

The ESSEX Carbon Tax Plan
for Vermont:
An Economic Analysis

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The front cover pictures the renewable-energy powered whaleship ESSEX. In 1820, on a voyage to harvest renewable lighting fuel, it was attacked and sunk by a huge sperm whale in Pacific waters off the Marquesas. Its 20 crew members drifted 95 days in longboats until eight survivors were rescued, after eating seven of their crewmates. The 19th Century whale slaughtering industry came to an end with the discovery in Pennsylvania of a fossil fuel replacement for whale oil. Any analogy to The ESSEX Plan analyzed in this report is purely coincidental.

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INTRODUCTION

Beginning in 1995, the United Nations Intergovernmental Panel on Climate Change (IPCC) began issuing reports ascribing rising global temperatures primarily to anthropogenic causes, notably the emission of carbon dioxide from the combustion of fossil fuels. Responding to this concern, the Vermont legislature in 2006 enacted a law (Act 168) setting a goal of reducing Vermont's emission of greenhouse gases by 25 percent below the 1990 baseline by 2012, 50 percent below by 2028, and "if practicable, using reasonable efforts, 75 percent below by 2050."

In the ensuing five years, little, if any, progress was made in reducing Vermont's fossil fuel emissions. Thus, in 2011, Gov. Peter Shumlin released a Comprehensive Energy Program, which declared his goal of having Vermont obtain 90 percent of its total energy from renewable sources by 2050. In 2013 the legislature, while not endorsing the Governor's specific goal, made a finding that "Vermont must act to reduce its greenhouse gas emissions and consumption of fossil fuels..." (Act 89 of 2013 Sec 1 (8)). To reach that goal, the legislature has enacted a host of subsidy and mandate programs: RESET (Renewable Energy Standard), Clean Energy Development Fund, Standard Offer Pricing, Solar PV tax credits, subsidized net metering, and more.

While these programs promised to push Vermonters toward the Governor's "90 percent renewable by 2050" goal, organizations concerned about the threat of climate change formed the "Energy Independent Vermont" coalition in 2014. EIV's goal was the enactment of still another program, a state carbon tax, in the 2015-16 legislature.

The EIV bill (H.412) to enact "a carbon pollution tax" proposed to levy a tax on gasoline, diesel, heating oil, natural gas, and propane, beginning at \$10 per metric ton (tonne) in its first year, rising to \$100/tonne in the tenth year. The bill, which projected a revenue intake of \$500 million a year in the tenth year, was not "revenue neutral". Ninety percent of the new proceeds of the tax would be returned to the public through a reduced sales tax, and various refundable tax credits and rebates. Ten percent would be used for government programs to promote "efficiency and clean energy investments". Backers argued that the proposed carbon tax would create "over 2,000 jobs" over the ten year period, increase the Vermont gross state product (GSP) by "nearly \$100 million", and reduce "carbon pollution" by 35 percent.¹

Despite legislative hearings and an aggressive campaign for public support, the bill was not acted upon. The groups urging a carbon tax have now united behind a revised proposal, the "ESSEX Plan."

THE ESSEX PLAN ("Economy Strengthening Strategic Energy eXchange")

The advocates for the ESSEX Plan claim that it would "create jobs, attract new businesses, spur strategic electrification and provide the cleanest electricity at the lowest rates in New England; prioritize the most vulnerable and the middle class by lowering utility bills for every Vermonter and Vermont business, and provide fully refundable rebates to low income and rural Vermonters; and harness the power of the market to reduce carbon pollution and help the state meet its climate and clean energy goals."²

The plan imposes a carbon tax, which it refers to as a "fee", on carbon emissions from the use of gasoline, on-road diesel fuel, heating oil, natural gas, and propane. Electricity, biomass fuels, landfill methane, and aviation fuel are exempted. The "fee" would start at \$5/per tonne in 2018 and would increase each year by an additional \$5/tonne to a maximum value of \$40/tonne in 2026. The plan's sponsors predict that this carbon "fee" will lead to refunds of \$120 million on electric bills for commercial and industrial customers, and another \$120 million in refunds to the residential sector.³

The sponsors claim that the plan will be revenue-neutral, which means the costs of administering the program will not be covered by the revenues collected.⁴ The state will turn over a percentage of the "fees" paid by commercial and industrial users to the electric utilities. The Public Utility Commission will require the utilities to reduce the rates they would otherwise be allowed to charge those users by the amount of the state payments. However, electricity taxes now used for subsidy programs would continue to be computed at the current rates, not the lower rates required by the PUC.

The plan calls for 50 percent of the revenues derived from the residential sector to be distributed to "working class families and rural Vermonters" through additional rebates. The former group are families that earn less than 400 percent of the Federal Poverty Level (now \$97,356 for a family of four). The latter group is comprised of families in "rural areas" earning less than \$150,000 per couple,

who will need the additional rebates to compensate them for their higher costs of driving to work, shopping, schools, and churches.⁵ If these families have electricity bills lower than the rebate amount, they will pay nothing for their electricity and receive a tax-exempt check from the state for the remaining rebate amount. The remaining 50 percent of those “fees” will be used to reduce residential electricity rates, as with businesses.

The sponsors believe that the ESSEX Plan will create as many as 6,000 jobs, such as contractors installing solar PV panels and replacing oil fired furnaces with electric heating systems. They also predict that the plan will reduce Vermont carbon dioxide emissions 15-25 percent below 1990 levels by 2025, and 30-50 percent by 2050.

The plan states, “Our economy is stronger when we use locally generated energy instead of imports from distant states and countries.”⁶ The plan’s authors also claim that Vermont will have the “cleanest electricity at the lowest rates in New England”⁷ and make energy conservation measures more financially attractive.⁸ The plan also claims that it will save the lives of 200 Vermonters every year who die prematurely from air pollution attributable to the combustion of fossil fuels.⁹

The plan is a project of the Seventh Generation, a Burlington home products corporation. It is actively promoted by the Climate Action Network, whose leading members are the Vermont Public Interest Research Group (VPIRG), the Vermont Natural Resources Council (VNRC), and Vermont Businesses for Social Responsibility (VBSR).

In January 2018, Sens. Chris Pearson (P/D-Chittenden) and Alison Clarkson (D-Windsor) introduced S.284, a bill to implement the ESSEX Plan.

Will the ESSEX Plan cause Vermont energy users to reduce their fossil fuel consumption?

