent report on best practices in economic development incentives](#). A key finding of this report is that peer-reviewed literature shows a number of quality-of-life improvements that are likely greater drivers of economic development than traditional methods such as tax incentives or marketing campaigns.

In this work, your report might be strengthened by referencing the following statistical measures at use locally:

- [Vermont's Genuine Progress Indicator Report](#) – a publication sponsored by the University of Vermont. In addition to using traditional GDP measurements, your report could also use GPI because it is a more holistic measure of quality of life that includes environmental, social, and economic metrics.
- The Cantril Scale that was used to frame The Vermont Happiness Initiative's [2013 Statewide Happiness Survey](#) - another UVM publication. (It is worth noting that of the [countries](#) that consistently score high on the Cantril Scale, all of them either have in place or are in the process of implementing carbon pricing programs to meet their commitments to the Paris Climate Accord.)
- Finally, I want to point you to a third resource I hope you will engage: my colleagues at [The Gund Institute for the Environment](#) at the University of Vermont. The Gund has a wealth of experience in the field of ecological economics, and a cohort of students and faculty who may be eager to add both a local and a young person's perspective to your work. I would be happy to provide introductions if you would like.

Thank you, again, for undertaking this vital work. Please let me know if I can be of any assistance!

Corbo, Ralph

East Wallingford

Comments: It's time to implement the Essex Plan.

Cota, Matt

Vermont Fuel Dealers Association (Executive Director)

Comments: *The comments below are respectively submitted by Matt Cota, on behalf of Vermont Fuel Dealers.*

VFDA asks that the carbon pricing study recognize the economic contribution of gasoline, diesel, heating oil, and propane businesses. Fuel companies employ thousands of Vermonters and pay hundreds of millions of dollars in taxes to the state of Vermont. These taxes, on both motor and heating fuel, pay for road construction, pollution mitigation and low income weatherization, as well as contribute to the general fund.

VFDA asks that the carbon pricing study recognize the economic challenges outside of Chittenden County. A carbon tax is regressive, particularly in rural areas of Vermont, where people are more dependent on gasoline to get to work and heating oil to stay warm. Earlier iterations of carbon pricing legislation in Vermont focused on taxing CO₂ and not other greenhouse gases, such as methane. This is problematic because methane is 20 to 30 times more damaging as a greenhouse gas than CO₂. Earlier iterations of carbon pricing legislation in Vermont also measured carbon at the burner, rather than the wellhead. This exacerbates the inequitable method of carbon pricing in Vermont as it makes it economically advantageous for homeowners and businesses in urban areas of Chittenden County where natural gas is prevalent.

VFDA asks that the carbon pricing study recognize that most of the fuel retailers operating in the state are owned by Vermonters and employ Vermonters. Switching from oil to electricity does not “keep money local” when most of our electricity comes from Canada and the largest electric utility in Vermont is owned by a corporation in Quebec.

VFDA asks that the carbon pricing study recognize that Vermont may need to rely on more power from ISO NE as Vermont electric companies build load as a result of carbon pricing policies. The ISO NE mix was 70% coal/oil/gas in 2017 and is expected to be 76% coal/oil/gas in 2025. This past winter, heating oil proved critical to ensuring that ISO NE had enough power. New England power generators used 84 million gallons of heating oil between December 25th and January 9th. *This is about the same amount of residential heating oil sold in Vermont during an entire year.* In other words, New England electric utilities needed a year's supply of Vermont's heating oil to ensure the region had enough electricity for two weeks.

VFDA asks that the carbon pricing study recognize the gap in transportation funding that would be realized if sales of motor fuels were to diminish as a result of carbon pricing policies. Vermont sells about 350 million gallons of motor fuel annually, which generates approximately \$100 million in excise

taxes for Vermont's transportation budget. These taxes directly fund road construction and bridge repairs in Vermont.

VFDA asks that the carbon pricing study recognize the loss of state revenue if sales of heating fuel were to decline as a result of carbon pricing policies. Vermont has a 2-cent per gallon fuel tax and a 1-cent per gallon pollution fee on all sales of heating fuel, as well as a 6% sales tax on heating fuel consumed by Vermont businesses.

VFDA asks that the carbon pricing study recognize that energy intensive businesses will be less inclined to expand or move to Vermont. Due to the sales tax, pollution fee, and fuel tax, Vermont businesses already pay 7% more per gallon than our neighbors in New Hampshire (based on \$3 gallon heating oil). A carbon pricing policy that levies a \$100 per metric ton tax would make the same fuel 50% more expensive. Raising the cost of energy purchased in our state will provide an economic advantage for businesses to operate outside of Vermont's border.

VFDA asks that the carbon pricing study recognize that half the population of Vermont lives near the border of New Hampshire, Massachusetts, or New York and that economic leakage could become a significant problem in the unregulated fuel market. Liquid fuels are easily transportable, delivered directly to a tank at a home or business. Tax avoidance, for fuel sellers and consumers, will become more of a problem as the tax increases if it is applied at the retail sale and not further upstream. In order to prevent delivery trucks from outside of Vermont delivering tax free fuel inside our borders, Vermont will need more resources for enforcement. However, there is no prohibition on consumers purchasing untaxed fuel outside of Vermont and transporting fuel in cans or portable tanks in their personal vehicle. Out of economic necessity, there will be widespread carbon tax avoidance. However, this method of transporting fuels is inherently unsafe.

Crowley, Steve

Sierra Club Vermont Chapter, Energy Chair

Comments: Thank you for the opportunity to provide input here today. As we begin to see the effects of climate change on our world, and to recognize the staggering cost of doing nothing about this crisis, and at the same time acknowledge that even here in our state our carbon emissions are increasing dramatically, it is time to implement major efforts to turn this around. Thankfully, we can turn this crisis into a tremendous and exciting opportunity to transition to a clean and sustainable energy economy.

A. What do you think are two or three things that a study of policies to reduce greenhouse gas emissions in Vermont ought to take into consideration, in order to be helpful in answering your questions and in advancing the climate and energy policy dialogue in Vermont?

1. Assess the varying effects of the size of a price on carbon pollution. Starting at \$5, \$10, or \$15 per ton, increasing over a decade to \$25, \$40, or \$50 a ton. How would this impact the effect in terms of reduced carbon emissions? How would this change behavior, in terms of fuel purchases, or in other technology choices or behaviors? How would this differentially effect various subgroups, including low or fixed income, rural residents, and different categories of small businesses? How will the carbon price alone (absent further incentives) affect investments in zero carbon energy?

2. Compare the carbon reduction effects of a revenue neutral price on carbon, as in the ESSEX Plan, at those various levels, with a program that would use some portion of the revenue stream to invest or provide incentives in ways that support opportunities for families and businesses to rapidly adopt the most effective emission mitigation choices -- energy efficiency and zero carbon renewables. For higher levels of price or investment, consider the longer term economic effect of applying some revenues toward forest carbon sinks, regenerative agriculture, or other proven measures that can provide both drawdown effects and co-benefits for ecosystem protection and for the sustainable use of agricultural lands.

3. Take a close look at alternative strategies for reducing the impact of different carbon pricing policies on low and fixed income Vermonters, rural residents, or small businesses, that already bear the burden of a regressive energy economy.

Nationwide, the Sierra Club has taken a critical look at different approaches to putting a price on carbon pollution. In support of our testimony here, we offer two documents below that lay out what we consider as essential elements of any strong and equitable approach. These embody two essential guiding principles: program effectiveness, and ensuring equity and inclusion in program design.

B. Starting by considering the policy approaches listed above, which approaches do you think RFF ought to focus on?

1. *Carbon fee-and-rebate, as in H.791 or S.284 (2018) – The ESSEX Plan;*
2. *Expanding cap-and-trade if Vermont joined the Western Climate Initiative (WCI);*
3. *Expanding cap-and-trade if the Regional Greenhouse Gas Initiative (RGGI) covered transportation fuels as considered in the Transportation and Climate Initiative (TCI); and*
4. *A carbon pricing policy based on further research and input from stakeholders.*

We believe the most critical use of this evaluation process will be to compare approaches to putting a price on carbon pollution, as described above. We do urge you to analyze the value of the ESSEX Plan. We also strongly urge you to look at those adjustments that might make a stronger plan for both carbon reduction and for the benefit of the Vermont economy, by optimizing the scale of the price on carbon, strategic leveraging through investments in a low carbon economy, and in opportunities to ensure that those who are already inequitably bearing the burden of a regressive energy economy have a pathway to reduce that burden and to participate fully in the beneficial aspects of this critical transition.

Sierra Club Carbon Pricing Guidance

Our two biggest problems are climate change and income inequality. If we pit one against the other, neither will win.

Michael Brune, PBS Newshour Oct 20, 2016

There is broad agreement that putting a price on carbon can be an effective part of a climate response. There are other options too (see below). The Sierra Club's carbon pricing policy can be found here. The Sierra Club's view has always been that effectiveness and equity are essential, design and implementation details matter a lot, and there are many different carbon pricing policy options that can potentially work. To achieve these goals we believe in engaging our allies early, especially those most adversely affected by climate change. This approach reflects our organizational commitment to the

Jemez Principles. Any carbon pricing mechanism must integrate environmental and economic justice principles and advance tangible outcomes.

In addition, experience is showing that carbon policy success is not contingent on a specific pricing mechanism. Carbon prices will make polluting sources internalize the cost of their pollution and thus reduce the incentive to burn fossil fuels. Carbon prices, however, must be part of a broader program that includes other policies needed to achieve the broader societal goals outlined below and fulfil the fastest and fairest move away from fossil fuels.

1. The outcome must be focused on measurable emissions reductions

When considering climate policy we should be guided by a need to meet and, if possible, exceed the emission reduction goals the Sierra Club has set. These include cutting pollution by a third from 2005 levels by 2025, one half by 2030 and at least 90 percent by 2050. Adoption of a CO₂ baseline and a declining emissions schedule that aim to achieve those goals and are consistent with the best climate science is extremely important.

2. Equity matters

Under the current fossil fuel-reliant energy system, frontline communities bear a disproportionate burden of the impacts of conventional air pollution and the climate impacts of greenhouse gas emissions. If designed appropriately, carbon pricing mechanisms will help tackle climate change and reduce conventional pollution, but they will also affect society at every level. The basic principle is that no one should bear an unfair burden, whether economic or environmental, from the effects of a carbon price. To the extent that a carbon price increases electricity rates, these costs will fall more heavily on low-income households, who spend a higher percentage of their incomes on energy and other goods whose prices would increase by the resulting increase in electricity prices. For workers and communities tied to the fossil fuel industry, a carbon price could result in job losses and economic impacts for those communities; in addition, in an effort to avoid the costs of a carbon pricing mechanism, trade-exposed industries could shift production to jurisdictions that are not subject to carbon pricing policies.

Carbon pricing programs can be designed in a manner that addresses these concerns. To the extent that policy makers establish cap-and-trade programs to control greenhouse gases, such programs should incorporate stringent pollution caps, and carbon taxes should be set at a level that reduces incentives to burn fossil fuels. In addition, in a cap-and-trade program regulated sources should not receive carbon allowances, which are permits to pollute, for free. None of these options, however, eliminate the risk of localized emission increases of co-pollutants in frontline communities, or the risk that these communities will not benefit from the conventional pollution reductions associated to a carbon pricing program. This issue should be addressed by incorporating other policies designed to achieve reductions in conventional air pollution, with an emphasis on polluting sources that harm the health and environment of frontline communities.

In addition, revenues obtained from carbon pricing programs should be used to: (1) expand clean energy and energy efficiency to further reduce carbon emissions, and to invest in climate adaptation; (2) finance targeted investments in frontline communities affected by conventional air pollution from polluting sources; (3) provide financial assistance to workers affected by the transition away from fossil fuels, and for new economy job training and clean energy investments in frontline communities and

communities where coal represents a significant part of the economy; and (4) offset the regressive effects of increased electricity prices in low-income households. In California, for example, auction revenues under AB32 have provided revenues for a variety of programs, including affordable housing, low-carbon transportation, transit capital and operations, weatherization and renewable energy, and urban forests. Under the Regional Greenhouse Gas Initiative (RGGI), states have invested the majority of auction revenues in energy efficiency, community-based renewable projects, credits on consumer bills, and bill assistance for low-income customers. Without using generated revenue to add multipliers like more clean energy or efficiency, the emissions impact of carbon pricing will be muted. And without addressing economic transition or inequity issues, any carbon pricing program will generate greater political pushback.

