



Carbon Pollution Taxes A Short Vermont Primer

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These Q&As explore the idea of taxing greenhouse gas emissions—why do it, how to do it, and who’s done it. Although they cannot answer all questions, they introduce you to the basics about carbon pollution taxes. They also provide some background about the Vermont context for considering carbon pollution taxes.

Carbon Tax Basics

Why worry, why now?

We need to find additional ways to reduce greenhouse gas emissions. The science is clear that greenhouse gases are contributing to climate change, including emissions from burning fossil fuels. At the international climate change negotiations in Paris last December, global leaders agreed that the world needs to pursue efforts to limit temperature increases from pre-industrial levels to 1.5°C.

Last year the Obama Administration set the goal of reducing US greenhouse gas emissions “by 26-28 per cent below its 2005 level in 2025 and to make best efforts to reduce its emissions by 28%.”¹ A decade ago, the Vermont legislature adopted a statutory goal of reducing emissions by 50% below 1990 levels by 2028, and if “practicable by using reasonable efforts” 75% by 2050.² The challenge is how to translate goals into results. Putting a price on emissions is one path.

¹ United States’ Intended Nationally Determined Contribution, submitted to the UN Framework Convention on Climate Change, March 31, 2015.

² 10 V.S.A. § 578(a).

Why think about putting a price on greenhouse gas emissions?

Reducing greenhouse gas emissions will involve a wide array of public and private actions, some encouraged by government and some springing from personal commitments to change the way in which we conduct life on a daily basis. There is no one, perfect silver bullet. But experts around the world and on both sides of the political aisle agree that putting a price on greenhouse gas emissions is essential to changing behavior.³

At risk of oversimplification, here's why charging for emissions makes sense. First, in a capitalist society, our DNA has trained us to be sensitive to prices. Prices can change behavior. Second, putting a price on greenhouse gas emissions can effectively reach into the corners of the daily decision-making process in households, businesses and industry that are often hard to reach through conventional "command-and-control" regulation. It can change the baseline for the millions of decisions made each day, each of which may contribute to greenhouse gas emissions—how easily we decide to jump into the car, what kind of vehicle we buy, how often we remember to turn off the lights, and more. Third, economists maintain that putting a price on emissions is a cost-effective approach. Even some of the largest oil companies are seeking a price on carbon.⁴

How do we put a price on greenhouse gas emissions?

There are two basic ways to put an explicit price on greenhouse gas emissions—through a "carbon tax" or through a "cap-and-trade" program. Let's start with an introduction to carbon taxes, then the difference between the two.

What is a carbon tax?

A carbon tax is a tax on carbon dioxide (CO₂) emissions associated with certain activities. The government sets the rate of the tax, so people know in advance how much they will have to pay. Thus, the tax puts a price on each ton of emissions. It also can be called a "carbon pollution tax," a term that reinforces the message that CO₂ is an air pollutant.

What does a carbon tax look like?

A carbon tax can have a very simple design. The idea is to put a price (a "tax rate") on each ton of CO₂ emissions (the "tax base"). The tax will then generate revenue, leaving government with the choice of how to use that revenue. At heart, it's a very simple formula:

TONS OF EMISSIONS (Tax Base)	X	\$ PER TON (Tax Rate)	=	\$\$\$ (Tax Revenue)
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But each of these components of a carbon tax will reflect design decisions that affect what is taxed, how high the tax rate is, and how the revenue will be used.

³ See, e.g., Henry Paulson, Jr., *The Coming Climate Crash: We Need to Tax Carbon Dioxide Emissions to Protect Our Economy*, New York Times, June 22, 2014.

⁴ See, e.g., Letter from BG Group plc, BP plc, Eni S.p.A., Royal Dutch Shell plc, Statoil ASA and Total S.A. to Christiana Fuentes, Executive Secretary of the UNFCCC, and Laurent Fabius, President of COP21, May 29, 2015.

Which emissions are taxed?

Policymakers will decide the scope of the tax—which types of greenhouse gas emissions to tax and from which sources. Greenhouse gases run the gamut from CO₂ emissions from the combustion of fossil fuels to potent HFCs used as substitutes for ozone-depleting chemicals, and more. Some emissions are difficult to tax as an administrative matter, such as methane emissions from livestock. Carbon taxes place a tax on CO₂ emissions, but they can also cover other greenhouse gas emissions.

