

REPORT TO THE VERMONT STATE LEGISLATURE

Act 62 – Preliminary Report on All-Fuels Energy Efficiency

**Submitted by the Vermont Public Utility Commission to the House
Committee on Energy and Technology and the Senate Committee on
Natural Resources and Energy**

January 15, 2020

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I. Executive Summary.

Vermont lawmakers have adopted ambitious environmental goals on aggressive timelines. The Governor has also committed Vermont to meeting the goals of the Paris Climate Agreement. Vermont entities have successfully implemented legislated renewable energy and energy efficiency programs. However, these programs cover only a small percentage of the Vermont economy. The evidence is clear and un rebutted that without additional funding sources and a simultaneous, parallel approach to those sectors not already covered by comprehensive programs –most importantly the transportation and heating sectors –Vermont will fall short of its goals and commitments.

While this preliminary report highlights the importance of substantial additional funding for the transportation and heating sectors, it will also identify some of the other impediments to achieving Vermont’s environmental goals. Coordination among entities and programming prioritization are critical to achieve cost-effective methods for tackling those goals. This report lays out the existing programming and funding landscape as a necessary starting point for achieving meaningful coordination.

In recognition of the fact that the State is so far failing to achieve its legislated environmental goals, in Section 2 of Act 62 (H.63) of the 2019-2020 Vermont legislative session, lawmakers directed the Public Utility Commission to report on the following: consideration of an all-fuels energy efficiency program, the expansion of the services that efficiency utilities may provide, and related issues – including funding for those programs.

This document is the Commission’s preliminary report. It is intended to provide lawmakers with a comprehensive inventory of Vermont’s current energy-related goals, programs, and funding sources. This inventory provides a basis for identifying program and funding gaps that prevent Vermont from achieving its goals. It also presents opportunities for additional program coordination.

As described below, Vermont already has many energy-related programs that are primarily publicly funded through utility ratepayers and State and federal appropriations. Some of these programs have stable, long-term funding, while others have temporary sources of funding that are unlikely to persist. Many of the programs included in this inventory do not necessarily have greenhouse gas emissions as a focus, but instead may provide Vermonters with other important benefits, such as fuel assistance or transportation options.

Based on the existing gaps, pursuant to Section 2(a)(3)(A) of Act 62, the Commission recommends that lawmakers identify appropriate, stable, and robust funding and program options for the transportation and heating sectors – the two sectors that consume the most energy and emit the most greenhouse gases – to complement Vermont’s existing, successful programs. New funding options should be sustainable, sufficient to meet Vermont’s goals yet affordable to Vermonters, equitable, administratively efficient, transparent, and should send price signals that support Vermont’s policy goals. It is beyond the scope of this preliminary report to quantify an amount of funding that is needed to put Vermont on a path to achieving its goals. However, previous reports to lawmakers have estimated the need to be on the order of \$30-60 million per year.

This preliminary report primarily addresses Section 2(a)(3)(A) of Act 62 (program funding), as specified in Section d(1). The remaining topics specified in Act 62 that are not covered by this preliminary report will be addressed in the Commission’s final Act 62 report, which is due to be filed on January 15, 2021.

II. Introduction and Statutory Basis.

On July 1, 2019, Section 2 of Act 62 (H.63) of the 2019-2020 Vermont legislative session took effect. In Act 62, lawmakers recognized that the State is failing to achieve its legislated environmental goals and that a multi-pronged approach is necessary to address Vermont’s greenhouse gas reduction and weatherization goals. In that regard, Section 2 of Act 62 directs the Commission to report on the following: consideration of an all-fuels energy efficiency program, the expansion of the services that efficiency utilities may provide, and related issues – including funding for those programs. Section 2 states:

(a) The Public Utility Commission shall open a proceeding, or continue an existing proceeding, to consider the following:

(1) Creation of an all-fuels energy efficiency program. The Commission shall consider whether to recommend that one or more entities should be appointed to provide for the coordinated development, implementation, and monitoring of efficiency, conservation, and related programs and services as to all regulated fuels, unregulated fuels, and fossil fuels as defined in 30 V.S.A. § 209(e)(3). The Commission shall consider all information it deems appropriate and make recommendations as to:

(A) whether the appointment of an all-fuels efficiency entity or entities to deliver the comprehensive and integrated programs and services necessary to establish an all-fuels energy efficiency and conservation program would, while continuing to further the objectives set forth in 30 V.S.A. § 209(d)(3)(B):

(i) accelerate progress toward the State goals set forth in 10 V.S.A. §§ 578, 580, and 581;

(ii) accelerate progress toward the recommendations contained in the State Comprehensive Energy Plan; and

(iii) further the objectives set forth in 30 V.S.A. § 8005(a)(3).

(B) the best model to create an all-fuels energy efficiency program including whether to recommend:

(i) the appointment of one or more new entities; or

(ii) the appointment of one or more entities that are currently providing efficiency and conservation programs pursuant to 30 V.S.A. § 209(d)(2) and distribution utilities that are currently providing programs and services pursuant to 30 V.S.A. § 8005(a)(3).

(C) how to:

(i) develop and utilize a full cost-benefit, full life cycle accounting method for analyzing energy policy and programs; and

(ii) employ metrics that assess positive and negative externalities, including health impacts on individuals and the public.

(2) Expansion of the programs and services that efficiency utilities may provide. The Commission shall consider whether to recommend that efficiency programs and services, whether provided by entities currently providing efficiency and conservation programs pursuant to 30 V.S.A. § 209(d)(2), distribution utilities currently providing programs and services pursuant to 30 V.S.A. § 8005(a)(3), or a new entity or entities recommended pursuant to subdivision (1) of this subsection (a), should incorporate additional technologies, services, and strategies, including:

(A) demand response;

(B) flexible load management;

(C) energy storage;

(D) reduction of fossil fuel use through electrification and the use of renewable fuels and energy; and

(E) building shell improvement and weatherization.

(3) Funding.

(A) The Commission shall consider and recommend how best to provide consistent, adequate, and equitable funding for efficiency, conservation, and related programs and services, including:

(i) how to use existing or new funding sources to better support existing efficiency and conservation programs and services, including those described in Sec. 1 of this act, during the period the Commission is conducting the proceeding pursuant to this subsection;

(ii) how to use existing or new funding sources to provide sufficient funds to implement and support the Commission's recommendations made pursuant to subdivisions (1) and (2) of this subsection (a); and

(iii) whether Thermal Renewable Energy Certificates (T-RECs) can be used to provide for the proper valuation of thermal load reduction investments, to create a revenue stream to support thermal load reduction work, and to evaluate the role of such work within the overall suite of energy programs designed to reduce greenhouse gas (GHG) emissions and generate savings for Vermonters.

(B) In reaching its recommendations pursuant to subdivision (A) of this subdivision (3), the Commission shall consider how any recommendation may affect the financial and economic well-being of Vermonters.

(b) The existing Energy Efficiency Utility Orders of Appointment issued by the Public Utility Commission shall not be altered or revoked in the proceeding pursuant to subsection (a) of this section.

(c) Process. The Commission shall schedule workshops and seek written filings from all interested stakeholders and ensure that all stakeholders

have an opportunity to provide input. The Commission may use contested case procedures if it deems appropriate.

(d) Reports. On or before:

(1) January 15, 2020, the Commission shall submit a preliminary report to the House Committee on Energy and Technology and the Senate Committee on Natural Resources and Energy concerning its progress and any preliminary findings and recommendations as to subsection (a) of this section, including recommendations as to subdivision (a)(3)(A) of this section, and any findings and recommendations that may influence the scope and focus of Efficiency Vermont's 2021-23 Demand Resources Plan Proceeding; and

(2) January 15, 2021, the Commission shall submit a final written report to the House Committee on Energy and Technology and the Senate Committee on Natural Resources and Energy with its findings and detailed recommendations as to subsection (a) of this section, including recommendations for legislative action.

In response, on July 11, 2019, the Commission initiated an investigation to explore the issues identified by Section 2, as well as other related topics that arose during the investigation.¹ The purpose of the investigation is to gather the information necessary to provide the Legislature with comprehensive reports.

This preliminary report provides lawmakers with a status update on the Commission's investigation and provides the Commission's initial consideration of the perspectives and recommendations of many interested participants.² The investigation has consisted of three workshops and multiple rounds of informational filings and recommendations. Participants have included relevant State agencies; Vermont's electric, natural gas, and energy efficiency utilities; public interest groups; building professionals; consulting groups; industry groups; planning commissions; and citizens. The Commission appreciates the time and effort that participants have put into the investigation and anticipates further thoughtful participation in the coming year.

¹ Case No. 19-2956-INV. All documents issued by the Commission and filed by the various participants can be accessed via ePUC, the Commission's online filing and case management system.

² Appendix A to this report sets forth the history of the Commission's investigation in Case No. 19-2956-INV, opened in response to Section 2. Appendix B to this report is a list of participants in the investigation.

This report is organized into seven sections.