The plan is based upon a basic economic concept: higher fossil fuel prices resulting from a carbon tax will lead to less fossil fuel consumption, and hence lower carbon dioxide emissions. Although the concept is sound, other factors likely will affect Vermonters’ responses and likely produce undesirable consequences. Faced with sufficiently high costs of fossil fuels, consumers may make a wide range of responses.

The plan envisions that Vermonters will respond by burning untaxed fuels, such as home heating with biomass or electric heat pumps; better insulating their dwellings; switching to hybrid or all-electric vehicles. The plan also envisions Vermonters installing behind-the-meter solar photovoltaics (PV) at their homes and businesses.¹⁰

However, all of these potential responses require new capital investment. Typical residential solar PV systems, for example, cost between \$15,000 and \$25,000. Installing a new furnace typically costs several thousand dollars. And electric vehicles are expensive, even with tax credits. Thus, many Vermonters may decide that their best long term solution is to relocate their business or residence to states with warmer climates and lower tax burdens.

The plan may also encourage some Vermonters, especially those who live near the state’s borders, to minimize their exposure to carbon taxes in other ways, such as by purchasing fossil fuels from out-of-state suppliers who are not subject to the tax.

Economists will note that, at least in the short run, the demand for fossil fuels is “inelastic”: As prices increase, the amounts consumed do not drop proportionally. For example, if the price of gasoline increases by 30 percent under the plan, consumption of gasoline will decrease less than 30 percent. The reason for this inelasticity is that consumers cannot easily change their behavior. They will not all suddenly sell their existing vehicles for new electric ones, rush out and purchase bicycles, replace their furnaces with new electric or wood-burning ones, and so forth, because doing so will be far too costly. The plan admits this, stating that the initial \$5/tonne carbon tax “is too low a price to significantly affect behavior.”¹¹ The 2014 DPS Total Energy Study similarly admitted that “There is no guarantee that a price on carbon will encourage greater usage of renewable energy, as opposed to switching between fossil fuel sources or using nuclear-generated electricity.”¹²

For many Vermonters, the capital investments needed to reduce their exposure to the carbon tax will be unaffordable. They will not have the money available to purchase a new wood-fired furnace to replace their existing oil furnace. They will not be able to purchase a solar PV system for their home, or purchase a new electric vehicle.

Similarly, the many Vermonters who live in apartments and rental homes cannot force their landlords to install new biomass-burning furnaces or solar panels on building rooftops. Nor can businesses who rent commercial space in office buildings. Thus, while the ESSEX Plan will likely reduce some fossil fuel consumption, especially as the carbon tax approaches its maximum, the amount of the reduction is likely to be less than predicted. Moreover, the higher the tax, the greater the incentive to avoid it. Thus, the plan may induce additional fossil fuel consumption – driving across state lines, for example, to avoid paying the tax.

Another possibility is that the ESSEX Plan will encourage more Vermont residents and businesses to undertake more investments in energy efficiency, such as weatherization, purchases of more efficient appliances, and so forth. Although this is consistent with the general economic reaction to higher fuel and electric prices, it still requires investment.¹³ Moreover, much of the “low-hanging fruit” in

energy efficiency, such as energy-efficient lighting, already has been installed. (One cannot even purchase standard incandescent light bulbs in the entire U.S., for example.) Similarly, Vermont has had subsidized weatherization programs in place for years. Thus, it is not clear how much these programs will be boosted by the plan. And, the same issues with those who rent are likely to arise. Finally, if the plan's projections of lower electricity prices were true (they are not, as discussed below), then Vermonters will have less incentive to reduce their electricity consumption.

Will the ESSEX Plan lower electricity costs for residential, commercial, and industrial consumers?

As discussed above, the ESSEX Plan, like all carbon tax plans, is based on increasing the cost of fossil fuels, thereby reducing fossil fuel consumption that Vermonters now depend on for home and business heating, industrial process heating, and transportation. The plan does not impose a carbon tax on coal-, gas-, or oil-fired electricity, which is covered by the Regional Greenhouse Gas Initiative.¹⁴ (Aside from two small natural gas-fired emergency and backup plants, Vermont contributes no fossil fuel-generated electricity to the power grid.)

The plan claims that it will “provide the cleanest electricity at the lowest rates in New England,”¹⁵ because carbon tax revenues will be used to reduce current electric rates. This, according to the plan, will lead to electricity rates that are “25-40 percent below the New England average, thus spurring greater economic growth and more “clean energy” jobs.¹⁶

According to the plan, the electric rate reductions will be achieved by the State paying much of the proceeds of the carbon tax to the utilities to subsidize electricity rates (in the eighth year, by an estimated 27 percent for commercial and industrial customers).¹⁷

The plan's promise of lower electric rates is unlikely to be realized. To understand why, it helps to understand how Vermont's electric utilities are regulated and how electricity is priced.

Vermont's electric utilities are regulated by the Public Utility Commission (PUC).¹⁸ These utilities have an obligation to operate prudently and in the public interest. For example, Green Mountain Power cannot simply charge whatever price it wants to its ratepayers. If the company wishes to increase its rates, it must submit an application to the PUC and justify the reasons for the increase.

Electric rates combine the costs of generating electricity, transmitting it at high voltages from distant sources (such as Canada), and distributing the electricity locally along the “poles and wires” system. Typically, the cost of electricity generation represents about one-half of the overall price paid by a retail consumer. Another one-third of the retail price is the cost of local distribution. The remaining portion pays for high-voltage transmission. For example, current residential electric rates for Public Service of New Hampshire include a 2.5 cents/kWh charge for transmission and a 4.1 cents/kWh charge for local distribution.¹⁹ Because New Hampshire, unlike Vermont, restructured its electric industry, retail customers there can choose their own electric generation supplier. Thus, the generation portion of their electric bill depends on their electric supplier.

Vermont currently imports two-thirds of the electricity consumed by individuals and businesses. About half of those imports are from Canada, primarily Hydro-Quebec. The other half is imported from the New England grid system. If, instead of importing electricity, Vermont's electric utilities could build new, in-state renewable generation and, by doing so, reduce electricity rates, then the PUC would require them to do so. That is exactly what the ESSEX Plan proposes: more locally sourced electricity from biomass plants and, especially, solar power, especially solar power that is generated by customers themselves and sold back to utilities through what is called “net-metering”.