3. A stand-alone carbon price is hard to make effective

Carbon pricing is not a silver bullet for solving climate change. The majority of prices set under existing taxes and trading systems are well below the social cost of carbon, which the Obama EPA estimated at \$36 per ton, and other expert assessments suggest much higher levels. Although there is evidence that existing carbon pricing programs have resulted in emissions reductions, those reductions are nowhere near the targets set by the Sierra Club. For this reason, the Sierra Club advocates for a comprehensive approach that includes a carbon price as well as complementary policies such as renewable electricity standards, funding for clean energy measures, research, building standards and codes, etc.

Carbon pricing efforts work best alongside complementary policies. California's climate approach is successful because its carbon price is only one part of a comprehensive policy toolbox (which includes, for example, a renewable electricity standard and a Low Carbon Fuel Standard). The pricing program (cap-and-trade) produces less than a quarter of the emissions reductions.

4. Devoting carbon revenues to a single purpose is less than ideal

The Sierra Club supports using revenue from a carbon price for targeted refunds, clean energy and other solutions, mitigation of climate impacts, and transition assistance and investments in frontline communities. The best mix depends on the context, but without elements of several of these categories we believe a carbon price will be more difficult to enact, will achieve less from an environmental perspective, and will be less equitable.

Many advocates and some economists argue that carbon revenues should be returned to taxpayers as a dividend or to the government's general fund in order to reduce taxes (for example, the corporate income tax) and to fund other, non-climate related purposes. While the argument for a simple "revenue neutral" system is obvious, the real world isn't so simple, and these approaches warrant additional scrutiny, especially if they are not the product of a diverse coalition.

5. A strong carbon pricing mechanism should be inclusive of all stakeholders

The measure of success is not whether a carbon price is adopted but whether it is effective over the long run. Enacting and sustaining a carbon pricing program requires broad political buy-in. In the case of carbon taxes it also starts from a political disadvantage, as the mechanism involves new taxes. In the case of cap-and-trade, communities are concerned that trading may create, maintain, or prevent the reduction of pollution hotspots because polluting sources can purchase allowances instead of reducing their emissions. Therefore, any carbon pricing effort must involve all stakeholders in a genuine dialog if

it is to achieve political viability and reflect a just approach. That means community members, labor, and others should be involved as equal partners in the design and dissemination of the proposed pricing approach.

6. Carbon pricing policies can be effective, but we should be open to other policy options

The Sierra Club is always open to other policy and legislative options to reduce climate pollution. Examples range from Renewable Portfolio Standards to regulatory decisions to move from coal, gas, and oil to clean energy. These and other options that provide certainty and speed the transition away from fossil fuels should be considered. Efforts to subsidize nuclear power should be opposed as well, due to the environmental and public health risks it entails, including nuclear waste disposal and the potential for disasters. Other policy options still need to address issues such as their impact on conventional pollution, equity, and inclusion. The Sierra Club is investing in efforts to ensure that the burgeoning clean energy industry delivers in these areas through advocacy for good, family supporting clean energy jobs and to ensure that the benefits of cheaper clean energy are passed on to low income households.

Policy on Carbon Market Programs

The Sierra Club recognizes that, of the many identified greenhouse gases, carbon dioxide (CO₂) emissions are the primary cause of global climate change. It is essential to establish binding targets for CO₂ emissions and to ensure that reductions are made consistent with scientific findings about the levels needed to avoid dangerous climate change. The Sierra Club supports reducing CO₂ emissions by at least 2% of baseline (present) emissions per year to achieve a 70% to 90% reduction by 2050.

The United States should adopt a comprehensive climate change strategy, consistent with the U.N. Framework Convention on Climate Change. The strategy must provide a broad array of components to reduce CO₂ emissions, including policies and incentives for promoting efficiency, conservation and renewable energy. Putting an adequate fee on pollution from carbon dioxide and other greenhouse gases to reflect their true costs would provide one such incentive. Any strategy must protect natural systems and species and promote environmental and economic justice.

Carbon emission fees will directly establish a cost associated with CO₂ emissions. Other market-based programs to establish declining caps on CO₂ emissions, sell allowances to specific economic sectors and permit trading of those allowances (“carbon cap-and-auction”) may help set market prices for reductions of CO₂ and lead to emissions reductions in an economically efficient manner, if they are properly developed and regulated. These programs must be designed so that they contribute to verifiable CO₂ reductions and work in harmony with other components of the climate change strategy.

The Sierra Club will consider the following criteria in assessing state, regional and national carbon market programs:

- Adoption of a CO₂ baseline and declining cap schedule that substantially reduces emissions over its term, reflecting the best scientific understanding of the climate system and the most rapid possible reduction of emissions to achieve a 70% to 90% reduction by 2050.
- Guidance by the “polluter pays” principle, i.e., all carbon allowances should be auctioned, and trading should be limited to participants in the program to minimize market distortions.

- Inclusion of key program goals to support climate stability, environmental protection, and efficiency and equity among emitting sectors of the economy and energy consumers.
- Sensitivity to environmental and economic justice concerns, such as carbon market systems not causing higher concentrations of pollution in localized areas, particularly in low-income communities and communities of color.
- Funds raised through the auction of carbon allowances are used for public purposes such as energy efficiency, promotion of renewable energy, mitigation of electricity ratepayer impacts, needed infrastructure in impacted communities and job training opportunities in renewable energy generation for individuals working in the fossil- fuel energy generation industry.
- Program design giving priority to CO2 reductions within the trading system, including emitter reductions, end user efficiency improvements, and substitution of renewable resources. Offsets from outside the trading system are additional and limited in quantity, as well as verifiable, certified by independent review, and enforceable. Until more experience is gained and a global framework is established, offsets should not be obtained from biosequestration or from reductions of other greenhouse gases.
- Provision of substantial penalties for market abuses and compensation for damage to the environment and human rights caused within the trading system.
- Accountability to public bodies, transparency, and public involvement.
- Provisions for program modification or termination if performance is not adequate.

Adopted by the Sierra Club Board of Directors, June 21, 2007

Daye, Dr. Kathleen

Waterbury

Comments: Please add information showing the results and benefits where carbon pricing has already been implemented.

Desautels, Sylvie

Tunbridge

Comments: Dear folks at Resources for the Future,

Thank you for taking my comment. I strongly support the pricing of carbon as is done in many countries all over the world. Climate change is speeding along and the effects are devastating to our health, and the health of many species. Funds raise by pricing carbon should be funneled to conservation programs for individuals, towns, business....all Vermonters as well as developing a more rigorous electric based transit system and developing charging stations for electric vehicles.

Time is of essence. Meeting the stated goals of 90% by 2050 can only happen if we act now.

I look forward to your recommendations.

Doran, Michael

Vergennes

Comments: That all of us need to move to a carbon neutral future is obvious. It prompted this study. What the study has to find is a comprehensive spread of methods for doing this. That's because one method is not enough. Everything we can use to make our state carbon neutral should be available and supported. Renewable energy sources and energy conservation methods must be fully supported, no-holds-barred. Ultimately over time this should contribute to jobs and to the economy in general.

Thanks & good luck to you and to us all.

Duda, Walter

Poultney

Comments: I have now for the past decade suggested that we have not yet really begun to tap the green energy that's out there wisely. Solar is great, in its place and locations is wind. The greatest misuse of energy is relegated to the use of water. Dams are a bad solution affecting the wildlife, drainage, silting and the ever present fear of failure resulting in chaos and deaths.

Intelligent use and generation would consist of generating facilities located at bottoms of deep rivers, most large cities are located on the banks of these as a way to facilitate movement of goods. Generators placed under the water and firmly anchored to river beds would provide energy 24/7/365 with no impact to the source for lack of wind or sun.

Being that the flow is gravity generated and consistent in energy output as a result. Shorelines where boat and ship traffic is not prevalent would hold thousands of these units generating a steady reliable source of energy. As an added plus, there would be thousands of miles less of transmission lines affected by winds, ice storms and other adverse natural causes. Using hydraulics the depth could be regulated to adjust for flooding and any cause that would be detrimental to the supply. As the flow is constant as in the energy these could be located very closely together and staggered if necessary for max power output. I realize this would tend to be a common sense solution and not as prestigious as the Grand Coulee dam or other structures and would be strictly for the purpose of generating power rather than providing water to millions and agriculture. It would however produce the desired reduction in carbon, no nuclear contamination and absolutely no waste or harm to the wildlife or environment. If for some reason you feel this is not feasible, I would admire to know why, I'm always willing to learn. There is no power on the planet equals the force of water.

Dwinell, Jane

Burlington

Comments: I am unable to attend either public meeting next week, but I think that dealing with climate change should be the #1 priority of any local, state or federal government. Climate change will affect everyone, but will affect the poor and marginalized much more. We must take care of one another by

becoming carbon neutral. More money must go to renewable energy subsidies, home weatherization, public transportation, and protection of our farmlands, forests, and waterways. I am fortunate to live in a net zero home — I could afford to insulate, purchase energy efficient appliances and lighting, and install solar panels. My hope is this for everyone.

Epstein, Keith

South Burlington

Comments: The transportation sector is the most difficult part of Vermont's goal of getting to 90% renewable energy by 2050. It is largely powered by non-renewable fuel, and electrifying our existing vehicle miles with renewable energy will have immense natural resource impacts from the vast quantity of renewable energy equipment needed. To transition our transportation system to be powered by renewable energy, we must significantly reduce our vehicle miles traveled in addition to improving efficiency and changing the fuel source. There are many methods to reduce vehicle miles traveled, including public transit, bicycling, walking, carpooling, combining errands, and telecommuting.

There are programs that address these identified methods, but there is no program that directly addresses one of the largest contributors to vehicle miles traveled: distance from home to work.

We need to address vehicle miles traveled by helping people shift their jobs to be closer to home. This could take many forms, including people changing jobs, businesses moving locations, people moving to be closer to their jobs, people working remotely, etc. I think it is important to study the possible actions to help people shift to jobs closer to home.

Gonzalez, Diana

Representative, Chittenden 6-7

Comments: I'm sorry I wasn't able to attend last month's public hearings about the decarbonization methods study. If I had been there, I would have encouraged Resources for the Future to investigate [The Vermont Case for Carbon Dividends](#) – a bill ([H.531](#)) I sponsored last year.

Carbon pricing and the carbon dividends approach has been in the news quite a bit this week:

- The IPCC report highlighted the urgency of leaders at every level of government to act on climate;
- The Nobel Prize for economics was awarded to a leading carbon pricing scholar; and
- The idea was hotly debated in both the governor and Lt. governor debates.

All this while a category 4 hurricane slammed into Florida and Vermont broke records for some of the hottest days in recorded history. Despite what Donald Trump says, climate change is real and Vermont needs to act.

While there are other worthy policy options that deserve investigation and consideration, the reason that I am particularly interested in the carbon dividends approach is its ability to bring together distant ends of the political spectrum. As a Progressive Democrat from Winooski, I don't have a lot in common,

politically, with Republicans like James Baker and George Schultz. And their Conservative Case for Carbon Dividends is not what I would propose here. But when GOP luminaries like the two of them and a Bernie Sanders supporter like me can agree on the broad outlines of a plan to combat climate change – perhaps that’s a concept that deserves further investigation. And that’s what I hope you’ll do.

If I can be of assistance in your work, please let me know.