- Section I is the Executive Summary.
- Section II provides an introduction and the statutory basis for the content of the preliminary report.
- Section III identifies Vermont’s energy and environmental goals and commitments and analyzes the State’s progress toward those goals.
- Section IV identifies Vermont’s existing statutorily authorized energy-related programs and services and their sources of funding.
- Section V identifies gaps in existing programs and funding sources.
- Section VI contains the Commission’s preliminary findings and recommendations on topics within the scope of this preliminary report – primarily Section 2(a)(3)(A) of Act 62.
- Last, section VII provides some concluding thoughts.

To analyze the questions posed in Act 62, we first summarize the laws, goals, and policies that guide Vermont’s existing energy programs. Next, we summarize the current energy programs and funding mechanisms, and identify gaps in programs and funding that prevent Vermont from achieving its goals. Finally, we offer recommendations primarily regarding Section 2(a)(3)(A) on how to fill the identified gaps.

We conclude that if Vermont is to make meaningful progress towards its goals and commitments, lawmakers will need to identify appropriate, stable, and robust funding and program options outside the traditionally regulated sectors. Dedicating funds toward these ends is an investment in Vermont that will leverage private capital, produce local jobs, and enhance the health and affordability of the State. This preliminary report is intended to assist lawmakers in this endeavor.

The final report, due on January 15, 2021, will explore these topics in greater detail, and will address the remaining topics not addressed in this preliminary report, including whether and how to create an all-fuels efficiency program, whether to expand the programs and services that efficiency utilities may provide, and how best to fund these programs and services.

III. Vermont’s Current Goals and Progress.

This section of the report identifies the statutory and non-statutory goals that guide Vermont’s progress toward greater renewable energy utilization and reductions in

greenhouse gas emissions. This section also provides an outline of Vermont’s progress to-date with respect to these identified goals.

A. Vermont’s Statutory Goals.

This subsection outlines Vermont’s current statutory goals for increased reliance on renewable energy and the reduction of greenhouse gas emissions.

1. Vermont’s State Energy Policy.

At the highest level, the State’s energy policy is: “[t]o assure, to the greatest extent practicable, that Vermont can meet its energy service needs in a manner that is adequate, reliable, and sustainable; that assures affordability and encourages the State’s economic vitality, the efficient use of energy resources, and cost-effective demand-side management, and that is environmentally sound.”³ This general policy is balanced with the goal of retaining and recruiting manufacturing and other business to Vermont, including “encourag[ing] recruitment and retention of employers providing high-quality jobs and related economic investment and support[ing] the State’s economic welfare.”⁴

The Legislature has deemed it necessary to promote renewable energy development as part of the State’s energy policy.⁵ Section 8001 identifies high-level approaches to supporting renewable energy development in a manner consistent with the State’s general energy policy: ensure that renewable energy’s economic benefits flow to Vermont’s economy; retain and grow renewable energy jobs; efficiently utilize natural resources and existing renewable energy infrastructure; incentivize affordable, long-term, stably priced renewable energy contracts; develop viable markets for renewable energy and energy efficiency projects; protect air and water quality through the reduction of fossil fuel use; reduce global climate change; support and incentivize the distribution of small- and moderate-size renewable energy plants across the State’s electric grid; and promote renewable energy plants diverse in capacity and type of technology in Vermont’s electric supply portfolio.⁶

Act 56 of 2015 established the Renewable Energy Standard (RES) program, which requires retail electricity providers to own “sufficient energy produced by renewable

³ 30 V.S.A. § 202a(1).

⁴ 30 V.S.A. § 218e.

⁵ 30 V.S.A. § 8001.

⁶ 30 V.S.A. § 8001.

energy plants or sufficient tradeable renewable energy credits.”⁷ This program has three categories of resources: total renewable energy, distributed renewable generation, and energy transformation.⁸ Under the RES, electric utilities must be 55% renewable in 2017, rising 4% every three years to 75% in 2032.⁹ The RES also requires 1% from distributed generators connected to Vermont’s electric grid in 2017, rising 0.6% per year to 10% in 2032.¹⁰ Finally, the RES requires electric utilities to reduce fossil fuel use by their customers by an amount equivalent to 2% of retail electric sales in 2017, rising two-thirds of a percent per year to 12% by 2032.¹¹

These goals are echoed in the “25 by 25 State goal” of Title 10: “It is a goal of the State, by the year 2025, to produce 25 percent of the energy consumed within the State through the use of renewable energy sources, particularly from Vermont’s farms and forests.”¹²

2. Energy Efficiency.

Energy efficiency has long been one of the foundational elements of Vermont’s energy policy and regulated energy programs. The Commission, the Vermont Department of Public Service (“Department”), independent efficiency entities, and gas and electric utility companies “are encouraged to propose, develop, solicit, and monitor energy efficiency and conservation programs and measures.”¹³ “Comprehensive energy efficiency programs” are “a coordinated set of investments or program expenditures made by a regulated electric or gas utility or other entity . . . to meet the public’s need for energy services through efficiency, conservation, or load management in all customer classes and areas of opportunity which is designed to acquire the full amount of cost-effective savings from such investments or programs.”¹⁴ The energy efficiency charge established by Section 209 supports energy efficiency programs that meet the requirements of Section 218c in the context of the State’s general energy policy embodied in Section 202a and balanced against the State’s economic policy interests.¹⁵

⁷ 30 V.S.A. § 8004.

⁸ 30 V.S.A. § 8005.

⁹ 30 V.S.A. § 8005(a)(1)(B).

¹⁰ 30 V.S.A. § 8005(a)(2)(C).

¹¹ 30 V.S.A. § 8005(a)(3)(B). Rather than reduce fossil fuel use, utilities may support additional distributed generation.

¹² 10 V.S.A. § 580(a).

¹³ 30 V.S.A. § 209(d)(1).

¹⁴ 30 V.S.A. § 218c(a)(2).

¹⁵ 30 V.S.A. § 209(d)(3).

3. Greenhouse Gas Targets.

Vermont also established specific greenhouse gas reduction targets pegged to 1990 baseline levels in order to reduce emissions within Vermont and outside of Vermont but caused by the use of energy within Vermont.¹⁶ These goals are: (1) a 25% reduction by January 1, 2012; (2) a 50% reduction by January 1, 2018; and (3) if practicable using reasonable efforts, a 75% reduction by January 1, 2050.¹⁷

Regulated electric and gas utilities' "least-cost integrated plans" must assess economic costs with respect to the following: (1) the greenhouse gas inventory developed under the provisions of 10 V.S.A. § 582; (2) the State's progress in meeting its greenhouse gas reduction goals; (3) the value of the financial risks associated with greenhouse gas emissions from various power sources; and (4) consistency with Section 8001 (renewable energy goals).¹⁸

4. Weatherization.

Act 92 of the 2007/2008 legislative session established goals for weatherizing Vermont's housing stock.¹⁹ The goals of Section 581 are as follows:

- Improve substantially the energy fitness of at least 20% of VT's housing stock by 2017 (more than 60,000 housing units) and 25% of VT's housing stock by 2020 (approximately 80,000 housing units).
- Reduce annual fuel needs and fuel bills by an average of 25% in the housing units served.
- Reduce total fossil fuel consumption across all buildings by an additional one-half percent each year, leading to a total reduction of 6% annually by 2017 and 10% annually by 2025.
- Save Vermont families and businesses a total of \$1.5 billion on their fuel bills over the lifetime of the improvements and measures installed between 2008 and 2017.
- Increase weatherization services to low-income Vermonters by expanding the number of units weatherized, or the scope of services provided, or both, as revenue becomes available in the home weatherization assistance trust fund.

¹⁶ 10 V.S.A. § 578(a).

¹⁷ 10 V.S.A. § 578(a).

¹⁸ 30 V.S.A. § 218c(a)(1).

¹⁹ 10 V.S.A. § 581.

5. Vermont's Comprehensive Energy Plan.

Pursuant to statute, the Department, in conjunction with other State agencies, compiled Vermont's Comprehensive Energy Plan (CEP) in 2016.²⁰ The CEP contains goals for greenhouse gas emission reduction, energy consumption and sources, renewable end-use by sector, and transportation.

Like the statutory greenhouse gas reduction goals, the CEP greenhouse gas emission reduction goals are pegged to 1990 levels. They contemplate a 40% reduction by 2030 and an 80%-95% reduction by 2050.

Regarding energy consumption and sources, the CEP recommends that Vermont reduce total energy consumption per capita by 15% by 2025 and by more than one-third by 2050. For the remaining energy need in both years, the CEP advises that Vermont meet 25% of the remaining need from renewable sources by 2025, 40% by 2035, and 90% by 2050. By 2025, the CEP indicates that renewable end-use by sector should be as follows: 10% transportation, 30% buildings, and 67% electric power.

Finally, the CEP specifically targets the transportation sector and identifies more general goals for the transformation of transportation. These include electric vehicles and biofuels taking hold nationwide, improving conventional fuel standards significantly, and decoupling transportation infrastructure funding from petroleum usage.