If the tax covers other greenhouse gas emissions, the concept of “carbon dioxide equivalents” (CO₂-e) creates a common denominator for tax purposes. Some greenhouse gases are more damaging than others. The international framework for climate change has determined the global warming potential for each of the greenhouse gases. Carbon dioxide emissions are assigned a factor of 1.0 and other emissions are weighted accordingly based on their relative global warming potential. Thus, methane has a global warming potential factor of 25 and N₂O a factor of 298. This means that one ton of methane emissions would translate into 25 tons for tax purposes, and one ton of N₂O into 298 tons.

Why is it called a “carbon tax” if it can be broader?

That’s a product of history. The concept started as a “carbon tax.” “Carbon tax” has become a shorthand term for the idea of placing a price on greenhouse gas emissions, but the name itself need not limit the idea.

It is not surprising that the name “carbon” has dominated the concept, given how much fossil fuels contribute to greenhouse gas emissions. For example, the US EPA’s most recent inventory of US greenhouse indicates that CO₂ constitutes 80.9% of US greenhouse gas emissions.⁵

There is no imperative to use the term “carbon tax.” Other terms can be used, such as carbon pollution tax, carbon emissions charge, greenhouse gas tax, or carbon fee. There can be a legal distinction between a tax and a fee, but generally speaking, policymakers and others have freedom to choose a name. The real nature of the mechanism will flow from its components, not its name.

How does one actually tax invisible emissions?

The climate change rationale for a carbon tax is that the price attaches to the actual emissions that cause the environmental damage. As a practical matter, however, it is not possible to put an emissions monitor at every emissions point, such as every vehicle tailpipe. Nor is it necessary to do so. In many situations, there is a direct correlation between the chemical components in a fossil fuel and the eventual emissions. Scientists can accurately predict how many tons of CO₂ will be released from the different types of fossil fuels. As a result, policymakers can justifiably place the tax on the fuels themselves based on the emissions that will eventually result from their use.

⁵ U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014* (April 15, 2016), p. ES-8 (measured in terms of CO₂-e).

Who pays the tax?

That depends on policymakers' choices. Many existing carbon taxes are paid early in the distribution chain for fossil fuels. Putting the tax "upstream" in this way limits the number of taxpayers, which makes it easier for the government to administer the tax. Those upstream taxpayers will then pass the tax down the chain as much as the market allows—which policymakers want to do in order to send the price signal along to people who will actually be using the fuels and generating the emissions. British Columbia's carbon tax requires that the full cost of the tax flow down to end users even though the tax is paid upstream. Vermont currently collects its gas tax upstream from the distributor. Building off of existing tax systems can make it easier to implement a carbon tax.

How high is the tax rate?

As a matter of environmental economics, the tax rate in theory could be set according to the costs that the emissions impose on society, the so-called social cost of carbon. Estimates of the social cost differ, depending on a variety of economic assumptions. Using various scenarios and 2007 dollars, the US EPA currently sets the social cost of each ton of CO₂ emissions at between \$11 and \$105 in 2015, rising to between \$26 and \$212 in 2050.⁶ Alternatively, the tax rate can be set at a level designed to achieve a certain degree of behavioral change. The tax rate may also be influenced by estimates of the tax's impact on the economy and individuals' ability to pay the tax and, of course, political considerations.

Policymakers will need to exercise the fine art of balancing theory, policy, and politics. But to retain its credibility as a strong environmental policy instrument, not just a revenue-generating instrument, the carbon tax should be high enough to induce behavioral change in the long term.

How would low-income and rural households be protected against the potential unfairness of a tax?

There are a number of different ways to provide assistance to people who may have difficulty paying more for heating fuel or gasoline, such as by providing tax relief or rebates and funding programs for fuel assistance and energy efficiency. For example, British Columbia dedicates part of the revenue from its carbon tax to a low income climate action tax credit, and it reduces the income tax rate for lower income taxpayers.

How much revenue would a state-level carbon pollution tax raise?

The amount of revenue will depend on the level of fossil fuel consumption in the state and the tax rate. Just as one example, an economic study of a possible carbon tax in Vermont looked at how much revenue the state would receive from a carbon tax at different tax rates. It estimated that a tax at the rate of \$50 per metric ton of CO₂ would generate just under \$300 million a year when fully phased in, or just over \$500 million at the rate of \$100, compared to a state budget of about \$6 billion.⁷

⁶ EPA Fact Sheet: *The Social Cost of Carbon* (Dec. 2015), <https://www3.epa.gov/climatechange/Downloads/EPAactivities/social-cost-carbon.pdf>.