Grandt, Doug

Putney

Comments: My views on “A Carbon Tax” or “A Carbon Fee & Dividend” or “Put A Price On Carbon” have evolved since the year leading up to the House of Representatives Waxman-Markey and other proposed “Cap & Trade” bills. At that time, I was “in tune” with all efforts to pass cap and trade legislation, starting with “Step It Up” and 1Sky.org campaigns, including the first chapters of Citizens Climate Lobby. During that period, I was a new Air Pollution Engineer (2005-2012) employed at CalEPA Air Resources Board, working on regulations to eliminate old technology high particulate matter (2.5 micron and 10 micron PM) polluting diesel engines in buses and harbor craft, as well as AB-32 (California’s Global Warming Solutions Act of 2006). Having been employed at ExxonMobil (then Humble Oil & Refining) in 1970-1972 (my first full-time job), I book-ended my career regulating ExxonMobil, as well as Chevron, ConocoPhillips, Tesoro, Valero, Shell and the rest of the one-dozen refineries—and oil fields—in California. I retired on the first day of Spring, 2012 and became a full-time energy and climate activist and policy lobbyist. Over the years, my perspective has evolved as I have observed and researched the many aspects of the challenges and conundrums of a just transition from the fossil fuel economy to a carbon-free economy. Having supported a Cap & Trade plan in the beginning, I became aware of the benefits of a Carbon Cap & Dividend concept from Peter Barnes in 2007—which evolved to be Carbon Fee & Dividend—including returning 100% of the revenues to households to compensate for the generally inflationary effects of a rising price on carbon. Over time, it occurred to me that there may not be dividend, because the deep thinkers neglected to consider the “final expenses” and “market panic” aspects of shutting down refineries and cleaning up the infrastructure as we abandon our reliance on burning carbon-based fuels. While interviewing California refinery management, government affairs and engineering staff as part of my efforts to regulate the industry, I learned that the physical constraints of the distillation towers and other elements of the continuous flow process disallow operating at lower and lower throughput volumes, and that those facilities reach an abrupt failure point at a relatively high percentage of maximum capacity. The end result of winding down the industry is a series of discreet closures on the order of one refinery per week over a 15-20 year period as renewables replace liquid fossil fuels. The finances of operating a business for profit face the reality of what Boards of Directors and CEOs and CFOs and COOs will encounter in the face of waning profits, reduced earnings and dividends per share, share value decline, debt default, insolvency and bankruptcy. Their Fiduciary Duty to investors in the endgame of the industry will necessarily conflict with what Congress and the Executive Branch require in the “Public Interest” and “National Interest.” Faced with unacknowledged “final expenses” from shutting down the industry, it seems to me, we need to drill down into the devil and the details of the fall-out from any plan to assess pollution taxes or fees aimed at quickly

transitioning away from gas and liquid fossil fuels. “Who will pay the final expenses?” and “Who will pay the piper?” must be addressed. My testimony before the Governor’s Vermont Climate Action Commission (VCAC) were my first attempt to bring attention to these conundrums, but since those 2017 hearings, I have also moved on to a new way of thinking, which I would also like to share with you. I believe now that we must demand the Oil & Gas industry to give us a realistic “endgame” plan for the responsible winding down of their respective companies as well as the interaction of all companies as feedstock is reallocated amongst the refineries that remain as they are shut down one-by-one at a rate of approximately one per week. Only the CEOs, COOs and CFOs of the collective production and refining operations can assess the scenarios that impact the economy and social wellbeing of the nation and of the world.

I have called upon the Senate Energy and Natural Resources Committee to put together a truly non-partisan energy bill that I refer to optimistically as W.E.C.A.R.E. for World Energy Crisis Aversion & Readiness Endgame. Such a bill would take into consideration all the aspects that I have testified to here in Vermont. Attached are four PDFs of my testimony and supplements, including an email that I have sent to a for-the-moment-undisclosed member of Congress’s energy staff, which contain all my thoughts, for your consideration.

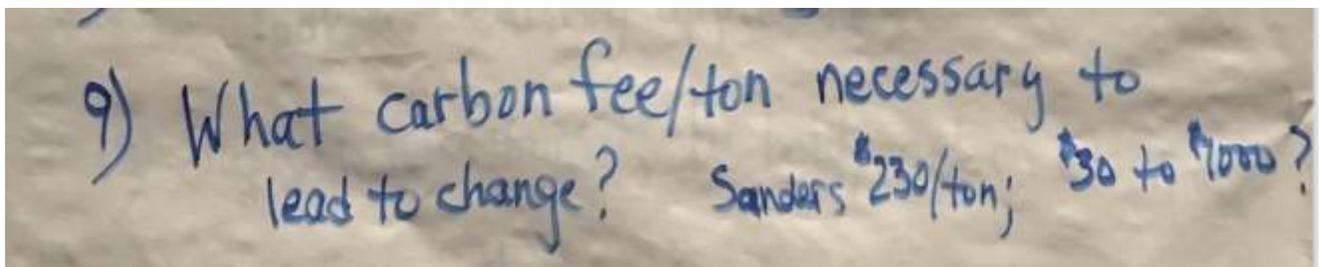
BOTTOM LINE: I believe Vermont needs to institute a three-pronged program:

- Declining cap on carbon-based fuels
- Limit imports into VT & sales in VT
- Multi-level revenue-neutral carbon price
 - by fuel type: diesel, gasoline, gas, coal
 - by sector: freight, passenger, industry
- Carbon drawdown aka CDR & DAC
 - DCR — Carbon Dioxide Removal
 - DAC — Direct Air Capture

Thank you for your objective and comprehensive efforts in tis urgent and challenging matter.

Follow-up: I am just now looking at the photos I took of the list on the flip chart and would like to clarify what I said and what was recorded; to add the the resource I may or may not have mentioned.

Unfortunately, the format and time constraints of the forum did not allow for my complete message to be expressed as I had intended as I prepared myself throughout the day. The concise and rushed statement was captured in even more abbreviated soundbite, no fault of your own (you got the essence) but there is more to it which I had hoped to convey to the RFF folks as well as to JFO whois responsible for their assessment:



Item 9 simply indicates Sanders staff send me a paper suggesting \$230/tCO₂ just as I mentioned, with a \$30 - \$1000 range without the detailed explanation. I had hoped to convey the entire context is that Senator Sanders' Energy and Natural Resources Policy Advisor Katie Thomas' mentioning \$230/tCO₂ as being recently published is explained in what I later found to be a People's Policy Project report titled "A Progressive Case for a Carbon Dividend - Disrupting the Dirty Economy" ([Bit.ly/PePoProSep18](https://bit.ly/PePoProSep18)) which concludes that \$230/tCO₂ is the effective level for a carbon price.

THIS **COULD BE** AN EFFECTIVE PRICE ON CARBON, BUT NOBODY KNOWS FOR SURE. My ending question was, I wondered if RFF has determined—or intends to determine—what price level would be effective for gasoline, diesel and propane.

I am not convinced that a single value—even \$230/tCO₂—will be effective across all fuel types (gasoline, diesel, kerosene, propane, heating oil, natural gas, etc.) and all sectors (passenger vehicles (ICE), light duty trucks (pick-ups and bob-tails), long-haul freight trucks (big rigs), rail (locomotives), aircraft (jets and ICE), heating (homes and buildings), etc. but \$230/tCO₂ is an order of magnitude greater than the conventional wisdom that the \$37/tCO₂ Social Cost of Carbon (SCC) which is a merely a calculated benchmark derived from averaging several scenarios and “discount factors” (which is a business tool intended only to adjust for future economic inflation and not risk of extinction). \$37/tCO₂ is a contrived and imaginary number. There is no objective correlation between SCC and an effective price signal to change travel behavior or capital investment decisions.

Hence, Vermont does indeed need to be bold and question the "conventional wisdom."

During the presentation, it was stated that carbon capture is “prohibitively” expensive, which made me bristle because that is an ‘a priori’ judgement that has no basis given the extraordinary breakthroughs that are now taking place, let alone the urgency to reduce atmospheric and oceanic concentrations of CO₂.

Who decided “prohibitively” and how?

I did not want to interrupt the presentation, but do want to inform RFF that many entrepreneurs, engineers, scientists, economist and eco-warriors are engaged on a few GoogleGroups (one of which involves a weekly international conference call among the principals) in the evaluation of a) making calcium carbonate aggregate, b) farmed oceanic algae and c) regenerative soil practices, making them commercially attractive in order to a) substitute for building materials of all sorts, b) restore the oceanic food chain, and c) replace carbon-based chemical fertilizers. There are demonstration projects in actual operation in Europe, Australia, North America and in the oceans around the globe.

Coincidentally, when Katie Thomas mentioned the \$230/tCO₂ as being an effective level for incentivizing alternatives to gasoline and diesel, what came to my mind was \$232/tCO₂ that is the upper range of the current cost to remove CO₂ from the atmosphere.

\$94-\$232/tCO₂ is a definitive range that sets a realistic starting point for a carbon fee, as we must begin to drawdown 50-100 gigatons of CO₂ per year for a couple of decades in order to restore a healthy climate at ~300ppm CO₂ atmosphere.

Establishing a goal like that, or even 2.0°C or 1.5°C is necessary before deciding on a fee and time frame. A 300ppm CO₂ concentration will be the biggest challenge in terms of urgently short time frame and aggressively high price per ton of CO₂.

The following is a resource that RFF may want to use in its analysis and recommendations.

Joule publication titled "A Process for Capturing CO₂ from the Atmosphere" ([Bit.ly/Joule15Aug18](https://bit.ly/Joule15Aug18)) which concludes that \$94-\$232/tCO₂ is the range of cost to remove CO₂ from the atmosphere by Direct Air Capture.

In addition, University of Houston authored an article in Forbes titled "Negative Emissions Technologies: Has Their Time Arrived?" ([Bit.ly/Forbes14Sep18](https://bit.ly/Forbes14Sep18)), and the paper is published in Joule at [Bit.ly/Cell15Aug18](https://bit.ly/Cell15Aug18).

This work jives with my standby article about Carbon Lockout which shows on logarithmic scale the effective price ranges for different fuel types and sectors (Figure 1 at [Bit.ly/IOP25Aug15](https://bit.ly/IOP25Aug15)):

Bottom line, in closing, is that to be an effective climate leader, Vermont should:

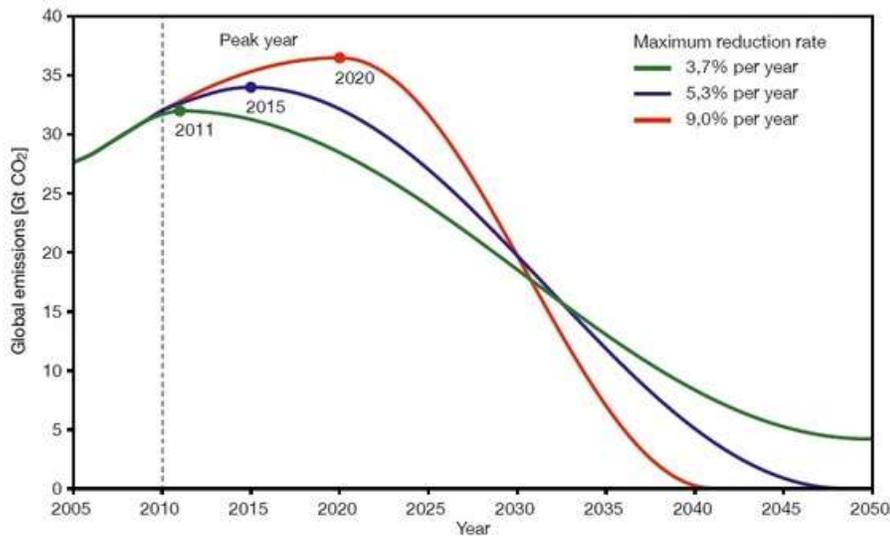
- 1) Limit the imports of all fuels into the state; a cap that declines 6%-9% per year.
- 2) Collect a tax tailored to truly impact each fuel-type in each sector of the state.
- 3) Rebate some of the revenues on a per capita basis, biased mostly to lower incomes.
- 4) Ensure that there are **affordable** and **easily available alternatives** to fossil fuels.
- 5) Use some of the revenues to subsidize and encourage home insulation upgrades
- 6) Use some of the revenues to subsidize and encourage replacing propane furnaces.
- 7) Use some of the revenues to create a statewide network of EV charging stations.
- 8) Use some of the revenues to promote Carbon Dioxide Removal projects in Vermont.

There will be some sectors and circumstances within sectors that will preclude transitioning from fossil fuels (e.g., rural buses on long routes where recharging a battery is just not possible, or heavy road building and maintenance equipment, or some industrial processes) so those need to be taken into account, and drawdown projects paid for specifically to offset the CO₂ emissions that cannot be avoided.

Suggest you take a look at [Nori.com](https://nori.com) if you have not already done so.