A key reason why Vermont imports electricity from Canada and the eastern U.S. is economic: such electricity is less costly than electricity generated in-state. In 2016, the average wholesale price of electricity in New England was around three cents per kilowatt-hour (kWh).²⁰ Half of all of the electricity supplied was generated with natural gas, whose price has fallen dramatically because of new supplies produced through hydraulic fracturing. In all of New England, wind generation accounted for 2 percent of all generation, while solar accounted for less than 1 percent.²¹

By contrast, the average Green Mountain Power residential ratepayer paid over 17 cents/kWh for electricity in 2016, including their share of the costs of the New England transmission grid and the costs for local distribution (i.e., “poles and wires”).²² In that same year, residential customers of Vermont Electric Cooperative paid over 19 cents/kWh for their electricity, while customers of Burlington Electric paid over 15 cents/kWh.²³ Green Mountain Power currently pays customers who supply solar electricity almost 15 cents/kWh through its net-metering program, a price that is about five times greater than the New England wholesale price.²⁴ (The adverse economic impacts of net metering programs are discussed below.)

Total electric consumption in the state in 2015, the latest year for which data are available, was about 5.5 million megawatt-hours (MWh).²⁵ That's equivalent to about 19 trillion Btus (TBtus) of energy.²⁶ By contrast, Vermont's total end-use energy consumption from all sources was over 130 TBtus.²⁷ In other words, electricity consumption accounts for less than one-sixth of total end-use energy. Transportation accounts for the largest portion of energy use, 49 TBtus (38 percent).²⁸

Currently, Vermont has 119 MW of installed wind capacity and less than 200 MW of solar photovoltaic (PV) capacity, including

rooftop solar PV. Together, these generated around 300,000 MWh of power in 2016, or 5 percent of total electric consumption.²⁹ Biomass, primarily electricity generated by burning wood, provided another 5 percent of electricity consumption. In-state hydroelectric generation accounts for about 20% of Vermont's total electricity consumption. Thus, taken together, in-state renewable generation accounts for about 30% of Vermont's current electricity consumption.

If Vermonters make the transition as envisioned by the ESSEX Plan, then the demand for electricity will increase. As discussed above, a fully electrified Vermont economy, perhaps the ultimate goal for the ESSEX Plan's authors, would increase electricity demand six-fold. Even if the ESSEX Plan only doubles the demand for electricity, the plan's envisioned additional local, renewable generation required will need to produce five million megawatt-hours (MWh).

As for solar PV, whether small-scale distributed solar (e.g., rooftop and "behind-the-meter" solar PV) or multi-MW, utility scale facilities, the costs are far more than the current New England wholesale price. The cost to install behind-the-meter solar PV is \$4,000-\$5,000 per kW. In an average year in New England, solar PV provides electricity about 15 percent of the time (called a "capacity factor").³⁰ In a cloudy, northern climate like Vermont, solar provides very little generation in winter. That translates into an average per-kWh cost over the lifetime of an installed system of between 15 and 25 cents/kWh (\$150/MWh - \$250/MWh), or five to seven times higher than the average wholesale price of electricity.³¹

Moreover, a direct comparison between solar PV and electricity purchased from the wholesale market ignores the cost of having to back-up all of the solar PV generation, either with other generating resources that are available "on-demand," such as natural gas-fired and hydro generation, or with battery storage. The greater the amount of solar PV installed, the greater will be the need – and the cost – of back-up generation to ensure reliable electric supplies. Similarly, battery storage costs, such as the costs associated with GMP's proposal to install Tesla Powerwalls in residents' homes, are costly. Customers who install solar PV at their homes or businesses and sell back the electricity to their local utility effectively "free ride" on the remaining customers who pay for providing them with back-up electricity at night and on cloudy days.

With solar PV so much more costly than electricity in the wholesale market, meeting increased electricity demand with high-cost electricity will not reduce electric rates, it will raise them. Furthermore, the ESSEX Plan's claim that the carbon tax will reduce the costs of low-carbon technologies, and therefore provide "twice the climate benefits of other plans,"³² is confusing, at best. Solar PV, for example, has virtually no operating costs at all. Thus, the plan won't reduce those costs. Nor will the plan reduce the capital costs of technologies. Vermont does not drive technological change and reduced costs in different industries, because the state is too small to influence multi-national markets. Furthermore, the physical ability of Vermont to generate all of its electricity from in-state renewable resources, especially if the state transforms all current fossil fuel use – including transportation – is extremely unlikely. The amount of wind, solar, and biomass resources would require carpeting large swaths of the state with solar panels and wind turbines, and only so much wood can be harvested sustainably from Vermont's forests.

Finally, if many customers switch to electric heat, purchase electric vehicles, and so forth, then Vermont's electric utilities may have to boost the capacity of their local distribution systems to ensure all of that new demand can be met. The ESSEX Plan ignores those costs, which will further increase electric rates and, because of net-metering, impose even greater burdens on lower income Vermonters (see below).

Thus, the plan's promise of the lowest electricity rates in New England is unlikely to be realized. Rather, the more the plan increases the demand for electricity, and the more that electricity is sourced from in-state renewable generation, especially solar PV, the higher will be retail electric rates. Those higher electric rates will, in turn, reduce economic growth and may cause some Vermont residents and businesses to relocate out-of-state.

Will the ESSEX Plan create thousands of "clean energy" jobs?

The ESSEX Plan makes much of the creation of new, clean energy jobs. This is another economic fallacy, for two reasons. First, the identification of clean energy jobs is itself arbitrary. Second, as counterintuitive as it may seem, the objective should not be policies that create jobs. Rather, the objective should be policies that increase economic value and economic growth. Those are not the same thing.

The DPS 2017 Clean Energy Investment Report, for example, uses arbitrary definitions of "clean energy" jobs. For example, if someone installs an "Energy Star" refrigerator, that person is in a clean energy job. But if that same person installs a refrigerator that is not "Energy Star" certified, his job is not clean energy.

Similarly, bus drivers are considered to be clean energy jobs. An accountant working at a local firm who spends 2/3 of his time dealing with renewable energy projects is considered a clean energy job. So is the banker who evaluates whether to loan money for renewable energy or biomass projects. Thus, a banker that spends most of his time working on loans for individuals wishing to purchase wood-fired furnaces would be considered in a clean energy job.

Although it may sound counterintuitive, providing more jobs is not an economic “benefit”. Rather, hiring an individual and paying their salary is what economists call a “transfer,” much like tax payments. Obviously, the person who is hired and is now paid a salary benefits. But that salary is paid by the business owner and, as such, is a cost.