B. Goals From Other Sources.

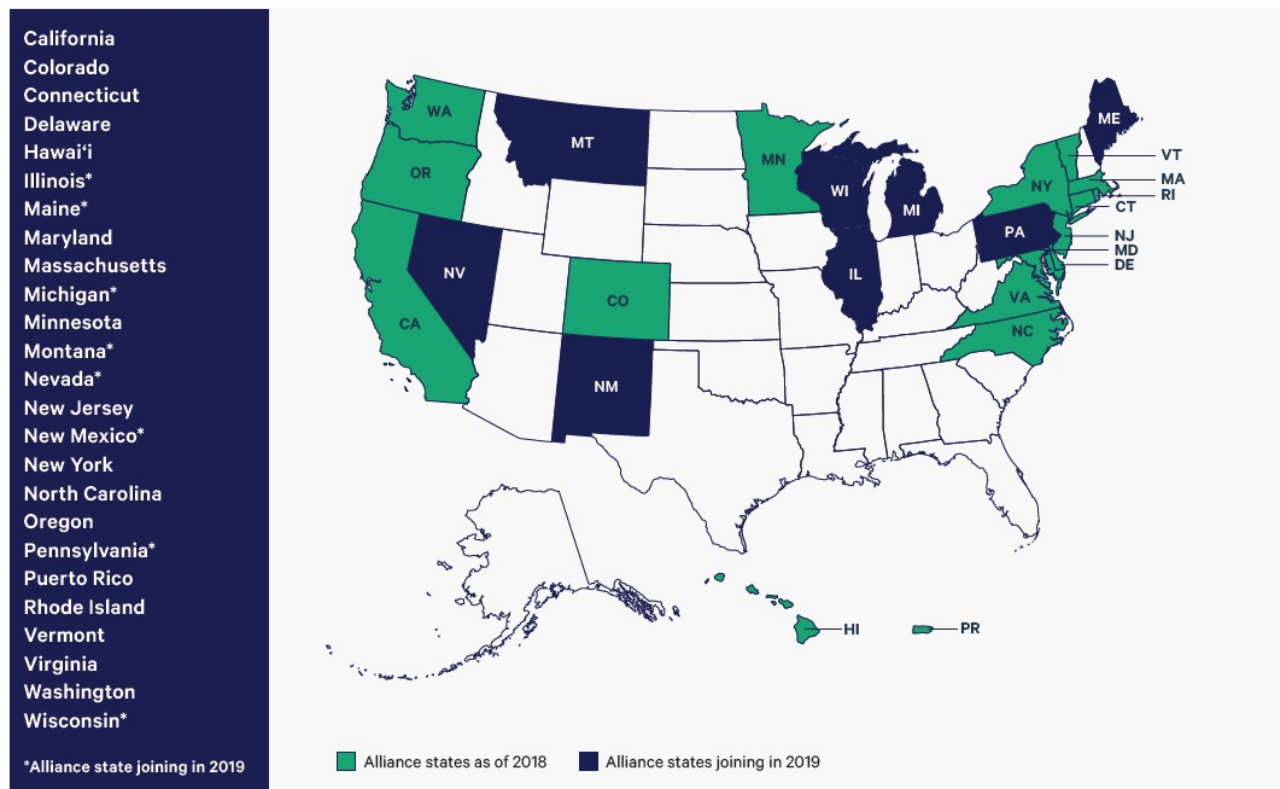
This subsection of the report summarizes some of the primary non-legislative goals for increased renewable energy usage and greenhouse gas reduction. The sources of these goals are within Vermont government, regional commitments, federal law, and international collaboration. This overview is not meant to be exhaustive but is instead a survey of other sources.

1. Paris Climate Agreement.

The Paris Climate Agreement (Agreement) went into force in November 2016 and focuses on greenhouse gas mitigation, technological adaptation, and financing to combat global temperature rise.²¹ In June 2017, after the Trump administration withdrew the United States' commitment to the Agreement, Governor Scott announced that Vermont would join the United States Climate Alliance, a coalition of states

²⁰ 30 V.S.A. § 202b (CEP subject to re-adoption every six years).

²¹ Paris Climate Agreement, United Nations, July 8, 2016.



committed to upholding the Agreement.²² The map below illustrates these participating states.²³

Following this commitment, on July 20, 2017, Governor Scott issued Executive Order 12-17, establishing the Vermont Climate Action Commission (VCAC).²⁴ The VCAC produced a report at the end of 2017 that recommended Vermont do the following to curb climate change: support advanced wood heat, increase the pace of weatherization, study all regulatory and market decarbonization mechanisms, foster the climate economy, and electrify the transportation system.²⁵ On July 31, 2018, the VCAC

²² The intended nationally determined contribution of greenhouse gas reduction pledged by the United States before it withdrew from the Agreement was a 26-28% domestic reduction in greenhouse gases by 2025 as compared to 2005 levels. U.S. Cover Note INDC and Accompanying Information, March 31, 2015, available at

<https://www4.unfccc.int/sites/submissions/INDC/Published%20Documents/United%20States%20of%20America/1/U.S.%20Cover%20Note%20INDC%20and%20Accompanying%20Information.pdf>.

²³ United States Climate Alliance, 2019 Annual Report, *Strength in Numbers: American Leadership on Climate* at 3.

²⁴ Vt. Exec. Order No. 12-17, Vermont Climate Action Commission, July 20, 2017.

²⁵ *Preliminary Recommendations of the Vermont Climate Action Commission Executive Order 12-17*, Vermont Climate Action Commission, December 29, 2017.

produced its final report recommending a suite of actions that would foster Vermont's goals while also meeting the Governor's requirements.²⁶

2. Other Regional and International Efforts.

Vermont is also engaged in other regional and international efforts to limit climate change by decreasing greenhouse gas emissions. Some of those initiatives include the Conference of the New England Governors and Eastern Canadian Premiers (NEG-ECP) Climate Change Action Plan, the Regional Greenhouse Gas Registry (RGGR) by the Northeast States for Coordinated Air Use Management (NESCAUM), and the Regional Greenhouse Gas Initiative (RGGI).

The NEG-ECP adopted a regional Climate Change Action Plan (CCAP) in 2001 with two goals: reduce greenhouse gas emissions and reduce the impacts of climate change through adaptation.²⁷ The 2017 Update Report set a new goal of reducing regional greenhouse gas emissions by at least 35-45% below 1990 levels by 2030.²⁸

The RGGI is a carbon cap-and-trade program covering the electric power sector across nine northeastern states. In Vermont, income from RGGI has been dedicated to thermal-energy and process-fuel energy efficiency.²⁹

3. Federal Regulations and Standards.

Under the Trump administration, energy and environmental standards at the federal level are a bit tenuous, but the following examples of federal regulations demonstrate some ongoing national statutory efforts at curtailing climate change.³⁰ They include the Environmental Protection Agency ("EPA") and National Highway and Safety Administration's joint rules to establish fuel economy and greenhouse gas standards for motor vehicles.

²⁶ *Report to the Governor*, Vermont Climate Action Commission, July 31, 2018.

²⁷ *2017 Update of the Regional Climate Change Action Plan: Building on Solid Foundations*, Conference of the New England Governors and Eastern Canadian Premiers, August 28, 2017, at 1.

²⁸ *2017 Update of the Regional Climate Change Action Plan: Building on Solid Foundations*, Conference of the New England Governors and Eastern Canadian Premiers, August 28, 2017, at 1.

²⁹ 30 V.S.A. § 209(e)(1).

³⁰ For example, in June 2019, the Trump administration repealed the Environmental Protection Agency's Clean Power Plan (CPP) and replaced it with the Affordable Clean Energy rule. 40 C.F.R. pt. 60 (2019) (repealing CPP). The CPP required states to meet targets for cutting greenhouse gas emissions from power plants and aimed to reduce power sector emissions 32% below 2005 levels by 2030.

The EPA's new Affordable Clean Energy (ACE) rule aims to reduce power sector greenhouse gas emissions by 11 million tons by 2030, which is approximately a 0.7-1.5% reduction from 2005 levels of emissions.³¹

Further, the United States Department of Energy's Appliance and Equipment Standards Program establishes energy efficiency standards for certain appliances and commercial equipment. The standards cover products that represent approximately 90% of home energy use, 60% of commercial building use, and 30% of industrial energy use with a projected goal of reducing cumulative operating cost from all standards in effect since 1987 by \$2 trillion in 2030.³²

Vermont Department of Public Service Rule 18-001 on Vermont Appliance Efficiency and Water Conservation Standards was adopted on January 11, 2018. This Department Rule implements the federal appliance efficiency and water conservation standards. The Department, pursuant to Act 139 of 2018, also developed Vermont Appliance Efficiency and Water Conservation Standards for 17 appliances and water conservation devices to which the State's efficiency standards contained in Title 9, Chapter 74 of the Vermont Statutes Annotated did not previously apply.³³ Vermont Department of Public Service Rule 19P-039 contains the specific standards for each product, and was adopted on October 3, 2019.

C. Progress Report.

Vermont's progress to date leaves a substantial gap toward achieving the goals laid out in statute and in our commitments regionally, nationally, and internationally. While Vermont's utility sector has significantly increased its reliance on renewable energy sources in furtherance of RES goals, the thermal and transportation sectors will require innovation, dedicated funding, and targeted efforts to make substantial progress toward our goals.