P.S. Be sure to understand and communicate clearly the end-goal and time frame, e.g.:

Figure 1 from the German Advisory Council on Global Change ([Bit.ly/WBGU-2009](https://bit.ly/WBGU-2009))



Hedden, Bob

Vermont Fuel Dealers Association [Efficient Home Heating Consultant and Trainer Technical Instructor]

Comments: I think a Vermont carbon tax is a terrible idea that will hurt the Vermont economy and will not save any energy. It is a manipulative regressive tax aimed at forcing us to use more Canadian electricity. Every study I have seen ranks Vermont in the top 5 most environmentally friendly States in the Union. Vermont has the lowest greenhouse gas emissions. We are making great progress already, why do we need another tax?

According to the Vermont Agency of Natural Resources thanks to improved technology the GHG emissions from heating oil and propane have dropped by 11% from 2000 to 2015. In 1980 the average Vermont oil customer used over 1,500 gallons of oil a year. Today they use less than 750 gallons, and 5% of that fuel is renewable biodiesel. By 2040 over 50% of heating oil consumed in the US will be at least 50% renewable biodiesel fuel.

Approximately half of the gasoline and diesel fuel sold in Vermont is sold to cars and trucks from out of state. If Vermont fuel prices dramatically increase relative to the surrounding states and Quebec all those vehicles will fill up elsewhere. A Vermont carbon tax will put all Vermont motor fuel stations within 20 miles of the border out of business. Vermonters living near the border will have to drive further to other states for motor fuels. So, the unintended consequence of a Vermont carbon tax will be to cut the Vermont road tax income in half, and increase the actual motor fuel consumption.

Currently there is no real alternative to the way Vermonters heat their buildings and power their vehicles that would result in lower GHG emissions. Slapping a punitive tax on us in the hope that it will inspire new technological innovations and investments in new energy infrastructure is ridiculous.

Encouraging Vermonters to continue to increase energy efficiency will save Vermonters money and reduce energy consumption. Encouraging rather than punishing seems to me to be a much better approach to the problem.

Hemenway, Augustus

Guilford, Vermont

Comments: It is time to stop delaying action on climate change. By not addressing global warming, the Republican party is basically willing to kill us.

Think about it. If we do not act in the next two years it will be too late. Since the Administration is unwilling to act, it is up to the states to accept responsibility. Myself, I do not wish the planet to die in twenty years. Is digging oil and coal so important to our economy that we are willing to die so that the rich can become richer?

I don't think so. We need to act now. There are many opportunities ahead. Abandoning the railroads in the 1900s did not destroy the economy. We simply changed. Alternatives are opportunities; Doing nothing is disaster. Let's go!

Hughes, Tom

Energy Independent Vermont

Comments: Wes, It was good meeting you last week in Vermont. I hope you had a good visit and gained some useful insight that you can use in your study. I wanted to follow-up on a point that came up in your events and share some resources...

First, you asked about the fourth model to examine. In addition to the three identified, could you evaluate more than just a fourth? Vermont legislators will be best served by a full suite of options in addition to the two cap-and-trade scenarios and the fee-and-rebate model already identified. Good additional candidates for study include: the [Vermont Case for Carbon Dividends](#) (which should be relatively easy given the previous work RFF has on the Conservative Case for Carbon Dividends), the Income Tax Reform/EITC Increase ([H.528](#)) and the Sales Tax Elimination ([H.533](#)) proposals from 2017, along with ([H.412](#)) from 2015 which provided a reduction in the sales tax, tax credits for businesses, and a 10% investment in the Clean Energy Development Fund (and was largely based on a [REMI](#) analysis in 2014). And, don't limit your report to just the above options. You're one of the premier academic research firms in the world and you're about to do a deep dive into the Vermont context. Given your expertise and the academic firepower at your disposal, what policy approach do you think would be best for the Vermont economy, for low- and middle-income Vermonters, and for the environment? If there is a better path forward, Vermont legislators will want to know about it.

Second, here are some resources that might be helpful – or at least deserve consideration – in your analysis. If nothing else, they'll provide further insight as you craft your report to reflect the Vermont context.

Vermont's Climate Goals:

- [Statute](#): 10 V.S.A. § 578 and [Authorizing Legislation](#): S.259 of 2005-2006 biennium

- [2016 Vermont Comprehensive Energy Plan](#). Vermont Department of Public Service. January 2016.
- Gov. Scott [announcement](#) joining the [U.S. Climate Alliance](#). June 2017.
- [H.R. 15](#) and [S.R. 10](#) of 2017
- Burlington, VT [Climate Action Plan](#)
- [Net Zero Montpelier](#)

VT Climate Emissions:

- [Vermont Greenhouse Gas Emissions Inventories](#). Vermont Department of Environmental Conservation, Air Quality & Climate Division. (data attached)

Fossil Fuel Consumption & Energy Expenditures in Vermont:

- Initial FY18 Estimate of Revenue Yield Associated with Proposed Carbon Pricing Plans. Kavet, Rockler & Associates, LLC memorandum to Steve Klein, Legislative Joint Fiscal Office. February 2017. (attached)
- VT Carbon Tax Revenues 11-27-15. Vermont Fuel Dealers Association estimates. (attached)
- Transportation fuel sales by month. [Federal Highway Administration](#).
- [Vermont Tourism Economic Impact Studies](#). Vermont Tourism Research Center. NOTE: Visitors to Vermont spend more than \$230 million on gasoline for vehicles, utilities and fuel for second homes – approximately 10-15% of total sales – a significant percentage. Revenues from these sales to non-Vermonters would be recycled to Vermonters in most tax reform or rebate models, and should be included in your calculations.
- [National Highway Transportation Survey: Data Extraction Tool](#). U.S. Department of Transportation. 2009. Note: Reports VMT and other relevant data for Vermont households by Household Income and Rural/Urban classification. (Urban/Rural [definition](#)).
- Average Price of Electricity to Ultimate Customers by End-Use Sector. U.S. Energy Information Administration. [Electric Power Monthly](#)
- U.S. Energy Information Administration. [Detailed State Data](#).

Energy Burdens in Vermont

- [Mapping Total Energy Burden: Geographic Patterns in Vermonters' Thermal, Electric, and Transportation Energy Use](#). Vermont Energy Investment Corp. July 2016. NOTE: Supporting data set available from VEIC.
- [Energy Costs and Burdens in Vermont: Burdensome for Whom?](#) The Energy Security and Justice Program of Vermont Law School's Institute for Energy and the Environment. December 2014.

Air Pollution Health Threats and Co-Benefits of Carbon Pricing:

- [Analysis of the Public Health Impacts of the Regional Greenhouse Gas Initiative, 2009–2014](#). Abt Associates. January 2017.
- [Air Quality and Health Co-Benefits of a Carbon Fee-and-Rebate Bill in Massachusetts](#). Harvard T.H. Chan School of Public Health. April 2017.
- [Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005](#). MIT Laboratory for Aviation and the Environment. 2013.

Carbon Pricing Research & Reports:

- [The Economic, Fiscal, Emissions, and Demographic Implications from a Carbon Price Policy in Vermont](#). Regional Economic Models, Inc. (REMI). November 2014.
- [Total Energy Study: Final Report on a Total Energy Approach to Meeting the State's Greenhouse Gas and Renewable Energy Goals](#). Vermont Department of Public Service. December 2014.

Previous Vermont-specific Carbon Pricing Papers:

- [The ESSEX Plan](#). 2017.
- [The Vermont Case for Carbon Dividends](#). 2017.
- [Put a Price on It: 27 Reasons Vermont Should Price Carbon Pollution](#). Energy Independent Vermont. 2017.
- [Carbon Pollution Taxes: A short Vermont Primer](#). Janet Milne, Vermont Law School. 2016.
- [A Green Tax Shift: Tax Bads Not Goods](#). Vermont Green Tax and Common Assets Project. 2009.
- [Taxing Pollution](#). The Vermont Fair Tax Coalition, Rebecca Ramos & Deb Brighton. Winter 2000.

Criticisms of Carbon Pricing that should be addressed:

- [The ESSEX Carbon Tax Profiles](#). David Flemming for the Ethan Allen Institute. 2018.
- [The ESSEX Carbon Tax Plan for Vermont: An Economic Analysis](#). Jonathan Lesser for the Ethan Allen Institute. 2018.

Additional Climate & Clean Energy Reports:

- [Getting to 90% Renewable by 2050](#). Energy Action Network. Annual report 2017.
- [Vermont Climate Action Commission Report to the Governor](#). July 2018.

Important/Existing Companion Policies:

- [Efficiency Vermont](#)
- [Regional Greenhouse Gas Initiative](#)
- [Renewable Energy Standard](#): requires utilities to source an increasing percentage of their electricity from renewable sources AND requires utilities to assist customers in transitioning off of FFs
- Solar [Net Metering](#) and [Standard Offer](#) programs
- [Green Mountain Power's](#) Energy Assistance Program in collaboration with the Department of Children and Families. Important to the ESSEX Plan because this existing administrative mechanism would be expanded to all electric utilities and utilized for the distribution of low-income and rural rebates.
- [Petroleum Cleanup Fund](#). Department of Environmental Conservation.

Clean Energy Industry in Vermont:

- [Vermont Clean Energy Industry Report 2018](#). Vermont Department of Public Service.

Thanks again for your work. If I can be of assistance, please let me know.

Kleppner, Bram

Danforth Pewter (CEO)

Comments: As we think about how we minimize global warming, and the many major destructive effects of global warming on our security, prosperity, and health, there are a few things we can do at the Vermont level right now.

First and foremost is to plan an orderly and rapid transition to zero fossil fuel use.

I strongly believe pricing carbon is an important and effective first step. We ask everyone in the community to pay to dispose of solid waste, and of liquid waste. Why do we let everyone dump

pollution into our air for free? Pricing carbon simply fixes a flaw in the market and allows the market to function effectively.

In Vermont, we need to do everything we can to make the transition as painless as possible for low-income Vermonters and rural Vermonters. I would also add that we need an active program to help every Vermont business in the fossil fuel industry, from the smallest gas station and the individual with one truck delivering home heating oil to Vermont Gas, transition to being a clean energy company.

From what I've seen, the ESSEX plan is the most thorough approach to achieving these goals, which is why I worked on it and why it bears my name. Every day that goes by, our weather gets more violent. The time to act decisively is now.

Please feel free to contact me any time if you have any questions or need any further information.

Lafayette, Karen

Vermont Low Income Advocacy Council

Comments: The Vermont Low Income Advocacy Council (VLIAC) is a statewide independent Board of individuals representing the interest of low-income Vermonters in matters of budgetary and policy issues before the Vermont State Legislature. We work closely with the Community Action Agencies and other advocates in the State.

VLIAC is committed to advancing those programs and policies that promote economic security and human rights for all Vermonters.

Through the Council's advocacy, VLIAC has been giving a voice to the poor, the elderly, those living with disabilities, and low-income working families in the policy making arena of state government.

"The Vermont Low Income Advocacy Council is committed to cleaner, more efficient, and more affordable energy future and continues to participate in the discussions on how to achieve these goals, enhance economic opportunities, and mitigate the burden on low income families - so that all Vermonters can benefit from a brighter energy future. "

VLIAC Priorities 2017

Weatherization

VLIAC has long supported the efforts of the Community Action Agencies and NETO's Vermont Low Income Weatherization Program efforts in this State.

Vermont is a State that has had a gross receipts fuel tax in place to fund LI WX efforts for over 25 years and a few years ago moved to cents per gallon on fossil fuel to support and expand this program as well. We set efficiency goals to weatherize 80,000 homes in the State, 20,000 of those are low income by 2020 which is fast approaching, but most likely out of reach.

Climate Change and Carbon Pollution

We believe that climate change is a major threat to individuals and families that are poor and low income because these Vermonters are often the most impacted by climate change, fossil fuel emissions, and energy burdens.

Vermonters with low incomes suffer the greatest consequences from violent climate events and volatile weather. They live in the most risk prone locations; they live in the most vulnerable structures; they face the greatest financial burden from our carbon-based economy.

Low Income Vermonters often drive inefficient vehicles a long way to their places of work because they live far away from their jobs where the housing is more affordable. They spend a large percentage of their income on fuel for their homes and transportation.

They are the most negatively impacted by the health risks from transportation carbon emissions and have the least access to Affordable Health Care.

Low income Vermonters are no different than most Vermonters – they want to make their homes more comfortable and save money on heating bills by weatherizing; they'd like to drive more efficient vehicles to work and live closer to their jobs. They too want to participate in a brighter energy future.