Moreover, the plan’s claim that it would generate 2,000-6,000 new clean energy jobs in the state is not defensible. That claim is based on the 2014 Total Energy Study prepared by the DPS.³³ But that study assumed a carbon tax rising to \$450/tonne, eleven times higher than proposed by the ESSEX Plan.³⁴

The more important economic point is the plan’s misguided focus on creating new clean-energy jobs, however such jobs are defined. Employers hire workers only if they expect the economic value produced by those workers to exceed the cost of hiring them. The goal of economic policies in Vermont, or elsewhere, should be to increase economic growth and the size of the economic pie. A focus solely on creating new jobs, rather than economic growth, would suggest creating thousands of low economic value jobs (e.g., requiring forest workers to use axes rather than chain saws), rather than allowing businesses to determine for themselves how to increase the productivity of their workers (e.g., by using chainsaws or mechanized equipment to cut wood).

The ESSEX Plan assumes that, as the carbon tax increases, more and more clean energy jobs will be created, over and above those lost by existing workers. This is an economic “free lunch,” which implies that Vermont can create unlimited numbers of jobs simply by raising the carbon tax to ever higher levels accompanied by even greater rebates. The ESSEX Plan will effectively force artificial “clean energy” employment increases, even though by doing so, total economic growth may be reduced. From society’s overall standpoint, that is not an economic benefit. Rather, it is an economic cost.

Will the ESSEX Plan carbon tax encourage a “buy local” effect?

The authors of the ESSEX Plan believe the higher prices of fossil fuels will cause Vermonters to substitute locally-produced energy from biomass and solar PV. The plan’s authors see this as an economic benefit, stating, “Our economy is stronger when we use locally generated energy instead of imports from distant states and countries.”³⁵ The authors use the example of Vermont maple syrup, stating, “It makes little sense for Vermont to import maple syrup when we produce the best product and all the quantity we need.”³⁶

Vermont does produce famous maple syrup, which it exports to other states. The logic of the plan’s authors suggests that states to which Vermont exports maple syrup should heavily tax the import of Vermont maple syrup. That would make it economical for them to produce their own so consumers could “buy local”. Applying this same logic suggests that Vermont should construct greenhouses to grow its own supply of oranges, lemons, avocados, and coffee beans; it should manufacture its own automobiles and tractors, clothing, and appliances. In short, “buy local” logic suggests that Vermont should become an economic island because, if it did so, then the state economy would boom.

Such logic is flawed. States and countries import some goods and export others based on a fundamental economic concept known as “comparative advantage”. New Mexico does not have a maple syrup industry because sugar maples do not flourish in its climate. Thus, if New Mexicans want maple syrup, they go to the store (or online) and purchase a bottle of Vermont maple syrup.

However, New Mexico is as famous for its green chile as Vermont is famous for maple syrup. Growing green chile in Vermont’s climate would be difficult and expensive. Farmers would need costly greenhouses, and would have to reproduce the hot and dry conditions that green chile requires. Even allowing for transportation costs, it is far more cost-effective for Vermonters to import New Mexico green chile than grow their own.

This basic economic concept applies equally to energy supplies. Vermont does not have its own supplies of petroleum, nor its own petroleum refineries. Thus, when Vermonters purchase fuel oil or propane to heat their homes, that fuel oil and propane is imported. It makes economic sense to do so when the alternatives, such as heating with electricity, are more expensive, or in the case of heating with local wood, less convenient. The same is true for the gasoline and diesel fuel used in Vermonters’ cars and trucks. Indeed, Vermont imports cars and trucks, because developing “locally manufactured” vehicles would be cost prohibitive.

When locally supplied energy costs far more than the delivered cost of energy from elsewhere, the ESSEX Plan’s statement that the Vermont economy is stronger with “locally supplied energy” is demonstrably wrong. Businesses that produce “locally supplied energy” are better off when the state mandates that consumers buy their products, such as the Standard Offer and RESET laws that oblige electric utilities to purchase Vermont-produced renewable wind and solar electricity at twice the cost of grid power. Other businesses and consumers that must pay the higher prices are not.

For instance, suppose 100,000 Vermont homes switched to biomass (i.e., wood-based) heating. Higher prices for wood would lead to increased investment in biomass production in the state, which may result in more jobs. However, there is a natural limit to how much wood can be harvested sustainably each year from Vermont’s forests. A massive switch to wood burning would result in massive cutting of forests, which many would find environmentally and esthetically unacceptable. To meet the increased demand for wood heat,

and higher market prices, wood would probably flow into Vermont from New Hampshire and Maine, contrary to the ESSEX Plan's "local energy" sourcing goal.

Would the ESSEX Plan be revenue neutral?

Unlike its predecessor, the EIV-backed plan of 2015, the ESSEX Plan professes to be revenue neutral. The plan claims that all of the revenues received by the State from the taxes levied on gasoline, on-road diesel, heating oil, natural gas and propane will be paid out in three ways: reduction of electric rates (separately) for industrial/commercial and residential customers, lower-income customer rebates, and "rural resident" rebates.

Administering the complex system of lower-income and rural resident rebates, however, will require not insignificant administrative costs. So will assessing the tax on gas, oil, natural gas and propane distributors (see below). While the ESSEX Plan avoids its predecessor plan's visible diversion of carbon tax revenues into state renewable energy and conservation programs, somewhere allowance must be made for the administrative costs. These will either have to be borne by the ESSEX Plan, in which case it will not be revenue neutral, or by taxpayers generally.

What effect is a Vermont carbon tax likely to have among Vermonters who live along the state's borders?

As fossil fuel prices rise in Vermont, they will have an incentive to cross over state lines to where the tax does not apply, much as Vermonters living along the New Hampshire border avoid paying sales taxes by simply crossing the Connecticut River. Rather than pay a higher price for gasoline, heating oil, and propane from a Vermont business, they will have an increasing economic incentive to purchase those fuels from out-of-state suppliers. However, they will still receive rebates on their electric bills and, in doing so, benefit from the carbon taxes paid by other Vermonters.

Economists call this behavior "free riding". To prevent it, Vermont, with its carbon tax, would need to take significant actions to block "smuggling" of bulk fossil fuels into the state. This would be complex and costly. Not only would it be physically impossible for the state to "intercept" individuals' purchases of gasoline and diesel fuel for their vehicles, the state would have to institute a program of stopping and taxing all commercial vehicles carrying petroleum fuel into the state. Moreover, it is not clear whether the state could do so without violating interstate commerce laws. But even if Vermont could legally "intercept" deliveries of petroleum fuel from outside the state, the cost of enforcement would be significant, adding to the plan's administrative cost.