The participants in the Commission's Act 62 workshops to date have identified the following primary impediments to reaching Vermont's statutory goals: limited funding sources, high up-front costs, a dearth of trained and certified workers, inadequate

³¹ Emissions Guidelines for Greenhouse Gas Emissions from Existing Electric Utility Generating Units, 83 Fed. Reg. 45,588 (Sept. 10, 2018) (to be codified at 40 C.F.R. pts. 51, 52, and 60).

³² Office of Energy Efficiency & Renewable Energy, Appliance and Equipment Standards Program, available at <https://www.energy.gov/eere/buildings/appliance-and-equipment-standards-program>.

³³ See 9 V.S.A. §§ 2791-2798.

financing options for Vermonters at all income levels, and constrained consumer budgets.

1. Renewable Energy Goals.

With respect to Vermont's renewable energy goals, most of the progress has been in the electric energy sector, with transportation and thermal lagging. However, the 2025 goal of 25% renewable energy across transportation, thermal, and electric energy sectors is within reach.³⁴ Total source energy ("all energy generated and consumed, including energy lost in production and delivery") is 18.5% renewable. Total site energy ("energy directly consumed in buildings and vehicles") is 19.4% renewable.³⁵

The current snapshot provided in Energy Action Network's ("EAN") 2018 Annual Progress Report indicates that there is substantial work to be done in both the transportation and building sectors, but that electric power has nearly met the 2025 goal of 67% renewable pursuant to the CEP.³⁶ This is particularly problematic because transportation and thermal combined make up 86% of Vermont's energy use.³⁷ The following chart breaks down energy sources by sector.³⁸

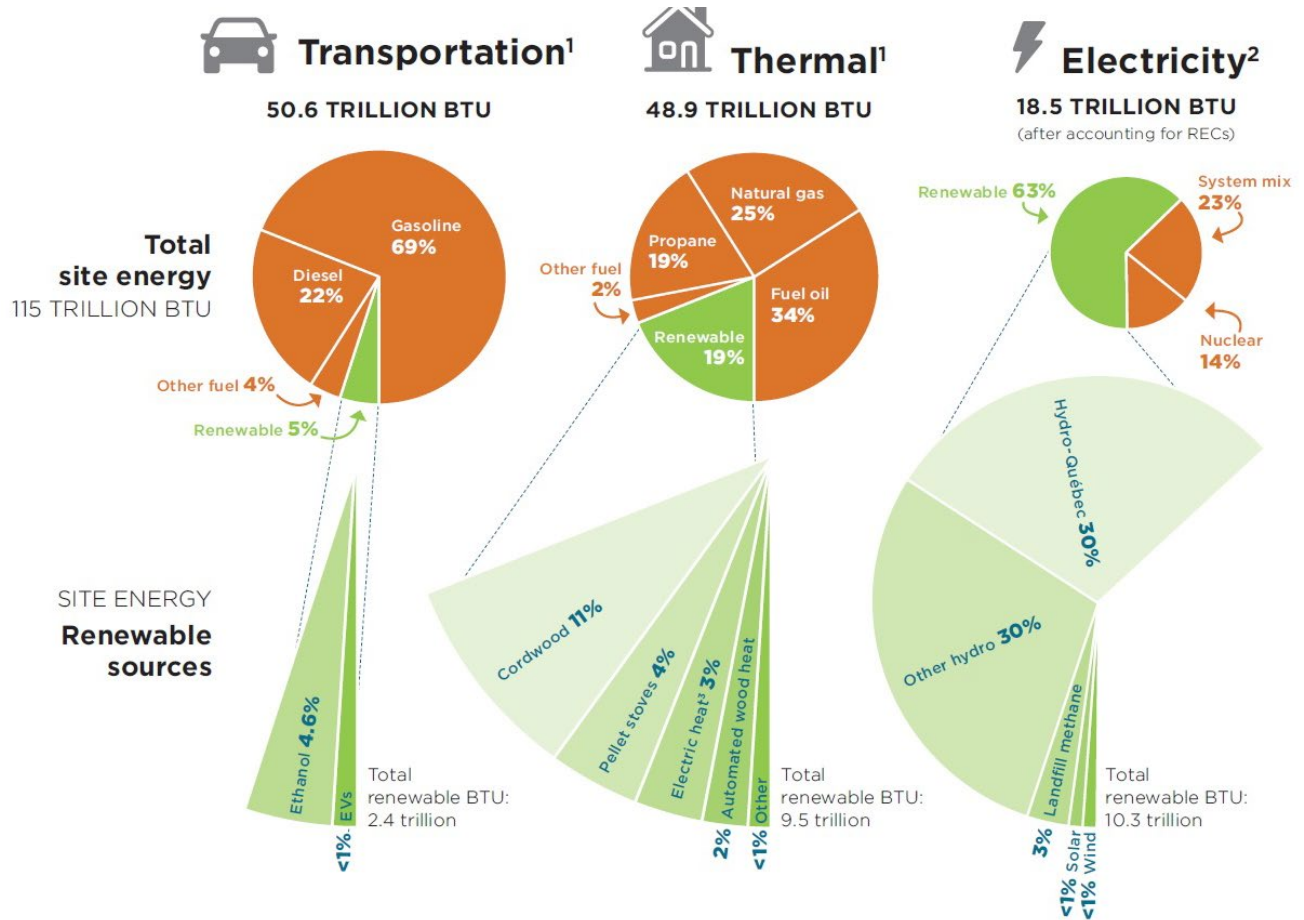
³⁴ *The Benefits of Achieving Vermont's Energy & Emissions Commitments: 2018 Annual Progress Report*, Energy Action Network at 3, 7.

³⁵ *The Benefits of Achieving Vermont's Energy & Emissions Commitments: 2018 Annual Progress Report*, Energy Action Network at 6.

³⁶ *The Benefits of Achieving Vermont's Energy & Emissions Commitments: 2018 Annual Progress Report*, Energy Action Network at 7 (electric power sector is 63% renewable as of 2017).

³⁷ *The Benefits of Achieving Vermont's Energy & Emissions Commitments: 2018 Annual Progress Report*, Energy Action Network at 7.

³⁸ *The Benefits of Achieving Vermont's Energy & Emissions Commitments: 2018 Annual Progress Report*, Energy Action Network at 7.



1. Energy Information Administration (2016). 2. Department of Public Service (2017). 3. Electric heat includes the renewably powered portions of heat pumps and electric resistance heat. Heat pumps are significantly more efficient than electric resistance heat.

The above graphic makes clear the following breakdown of renewable energy progress by sector:

- Transportation: 5% renewable made up of 4.6% ethanol and less than 1% electric vehicles.
- Thermal: 19% renewable made up of 11% cordwood, 4% pellet stoves, 3% electric heat, 2% automated wood heat, and <1% Other.
- Electricity: 63% renewable made up of 60% hydro, 3% landfill methane, and less than 1% each of solar and wind. This data is drawn from a 2017 Department report and accounts for sales and purchases of renewable energy credits in its description of Vermont’s electric source portfolio. It therefore does not reflect the substantial amount of solar that has been built in Vermont. In fact, before accounting for renewable energy credit sales and purchases, solar made up 4% of Vermont’s power supply mix. In addition to hydroelectric power, nearly one-fifth of Vermont’s in-state

generation came from biomass, which includes wood. Solar energy's contribution more than doubled from 2016 to 2018, which is unlikely to appear in the data used by EAN to formulate the above chart.³⁹ Solar is expected to contribute a larger share of Vermont's electricity portfolio as the requirements of Vermont's Renewable Energy Standard ramp up over time and more renewable energy credits from Vermont's new and existing renewable generators are retired by Vermont's electric utilities.

Further, Efficiency Vermont's Energy Burden Report explains that Vermonters spend an average of \$1,150 annually on electricity, which represents 20% of annual household total energy costs.⁴⁰ Vermonters spend an average of \$2,636 annually on transportation energy, which represents 45% of annual household total energy costs.⁴¹ Vermonters spend an average of \$2,050 annually on thermal energy, which represents 35% of annual household total energy costs.⁴²

Thus, Vermont's energy successes have come in the electricity sector, but substantial work is needed to meet the State's thermal and transportation goals.

2. Greenhouse Gas Emission Goals.

Vermont has reduced greenhouse gas emissions by 2% below 2005 levels, but emissions are up 13% since 1990, "despite a decline of approximately 0.43 million metric tons of carbon dioxide equivalent (MMTCO_{2e}), or 4%, from 2015 levels."⁴³ "Although GHG emissions decreased from 2015 to 2016, the 2016 levels are still well above the future targets."⁴⁴ Nonetheless, Vermont may be able to meet the Paris Climate Agreement's 2025 milestone of 26-28% economy-wide greenhouse gas emission reduction below 2005

³⁹ U.S. Energy Information Administration, Electricity Data Browser, Net Generation for All Sectors, Annual, Vermont, 2001-18. In 2018, wind generation accounts for 373,000 MWh and solar generation (both utility-scale and small-scale) accounts for 237,000 MWh, which, regarding solar, represents an increase from 102,000 MWh in 2015. U.S. Energy Information Administration, Electricity Data Browser, Net Generation for All Sectors, Annual, Vermont, 2001-18. By comparison in 2018, biomass accounts for 426,000 MWh, and in-state hydroelectric generation accounts for 1,258,000 MWh.