Putting a price on carbon pollution has proven to be effective at reducing greenhouse gas emissions and putting a price on carbon pollution appears to be part of the solution to help speed Vermont's transition to the clean energy future.

So how do we get there - and not overburden the most vulnerable Vermonters?

Collaboration

VLIAC has spent the last couple of years working with the Legislature, Advocates and Vermonters that are interested in our environment and energy future, reducing carbon emissions, and how we mitigate the energy burden for low income folks and prioritize low- and moderate-income concerns as we transition to the clean energy future.

From the start VLIAC has had a seat at the table - we have participated in numerous educational and outreach efforts with legislative groups, advocate groups, colleges, forums, events and other opportunities

The de-carbonization proposals that have been introduced so far have included substantial set-asides for low-income Vermonters, and benefits intended to reach all Vermonters – including working families, low-income Vermonters and those living on fixed incomes in both the revenue neutral plans and those that direct revenues to certain investments and benefits.

Any carbon pricing plan should be a Vermont based plan – One that provides a stronger economy, one that protects low-and middle-income Vermonters and gives them real opportunities to make energy efficient choices, one that reduces carbon emissions and pollution.

We have brought forth set of questions that we have suggested need to be researched and analyzed in considering any legislation/plan to reduce carbon emissions and protect low- and moderate-income Vermont consumers.

Plan should be as sophisticated as reasonably possible to address specific household needs and consumption and what the additional burden would be from increasing prices on carbon. Where do people live, how many miles do they drive to work, what does it cost to heat their homes.

In addition to the ESSEX plan that takes into consideration Vermont's unique mix of circumstances and would provide Vermonters the cleanest electricity at the lowest rates - take a look at some of the earlier proposals that put a price on carbon and use some of the new revenues to provide additional rebates

and benefits to low- and moderate- income folks; more weatherization services, a reduction in sales taxes, possible investments in public transportation, fuel efficient cars, or switching out fuel sources.

Questions:

A. What do you think are two or three things that a study of policies to reduce climate emissions in Vermont ought to take into consideration in order to be helpful in answering your questions and in advancing the climate and energy policy dialogue in Vermont?

Carbon Pricing

- Mitigate increased burden for low income Vermonters
- Opportunities for job creation and a stronger economy
- Investments (weatherization, public transportation, fuel efficient cars)
- Benefits (Rebates, reduction in other tax/energy liabilities)
- Pollution reduction – Health Outcomes

B. Considering the four policy approaches listed above, which of the approaches do you think RFF ought to focus on?

- Should consider the ESSEX Plan - Consider others
- Non-Revenue Neutral plans
- Earlier plans (H.412)
- Tax Reform proposals – Dividends/ Expand EITC

C. What elements of framing would be important for RFF and JFO to consider in its analysis and report, and what metrics or analytical outputs do you think would be important to include in this study?

- Graduated Benefit based on income levels below 400% of Poverty
- Outreach effort in communities to many more stakeholders
- Recognize the different economic regions of Vermont
- Scenarios that show effect on different households based on consumption of transportation fuel and heating fuels
- Delivery of benefit to low-income Vermonters

Levine, Sandy

Conservation Law Foundation (Senior Attorney)

Comments: Conservation Law Foundation (CLF) offers the following comments on the Vermont Decarbonization Study that the Joint Fiscal Office (JFO) is undertaking along with Resources for the Future (RFF).

Conservation Law Foundation (CLF) is a nonprofit, member-supported advocacy organization founded in 1966. Based in Boston, and with offices in Maine, Vermont, New Hampshire, and Rhode Island, CLF's mission is to advocate on behalf of the region's environment and communities with an emphasis on

several major areas: clean energy and climate change, clean water, ocean conservation, healthy communities and environmental justice, and community resilience.

Which policy approaches do you think it would be best for JFO and RFF to prioritize for this analysis, and why?

CLF recommends that in addition to the three identified policy approaches, an evaluation of a Vermont specific carbon dividend be evaluated. This would be similar to work that RFF has done on the national scale and would be helpful for Vermont.

It would also be helpful to evaluate a policy that includes a) eliminating the sales tax and b) income tax reform / EITC increase along with c) the H.412 proposal from 2015 that provided for a sales tax reduction, tax credits for business, and a 10% investment in clean energy.

What analytical angles do you think would be important for JFO and RFF to consider in this analysis and report, and what metrics or analytical outputs do you think would be important to include?

CLF recommends that the study be framed around the benefits of carbon pricing (increasing GDP, growing jobs, attracting business, meeting state goals). Specifically it would be helpful to analyze the policies in terms of their economic development and poverty mitigation potential as well as the climate benefits.

Specific questions to answer should include:

- a. What are the impacts on Vermonters with low incomes?
- b. What are the impacts on rural Vermonters?
- c. How will this affect Vermonters who live within a short drive of a border or have business near a border?

It would also be helpful to learn the co-benefits of carbon pricing, such as reduced air pollution and increased active transport leading to better health and lower health care costs for Vermonters.

What do you think are two or three things that a study of policies to reduce climate emissions in Vermont ought to take into consideration in order to be helpful in answering your questions and in advancing the climate and energy policy dialogue in Vermont?

It is important that the study provide useful information to legislators and include legislators in the design of the study.

CLF recommends that RFF hold webinars or other information sessions for legislators to solicit further input from those who did not participate in either the smaller group meetings or the public forums.

The study should provide a very clear Vermont focus. National level analysis is informative, but may not apply to Vermont. CLF recommends that RFF include analysis of Vermont specific case studies to accompany any macro analysis. This should include outreach to important stakeholders for their input, including:

- Vermont Utilities
- Major Industry & Trade Groups
- Vermont Colleges and University
- Vermont Health Care Institutions

- Vermont Insurance Companies
- Large and Iconic Vermont Brands
- Government Institutions
- Advocacy Organizations

What relevant research, policy issues, and political circumstances should RFF take into consideration when executing this project?

For more on CLF's carbon pricing positions see: <https://www.clf.org/making-an-impact/carbon-pricing/>

McBride, Maeve

350Vermont (Director)

Comments: Dear Mark and Wesley, We appreciate the opportunity to share our input on the study that Resources for the Future (RFF) is conducting, as mandated by Vermont's Act 11 of 2018. We believe that public participation is a vital and necessary step to producing a study that will reflect the unique character, culture, and economy that is Vermont. No doubt, you've heard from some of our grassroots activists at your public forums this week, as 350VT's network is over 6000 people strong; however, our leadership team has crafted a more formal response. You requested responses to the following questions:

- 1. What do you think are two or three things that a study of policies to reduce greenhouse gas emissions in Vermont ought to take into consideration, in order to be helpful in answering your questions and in advancing the climate and energy policy dialogue in Vermont?*
- 2. Starting by considering the policy approaches listed above, which approaches do you think RFF ought to focus on?*

On Question #1, we strongly urge you to consider **economic justice**. Any carbon pricing scheme developed for Vermont should work to relieve the existing regressive fossil fuel cost burdens on low-income Vermonters. We want to see carbon pricing that simultaneously reduces emissions and reduces the enormous gaps in income, wages, and wealth in this state. Proceeds from a carbon fee should be equitably reimbursed to citizens, as has been proposed, and also made available, in part, to support the adoption of energy-saving technologies by those who otherwise cannot afford them. Second, your study should detail and aim to **quantify the expected behavior changes** with a carbon fee-and-rebate. Will this policy result in deep conservation and reductions in fuel and power use? Will reductions in electricity price promote flagrant use of electric power? How quickly will the electrification of the transportation, heating, commercial sectors happen if we don't have revenue generated to cover the up-front costs of implementation? Third, our supporters will not accept false policy solutions that shift the burden of our energy use onto other communities. Your study should **consider impacts to frontline communities** and account for all costs to the environment and human health. Finally, our hope is that your good work will not only help "*in advancing the climate and energy policy dialogue,*" but in advancing action and implementation.

On Question #2, we feel strongly that RFF should **focus on the carbon fee-and-rebate plan**. Although the ESSEX plan is not perfect, it is a far better direction than a cap-and-trade program, which many believe is a failed market-based experiment. Isaac Osuoka, the joint coordinator of the Gulf of Guinea Citizens Network, states that “carbon trading reflects one of the worst forms of neoliberal fanaticism and attempts at re-legitimizing corporate rule experienced in the past decades.” We believe the ESSEX plan could be improved by including methane emissions and creating a revenue stream for efficiency programs and decentralized renewable energy infrastructure. 350Vermont would support a carbon pricing policy that:

1. Achieves the maximum possible reductions in greenhouse gas emissions, now and into the future;
2. Protects human health, wildlife, and the health of sensitive ecosystems;
3. Stabilizes costs to consumers without compromising our environmental goals, and distribute energy costs as equitably as possible;
4. Incorporates principles of human rights and climate justice.

Finally, let’s be clear: Policy option #4, “A carbon pricing policy based on further research and input from stakeholders” is not, in fact, a policy option at all, but a mechanism to further delay. We have no time to waste. A smart and equitable carbon pricing policy is long overdue. Again, thank you for this opportunity to voice our opinions and concerns. May you take our words and others words to heart and to mind as you complete this important work for Vermont.

McCloughry, John

Ethan Allen Institute

Comments: Ethan Allen Institute comments on RFF Decarbonization Study 10/9/18

Vermont’s Act 168 of 2006 establishes a goal of “reduc(ing) the emissions of greenhouse gases from within the geographical boundaries of the state and those emissions outside the boundaries of the state that are caused by the use of energy in Vermont in order to make an appropriate contribution to reaching the regional goals of reducing emissions of greenhouse gases from the 1990 baseline by...(2) 50% by January 1, 2028 , and (3) if practicable using reasonable efforts, 75% by January 1, 2050.” (10 VSA 578(a)).

We don’t doubt but what a sufficiently burdensome fossil fuel tax could reduce Vermont emissions to the statutorily defined levels, albeit with severe disruptive consequences. How the Vermont tax could affect emissions outside the state seems problematic, beyond prohibiting the importation of any emission-causing fuel, or energy produced by emission-causing fuel, into the state.

We thus will look to the RFF study to establish the level of fossil fuel taxation that will achieve the statutory goal of GHG reduction, and the likely economic consequences. For example, Vermont’s GHG emissions could be reduced by requiring all manufacturing plants in the state to certify that 100% of their energy comes from renewable sources. How many plants, employing how many workers and paying how much in other Vermont taxes, would close or choose to relocate, rather than shoulder the economic burden of using only higher-priced, intermittent renewables? And how would such a tax spur

economic development and innovation in the state, other than among businesses installing renewable energy systems?

With respect to the ESSEX Plan, the latest offering from environmental advocates concerned about climate change, we published an analysis by Jonathan Lesser PhD, formerly Director of Planning at the Vermont Department of Public Service. (*The ESSEX Carbon Tax Plan, 2018*) that addressed the economic effects of taxing fossil fuels (not including electricity, covered by RGGI). Dr. Lesser's summary:

The ESSEX Plan: Symbolic Environmentalism That Will Impose Economic Harm on Vermonters

by Jonathan A. Lesser, PhD

I was asked by Vermont's Ethan Allen Institute to prepare an economic analysis of The ESSEX Plan, the most recent carbon tax proposal for Vermont. I'm quite familiar with Vermont, having lived there for 14 years and because I served as Director of Planning at the Vermont Department of Public Service during Gov. Douglas's administration.

The ESSEX Plan proposes, when fully implemented over eight years, to impose a carbon tax on heating oil, gasoline, diesel, natural gas and propane sufficient to bring in \$240 million a year. According to the Plan, the state would use those dollars to subsidize electricity rates and give rebates to what it calls "working families" and "rural residents."