The adverse effects near the borders will not be limited to Vermont petroleum dealers. The carbon tax will make goods and services produced in Vermont that use fossil fuels more costly. For example, store, UPS and FedEx deliveries will become more costly because of the tax-inflated prices for gasoline and diesel. As those prices increase, more Vermonters along the border will cross the state line to shop, as they have done since 1970 along the New Hampshire border to avoid the Vermont sales tax. The increasing "leakages" of purchasing power to outside the state will cause further economic harm to existing Vermont businesses, especially those near the state's borders. This impact was also noted in the 2014 Total Energy Study.

In these "go it alone" simulations, other states do not take on the costs of building a renewable energy supply alongside Vermont. As a consequence, the competitive position of Vermont declines; businesses lose market share and consumer dollars leak increasingly out of state to cheaper sources of supply.³⁷

Thus, if Vermont imposes a carbon tax, while neighboring states do not, Vermont will suffer relatively more economic harm because of leakages. Vermont also exports goods produced within the state, including those produced by the ESSEX Plan's sponsor, Seventh Generation. To the extent those goods become more costly to produce and distribute, sales of Vermont-made products will decrease in competitive national markets, further harming the Vermont economy.

Will the ESSEX Plan impose an economic burden on lower income Vermonters?

The ESSEX Plan is designed to "prioritize the most vulnerable and the middle class".³⁸ What this means is that the carbon tax will, first, make the most vulnerable and the middle class (and everybody else) pay more for gasoline, on-road diesel, heating oil, natural gas and propane; and second, give electricity consumers lower electric rates and two new subsidies (lower income and rural rebates) to help them pay the added costs of the newly imposed carbon tax.

The plan promises, but does not specify, a provision to ensure that "economically vulnerable Vermonters whose rent includes electricity and those whose homes are off the electric grid" will receive the benefits of the ESSEX Plan. Of course, to the extent the recipients of these benefits are held harmless, they lose all incentive to switch their energy consumption away from the carbon fuels.

Moreover, the plan's proposed incentives for net-metering will shift electricity costs from those who can take advantage of net-metering, most likely higher-income consumers, to those who cannot, most likely lower-income ones.

As explained previously, net-metering refers to retail electric customers who install solar PV and "sell" the electricity produced back to their local utility for credit against their power bills. Under net-metering, initiated in Vermont in 1998, these customers are

credited at the retail price of electricity, which is much higher than the wholesale price. As discussed previously, in 2017, GMP paid net-metering customers almost 15 cents/kWh for all of the electricity they generated, about five times the average wholesale electric price in New England.

By selling power back to their local utility at rates far higher than the utility's market cost of electricity (i.e., the wholesale market price), the utility overpays for its electricity. These excess costs must be recovered from the utility's other ratepayers. The higher the net metering rate paid to customers, the greater the economic incentive to install solar PV. But as more customers install solar PV and net-meter, fewer nonparticipating customers are left to pay the higher costs.

Installing solar PV systems is expensive.³⁹ Lower-income Vermonters, along with those who live in apartments or rental housing, are unlikely to participate. As such, installing solar PV tends to be undertaken by wealthier Vermonters. Therefore, lower-income Vermonters are effectively forced to subsidize wealthier ones.

Another indirect subsidy, borne by customers who do not net-meter is providing back-up service to those who do. Net metering customers are still connected to the local electric grid. Thus, on cloudy days and at night, they purchase electricity from their local utility. The local utility must ensure it has sufficient generation at the ready to meet net metering customers' electricity needs at a moment's notice. But net-metering customers do not pay the full cost of this back-up service, which means that a utility's remaining customers are forced to subsidize that as well.

Because electricity generated by solar PV is inherently intermittent, it is actually less valuable than electricity purchased from the grid market, which can be scheduled as needed. Thus, net metering customers are paid a price far greater than the wholesale market price for electricity that is less valuable than the market price.

Although the ESSEX Plan promises lower electric rates because of rebates, the plan recommends that net metering rates should remain at the previous pre-ESSEX level. Thus, this economic incentive for net metering will increase, meaning that more Vermonters will wish to install solar PV. As more Vermonters choose net-metering at the ESSEX Plan's fictitious premium price, the more utilities will be forced to raise their rates to recover the costs of providing net-metering customers with back-up power on cloudy days and at night. This will put a further burden on lower-income Vermonters, regardless of promised rebates.⁴⁰

The bottom line is that the plan's proposal for "locally-sourced" electricity will not lower electric rates, it will increase them. And, the plan will force lower-income Vermonters to bear a disproportionate burden of those higher costs.

What would be the effect of a state carbon tax on maintaining Vermont's transportation infrastructure?

Vermont's highway system – construction, maintenance, bridge replacement, and town road assistance – largely depends on receipts from taxes on gasoline and on-road diesel fuels, 35 percent of the state's share of revenues. In 2016 the Agency of Transportation estimated a total FY2018 transportation funding gap of \$227 million.⁴¹ Mainly because the Federal gasoline tax has remained at 18.4 cents since 1993, while vehicle fuel efficiency has sharply increased and inflation has increased transportation system costs, Federal payment streams have become more precarious. The major source of highway funding, the Federal Highway Fund, is out of money and survives only because of special appropriations by Congress, which cannot be guaranteed.

As the ESSEX Plan carbon tax impels consumers to shift away from fossil fuels, the state's gasoline and on-road diesel fuel tax receipts will decrease, putting the state's highway network at further risk. Worse yet, the profusion of electric vehicles advocated by the ESSEX Plan will not contribute whatsoever to highway and bridge maintenance and replacement. In fact, EV drivers now get "free" fuel from state-financed charging stations. If the demand for EVs increases, so will taxpayer subsidies to EV owners. Alternatively, EV owners will have to begin paying for the electricity they use that, as discussed previously, is likely to become more costly, not less.

To compensate, Vermont would need to raise additional monies by increasing gasoline and diesel taxes, recover the two cents of the vehicle sales and use tax currently diverted to the Education Fund, levy taxes on mileage driven, or find some other revenue source. When it becomes necessary to increase the per gallon tax rate on gasoline and on-road diesel, as it does every decade, legislators would find that that increase would come on top of the gasoline and on-road diesel taxes levied by the ESSEX Plan. Allowing the ESSEX Plan's motor fuel carbon tax revenues to flow into highway maintenance and bridge replacement would reduce rebates to customers and negate the plan's promise of "revenue neutrality".