⁷ REMI, *The Economic, Fiscal, Emissions, and Demographic Implications from a Carbon Price Policy in Vermont* (2014), p. 26.

What does government do with the new tax revenue?

Policymakers have a wide array of choices—invest the revenue in climate change programs, send the revenue to the general fund to help finance other government programs, use the revenue to lower other tax burdens by linking the carbon tax to more comprehensive tax reform, offer relief for some people or enterprises who may be burdened by the tax, or some combination of these or other possibilities. Deciding among these alternatives involves important policy and political judgments for which there is no one, absolutely right answer.

What does it mean when people say that a carbon tax is “revenue neutral”?

Some carbon taxes, such as the carbon tax in British Columbia, are “revenue neutral.” This means that all of the revenue from the tax is used to reduce other taxes. The result is that the government does not receive any net increase in tax revenues. The carbon tax, combined with the other tax relief, makes the tax package “revenue neutral.”

Sometimes people will refer to revenue recycling. That is the related idea that the government may take some or all of the carbon tax revenue and distribute it back to people or businesses, for example through cash rebates or “dividends.” The carbon tax revenue comes into the government but then is redistributed back out.

How does a cap-and-trade program put a price on emissions?

Cap-and-trade takes a different approach. Government sets a cap on the total volume of emissions it will allow each year. And each year it issues allowances, or permits, for only the number of tons of emissions allowed under the cap—one allowance for each ton. At the end of the year, everyone whose emissions are subject to the cap must submit to the government an allowance for each ton of their emissions. So how does this put a price on emissions? Unless the government gives the allowances to emitters for free, people who need allowances will buy them at a government auction or purchase them in the market place from others who have bought them. As a result, the market demand for allowances sets the price for each ton of emissions.

How is a carbon tax different from a cap-and-trade program?

Carbon taxes and cap-and-trade programs are both called “market-based instruments” because they send prices signals into the marketplace to influence people’s decisions, unlike “command-and-control” regulations that require specific changes in behavior. But the two are different in several respects: the level of the price (fixed or fluctuating), who is involved in the pricing system (taxpayers and the government, or the government, the regulated entities and the trading market place), and the degree of environmental certainty about the result (open-ended or established).

A carbon tax sets a fixed price for each ton of greenhouse gas emissions covered by the tax. The price attached to emissions under a cap-and-trade program will fluctuate, because the price will depend on market conditions. Some cap-and-trade proposals would limit price fluctuations, such as by requiring floor prices and ceilings for allowance prices or by giving the government the ability to issue more allowances if the price is too high. These features make cap-and-trade look more like a fixed-rate tax because they limit price fluctuations.

A carbon tax operates as a bilateral transaction between the taxpayer and the government. Cap-and-trade involves multiple players. The government sets the cap, issues the allowances, and monitors compliance. But in between, the trading market plays a central role. After the initial issuance of allowances by auction or free distribution, people can trade the allowances, or their derivatives, in the marketplace. Entities that are required to submit allowances to the government at the end of a reporting period will make market choices about when to buy allowances or their derivatives, and individuals and entities not subject to the pollution may participate in the trading market as well. The trading market sits at the functional core of the system.

Under a cap-and-trade approach, a properly enforced cap will ensure that emissions are reduced to meet the cap, unless government intervenes to offer relief if the price of allowances rises too high. How much a carbon tax will reduce emissions depends on how much the tax influences people's decisions. Government should set the tax at a level designed to achieve its emission goal, but there is no guaranteed result because it is difficult to precisely predict behavioral choices. The environmental impact may also depend on whether the government invests some or all of the tax revenue in programs designed to further reduce emissions.

Carbon Pricing Around the World

Which countries already have carbon taxes?