My economic analysis of the proposal yielded these conclusions:

1. The Plan will provide an economic incentive for Vermonters to avoid paying the tax by purchasing fossil fuels from outside the state; the higher the carbon tax, the greater will be that incentive. Preventing such behavior will either be impossible or administratively costly. Such "free-riding" behavior will also inequitably transfer monies from Vermonters who do pay the tax to those who do not.
2. The Plan will reduce Vermont's economic competitiveness by increasing the cost to produce goods and services, including Vermont's famous maple syrup.
3. Many Vermonters will be unable to afford the capital investments necessary to reduce their carbon tax payments.
4. Electric rates will increase under the Plan, not decrease. Rebates on current electricity rates will not compensate for the Plan's call for increased reliance on high-cost, locally-sourced renewable biofuels and solar power.
5. The Plan will cause the cost of biofuels to increase because the demand for biofuels will increase as a consequence of the tax, harming lower-income Vermonters who rely on wood to heat their homes.
6. The Plan's call for developing more residential and commercial solar power using "net-metering" will benefit higher-income Vermonters at the expense of lower-income ones, who will bear increasing shares of the costs of back-up generation and the fixed costs associated with operating
7. local utility infrastructure. Increased reliance on solar power will also mean having to pay the costs for more back-up generation and storage, which will cause electric rates to increase further.
8. The Plan is likely to adversely affect funding to maintain Vermont's aging transportation infrastructure, which is already underfunded. To compensate, the state will likely have to increase taxes on motor fuel, levy a tax on miles driven, or raise the state's income tax. Alternatively, revenues raised

by the carbon tax would have to be diverted from the proposed electric rebates, contrary to the Plan's promise of revenue neutrality.

9. The Plan will be complex and costly to administer. Retailers will have no way of distinguishing the sales to residential, commercial, and industrial customers, and the Plan is silent on how the amount of money to be rebated to electric ratepayers will be determined. Administering the Plan will require providing the state's electric utilities with Vermonters' confidential taxpayer information. Connecticut estimated a similar carbon tax program would have a five percent administrative burden, meaning that the administrative costs could total \$12 million per year.

10. The Plan may increase local air pollution as more Vermonters switch to wood-burning to avoid burning natural gas and fuel oil.

11. The Plan's rationale, reducing carbon emissions, will provide no climate benefits whatsoever because the predicted reductions in carbon emissions will have no measurable impact on climate. Nor will the Plan encourage other states or nations to enact their own carbon tax measures.

As a onetime Vermonter who was deeply involved in the state's energy planning, I conclude that the ESSEX Plan is premised on vague and incorrect economic assumptions. Enacting it will damage Vermont's economy, place an undue and unfair burden on lower-income Vermonters, and encourage more people to leave Vermont in search of better economic opportunity.

– Jonathan A. Lesser is President of Continental Economics. He is a former Policy Director for the Vermont Department of Public Service.

We would expect that your report would directly address these questions posed in this report for both the ESSEX plan and for the other varieties described in your "pricing approaches" section:

Emission reductions?

Lower electricity costs (subsidized by carbon tax revenues)?

Job creation (and destruction)?

"Buy local" benefits?

Transborder effects?

Economic burdens on businesses, working people and lower income families?

Transportation infrastructure financing and maintenance?

Projected effect on 21st century planetary warming?

We expect the RFF report to address the same questions insofar as they apply to "regulatory approaches" (WCI and TCI).

We are especially interested in the "Social Cost of Carbon" figure that RFF may use in its analyses. We believe such a calculation must include the benefits of increased atmospheric CO₂ concentration as well as possible harms (i.e., their contribution to adverse climate change). We trust that RFF will not merely assume ill effects from increasing global temperatures believed to be caused by anthropogenic atmospheric CO₂ levels, without accounting for offsetting benefits, such as longer growing seasons, increased plant production and reduced heating bills and highway maintenance costs.

McCormack, Curt

Representative Chittenden 6-3, and; On behalf of Sustainable Environmental Services

Three Attachments

Comments: Attached, please find:

1. Comments
2. A Study of District 6-3 Carbon Footprint that documents inherent environmental/energy advantage of town living.
3. A summary of the District 6-3 study

McCullough, Jim

State Representative, Williston

Comments: We need a proactive plan for reducing carbon usage that includes distributive equity.

Miller, Johanna

Vermont Natural Resources Council [*Energy and Climate Action Program Director/VECAN Coordinator*]

Comments: Protecting Vermont's environment through research, education and advocacy since 1963.

VERMONT NATURAL RESOURCES COUNCIL — COMMENTS on DECARBONIZATION STUDY

What do you think are two or three things that a study of policies to reduce climate emissions in Vermont ought to take into consideration in order to be helpful in answering your questions and in advancing the climate and energy policy dialogue in Vermont?

1. RFF should model, speak to and account for – in numbers – business as usual as a strategy. It is important that Vermonters understand the costs – economically and environmentally – we are already paying (including in currently externalized costs; see more below) to fairly analyze other policies. A well crafted economy wide policy could meet multiple goals – reducing GHGs, growing jobs and the economy and protecting vulnerable Vermonters and providing the framework to help them participate in the transition. The ability to make comparisons like this will be key to a fair and full analysis of the issue and policy opportunities.
2. The unique Vermont context matters the most. National level analysis, while illustrative and informative, is virtually useless to policy makers and Vermonters concerned about their constituents and Vermonters' own situations. What will this policy mean for Vermonters? **RECOMMENDATION:** Create case studies to accompany the macro analysis. This would include doing a few case studies on BAU as well; highlighting the loss of 8 out of every 10 dollars spent on energy in the transportation and thermal sector leaving the state economy.

3. It is important to model policies aimed at achieving our goals, but recognize that that will likely come at a political cost, which could undermine the entire effort unless the full story is told and the cost savings and energy value are equally highlighted. The easy politicization of this issue has already been borne out several times when it comes to carbon pricing. One side of the story is easy to tell – the cost side – with numbers taken out of context and with stories and narratives often only highlighting the cost and failing to highlight the cost relief, tax relief or financial benefits of any policy. Talking about the costs, benefits and other positive outcomes of any policy will be crucial to the full story and a fair conversation.

4. We also urge RFF to focus on and model the unregulated liquid fuel sector in Vermont. The regulated electric sector has been meeting its GHG targets and is required through the Renewable Energy Standard and more to help Vermont meet its climate and clean energy goals.

5. Lastly, it will be important for all policies to be comparative, apples to apples. Policy frameworks like WCI and RGGI are not revenue neutral, but the ESSEX plan as introduced was. Each policy should model and include a reinvestment component that is the same across the board and the model should account for the GHG savings and economic benefits from reinvested revenue (expended through a Green Fund or an expanded and funded Clean Energy Development Fund).

Considering the four policy approaches listed above, which of the approaches do you think RFF ought to focus on?

The three policy approaches identified are important to model and analyze. Ideally, because each policy could be so different, if possible, modeling more than just one more would be ideal. That would include: modeling the cap and dividend approach and, in particular, the [Vermont Case for Carbon Dividends](#). Another important policy to model would be the nearly revenue neutral [H.412 policy](#) from 2015 which provided a reduction in the sales tax, tax credits for businesses, and a 10 percent investment in the Clean Energy Development Fund.

What elements of framing would be important for RFF and JFO to consider in its analysis and report, and what metrics or analytical outputs do you think would be important to include in this study?

FRAMING: When we are talking about economy wide policy approaches its important to recognize that we are talking about restructuring the biggest sector of our economy; a huge undertaking and an essential effort. Not only is it essential because we have a climate crisis but, in Vermont, where we import 100 percent of the fossil fuels we use, we are incredibly vulnerable to a volatile, international oil market. And, that reliance leaves a huge a job-creating, energy independence opportunity on the table. It's important for this report to recognize that we have essentially three choices: 1) We can reject taking meaningful action and let things happen to us, standing ready to pay whatever the costs. 2) We can acknowledge that climate change is real and give rhetorical lip service to it; taking incremental steps (minimizing short term costs, but also kicking the can down the road), which is exactly what we are doing now. Or, 3), we can be proactive and identify a solution that addresses the issue – and the opportunity – in a way that best serves Vermonters; builds off of our unique characteristics and is crafted to capitalize on our unique assets – such as a pretty clean and required-to-get-clean electric portfolio. It is our hope that this study, and its deep, impartial examination of the issues, data and facts,

provides the information policy makers and Vermonters need to identify and advance the best policy – proactively – and shape it in a way that works well for Vermonters now – and far into the future.

This issue is often – almost always – framed in the cost frame; and very rarely on the benefits and cost of inaction. It will be important for RFF – and this issue more broadly – to be framed fully and fairly. The study should highlight the benefits of carbon pricing (increasing GDP, growing jobs, attracting business, meeting state goals). This policy could be crafted and implemented as an economic development policy. As well, as a health and poverty mitigation policy, considering the current externalized costs of energy inequality and public health.

SPECIFICALLY, the analysis should attempt to answer how any of the policies analyzed:

- Are regressive or progressive for Vermonters with low incomes?
- Are overly burdensome on, or beneficial to, rural Vermonters?
- Affect Vermonters who live within a short drive of a border. How will this affect them? How will it affect border businesses?
- Offer, and quantify, co-benefits – Reduced air pollution, better health outcomes for individuals and lower health care costs for Vermonters collectively; reduced infrastructure expenditure costs etc.

What relevant research, policy issues, and political circumstances should RFF take into consideration when executing this project?

1. Vermont Department of Health’s Climate Change and Health white paper --

http://www.healthvermont.gov/sites/default/files/documents/pdf/ENV_CH_WhitePaper.pdf -- which gives a brief overview of research on expected health impacts from climate change and potential costs and benefits of acting on climate.

2. The economic analysis of H.412 – a nearly revenue neutral carbon pricing proposal --

https://www.energyindependentvt.org/wp-content/uploads/2015/04/REMI_ppt.pdf

3. Vermont’s Total Energy Study analysis -- https://publicservice.vermont.gov/publications-resources/publications/total_energy_study

O’Callaghan, Jack

Vermont Public Interest Research Group (VPIRG) Climate & Clean Energy Fellow

Comments: To whom it may concern at the Joint Fiscal Office and Resources for the Future:

My name is Jack O’Callaghan and I am a 25-year-old Climate & Clean Energy fellow at the Vermont Public Interest Research Group. VPIRG is Vermont’s largest nonpartisan environmental and public advocacy organization. Together with our 50,000 members and supporters, we fight for policy solutions that will strengthen the local economy, help low- and middle-income Vermonters get ahead, and reduce the pollution causing global warming.

Thank you for the opportunity to submit comments regarding the direction of the “decarbonization methods” study. I’d also like to thank the researchers from the Joint Fiscal Office and Resources for the Future for making the time and effort to meet with Vermonters in public this week.

We are pleased that Republican Governor Phil Scott's Climate Action Commission and the Democratic-controlled General Assembly were able to work together in a bipartisan fashion to recommend and fund this critical study.

And we are delighted that Resources for the Future – a nonpartisan academic research firm that has been studying the nexus between the economy and the environment at the national level for decades – has been selected to work with the nonpartisan Vermont experts at the Joint Fiscal Office. We believe this is a great pairing, and look forward to your report.

In the invitation to this forum, you asked people to come prepared to answer two questions. The first is what should the study take into consideration to advance the climate and energy dialogue in Vermont?

To this, I have three recommendations:

First, write the report for your audience: Vermont legislators. As you have undoubtedly learned, Vermont has a citizen legislature. Our senators and representatives have no offices, no staff and – during the legislative session when your report will be released – precious little time. Please write the report, or at least its executive summary, for the layperson. There will certainly be people who want to know the intricacies of a general equilibrium model, but most legislators will want to know in simple English: What do these policy options mean for the Vermont economy, for my constituents and for the environment?

Second, while Resources for the Future has provided expert analysis on energy and environmental policy in Washington, DC for decades, this is Vermont. I urge you to delve deep into the Vermont context. Get to know our unique energy and environmental profile and policies. For as important as the national perspective is, it is the details of how the policy will affect Vermonters which is most important. Further, while your macroeconomic analysis will be helpful, if possible the report should include local case studies to make it as relevant as possible for policymakers. It is the impacts of a policy on individual households and local businesses that matter – so please add some of those examples to the work.

Third, to get the Vermont perspective, I recommend that you proactively reach out to even more individual Vermonters, state legislators and stakeholders than were able to attend the public forums in Montpelier and Woodstock. In particular, I think you should make every effort to connect with some of Vermont's major employers, energy providers and energy consumers. If you haven't heard from them, organizations and institutions like the Vermont Hospitals Association, UVM and the state colleges, Global Foundries, Vermont Gas Systems, the Vermont-NEA and the Vermont Ski Areas Association to name a few should have an opportunity to weigh in now so that their questions are answered in the report come January.