Although there are many factors in play in paying for a state highway system, it seems clear that allowing the ESSEX Plan's carbon tax on motor fuels to take away a steadily growing portion of the principal state tax base for highway maintenance, construction, bridge repair, and town highway support will cripple an already underfunded state highway system.

Can the ESSEX Plan be administered efficiently?

A final point on which the ESSEX Plan is silent is the resulting administrative complexity. The plan assumes that the state will distribute 50 percent of the revenues that accrue to residential customers as rebates to thousands of such customers. The State will have

to determine which customers are eligible for low-income and rural rebates, what their incomes are, what their monthly electric bills are, and the amount of the monthly checks to be paid out. The state's experience with the Vermont Health Connect insurance exchange, which had a similar task, is not reassuring.

Determining the carbon tax revenues that should be allocated to residential, commercial, and industrial customers will be virtually impossible, without some form of complex distribution and auditing system.

For example, the state will collect carbon tax dollars from fossil-fuel distributors. Thus, a gasoline distributor will pay the carbon tax when selling fuel to retail gasoline stations. The gasoline stations will then sell this carbon-taxed gasoline to Vermont residents and businesses. However, gasoline station owners are unlikely to be able to capture the entirety of the tax because supply and demand conditions determine what fraction of a tax can be passed on to consumers, and thus they effectively pay a portion of the carbon tax.⁴² Retailers would have no way of distinguishing the sales to residential, commercial, and industrial customers. Thus, how the ESSEX Plan proposes to determine the amount of money to be rebated to electric ratepayers is unknown.

Furthermore, the plan cites to "ruralness" data prepared by the U.S. Department of Agriculture (USDA) to identify which customers would receive rural rebates. But the USDA has three definitions of "ruralness," each of which would change the mix of Vermonters receiving rebates.

Even if the monies could be allocated accurately, will GMP's Energy Assistance Program, which The ESSEX Plan offers as a model for rebate distribution, be given confidential tax data to identify households whose incomes are less than 400 percent of the federal poverty level? What happens when those data become obsolete? Suppose a residential customer's income was under the 400 percent threshold last year but is over the threshold this year? How will the utilities make determinations so as not to send that customer a low-income rebate?

The State's Petroleum Cleanup Fund was created to underwrite the cleanup of oil spills. The ESSEX Plan dramatically expands the purpose of this minor fund to include combating "climate pollution", and tasks it with distributing millions of dollars of "rural rebates" to eligible families. That will mean higher administrative costs.

The plan also calls for the State's Auditor of Accounts to assess the program each year. That, too, will be costly, likely requiring hiring new employees to do so. (Of course, it may be that, under the plan, these will be considered "clean energy" jobs and thus regarded as an economic benefit.) For example, Connecticut's carbon tax bill (proposed but not enacted) states that, of the revenues collected, "not more than five percent shall be used to pay for administrative costs." The ESSEX Plan estimates \$240 million in carbon tax revenues will be collected annually once the carbon tax reaches its peak. Five percent of that is \$12 million. Of course, the costs of administering the tax are unlikely to change much as the tax increases. Thus, in the initial years, the relative burden of administrative costs to monitor and enforce the plan may represent a much higher percentage of the revenues.

What environmental benefits will the ESSEX Plan produce?

The ESSEX Plan claims environmental benefits from avoiding premature deaths associated with fossil fuel combustion. The plan's authors state that, "One recent study conducted by MIT estimated that more than 200 Vermonters suffer premature deaths annually due to air pollution attributable to the burning of fossil fuels."⁴³ The plan's authors have misinterpreted the MIT study, which they fail to even cite in their bibliography.

The MIT study used national emissions data to predict premature deaths from particulate emissions (not carbon dioxide emissions). For example, the study estimated that 57 Vermonters would suffer premature deaths each year from particulate emissions from coal-fired power plants.⁴⁴ However, Vermont has no coal-fired power plants. The study assumes that pollution from such plants drifts into Vermont from the Midwest. The study also predicts that 36 Vermonters die each year from particulates emitted by Vermont's smoke-belching industries. However, Vermont has no such industries. The largest single source of estimated premature deaths is the residential/commercial sector, which in Vermont was estimated to cause 69 deaths each year. Some of this may be due to the use of fuel oil for heating. Of course, if residences and commercial businesses switch from fuel oil to wood because of the proposed carbon tax, premature deaths may increase, owing to wood's far greater particulate emissions.⁴⁵

The plan also cites to a 2017 study prepared by the Harvard School of Public Health associated with a proposed tax on carbon "pollution" in Massachusetts. That study found that a \$40/tonne carbon tax would save an estimated 340 lives in Massachusetts over a 24-year period, 2017-2040, or about 15 lives/year, whose 6.9 million population is ten times that of Vermont.⁴⁶

The largest source of larger particulates (called "PM 10")⁴⁷ within Vermont is dust from roads, agriculture, and construction. Dust accounted for 86 percent of total PM10 emissions in 2014. Residential wood burning accounted for another 10 percent, while fossil fuel combustion accounted for just 2 percent of PM10 emissions. In 2014, dust and residential wood burning accounted for 87 percent of smaller particulates (called "PM2.5") in the state.⁴⁸ Fossil fuel combustion accounted for just 6 percent of PM2.5 emissions.

Thus, the ESSEX Plan would have a minimal impact on total particulate emissions in Vermont, and thus virtually no health co-

benefits from reduced premature deaths. In fact, the ESSEX Plan could result in higher levels of particulate emissions if consumers and businesses substituted wood for fossil-fuel consumption, rather than converting their space and water heating to electricity.

How is the ESSEX Plan's ultimate tax rate related to the social cost of carbon?

The plan bases its choice of the maximum \$40/tonne carbon tax on what is called the “social cost of carbon” (SCC). The Obama administration in 2010 arrived at \$42/tonne for this cost. The models used to estimate SCC value, called “integrated planning models,” are controversial. Different models have estimated a wide range of SCC values, from negative ones (i.e., carbon emissions are beneficial) to ones in the hundreds of dollars per tonne,⁴⁹ depending on the underlying assumptions.

What effect will the proposed CO₂ reductions have on climate change?