According to a 2015 World Bank study,⁸ a number of countries have adopted carbon taxes at varying rates. The following list shows the year the carbon tax was adopted and the maximum 2015 tax rate in US dollars: Finland (1990, \$64 for transportation fuels, \$48 for heating fuels), Poland (1990, <\$1), Sweden (1991, \$130), Norway (1991, \$52), Denmark (1992, \$25), Latvia (1995, \$4), Slovenia (1996, \$19), Estonia (2000, \$2), Switzerland (2008, \$62), Ireland (2010, \$22), Iceland (2010, \$8), Japan (2012, \$2), France (2014, \$16), Mexico (2014, \$3), Portugal (2015, \$6), South Africa (2016), and Chile (2017). Carbon taxes also occur at the sub-national level, such as British Columbia, Canada (2008, \$23).

Have countries used both carbon taxes and cap-and-trade?

Yes. For example, the European Union has a cap-and-trade program called the EU Emissions Trading Scheme (EU ETS), which covers large fossil-fuel based electricity generators, large industry and aviation. At the same time, some European countries, such as Sweden and Ireland, also have carbon taxes, but they do not apply their carbon taxes to the entities that are covered by the EU ETS. The United Kingdom is part of the EU ETS, but it also has a "carbon floor price" that creates a minimum price. Switzerland uses both a trading program and a carbon tax.

How extensive is carbon pricing around the world?

The World Bank's 2015 study indicates that about 40 countries and more than 20 cities, states and regions have carbon pricing programs. Collectively, they covered about 12% of global greenhouse gas emissions in 2015, up from under 1% in 2004 and about 4% in 2012.⁹

⁸ World Bank Group, *State and Trends of Carbon Pricing 2015* (2015), pp. 12, 13 Figure 3.

⁹ World Bank Group, *State and Trends of Carbon Pricing 2015* (2015), pp. 10, 12 Figure 2.

How do taxes on fossil fuels in the US compare with taxes on fossil fuels in other countries?

Among the OECD countries, the US ranks next to last in the tax rates it imposes on both energy and CO₂, second only to Mexico (not taking into account sub-federal taxes).¹⁰ If one also includes countries with a large and growing share of energy use—Argentina, South Africa, Brazil, China, India, Russia and Indonesia—the US is 6th from the bottom in terms of the tax rate on energy (above China, India, Mexico, Russia and Indonesia) and 7th from the bottom in terms of the tax rate on CO₂ (above China, India, Mexico, Brazil, Russia and Indonesia).¹¹

Have carbon taxes been proposed at the state level in the United States?

Yes, legislators in a handful of states have introduced carbon tax measures. In 2015 and 2016, proposals for carbon taxes, sometimes called by other names, were introduced in six states, although none has yet become law:

Massachusetts—a revenue-neutral carbon dioxide emissions charge, starting at \$10 per ton of CO₂-e and increasing \$5 a year to \$40 (and periodic evaluations of the tax rate thereafter), with revenue distributed to residents per capita and to employers on a per-employee basis.

New York—a carbon dioxide emissions tax, starting at \$35 per ton of CO₂ and increasing \$15 a year to \$185 a ton (adjustable up or down against emissions targets), with 60% of the revenue returned as tax credits to very low to moderate income taxpayers and 40% used for climate-related programs.

Oregon (two bills)—a revenue-neutral carbon fee, starting at \$30 per ton of CO₂ and increasing \$10 a year, plus a second proposal for a tax on fossil fuels, starting at \$10 per ton of carbon and increasing \$10 a year to \$60, with all the revenue dedicated to climate-related programs and low-income assistance.

Rhode Island—a fee on fossil fuels at the rate of \$15 per ton of CO₂, adjusted for inflation, with revenue used 40% for refundable tax credits for residents on a per capita basis, 30% for refundable tax credits for employers on a per-employee basis, 25% for climate-related programs, and up to 5% for administration.

Vermont (two bills)—a carbon pollution tax, starting at either \$10 or \$50 per metric ton of CO₂, depending on the bill, and rising to \$100 per ton, with revenue used primarily for tax relief or rebates for low-income people and businesses but also (20% and 10% respectively) for climate-related programs.

Washington—a revenue-neutral carbon pollution tax starting at \$15 per ton of CO₂ the first year, \$25 the second year, then rising over time to \$100. As a citizen initiative, the proposal was on the ballot at the November 8, 2016, general election but lost by a vote of 59% (no) to 41% (yes). Nevertheless, over 1.2 million people voted for the tax.

¹⁰ OECD, *Taxing Energy Use 2015* (OECD 2015), p. 62 Figure 21.