The other question you asked tonight's participants to answer was, "In addition to the three proposals already defined, what fourth policy design should RFF analyze?" I have two answers to that.

First, don't limit your report to just one additional policy design. There are several proposals worthy of consideration including the Vermont Case for Carbon Dividends, H.412 from the 2015-16 legislative biennium, and the tax reform and climate action proposals issued in 2017 - H.528, H.532 and H.533. Lawmakers will want and deserve to have full suite of options to compare and contrast.

Second, don't limit your report to just the options that have already been proposed. Resources for the Future has been studying energy, environmental and economic policy for decades. You're one of the

premier academic research firms in the world and you're about to do a deep dive into the Vermont context. That's very exciting and a great opportunity. Given your expertise and the academic firepower at your disposal, what policy approach do you think would be best for the Vermont economy, for low- and middle-income Vermonters, and for the environment? Don't limit yourself to what's already on the table. If there is a better path forward, Vermont legislators will want to know about it.

Finally, VPIRG has been advocating for climate and clean energy policy in Vermont for five decades. We have a deep understanding and passion for the issues that this study will explore. If we can be of assistance to the teams from Resources for the Future or the Joint Fiscal Office as you prepare your report, we would be happy to help.

On behalf of the young people of my generation and all future generations, thank you again for the opportunity to submit comment. This critical conversation about how we transition away from a fossil fuel dependent economy must include young people at the table who will be disproportionately affected by the policy decisions made today. Good luck with your very important work.

O'Dell, Timothy

Corinth

Comments: <https://www.youtube.com/watch?v=RVYNJHxB5Ls>. My comment of yesterday probably left many of you scratching your heads. If so, here is backstory that you need to know about carbon sequestration by soil. This is about regenerating agricultural soils, THE practice shown to capture, short cycle and long-term sequester atmospheric carbon over periods of years.

Note: Received wisdom that it takes 1000 years to generate an inch of topsoil is a myth. If you believe that, try to square it with what happens in a compost pile over a single growing season. The "technology" here has proven itself over geological time. Note the spinoffs, dividends and improved business models. This is what smart money already knows, Like to get on the train that's leaving the station? Get a coffee and spend 23 minutes listening, or just let it play in the background. Hint to those with high-and-tight hair and world views: You'll be put off by his hair to YOUR disadvantage.

Parent, Charles

Hinesburg

Comments: I am writing to express my concern for the economic and environmental policies the state of Vermont is pursuing. It seems to me the only sane and long term solution is a sustainable path. We have to stop using fossil fuels. We are destroying the earth and jeopardizing the health and safety of all living things on the planet by continuing on this non sustainable path. The answers are right in front of us. Renewable energy, electric vehicles, conservation and efficiency are the answers. We just need to break the stranglehold fossil fuel companies have over our politicians. Where there is a will there is a way. We need a green economy!

Parsons, William

Dorset [second home owner – primary in Brooklyn NY]

Comments: There has to be a way to move to a carbon reducing environment and at the same time increase job opportunities in the state. I love my home state but it is true that almost everyone I grew up with has moved elsewhere for work. Our hilltops should be covered with windmills and fields with solar panels, and frankly Nuclear must be in the mix. We are not and will never be an industrial state but we have to be a little less quaint.

Quinlan, Dan

Vermont Climate and Health Alliance (Chair)

Attachment: RGGI Analysis

Attachment: CDC Diagram

Comments: I am sorry to say that I cannot attend the public input events. Instead, I would like to offer thoughts on behalf of the Vermont Climate and Health Alliance via e-mail. It is our position that analysis that does not include examination of the health impacts of climate change will vastly underestimate the full financial impact of the policies being considered. That has two aspects: avoided costs and possibly health co-benefits. By way of example, RFF is likely to be aware of an analysis that was done not long ago examining the public health benefits of the Regional Greenhouse Gas Initiative by Abt Associates in 2017 (report attached). We believe this was a critical piece of work - in that it exemplified the financial magnitude of health considerations and put this topic on the table. We would like to refer JFO and RFF to the work of the Center for Disease Control (<https://www.cdc.gov/climateandhealth/default.htm>), and the attached CDC diagram that summarizes the areas that are central to this conversation. We recognize that there are inherent challenges to creating numerical models that would examine the full suite of health considerations as they pertain to the policies being considered. Yet, to the extent it can be done, it must be done. For the arenas where modeling is not possible, the RFF report should attempt to bracket the range of financial impacts. In areas that are not treated at all financially, these arenas should be acknowledged as other possible sources of economic impact. To summarize, it is our position that if public health considerations are not dealt with or discussed, the final report will continue to steer people away from the fact that climate change is, at its core, a human health problem that will have enormous financial impact. I would be happy to discuss these thoughts with the JFO or RFF team if that would be appropriate and helpful. Dan Quinlan, Chair, VTCHA.org.

Schlangen, Rhonda

West Pawlet

Comments: Climate change is already affecting us and will impact Vermont's future economic, social, and cultural future. The decarbonization report is a critical aspect of the knowledge we need to ensure we are as well-equipped as possible to both mitigate harm and take advantage of the opportunities to

build a sounder future for our state. The report must include analysis of the costs of inaction. Given the politicization of climate change and science, it is very important that we have access to the information needed to hold policymakers accountable--particularly those who dispute the necessity of action.

Sears, Justine

Vermont Energy Investment Corporation

Comments: I suggest that the research report 'Mapping Total Energy Burden' be considered in the JFO's study of decarbonization methods. The paper can be found here:

<https://www.encyvermont.com/Media/Default/docs/white-papers/efficiency-vermont-mapping-energy-burden-vermont-white-paper.pdf>

The report uses primarily publicly available data sources to estimate spending on energy by Vermont households, including the American Community Survey, and the Housing and Transportation Affordability Index. Further information on electricity spending was provided by Efficiency Vermont, but that data is also publicly available, I believe. The US DOE Low Income Energy Affordability Tool may also be of interest (the LEAD Tool, found here: <https://openei.org/doe-opendata/dataset/celica-data>).

Please be in touch with any questions regarding the papers methods or data sources.

Sibilia, Rep. Laura

Representative, Dover, Readsboro, Searsburg, Somerset, Stamford, Wardsboro, Whitingham

Comments: Thank you for the opportunity to offer additional comments on the direction of the decarbonization methods study. As this week's [IPCC report](#) continues to make starkly clear, the consequences of inaction on global warming are extreme. Vermont's report is both relevant and timely.

I was unable to attend the public forums last month but did publicize to my communities and constituents. In the invitation you asked participants which fourth policy approach RFF ought to focus on. I'd like to encourage you to also look into carbon dividends. On the federal level, this concept has drawn interest from across the political spectrum – and, as an independent representative, I have the most enthusiasm for proposals that are able to get some bipartisan traction. The Climate Leadership Council and Americans for Carbon Dividends have attracted an impressive list of individual and corporate backers for this idea: Christine Todd Whitman & Janet Yellen, James Baker & Lawrence Summers, Stephen Chu & Ben Bernanke, The Nature Conservancy & General Motors, Conservation International & Unilever, First Solar & Shell. Earlier this week, ExxonMobil pledged \$1 million for the lobbying effort to pass this proposal. Interestingly, while this concept is known as the [Conservative Case for Carbon Dividends](#) in Washington, it was one of my Progressive Party colleagues – Rep. Diana González – who introduced similar legislation called the [Vermont Case for Carbon Dividends](#) last year. Because of this concept's ability to attract support from such diverse stakeholders I believe it merits your consideration in the study.

To be very clear, I am not ready to support the idea of carbon dividends absent more information. But that's why your report is important to legislators and others. I strongly believe I have an obligation to help my constituents grapple with this defining issue of our lifetime and encourage them to not be afraid of exploring independent, nonpartisan analysis. If elected officials can drop the party-issued talking points and deal with the data, stop using our shared climate as a campaign prop, and help empower our communities to deal with climate change, we'll all be better off. It's clear that much more action on climate is needed, and that your work can provide policymakers important knowledge and courage to develop proposals equal to the size of this challenge.

Thank you for your work.

Souza, P.

Bennington

Comments: Asthma and health the increase in ticks, rodents and disease, and invasive pellets are suddenly popular, make laws to use paper instead of plastic packaging ban single use plastics increase all natural energy use fix the fine red tape that keeps us for creating our own energy resource i.e. water, wind solar, impossible to sign up to make green power Vermont be 100 percent green.

Sullivan, Jim

Bennington County Regional Planning Commission

Comments: Please distribute information on the alternative policy scenarios to facilitate comments. In general, consider issues of "border areas" when evaluating carbon pricing alternatives.

Sullivan, Rep. Mary and McCormack, Sen. Dick

Vermont Climate Solutions [Co-Chairs] (submitted by Rep. Colburn)

Comments: I'm sharing the attached letter on behalf of the legislature's Vermont Climate Solutions co-chairs, Representative Mary Sullivan and Senator Dick McCormack. In it you'll find many suggestions about the upcoming study and how to ensure that it can be used effectively to inform the legislature's work on this issue.

Much thanks for your consideration,

Selene Colburn

Clerk, Climate Solutions Caucus

As co-chairs of the Climate Solutions Caucus, we would like to thank the Joint Fiscal Office and Resources for the Future for undertaking the critical work of modeling the economic impacts of policies to reduce Vermont's greenhouse gas pollution. This study was recommended by Governor Scott's Climate Action Commission and required by Act 11 of 2018. It is both important and timely given:

Vermont's rising climate pollution levels. Per the latest *Vermont Greenhouse Gas Inventory Update (1990-2015)* issued this past summer, emissions are "approximately 16% above the 1990 baseline value

of 8.59 MMTCO₂e.” This makes achieving the statutory goal of a 50% reduction below 1990 emissions levels by 2028 all the more difficult;

The Intergovernmental Panel on Climate Change (IPCC) *Report on Global Warming* issued this week, that makes clear that the policy decisions we make today are critical in ensuring a safe and sustainable world for everyone, both now and in the future;

And also this week, the Nobel Prize in Economics being awarded to William Nordhaus of Yale “for integrating climate change into long-run macroeconomic analysis” – exactly the type of analysis you have been asked to complete applied to the Vermont context.

Given the benefits that can flow from cleaner air, we are impatient to see the results of your study. More importantly – should your research provide a roadmap for how Vermont can strengthen its economy, create jobs, assist Vermonters with low incomes, and reduce pollution – we are eager to turn your recommendations into legislation.

To help the members of our Caucus, our colleagues in the Legislature, members of the media, and Vermonters at large understand and accept your work, we offer the following requests and recommendations:

Write for the layman. Vermont has a citizen legislature. Representatives and senators have no offices or staff, and – during the session when your study will be released – precious little time. At a minimum, please provide a 1-page synopsis that highlights the economic, employment, public health, and environmental benefits of climate action.

Consider the Vermont context. While Resources for the Future is a premier academic research firm with decades of experience modeling the nexus of environmental and economy policy at the national level, it is imperative that this study reflect the Vermont realities, which can be considerably different from those of the nation as a whole. For example, Vermont imports 100% of its fossil fuels at considerable expense each year; the percentage of emissions from transportation and R/C/I use are far higher in Vermont than the rest of the country; our electricity portfolio is among the lowest-carbon in the nation; and our Renewable Energy Standard requires utilities to source an ever-increasing percentage of their electricity from renewable sources and support their customers in the transition off of fossil fuels. These differences – among others – affect policymakers’ thinking, and should be accurately reflected in the report. We have every confidence that the Joint Fiscal Office can and will “ground truth” the report before its release.

Include case studies. In addition to a macroeconomic analysis, legislators will want to know how these policy options impact their constituents. What will the policies you investigate mean for low-income Vermonters living in the rural parts of our state? What will they mean for small businesses which employ the majority of Vermonters in the workforce? What will they mean for our largest employers in health care, education, tourism and manufacturing?

Cite real-world examples. Many of the policy options you will examine are similar to decarbonization programs at work in other states and countries. Where possible, please share the economic and environmental results of those initiatives.

Compare apples-to-apples across outcomes. You have been charged to explore policy options that are considerably different from one another in their implementation, which could make comparisons

difficult. We believe what will be most important for your primary audience (legislators) are clear and concise comparisons of expected outcomes across the policy options studied. Using the same metrics in each category, tell us your forecast of Vermont jobs created or lost, the increase or decrease in GDP, the rise or fall in greenhouse gas emissions, etc. for each of the policies you explore.