⁴⁰ Justine Sears & Kelly Lucci, Efficiency Vermont, *Vermont Energy Burden Report*, Oct. 2019 at 6.

⁴¹ Justine Sears & Kelly Lucci, Efficiency Vermont, *Vermont Energy Burden Report*, Oct. 2019 at 7.

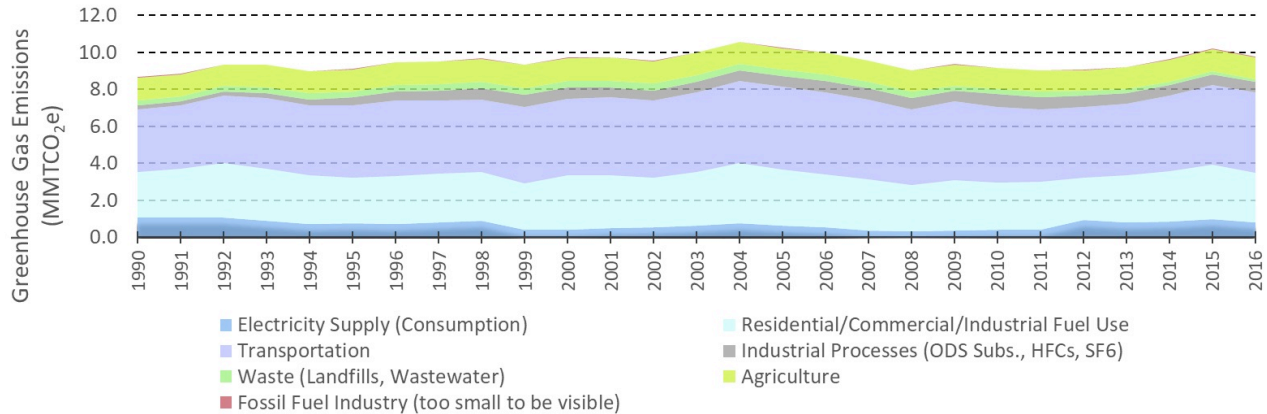
⁴² Justine Sears & Kelly Lucci, Efficiency Vermont, *Vermont Energy Burden Report*, Oct. 2019 at 6.

⁴³ Vermont Greenhouse Gas Emissions Inventory Update 1990-2016, Vermont Department of Environmental Conservation Air Quality and Climate Division, January 2020 at 5.

⁴⁴ Vermont Greenhouse Gas Emissions Inventory Update 1990-2016, Vermont Department of Environmental Conservation Air Quality and Climate Division, January 2020 at 6. "Overall emissions reductions from 2015 to 2016 were driven by the Residential/Commercial/Industrial (RCI) sector and the Electricity sector." Vermont Greenhouse Gas Emissions Inventory Update 1990-2016, Vermont Department of Environmental Conservation Air Quality and Climate Division, January 2020 at 5.

levels, but significant work, including substantial new technology adoption, must occur. Between 2013 and 2015, emissions from transportation and thermal fuels together accounted for nearly 80% of Vermont’s overall emission increase.⁴⁵ Transportation and thermal energy use cause more than 70% of Vermont’s GHG pollution.⁴⁶

The figure below details Vermont’s historic greenhouse gas emissions by sector.⁴⁷



Although Vermont’s greenhouse gas emissions may decline in coming years, greenhouse gas emissions “remain at levels well above its reduction goals established in State statute (10 V.S.A. § 578) and in the Comprehensive Energy Plan. Each successive year of [] emissions levels [above reduction goals] makes achieving the State’s emission reduction goals significantly more difficult.”⁴⁸ However, the Commission expects that future greenhouse gas emission inventories will reflect the contributions of the Vermont Renewable Energy Standard.⁴⁹ For example, the Department of Public Service estimates

⁴⁵ *The Benefits of Achieving Vermont’s Energy & Emissions Commitments: 2018 Annual Progress Report*, Energy Action Network at 4.

⁴⁶ *The Benefits of Achieving Vermont’s Energy & Emissions Commitments: 2018 Annual Progress Report*, Energy Action Network at 4.

⁴⁷ Vermont Greenhouse Gas Emissions Inventory Update 1990-2016, Vermont Department of Environmental Conservation Air Quality and Climate Division, January 2020 at 11.

⁴⁸ Vermont Greenhouse Gas Emissions Inventory Update 1990-2015, Vermont Department of Environmental Conservation Air Quality and Climate Division, June 2018 at 13.

⁴⁹ See Vermont Greenhouse Gas Emissions Inventory Update 1990-2016, Vermont Department of Environmental Conservation Air Quality and Climate Division, January 2020 at 19 (“Emissions from the electricity sector are [] difficult to predict, however emissions levels from this sector are given more certainty due to the implementation of the Renewable Energy Standard (RES).”); Vermont Greenhouse Gas Emissions Inventory Update 1990-2016, Vermont Department of Environmental Conservation Air Quality and Climate Division, January 2020 at 21 (“Emissions from the electricity sector show continued

that in 2017 carbon dioxide emissions were reduced by approximately 579,000 tons from 2016 levels as a result of the Renewable Energy Standard.⁵⁰ “Although progress in the electricity sector is encouraging, the transportation sector remains by far the largest contributor to our gross emissions total and there have been few emissions reductions from this sector.”⁵¹

3. Thermal Energy and Weatherization Goals.

Title 10, Section 581 of the Vermont Statutes Annotated requires the weatherization of 80,000 homes by 2020 and the reduction of annual fuel needs and bills by an average of 25%.⁵² The Department’s December 2018 progress report on Section 581 concludes: “The progress toward the building energy efficiency goals for the State as defined in 10 V.S.A. § 581(1) has been steady since 2008, but well below the rate necessary to achieve the 2020 goal of 80,000 homes. The average savings per home has also tracked slightly below the goal of 25% reduction in energy usage.”⁵³

Figures 1 and 2 below were submitted by the Department to show the annual and cumulative housing unit retrofits by provider from 2008 through 2018. Since 2008, 27,216 housing units have received a comprehensive retrofit. Figure 3 shows average fuel use reduction across providers.⁵⁴

declines through 2018 and with the implementation of the RES in 2017 . . . the emissions totals from the sector are not expected to rise significantly.”).

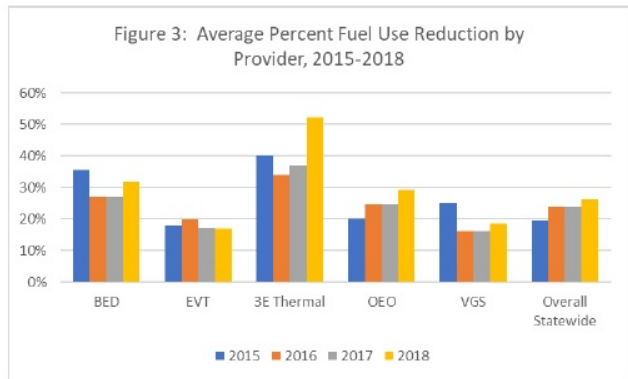
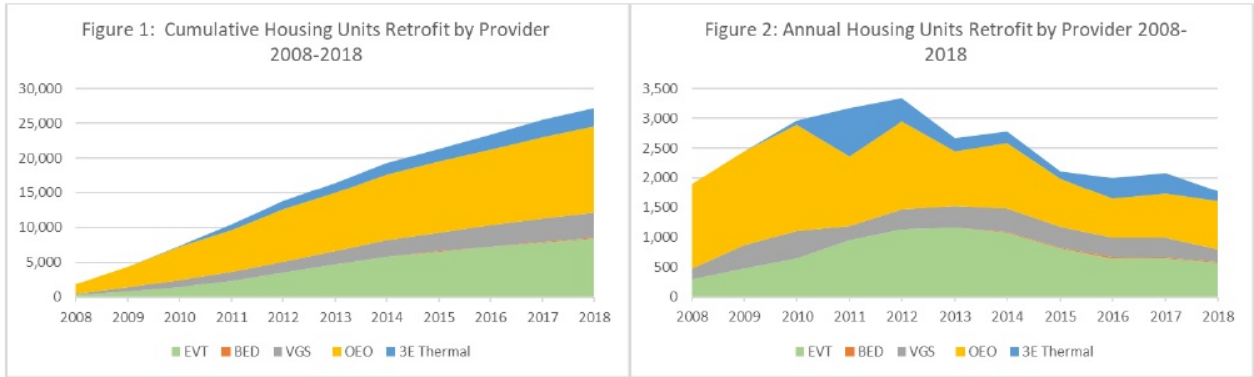
⁵⁰ 2019 *Annual Report on the Renewable Energy Standard*, Vermont Department of Public Service, January 15, 2019 at 10-11; Vermont Greenhouse Gas Emissions Inventory Update 1990-2016, Vermont Department of Environmental Conservation Air Quality and Climate Division, January 2020 at 6.