¹¹ OECD, *Taxing Energy Use 2015* (OECD 2015), pp. 9, 62 Figure 21.

The Vermont Context for Considering Carbon Pollution Taxes

What are the sources of Vermont's greenhouse gas emissions?

Vermont's most recent inventory of emissions shows the level of greenhouse gas emissions in 2012. Combining all types of greenhouse gas emissions, weighted by CO₂-e, the inventory shows how emissions were attributable to different sectors and provides a comparison with US emissions generally:¹²

<i>GHG Emissions by Sector</i>	<i>Vermont Percent of Total</i>	<i>United States Percent of Total</i>
Transportation	44.6%	29%
Residential/Commercial Fuel	21.6%	8%
Electricity	11.1%	32%
Agriculture	10.2%	9%
Industrial Fuel	6.1%	11%
Industrial Process	3.5%	5%
Waste	2.8%	2%
Fossil Fuel Industry	0.03%	4%

This accounting of Vermont's emissions includes out-of-state emissions attributable to the generation of electricity that was produced elsewhere and imported into Vermont. Energy use accounts for more than 83% of Vermont's greenhouse gas emissions.¹³ The level of emissions in 2012 was about 2% higher than the level in 1990.¹⁴

What are Vermont's goals for reducing greenhouse gas emissions?

Over the past fifteen years, Vermont has set aggressive goals for reducing greenhouse gas emissions. Here are some highlights. The Public Service Board's *Comprehensive Energy Plan 2016* also contains a summary of Vermont's goals.¹⁵

In 2006, the Vermont legislature set the goal of reducing greenhouse gas emissions by 25% by 2012, 50% by 2028, and if "practicable by using reasonable efforts" 75% by 2050, compared to 1990 levels.¹⁶ This goal applies to in-state emissions and to out-of-state emissions caused by energy use in Vermont, such as emissions from electricity imported for use in the state.

¹² Vermont Department of Environmental Conservation, Air Quality and Climate Division, *Vermont Greenhouse Gas Emissions Inventory Update 1990-2012* (June 2015), p. 5.

¹³ Vermont Department of Public Service, *Comprehensive Energy Plan 2016* (2016), p. 25, http://publicservice.vermont.gov/sites/dps/files/documents/Pubs_Plans_Reports/State_Plans/Comp_Energy_Plan/2015/2016CEP_ES_Final.pdf [hereinafter *Comprehensive Energy Plan 2016*].

¹⁴ Vermont Department of Environmental Conservation, Air Quality and Climate Division, *Vermont Greenhouse Gas Emissions Inventory Update 1990-2012* (June 2015), p. 2.

¹⁵ *Comprehensive Energy Plan 2016*, pp. 35-38.

¹⁶ 10 V.S.A. § 578(a).

In 2016, the Vermont Public Service Board's *Comprehensive Energy Plan 2016* set the goal of reducing greenhouse gas emissions from Vermont's energy use (not all greenhouse gas emissions) by 40% below 1990 levels by 2030, and by 80% to 90% by 2050.¹⁷

Vermont has also supported regional goals. In 2001, the New England governors and Eastern Canadian premiers established the target of reducing greenhouse gas emissions between 75% and 95% of 2001 levels by 2050, and in 2015 they set a new interim goal for 2030.¹⁸

What are Vermont's goals for energy conservation?

To achieve emission reductions, Vermont looks, in part, to energy conservation. The *Comprehensive Energy Plan 2016* establishes the goal of reducing energy consumption per capita by 15% by 2025 and over one-third by 2050.¹⁹

What are Vermont's goals for renewable energy?

The State has also set goals for increasing the use of renewable energy to satisfy the energy needs that remain after conservation efforts. The legislature set a statutory goal of 25% renewable energy by 2025.²⁰ The *Comprehensive Energy Plan 2016* looks further ahead to increasing reliance on renewable energy to 40% by 2035 and 90% by 2050. To create a frame of reference, about 16% of Vermont's total energy usage in 2015 came from renewable sources and about 45% of its electricity was from renewable sources.²¹

These renewable energy goals apply to total energy use in all sectors. There are also goals for specific sectors. In 2015, the legislature set standards for the electricity sector, requiring that electric power sold to Vermonters reach 55% renewable energy by 2017, and then increase gradually to 75% by 2032.²² The *Comprehensive Energy Plan 2016* sets a 2025 target of 10% renewable energy in the transportation sector (now 6% with corn-based ethanol blended into gasoline), and 30% renewable energy for buildings (now about 20%, primarily from using wood for heating).