Compare and contrast stand-alone policies versus regional approaches. In addition to comparing outcomes at the state level, compare impacts across the northeast if Vermont were to join a multi-state effort to reduce CO₂ from the transportation and heating sectors or if other regional states joined Vermont in implementing individual carbon pricing strategies at a harmonized rate.

Compare action to inaction. The business-as-usual (BAU) approach has led to a 16% increase in greenhouse gas pollution since 1990, and continuing on that path means that Vermonters will continue to import all of their fossil fuels while emissions continue to rise. In addition to a discussion of the benefits of action, your report should also include the costs of inaction.

Include the health benefits. There is no safe level of air pollution, and a reduction in fossil fuel combustion as Vermonters transition to cleaner heating and transportation options will have significant co-benefits both in terms of money saved and premature deaths avoided. In *Confronting the Climate Challenge: U.S. Policy Options*, Goulder and Hofstead found that, at the national level, the financial benefits of avoided health damages eclipse the climate benefits of carbon pricing. That same analysis should be applied to the policy options in this study. Will Vermonters save money on health care costs, and how much, by reducing climate pollution?

Regressive or Progressive? Legislators will want to know how these policies affect Vermonters across incomes. Will Vermonters with low-incomes come out ahead? Will any Vermonters be unduly burdened?

Discuss distributional impacts across geography. How will these policies impact the different regions of the state? For example, what are the implications for Chittenden County – the most populous and wealthiest (by per capita income) county with its high penetration of low-cost natural gas? What are the implications for Vermont's rural counties that are home to the majority of Vermonters who largely depend on fuel oil and propane delivery and have lower per capita incomes? The *Mapping Total Energy Burden in Vermont: Geographic Patterns in Vermonters' Thermal, Electric, and Transportation Energy Use (2016)* report and data set from Efficiency Vermont and the National Highway Transportation Survey: Data Extraction Tool (2009) from the U.S. Department of Transportation could be useful in exploring the implications of various climate policies for urban and rural Vermonters at different levels of household income.

Estimate the impacts on the costs of energy and the cost of living in Vermont. What will be the net effect of these policies on the costs of electricity, fossil fuels and biomass for Vermont households and businesses? What will be the overall change in the cost of living? Will living, working and raising a family in Vermont be more or less affordable if one of these proposals is implemented? By acting on climate, can Vermonters save money?

Discuss each policy's potential to spur innovation and economic growth. Former U.S. Treasury Secretary Henry Paulson has argued that a federal carbon price would “unleash a wave of innovation to develop technologies, lower the costs of clean energy and create jobs as we and other nations develop

new energy products and infrastructure.” Could we expect some of that increased economic activity in Vermont if Vermont implemented one or more of the policies under consideration?

Estimate administrative costs. Vermont is a small, frugal state. Our state government doesn’t have a lot of money to spend, and what money we do have we don’t want to waste. Therefore, legislators will want to know how much it might cost to initiate and maintain each of the policies you are exploring. If you cannot forecast the dollar amounts, please estimate administrative costs as a percentage of total policy/program costs.

Address leakage rhetoric versus reality. Few Vermonters live more than an hour’s drive away from a state or provincial border, and cross-border shopping is a reality. That said, the economic impact of those cross-border purchases is often misunderstood or mischaracterized. To accurately reflect the Vermont context, your report should consider the net costs and benefits of cross-border traffic. The following studies may provide useful insight:

- *The Cross-Border Issue: An Ongoing Analysis Affecting Multiple Taxes*, Tom Kavet, 2017. (“Despite lower effective gasoline tax rates in NH, retail prices at stations in NH near the Vermont border are close to or often even above those at nearby Vermont stations. Further from the Vermont border, NH prices tend to be lower. Also of importance, the location of Interstate 91 on the Vermont side of the Connecticut River gives Vermont an advantage in attracting gasoline sales from both local and through traffic. For this reason, per capita measures of gasoline sales have not exhibited the same kind of cross border variation seen in other retail sales sectors.”)
- *2015 Benchmark Report: Tourism in Vermont*, Vermont Department of Tourism and Marketing, 2017 Release. (In 2015, visitors to Vermont spent approximately \$230 million on gasoline and diesel for transportation and utilities and fuel for second homes.)

Discuss impacts on Vermont’s existing climate policies. While Vermont’s rising CO₂ emissions are distressing, state and municipal policymakers have been trying to address climate pollution for some time. Your study should discuss how the decarbonization methods you examine could interact with those existing programs and policies, including:

- Vermont’s Renewable Energy Standard;
- The Regional Greenhouse Gas Initiative (RGGI);
- Efficiency Vermont – the nation’s first statewide energy efficiency utility;
- Our solar Net Metering and Standard Offer programs;
- Burlington’s Climate Action Plan; and
- Our capitol city’s Net Zero Montpelier goal.

Provide a review the low-carbon alternatives available to Vermonters. Your report may recommend policies that leave fossil fuels in the past, but legislators will also want to know more about the technologies of the future. Electric vehicles and cold climate heat pumps are two of the exciting innovations that may provide Vermonters ways to improve their quality of life while also reducing their energy costs. Drive Electric Vermont (“On average, driving an electric car in Vermont will cost you half as much as a gas-powered vehicle, including electricity”) and the Public Service Department (“On average,

a ccHP in Vermont consumed 2,085 kWh and supplied 21.4 million Btu of heating capacity during one heating season. This translates to an average seasonal efficiency of 314%”) have useful information on these technologies.

Identify corollary policies that may need consideration. Barring a technological advance that magically decarbonizes combustion, a successful climate program will reduce the consumption, and therefore purchase, of fossil fuels in Vermont. While your study may demonstrate the many benefits of decarbonization, a portion of Vermont’s state revenues are derived from the taxation of fossil fuel sales. For example, gasoline and diesel fuels, as well as the purchase of vehicles, support the Transportation Fund and the sale of heating fuels and electricity fund the state’s low income weatherization providers. No report on policies with the potential to transform the way Vermonters generate and consume energy would be complete without identifying how the policies interact with existing revenue streams.

Identify additional policies that may be required. If your models indicate that no one policy alone will achieve Vermont’s decarbonization goals, please identify a) other policies that may be necessary and/or b) modifications of the policies that could make them more effective.

Consider GPI and GDP. In 2012, through Act 113, Vermont became the first state in the nation to legislate the use of an alternative indicator of macroeconomic performance known as the Genuine Progress Indicator (GPI). The 2018 Vermont Genuine Progress Indicator Report provides an overview of the dimensions of GPI and how it differs from and complements traditional Gross Domestic Product (GDP) calculations.

What, if any, advantages can Vermont gain by leading on climate? The critics of climate action say Vermont is too small to make a difference in the fight against global warming. But is the state too small to reap the economic benefits of climate action? Legislators want to know if reducing climate pollution can strengthen Vermont’s economy, create jobs, lower health care costs, and help low- and middle-income Vermonters transition to clean energy and save money. To truly advance the climate dialog in Vermont, your report should provide legislators with responses to the above questions and recommendations. To that end, if we can be helpful by providing additional information or direction, please let us know.

Swanberg, Ned

Montpelier

Comments: Thank you for undertaking this study. We need clear pathways to move ahead that can avert the worst of the climate catastrophe ahead.

Part of the process that you need to acknowledge is the value of ecosystem services, cultural heritage, and the disruption and political consequences of climate change. The near-term political response by the US is alarming.

Pricing carbon is essential. We need a value on carbon that reflects its true costs, gives a clear price signal to all of us as consumers, pays for mitigation, pays for the development of non-carbon emitting practices, and invests meaningfully in the quality of life for people with fixed incomes and little cash (particularly weatherization and access).

Aside from a carbon price - we also need something like a cap and trade. The builders of buildings, cars, trucks, and other facilities are not going to directly pay the subsequent carbon bill. If these new capital investments are in fact net zero...we can run out the existing equipment to some degree. However, the practices of these industries need to be part of the overall plan to accomplish a sustainable settlement, transportation and production system and again we are looking at a willful failure at the federal level.

There is a tremendous need for investment and jobs to get EVs into practice. Wiring all the street signs. Rewiring all the private parking. Making car sharing easiest.

Thank you for your work.

We need to turn the corner now (if not 30 years ago when it was much easier).

Taranovich, Judy

Proctor Gas Inc.

Comments: As a member of the VFDA board and a small (13 employee) family run propane business in Vt. only I would first like to say I stand by the comments submitted by Matt Cota on behalf of our board and members.

I would also like to ask this study be done by an outside entity and not the group that put forth the first study that showed they were already in favor of the carbon tax.

Should this study move forward I would also like to respectfully submit that ALL SOURCES OF ENERGY INCLUDING Natural gas and electricity be included. I find it rather upsetting that the two forms of energy owned one company are excluded especially when using a full fuel cycle test Propane is cleaner than both electric and Natural gas!!

IF a **CLEAN** environment is truly what you seek – be fair!!!! Propane is not the bad guy here. We have a story to tell and we are a part of clean energy.

Von Alt, Christopher

Maidstone

Comments: I live in Maidstone, VT a rural town in Essex County in the Northeast Kingdom, which borders NH and Canada. The majority of people in this area live in poverty and from pay check to pay check. I support the Essex plan, and I think it gets allot of things correct, but it needs to address the situation that the majority of people who live in rural areas in VT now experience. They live in poorly insulated mobile, prefabricated, or older houses which are heated with wood or in many cases propane or oil. The bottom line is they do not use allot of electricity. So you increase their heating bill by taxing fossil fuels and it is not clear that the reduction in their electrical bill will offset the tax on fossil fuels. That is, if we implement the Essex Plan it will cost them more to live. For most people in VT this is an unacceptable outcome and they will be against the Essex Plan.

You need to show that the Essex plan will protect people in poverty who heat with fossil fuels and do not currently use allot of electricity. You need to show that the Essex Plan will not drive them deeper into poverty. From what I have read and seen in your presentations, this issue is not addressed.

Please feel free to contact me if you have any questions. Regards

Williams, Eesha

Dummerston

Comments: Climate change is already impacting Vermonters' health, and in some cases lives. (See last July's deadly heatwave for proof.) This study should include the costs of inaction as well as the health benefits of reduced air pollution.

Williams, Kate

Leicester

Comments: The latest report on climate change from the U.N. makes it clear that we don't have long to take action to avert disaster for many human populations. This is no time for politics! I urge our legislators to support a carbon tax.

Wuertele, James

Energy Coordinator for the Town of St. Johnsbury

Attachment: Essex Business study shared

Comments: I apologize for the detailed comment.

From my calculator (below) I determined that many small businesses would prefer to work under the ESSEX Plan. Also, all residential models I tried seemed similarly able to benefit from the Plan. Therefore, I support the ESSEX Plan as proposed. I reported this opinion to my Senators in March, 2018.

I suspect that there are transportation businesses which will not support the Plan.

Background:

I have been St. Johnsbury's Energy Coordinator since 2012, with a super-insulated house since 2009, and a solar hot-water system running since 2007. Neighbors and businesses have asked about their options. Mostly I have data of my personal energy use transitions to share with them and university students, but then the prospect of ESSEX Plan arose, and this captured my interest and concern.

Process:

I casually developed some energy consumption models (from business friends and residents) and produced my own calculator using published US Government's energy consumption projections (ca. 2 February, 2018). Since I felt "alone" on this project, and the Vermont Legislature later desired an

“official” analysis (and perhaps calculator?), I held off sharing my experimental calculator with potential users going forward.

I attach that calculator here for whatever use it may be to RFF.

The calculator is ready to use for any business, and models for experimental learning trials are in page 2 (“entering” page) with instructions how to input one or more at a time to observe sensitivities to total energy costs, etc.

Hopes:

I remain hopeful that as many legislators and their businesses friends as possible could run trials with this or an “official” calculator before making up their "corporate minds" about the ESSEX Plan.

It may be that a calculator would also help legislators—and the Governor—try different iterations of the proposed ESSEX Plan before publicly rejecting it.

We need action to improve our future.

Yantachka, Rep. Michael

Representative, Charlotte-Hinesburg (Chittenden District 4-1)

Comments: I am writing to let you know that I concur with the statements in the attached letter from the Legislative Climate Caucus. I am a member of the Caucus, but I want to underline my support.