⁵¹ Vermont Greenhouse Gas Emissions Inventory Update 1990-2016, Vermont Department of Environmental Conservation Air Quality and Climate Division, January 2020 at 21.

⁵² 10 V.S.A. § 581; see also Department of Public Service, 2019 *Annual Energy Report*, Jan. 15, 2019 at 22.

⁵³ Department of Public Service, *Annual Report of the Department of Public Service on Vermont’s Progress Toward Building Energy Goals Pursuant to 10 V.S.A. § 581*, Dec. 2018.

⁵⁴ Department of Public Service, Attachment A: Third Round of Comments, Nov. 15, 2019, at 6.



To meet the 10 V.S.A. § 581 goal of weatherizing 80,000 homes by 2020, approximately 53,000 additional homes would need retrofits. According to the Department, at the 2018 average incentive cost of \$6,599 per home, an additional \$350 million in public investment would be needed.⁵⁵ With 2020 here, these statutory goals have not been achieved.

D. Progress Report Conclusions.

Vermont’s progress toward more renewable energy, reduced greenhouse gas emissions, and increased building efficiency as measured by goals set at the state, regional, national, and international level has been steady, but falls short, particularly in the thermal and transportation energy sectors. Significant additional funding, coordination, innovation, technology adoption, and targeted strategic efforts are imperative to achieve these goals on a meaningful time scale to combat global climate change, decrease reliance on fossil fuels, and make energy more affordable for Vermonters.

⁵⁵ Department of Public Service, Attachment A: Third Round of Comments, Nov. 15, 2019, at 8.

IV. Vermont's Current Programs.

The current programs described below are authorized by statute or are funded with direct allocation of taxpayer or ratepayer dollars. They do not represent all Vermont activity in a given sector. For example, fuel dealers may provide biofuel blends or biomass heating systems, or contractors may offer trainings outside of those funded by the programs described below. The summaries are organized in the following topic areas: electric efficiency, thermal energy efficiency, electrification, electric load management, intermodal transportation, and cross-cutting programs. Some programs may include services in multiple sectors and are summarized once instead of repeated.

A. Electric Efficiency Programs.

1. Energy Efficiency Utilities.

The Vermont Legislature has long required that regulated utilities include “comprehensive energy efficiency programs” as part of their responsibility to deliver services to their customers at least cost, pursuant to 30 V.S.A. § 218c. Electric efficiency programs and services are currently delivered primarily through two energy efficiency utilities (“EEUs”) that have been appointed by the Commission, as authorized by 30 V.S.A § 209(d).

The EEUs design and deliver technical, financial, and educational services to help Vermonters overcome barriers to improving the energy efficiency of their homes, businesses, institutions, and municipal facilities. The EEUs provide financial support to retail customers, distributors, and wholesalers, as well as technical assistance across a wide variety of electric efficiency technologies, to improve the efficiency of electric consumption across sectors.

Burlington Electric Department (“BED”) is appointed to provide electric energy efficiency services in its service territory, and Vermont Energy Investment Corporation (“Efficiency Vermont” or “EVT”) is appointed to operate as Efficiency Vermont to provide electric energy efficiency services for the remainder of the state. Where services overlap, BED and Efficiency Vermont coordinate delivery of service to BED customers. The Department provides evaluation, measurement, and verification services to ensure that claimed savings materialize.

Under 30 V.S.A. § 209(d)(3)(B), the Commission is required to establish and adjust energy efficiency charges in order to realize all reasonably available, cost-effective energy efficiency savings, with due consideration to rate impacts and several policy

priorities. Section 209 requires the Commission to balance a number of considerations when setting the energy efficiency charge, including “providing the opportunity for all Vermonters to participate in efficiency and conservation programs; and targeting efficiency and conservation efforts to locations, markets, or customers where they may provide the greatest value.” The Commission’s three-year performance targets for Efficiency Vermont and BED have minimum spending and equity requirements for residential, commercial, small business, and low-income customers.

Electric efficiency programs are funded by electric ratepayers through the energy efficiency charge on their bills. The energy efficiency charge is set by the Commission to collect funds to meet the three-year budgets adopted in a Demand Resource Plan Proceeding. The three-year budgets include the costs for the Department’s evaluation activities and other programmatic regulatory expenses.

Funding: Commission-approved budgets for the 2018-2020 performance period:

Electric Efficiency Budgets for 2018-2020			
	<i>2018</i>	<i>2019</i>	<i>2020</i>
Efficiency Vermont	\$50,944,146	\$51,106,595	\$51,403,668
BED	\$2,632,256	\$2,804,805	\$2,825,080
Total	\$53,576,402	\$53,911,400	\$54,228,748

2. Customer Programs.

Vermont law establishes three types of programs that qualifying commercial and industrial customers can use to manage their own energy efficiency projects: the Self-Managed Energy Efficiency Program (“SMEEP”), the Energy Savings Account (“ESA”) program, and the Customer Credit Program.

Under the requirements of 30 V.S.A. § 209(j), the SMEEP allows certain eligible transmission and industrial electric customers to be exempt from the energy efficiency charge provided the customer commits to minimum annual investments in energy efficiency over a three-year period. Under the requirements of 30 V.S.A. § 209(d)(3)(B), customers paying an average annual energy efficiency charge of at least \$5,000 may apply to the Commission to self-administer energy efficiency through an ESA. The

Customer Credit Program allows commercial and industrial customers that meet certain eligibility standards to use most of their energy efficiency charge funds to implement energy-savings measures of their own as a substitute for participation in the system-wide programs of Efficiency Vermont.

As required by Act 150, Section 2, on July 1, 2019, the Commission established a three-year partnership pilot program as an expansion of the existing ESA option.⁵⁶ The ESA pilot program allows a participant, working with Efficiency Vermont, to place the participant's energy efficiency charge payments in an ESA and then spend 100% of the funds on the participant's own energy efficiency and productivity projects. The size of the pilot program is limited by statute to \$2 million each year.

Funding: Funds for the ESA and Customer Credit Programs are accounted for in the three-year budgets approved by the Commission for Efficiency Vermont. SMEEP customers pay costs directly instead of paying the energy efficiency charge.

3. State Energy Management Program.

Authorized by Act 58 of 2015, the Vermont Department of Buildings and General Services has leveraged services from Efficiency Vermont to develop and deploy an internalized energy-saving performance contracting model for taxpayer benefit through the State Energy Management Program. The program's intent is to accelerate, for State buildings and facilities, energy management measures, the implementation of efficiency and conservation, and the use of renewable energy resources. Efforts are being made to expand this model to address municipal, university, school, and hospital communities through the creation of a municipally based energy management program.

Funding: No specific dedicated funding outside the budgets for Efficiency Vermont.

B. Thermal Efficiency Programs.

1. Vermont Gas.

Vermont Gas has offered energy efficiency services for more than 20 years. In 2015, Vermont Gas was appointed by the Commission to serve as the natural gas EEU in its service territory. Vermont Gas offers both residential and commercial energy efficiency programs for new and existing buildings.

⁵⁶ Public Act No. 150 (2018 Vt. Adj. Sess.). See *Order Re Energy Savings Account Pilot Program*, Case No. 19-0302-INV, Order of 5/16/19.

The Residential Retrofit Program primarily focuses on higher-density users: homes that use at least 50,000 Btus per square foot per year for heating. Vermont Gas provides free comprehensive energy audits, rebates for a portion of the installed costs of the recommended measures, and zero-interest or low-interest loans. Vermont Gas also offers an equipment replacement program, with rebates for hot air furnaces, hot water boilers, and water heaters, among other measures. Customers below a threshold of 50,000 Btus per square foot per year are eligible for a one-hour walk-through focused on education and engagement of the customer about her energy usage, or the customer could be referred to Efficiency Vermont's Home Performance with Energy Star program.

For commercial buildings, Vermont Gas offers an equipment replacement and retrofit program. Vermont Gas conducts free energy audits, and offers technical assistance, zero-interest or low-interest loans for energy efficiency improvements, and rebates for certain equipment.

For 2018, Vermont Gas performed comprehensive thermal efficiency services on 165 buildings, representing 204 units. Vermont Gas comprehensive audits and weatherization for residences typically cost \$1,500 to \$6,000, with amounts on the higher side if a heating system is also replaced.

Under 30 V.S.A § 209(d)(3)(B), the Commission is required to balance a number of considerations when setting the energy efficiency charge, including "providing the opportunity for all Vermonters to participate in efficiency and conservation programs; and targeting efficiency and conservation efforts to locations, markets, or customers where they may provide the greatest value." To reach lower-income customers, Vermont Gas works closely with the Champlain Valley Office of Economic Opportunity. In addition, the three-year performance targets for Vermont Gas include minimum spending and equity requirements for residential, commercial, small business, and low-income customers.