The ESSEX Plan defends “being a proactive innovator” in achieving climate benefits by suggesting that “Vermont’s brand identity will be enhanced and our rhetoric will match reality.” The effect of CO₂ emissions on global climate is a question for atmospheric physicists, but it seems significant that Dr. Asa Hopkins, Policy Director for the Vermont Public Service Department, said at a public information meeting in October 2015 that achieving Gov. Shumlin’s “90 percent renewable energy by 2050” goal would have no significant effect on climate change. The ESSEX Plan’s goal of reducing carbon dioxide to 15-25 percent below 1990 levels (8.1 MMT) by 2026 would surely produce far less of an effect than achieving the Shumlin goal.

Although some argue that Vermont’s climate leadership will inspire others to follow, in fact, other states will have an economic incentive not to follow Vermont’s lead in order to improve the relative competitiveness of their own economies.⁵⁰ As such, the ESSEX Plan will not only not provide any measurable climate benefits, it will provide an economic incentive for other states to exploit Vermont’s decreasing competitiveness.

Conclusion: The ESSEX Plan will impose significant economic harm on Vermonters, but provide virtually no environmental benefits

The fundamental premise of the ESSEX Plan – that taxing fossil fuels by way of a carbon tax will reduce consumption of those fuels – is valid as far as it goes. Unfortunately, the ESSEX Plan ignores all other economic realities.

First, 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.

Second, many Vermonters will be unable to afford the needed capital investments – new energy efficient equipment, such as furnaces, solar PV installations, and new electric vehicles – because those investments are costly. Moreover, the forthcoming decreases in the federal government’s solar investment tax credit means the costs of those installations, which are a pillar of the proposed plan, will become far more costly.

Third, 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 locally-sourced renewable biofuels and solar power. The latter is currently five times more expensive than the average price of electricity in the New England wholesale electric market. The cost of the former will increase because the demand for biofuels will increase as a consequence of the tax. Moreover, there is a limit to how much can be harvested locally on a sustainable basis. Increased reliance on solar power will also mean having to pay the costs for more back-up generation and storage.

Fourth, by recommending that net-metering rates not be reduced, despite electricity rebates, **the plan will further exacerbate net-metering’s subsidies,** which will primarily benefit higher-income Vermonters at the expense of lower-income ones. As more electric utility customers opt to net-meter, fewer customers will remain to pay for the costs of back-up generation and some of the fixed costs associated with operating local utility infrastructure. Moreover, lower-income Vermonters will be harmed as the demand for biofuels increases, which will increase their price.

Fifth, 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.

Sixth, the plan would be complex and costly to administer. Retailers will have no way of distinguishing the sales to residential, commercial, and industrial customers. Thus, how the ESSEX Plan proposes to determine the amount of money to be rebated to electric ratepayers is unknown. Administering the plan will require providing the state’s electric utilities with confidential taxpayer information. And, if Connecticut’s estimates of a five percent administrative burden is a guide, the administrative costs could be \$12 million per year.

Seventh, because most particulate pollution in the state – the primary source of adverse health impacts – is generated by dust and wood smoke, **the health benefits of the plan will be minimal**. Claims of reducing the premature deaths of hundreds of Vermonters each year are not credible.

Finally, regardless of whether enacting a carbon tax will improve “Vermont’s brand identify,” **the plan will provide no climate benefits** because the forecast reductions in carbon dioxide emissions will have no measurable impact on climate.

END NOTES

- 1 Source: “The Economic, Fiscal, Emissions, and Demographic Implications from a Carbon Price Policy in Vermont,” Report prepared for Vermont Public Interest Research and Education Fund, November 13, 2014. Available at: https://www.energyindependentvt.org/wp-content/uploads/2015/04/REMI_Final.pdf
- 2 ESSEX Plan, p. 1. Available at http://ethanallen.org/wp-content/uploads/2018/01/the_essex_plan_pdf.pdf
- 3 The ESSEX Plan predicts that the \$40/tonne tax would raise \$120 million in commercial and industrial rebates. The “Sample Bill Details” in the plan (p. 15) assume that 50 percent of the revenues raised by the tax would be refunded to residential customers, implying \$240 million in total revenues collected.
- 4 ESSEX Plan, p. 11.
- 5 As discussed below, there are different definitions of “rural.” Moreover, the plan will not provide any rebates to businesses located in rural locations.
- 6 Id., p. 6.
- 7 Id., p. 7.
- 8 Id., p. 8.
- 9 Id., pp. 8-9.
- 10 Id., p. 8.
- 11 Id., p. 10.
- 12 Vermont Department of Public Service, “Total Energy Study: Final Reports on a Total Energy Approach to Meeting the States Greenhouse Gas and Renewable Energy Goals,” December 8, 2014 (2014 TES Study), Appendix D, “Economic Modeling Analysis of Total Energy Study Policies,” p. 24. Available at: http://publicservice.vermont.gov/publications-resources/publications/total_energy_study
- 13 It is common for energy efficiency advocates to determine the cost-effectiveness of various measures based on unrealistic assumptions, including: (i) that consumers have long (20-30 year) time horizons and can capture all of the benefits from installed measures; and (ii) that there is no uncertainty regarding energy savings (e.g., how long a new LED lightbulb will last).
- 14 Information on RGGI can be found at the Vermont Public Utility Commission website: <http://puc.vermont.gov/electric/regional-greenhouse-gas-initiative>
- 15 ESSEX Plan, p. 7.
- 16 Id., p. 5
- 17 Id., p. 7.
- 18 All electric utilities in Vermont – GMP, municipally owned utilities (e.g., Burlington Electric), and rural cooperatives (e.g., Vermont Electric Cooperative) are required to have Certificates of Public Good to operate.
- 19 Source: New Hampshire Public Utilities Commission. Eversource Tariff, p. 41. Available at: http://www.puc.state.nh.us/Regulatory/Tariffs/Eversource-PSNH_percent20Tariff_percent20No_percent209.pdf
- 20 Source: ISO-New England, 2016 Annual Markets Report, p. 14. Available at: https://www.iso-ne.com/static-assets/documents/2017/05/annual_markets_report_2016.pdf. In addition to the wholesale price of energy, local utilities must also pay for “capacity” that provide sufficient electric generating resources available to ensure reliable electric service. The cost for capacity varies, but in 2016, was about 25 percent of the wholesale cost of electric energy. Id., p. 14.
- 21 Id.
- 22 This includes the “ready-to-serve” minimum charge levied on customers’ electric bills.
- 23 Prices based on sales and revenue data reported by electric utilities to the U.S. Energy Information Administration (EIA) on Form No. EIA-861. Available at: <https://www.eia.gov/electricity/data/eia861m/index.html#salesrevenue>
- 24 Source: <https://www.energysage.com/net-metering/green-mountain-power/>. Under a PSB rule adopted in 2016, customer payments are limited to the electricity component of their bills. In other words, customers must still pay the fixed, “ready-to-serve” charges. For GMP’s residential customers, the current ready-to-serve customer charge is 57.1 cents/day. But this amount does not pay for all of the fixed costs of the distribution system, nor does it pay for all back-up costs.
- 25 One MWh = 1,000 kWh.