Does Vermont's Comprehensive Energy Plan recommend a carbon pollution tax?

The *Comprehensive Energy Plan 2016* proposes a number of strategies for reaching the short and long term goals and lists carbon taxes among the market-based policy options.²³ It does not specifically recommend a carbon pollution tax, but it recommends that Vermont should "investigate and pursue options for market-based GHG emission policies that integrate with other approaches described in this

¹⁷ *Comprehensive Energy Plan 2016*, Executive Summary, p. 4.

¹⁸ *Resolution 39-1: Resolution Regarding Climate Change*, 39TH ANNUAL CONFERENCE OF NEW ENGLAND GOVERNORS AND EASTERN CANADIAN PREMIERS (Aug. 31, 2015), <http://coneg.org/Data/Sites/1/media/39-1-climate-change.pdf>.

¹⁹ For information about the Plan's goals for conservation and renewable energy, see *Comprehensive Energy Plan 2016*, Executive Summary, pp. 2, 8, and Plan, pp. 2-7.

²⁰ 10 V.S.A. § 580(a).

²¹ *Comprehensive Energy Plan 2016*, Executive Summary, pp. 3-5.

²² 30 V.S.A. §§ 8004, 8005.

²³ *Comprehensive Energy Plan 2016*, Executive Summary, p. 7, and Plan, p. 53.

[Plan], and are consistent with the principles regarding revenue recycling, pace, equity and competitiveness”²⁴ described in the Plan.

How does Vermont currently tax fossil fuels, and how does it use that tax revenue?

Vermont places taxes and other charges on fossil fuels in a variety of ways. The following description highlights key measures but cannot claim to provide a full inventory. The recently restructured levies on gasoline consist of the following:

- A tax of 12.1 cents per gallon, which goes into the Transportation Fund (except for allocation of 3/8ths of one cent to the Fish and Wildlife Fund and for natural resource management);
- An assessment of 4% of the price of gasoline (with a minimum of 13.4 cents per gallon and a maximum of 18 cents per gallon), which also goes into the Transportation Fund;
- An assessment of 2% of the price of gasoline (with a minimum of 3.96 cents per gallon), which goes into the Transportation Infrastructure Bond Fund; and
- A license fee of 1 cent per gallon that goes into the Petroleum Cleanup Fund.

The total of these gasoline levies is a minimum of 30.46 cents per gallon. The total would be higher if the price of gasoline causes the percentage-based levies to exceed the minimum threshold. Federal gasoline taxes are currently 18.4 cents per gallon. As a result, the total federal and state cost is a minimum of 48.86 cents per gallon.

Vermont’s taxes and charges on diesel fuel total 32 cents per gallon—a 28 cents-per-gallon tax for the Transportation Fund, a 3 cents-per-gallon assessment for the Transportation Infrastructure Bond Fund, and a 1 cent-per-gallon fee for the Petroleum Cleanup Fund.

Vermont also taxes other fossil fuels. It applies a fuel gross receipts tax to the retail sale of heating oil, propane, kerosene and dyed diesel delivered to residences and businesses at the rate of 2 cents per gallon and a gross receipts tax on sales of natural gas and coal at a rate of 0.75%. These taxes are dedicated to the Home Weatherization Assistance Trust Fund.

What are Vermont’s taxes on electricity?

Electricity is subject to taxes and charges, regardless whether it is produced from fossil fuels or renewable sources. The fuel gross receipts tax on electricity, 0.5 percent of the retail sale, is dedicated to the Home Weatherization Assistance Trust Fund. In addition, the Public Service Board places a charge on electricity bills, currently 1.281 cents per kilowatt hour, for example, for residential consumers.²⁵ That charge supports Vermont’s Energy Efficiency Utility, which provides services that will encourage efficiency among electricity consumers and consumers of heating fuel and process fuel.²⁶

²⁴ *Comprehensive Energy Plan 2016*, p. 57.

²⁵ Public Service Board, *Current Energy Efficiency Charge Rates*, <http://psb.vermont.gov/utilityindustries/eeu/generalinfo/currentEECrates>.

²⁶ Public Service Board, *General Energy Efficiency Utility Information*, <http://psb.vermont.gov/utilityindustries/eeu/generalinfo>.