The Vermont Gas efficiency programs are funded by an energy efficiency charge on natural gas ratepayer bills.⁵⁷ The energy efficiency charge is set by the Commission to collect funds sufficient to meet the three-year budgets adopted in a Demand Resource Plan Proceeding. The three-year budgets include the costs for the Department's evaluation activities and other programmatic regulatory expenses.

⁵⁷ Vermont Gas customers contribute to both the natural gas efficiency fund and an electric efficiency fund through the charge on each bill.

Funding: Commission-approved budgets for the 2018-2020 performance period:

Natural Gas Efficiency Budgets for 2018-2020			
	<i>2018</i>	<i>2019</i>	<i>2020</i>
Vermont Gas	\$3,386,237	\$3,515,838	\$3,576,991

2. Efficiency Vermont and Burlington Electric Department – Thermal-Energy and Process-Fuel Efficiency.

Beginning in 2010, as required by 30 V.S.A. § 209(e), revenues from the Regional Greenhouse Gas Initiative (“RGGI”) and Vermont’s electric efficiency savings portfolio participation in the Forward Capacity Market (“FCM”) have been directed to Efficiency Vermont and BED for the purpose of developing unregulated-fuels energy efficiency services.

Thermal efficiency services (weatherization services) are offered to homeowners (for existing homes) and to owners of small businesses, multifamily residences, residential rental properties, and mixed-use buildings. Efficiency Vermont and BED coordinate these programs with activities funded through the electric energy efficiency charge. These efforts have also included residential and commercial new construction programs and heating system incentives. Efficiency Vermont provides training, quality assurance, and marketing assistance for contractors, and maintains a statewide network of certified energy-efficiency service contractors on its website.

In addition to building weatherization services, programs include other thermal-energy and process-fuel (“TEPF”) services. Efficiency Vermont’s Business Existing Facilities programs may include snowmaking upgrades, maple sap reverse osmosis, heat recovery and space heating controls, ventilation improvements, HVAC system optimization, burner controls, industrial process heat recovery, and steam trap repair and replacement. Efficient Products programs may include heat pump water heaters, smart thermostats, and low-E storm windows, as well as do-it-yourself home weatherization products for insulating and air sealing. BED’s potential in the TEPF area is limited because its territory significantly overlaps with Vermont Gas’s territory, and TEPF funds are prohibited from being used for regulated fuels efficiency services. Recent statutory changes enable BED to use TEPF funds to support district heating.

To reach a diversity of customers, the three-year performance targets for Efficiency Vermont and BED include minimum spending and equity requirements for residential, commercial, small business, and low-income customers.

In 2018, Efficiency Vermont’s programs resulted in approximately 700 homes weatherized. The costs to complete comprehensive weatherization projects vary across service providers. On average, Efficiency Vermont Home Performance with Energy Star projects cost \$7,000 to \$8,000 to install comprehensive weatherization improvements and health and safety upgrades. This estimate does not include costs associated with fuel switches or heating system improvements. The total cost includes the cost borne by the homeowner and the incentive cost provided by Efficiency Vermont. The average Efficiency Vermont incentive provided in 2018 was \$1,400 per home.

Since the inception of the TEPF program in 2009, BED has provided incentives to weatherize an average of eight dwellings per year. Over the years, BED has observed that the cost of these weatherization projects (paid to the contractors) has averaged approximately \$7,430 per project. After BED incentives of approximately \$2,000 per project, customer costs have amounted to about \$5,430.

The Commission approves three-year budgets in a Demand Resource Plan Proceeding. The three-year budgets are based on estimates of RGGI and Forward Capacity Market revenues and include the costs for the Department’s evaluation activities and other programmatic regulatory expenses. In addition (and not reflected in the table below), for the 2018-2020 performance period, Act 62 allocated up to \$2.25 million of electric efficiency charge funds and \$350,000 of General Funds to Efficiency Vermont’s Existing Homes programs (directed toward customers between 80% and 140% of Area Median Income).

Funding: Commission-approved budgets for the 2018-2020 performance period:

TEPF Budgets for 2018-2020			
	<i>2018</i>	<i>2019</i>	<i>2020</i>
Efficiency Vermont	\$9,786,760	\$9,786,131	\$9,275,336
BED	\$113,655	\$115,928	\$118,247

3. Weatherization Assistance Program.

The Office of Economic Opportunity is required by 33 V.S.A. § 2502 to administer Vermont's Weatherization Assistance Program ("WAP"). As required under 33 V.S.A. § 2502, WAP is operated consistent with U.S. Department of Energy National Weatherization Program rules.

WAP provides free weatherization services to qualifying low-income Vermonters. The program is operated by four Community Action Program agencies and the Northeast Employment and Training Organization. These agencies have their own weatherization crews and also rely on private contractors for a portion of the work. The weatherization program performs its services in partnership with Vermont Gas, Efficiency Vermont, BED, fuel dealers, and private contractors. Vermont Gas, Efficiency Vermont, and BED provide additional funding toward the WAP costs related to electrical and natural gas efficiency measures.

WAP serves low-income Vermonters in both single-family homes and multi-family buildings (including developments with more than 5 units). To be eligible for services, households must meet income eligibility guidelines listed by the Office of Economic Opportunity. These are currently 200% of the federal poverty level or less (federal guidelines) or 80% of the state's median income or less (State guidelines).

Vermont's WAP currently weatherizes about 900 low-income homes each year, reducing energy costs by about 25% and greenhouse gas emissions by 1.8 tons per home annually. The average cost of a low-income weatherization project in Vermont is \$8,500, of which about 20% goes towards non-energy health and safety improvements.

A fuel tax established under 33 V.S.A. § 2503 and deposited into the Vermont Home Weatherization Assistance Program Fund serves as a funding source for the program. The fuel tax includes the following sources: (1) two cents per gallon tax on fuel oil, propane, and kerosene; (2) 0.75% Gross Receipts Tax on natural gas and coal; and (3) 0.5% Gross Receipts Tax on electricity. Additional funding is provided by the U.S. Department of Energy.

Funding: The fuel tax raised \$9.6 million in 2017 and \$10.1 million in 2018. Another \$1.1 to \$1.4 million came from the U.S. Department of Energy.

4. Clean Energy Development Fund (CEDF): Advanced Wood Heating.

In recent years, the Vermont Clean Energy Development Fund (“CEDF”), established under 30 V.S.A. § 8015, has focused on advanced wood heating initiatives. This initiative includes incentives for automated pellet boilers for heating of residential, institutional, and commercial buildings, and residential change-outs of old non-EPA-certified stoves for new efficient stoves certified to meet EPA’s new 2020 stove standards. The CEDF is also offering \$350,000 in grants to businesses in support of the supply side of the local bulk pellet heating market.

The CEDF has budgeted more than \$1.2 million in fiscal year 2020 for the advanced wood heating programs. The CEDF does not have on-going funding to continue these programs.

The CEDF is deploying approximately \$400,000 in American Recovery and Reinvestment Act (“ARRA”) funds, returned from borrowers of an ARRA Loan Fund program, to support the installation of wood heating in low-income Vermonters’ homes.

The CEDF works cooperatively with Efficiency Vermont’s Existing Homes program, which also provides residential and commercial incentives for automated pellet heating systems and for pellet and cord wood stoves for homeowners. Efficiency Vermont’s wood heating incentives also include enhanced incentives for low-income Vermonters.

Funding: \$1.2 million for FY2020, no future dedicated funding.

C. Electrification Programs.

1. Renewable Energy Standard – Tier III Programs.

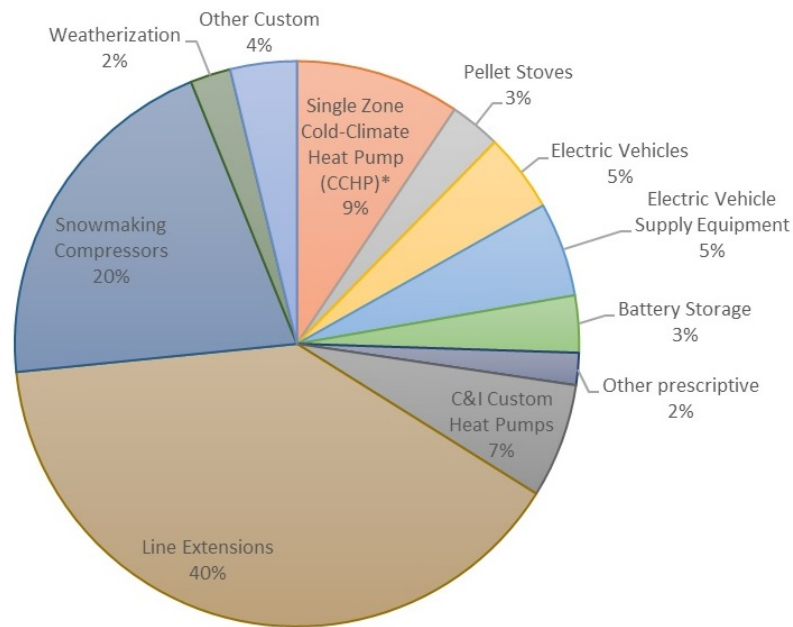
As outlined above in Section III(A)(1), the Vermont Renewable Energy Standard, established under 30 V.S.A. §§ 8004 and 8005, has three tiers of requirements: Tier I - utility-scale renewable generation; Tier II - distributed renewable generation; and Tier III - energy transformation. Tier III requires utilities to acquire MWh (megawatt hour equivalent) savings of 2% of the distribution utility’s retail sales in 2017, increasing by an additional two-thirds of a percent each subsequent year.⁵⁸ Energy transformation projects are those that reduce fossil fuel consumption. Projects may include electrification of thermal energy systems and weatherization measures. Increases in

⁵⁸ The requirement for distribution utilities serving fewer than 6,000 customers began in 2019.

distributed renewable energy generation above the Tier II requirements are also eligible under Tier III.