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- 26 One kWh = 3,412 Btus. Source: U.S. EIA, State Electricity Profiles, Vermont Available at: <https://www.eia.gov/electricity/state/vermont/>
- 27 Source: U.S. EIA, State Energy Data System, Vermont. Available at: https://www.eia.gov/state/seds/data.php?incfile=/state/seds/sep_fuel/html/fuel_te.html&sid=US&sid=VT
- 28 Id.
- 29 Source: EIA Form No. 861.
- 30 ISO-NE assumes a solar PV capacity factor of just 2 percent during peak demand hours during the winter.
- 31 The U.S. EIA estimates a levelized cost in 2016 dollars for all solar PV of between \$46/MWh and \$143/MWh for installations in 2022, excluding tax credits. Given the relatively small output of solar PV in Vermont due to the climate, the levelized costs for solar PV in the state will be at the high end of the range. Moreover, behind-the-meter solar PV is much more costly than utility-scale solar PV. Thus, a range of costs of \$150/MWh - \$250/MWh for behind-the-meter solar PV is a conservative estimate.
- 32 ESSEX Plan, p. 11.
- 33 2014 TES Study, Appendix D, “Economic Modeling Analysis of Total Energy Study Policies,” p. 6. The TES Study also contends that imposing an increasing carbon tax, even without rebates, grows the Vermont economy. A discussion of the structure and underlying assumptions of the economic model used by the DPS is far beyond the scope of this report.
- 34 Id., p. 8.
- 35 ESSEX Plan, p. 7.
- 36 Id., p. 6.
- 37 2014 TES Study, Appendix D, p. 7.
- 38 ESSEX Plan, p. 1.
- 39 Solar PV installations have been heavily subsidized by a 30 percent federal investment tax credit. However, beginning in 2019, that tax credit will decrease. At the start of 2022, the tax credit for residential installations will be eliminated, while the credit for commercial installations will be 10 percent. This will raise the effective cost of behind-the-meter solar installations significantly and, consequently, will reduce the economic incentive for customers to install them. The plan will not affect that economic reality.
- 40 As for rural Vermonters, the plan’s proposed rebate system depends critically on the definition of “rural.” Although the plan cites to data published by the Economic Research Service of the U.S. Department of Agriculture estimate which Vermonters would be considered to be “rural,” that same data provides three alternative definitions of “ruralness.” Moreover, the plan provides no benefits to businesses located in rural areas. The higher costs imposed on rural businesses would disadvantage them relative to their “urban” counterparts, likely leading to closures and higher levels of rural unemployment.
- 41 Source: Transportation Asset Management Plan, Finance Working Group Report, January 28, 2016, p. 17.
- 42 Economists refer to this as the “incidence” of a tax. Unless demand is completely unresponsive to price changes (i.e., consumers will purchase the same quantities regardless of how high the tax is), a portion of the tax levied will be borne by suppliers.
- 43 ESSEX Plan, pp. 8-9. There is no reference to any such MIT study in the plan’s bibliography. However the discussion in the plan appears to be referencing a study based on 2005 data that was prepared by researchers at MIT. See Fabio Caiazzo, et al., “Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005,” *Atmospheric Environment* 79 (2013), pp. 198-208, 203 (Table 5). Available at: <http://www.talmudology.com/s/Air-pollution-and-early-deaths-in-the-United-States-2103.pdf>
- 44 The definition of a “premature death” is also controversial. For example, the cost-benefit analysis accompanying the U.S. EPA’s Clean Power Plan defined a “premature death” as anyone, regardless of age, dying from heart or lung-related diseases. For a discussion, see Jonathan Lesser, “Missing Benefits, Hidden Costs: The Cloudy Numbers in the EPA’s Proposed Clean Power Plan,” Manhattan Institute for Policy Research, June 2016, pp. 27-28. Available at: <https://www.manhattan-institute.org/download/8988/article.pdf>
- 45 See Roger McDonald, “Evaluation of Gas, Oil, and Wood Pellet Fueled Residential Heating System Emissions Characteristics,” Brookhaven National Laboratories, BNL-91286-2009-IR, December 2009. Available at: <https://www.bnl.gov/isd/documents/71376.pdf>
- 46 Jonathan Buonocore, et al., “Air Quality and Health Co-Benefits of a Carbon Fee-and-Rebate Bill in Massachusetts,” Center for Health and the Global Environment, Harvard T.H. Chan School of Public Health, April 2017, p. 10. Available at: <http://chge.hsph.harvard.edu/files/chge/files/carbonfeema.pdf>
- 47 The “10” refers to the average particle size in microns.
- 48 2014 is the latest year for which the EPA has published state level emissions.
- 49 See “Missing Benefits, Hidden Costs: The Cloudy Numbers in the EPA’s Proposed Clean Power Plan,” Manhattan Institute for Policy Research, June 2016 (Lesser 2016), pp. 27-28 for a discussion. Available at: <https://www.manhattan-institute.org/download/8988/article.pdf> The key flaw in using SCC values to estimate monetary benefits from reductions in carbon emissions is that the benefits must be determined based on marginal reductions in emissions, whereas the SCC value is based on an overall average change.
- 50 The EPA’s Clean Power Plan was based similarly on this “leader-follower” assumption. Again, however, there is no reason to believe that foreign countries would voluntarily squander economic advantages they obtain if the U.S. reduced its competitiveness through higher energy prices.



Ethan Allen Institute

The Ethan Allen Institute, founded in 1993, is Vermont's independent, nonpartisan, free-market public policy research and education organization – a “think tank” for issues facing Vermonters.

The Mission of the Institute is to influence public policy in Vermont by helping its people to better understand and put into practice the fundamentals of a free society: individual liberty, private property, competitive free enterprise, limited and frugal government, strong local communities, personal responsibility, and expanded opportunity for human endeavor.

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- Better education for all Vermont children, and an efficient, accessible health care system, each based on the principles of personal responsibility, competition, and empowered consumer choice.
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