How do Vermont's gas tax and other levies compare with the taxes in nearby states?

Assuming that the gas tax and other levies in Vermont would be the minimum of 30.46 cents per gallon, here's a comparison of the total federal, state and local taxes per gallon in the surrounding states:²⁷

New Hampshire	42.23
Massachusetts	44.94
Maine	48.41
Vermont	48.86
Rhode Island	52.40
Connecticut	56.70
New York	61.47

How do these fossil fuel taxes rates compare with a carbon pollution tax?

Each \$10 of carbon tax per metric ton of CO₂ emissions would translate into 8.78 cents per gallon for gasoline, 10.21 cents per gallon for diesel and fuel oil, and 5.72 cents per gallon for propane, and \$28.662 per ton of coal.²⁸

What price does RGGI place on carbon?

First, here's a bit of background about the Regional Greenhouse Gas Initiative (RGGI). RGGI is a cap-and-trade program just for the electricity sector in which nine states in the Northeast now participate, including Vermont. RGGI covers power plants with a capacity of at least 25 megawatts that generate electricity using fossil fuel, and Vermont has two power plants subject to the RGGI. Vermont receives an allocation of allowances from RGGI each year (about 623,000 allowances in 2016, or less than one percent of the regional allowances).²⁹ RGGI auctions the allowances quarterly on behalf of the participating states.

The market sets the price for each ton of CO₂ emissions by attaching a price to allowances, each of which allows one ton of emissions. Auction prices for allowances have ranged from a low of \$1.86 per allowance (and therefore per ton of emissions) in 2009 and 2010 to a high of \$7.50 in 2015. Allowances sold for \$4.54 at the September 2016 auction, the most recent auction for which results are available. As of late 2015, auctioned allowances had generated \$16 million in new revenue for Vermont, virtually all of which goes into the Electric Efficiency Fund for building efficiency projects managed by Vermont Energy Investment Corporation for Efficiency Vermont.³⁰

How would a carbon pollution tax in Vermont relate to RGGI?

Policymakers would have various choices. If Vermont were to pursue a carbon pollution tax, it could allow the RGGI process to continue to set the carbon price associated with electricity produced in

²⁷ American Petroleum Institute, *Gasoline Taxes: Combined Local, State and Federal (Cents per Gallon) Rates Effective 10/1/2016*, <http://www.api.org/oil-and-natural-gas-overview/industry-economics/~/media/files/statistics/gasoline-tax-map.ashx>.

²⁸ Calculations prepared by Aaron Adler, Legislative Counsel.

²⁹ RGGI, *Auction Results*, https://www.rggi.org/market/co2_auctions/results; RGGI, *Regulated Sources*, https://www.rggi.org/design/overview/regulated_sources.

³⁰ Vermont Agency of Natural Resources, *Vermont Receives Record Funding for State Energy Efficiency Efforts*, <http://anr.vermont.gov/news/record-funding-energy-efficiency>; 30 V.S.A. § 255(d).

Vermont and imported into Vermont, or it could consider taxing emissions attributable to electricity generation. To tax imported electricity, policymakers would need to be able to accurately determine the quantity of CO₂ emissions that occurred when the imported electricity was generated outside Vermont. The United Kingdom has taken a hybrid approach. It uses a tax, or levy, to create a carbon price floor for emissions covered by the European cap-and-trade program, which ensures that each ton of CO₂ emissions is subject to a minimum price even when the cap-and-trade price is lower.

Where can I find additional information?

One source is *The Reality of Carbon Taxes in the 21st Century*,³¹ a joint publication of Vermont Law School's Environmental Tax Policy Institute and the Vermont Journal of Environmental Law. It contains an introduction to carbon and energy taxes, a discussion of President Clinton's proposal for a broad-based energy tax, analyses of carbon pricing in Europe, and an explanation of British Columbia's carbon tax.

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December 8, 2016

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³¹ <http://vjel.vermontlaw.edu/files/2013/05/The-Reality-of-Carbon-Taxes-in-the-21st-Century.pdf>

* Thanks are owed to the Lintilhac Foundation for its support of this project and to Vermont Law School students who assisted, Patrick Marass (J.D. candidate 2017), Alexis Peters (J.D. candidate 2016), and Georgina Salcido (J.D. candidate 2017).