Tier III requirements are currently met primarily with electrification measures. The electric distribution utilities have funded programs through upstream or direct incentives as well as technical assistance. Projects include cold-climate heat pumps, electric vehicles, electric buses, electric vehicle charging stations, battery storage, weatherization, electric line extensions to maple syrup producers and lumber mills previously powered by diesel generators, and other custom projects that reduce fossil fuel use. The figure below provides a summary of Tier III measures implemented by the electric distribution utilities in 2018.

Figure 1: 2018 Tier III Savings Profile



Funding: Tier III program costs are embedded in distribution utility rates.

2. Electric Vehicle Programs.

Act 59, Section 34 of the 2019 Transportation Bill established an Electric Vehicle Incentive Program for income-qualified Vermonters.⁵⁹ Act 59 authorizes \$2 million (and requires the use of at least \$1.1 million) to provide an incentive program for the purchase or lease of new plug-in electric vehicles, the purchase of high-fuel-efficiency

⁵⁹ Public Act No. 59 (2019 Vt. Adj. Sess.).

used vehicles, and the repair of emissions systems. In December 2019, the Vermont Agency of Transportation (“VTrans”) launched the incentive program. Incentives are for individuals with an annual household income less than about \$96,000 (160% of the Median Household Income) and apply to purchases or leases of new electric vehicles with a base price of \$40,000 or less. More than 20 electric vehicle models available in Vermont are eligible. The incentive amounts are \$1,500 for plug-in hybrid electric vehicles and \$2,500 for all-electric vehicles. Larger incentives are available for individuals from households that qualify for the Weatherization Assistance Program: \$4,000 for plug-in hybrid electric vehicles and \$5,000 for all-electric vehicles. The statewide incentive may be used in combination with additional incentives offered by the state’s electric distribution utilities and federal tax credits.

As discussed above, as part of Renewable Energy Standard Tier III programs, electric distribution utilities offer incentives for the purchase or lease of electric vehicles and the installation of electric vehicle charging stations. Incentives are offered for used and new all-electric and hybrid-electric vehicles.

The Vermont Agency of Natural Resources (“ANR”) is implementing two electric vehicle programs using funds from the Volkswagen Environmental Mitigation Trust: (1) the Electric Vehicle Supply Equipment Grant Program, and (2) the Electric School and Transit Bus Pilot Program. Under the Electric Vehicle Supply Equipment Grant Program, more than \$1 million has been invested in Level 2 and DC fast-charge equipment at 30 locations around Vermont. In 2020, an additional \$1.9 million (requiring a 20% match by applicants) will be made available through a request-for-proposal process to expand the DC fast-charging network. Under the Electric School and Transit Bus Pilot Program, ANR has allocated \$2 million over a two-year period to evaluate the feasibility and cost-effectiveness of electric school and transit bus operation in Vermont.

ANR, VTrans, and the Department have allocated funding to support the Drive Electric Vermont program. This program offers education and outreach services to consumers and technical assistance to municipalities, regional planning commissions, and the State. In 2019, these three Agencies provided approximately \$70,000 to Drive Electric Vermont. Drive Electric Vermont has also received past funding from the John Merck Fund.

Funding: Except for the Renewable Energy Standard Tier III programs, none of the above electric vehicle programs has a continued source of funding beyond FY2020.

D. Electric Load Management Programs.

1. Load Management, Including Energy Storage.

Electric load management is enabled by the Advanced Metering Infrastructure (“AMI”) (or smart meter) investment made by the distribution utilities. More than 80% of the state’s electric meters are now AMI-capable. Using AMI in conjunction with data analytics and other emerging control and communications platforms, the distribution utilities, their customers, and third parties can actively manage electric loads across residential, commercial, and industrial sectors. This reduces electric system costs. Distribution utilities are also examining and, in some cases, implementing rate design solutions that enable customers to actively reduce their demand in response to price signals. Examples of such solutions include time-of-use rates, smart rates, and even energy-use feedback.

Examples of load management programs include BED’s pilot program that controls water heating devices. The program helps balance energy supply and demand in real time by enabling BED to evaluate whether coordinating energy consumption of residential equipment can better balance the supply and demand for electricity. The program goal is to reduce costs while improving service to customers. Washington Electric Cooperative’s “Powershift” pilot, jointly implemented with Efficiency Vermont, aims to test the ability of cold climate heat pumps and water heaters to shift load during peaks and other high-cost times, by using two different control platforms to aggregate and dispatch resources. Green Mountain Power Corporation (“GMP”) is piloting the use of distributed energy resources (e.g., thermal or ice storage or load shifting) to use controllable load to manage fluctuating demands in the commercial and industrial sector. To manage these resources, GMP employs several cloud-based, shared-access control platforms to connect to these resources. The resources are then aggregated and dispatched to reduce system peaks. One platform is used to manage the fleet of heat pumps, water heaters, electric vehicle chargers, and non-Tesla battery storage systems. A proprietary Tesla software is used to manage the Tesla Powerwall (residential-scale) and Powerpack (utility-scale) resources.

Additional storage programs have been provided by the Vermont Low Income Trust for Electricity (“VLITE”). Under a VLITE grant, 100 Powerwall systems were provided free

to low-income customers with significant need for backup power reliability due to health and mobility issues.⁶⁰

Funding for load management programs may be embedded in distribution utility rates. Many programs, like GMP's pilot programs, use a shared-cost, shared-value approach. For example, under the GMP Powerwall pilots, customers pay a fixed monthly price (e.g., \$15/month) for access to the storage capability during service outages. The programs and costs can vary, from annual subscription fees to per-battery fees, depending on the vendor, the number of resources connected, and other variables.

Funding: Program costs may be embedded in distribution utility rates.

2. Rate Design.

Rate design can set the foundation for customers' engagement with regulated-fuel service delivery. Historically, rate design has been used to send conservation price signals through inclining-block rate designs and high usage charges.⁶¹ Vermont residential electric consumers receive a retail price signal that typically ranges from 16 to 23 cents per kWh (lower for some municipalities), even while the direct costs of underlying wholesale products and bulk transmission services range between 7 and 8 cents per kWh.

Vermont distribution utilities have historically offered special prices to customers in exchange for load control. As mentioned above, utility-managed or controlled loads, including load management, hold the potential to minimize system costs. Many Vermont distribution utilities have offered some form of water-heater-controlled load program. GMP offers various forms of dynamic prices to both residential and commercial customers. BED offers a deeply discounted electric vehicle charging rate in exchange for some measure of load control. Vermont Gas offers interruptible rates to commercial and industrial customers. All distribution utilities rely on demand charges to encourage conservation of commercial and industrial customer peak loads. Three distribution utilities extend those charges to residential customers.

Funding: Costs are embedded in distribution utility rates.

⁶⁰ VLITE was created when Central Vermont Public Service ("CVPS") and GMP merged in 2012. A significant ownership interest in VELCO was transferred by CVPS to VLITE. As an owner of VELCO, VLITE receives dividend income from VELCO—estimated at \$1 million per year—to fund projects and initiatives that further the energy policies of the state of Vermont.

⁶¹ Under inclining block rates, customers pay more per kWh at higher levels of energy usage.

E. Transportation Programs.

1. Transportation Climate Initiative.

The Transportation and Climate Initiative (“TCI”) is a regional collaboration of twelve northeast and mid-Atlantic states and the District of Columbia that seeks to improve transportation, develop the clean energy economy, and reduce carbon emissions from the transportation sector. The participating states are Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia. TCI builds on the experience of the Regional Greenhouse Gas Initiative (“RGGI”), a cap-and-invest program that aims to reduce carbon emissions in the power sector.

Over the course of 2019, the TCI states have been designing a proposal for a potential regional cap-and-invest policy to reduce global-warming carbon emissions from the transportation sector. The TCI states are considering a program that would put a declining “cap” on carbon pollution from burning fossil fuels in the transportation sector to reduce transportation emissions. The total emission limit—or cap—sets the reduction requirement, and allowances equal to the cap are auctioned. Large gasoline and diesel fuel suppliers are required to hold allowances for the emissions that result from the combustion of the fuels that they sell to consumers. Proceeds from the auction may provide funding for programs to further reduce emissions or to provide other benefits to households and communities, at the discretion of each state.⁶²

Vermont’s participation in the TCI is currently at the exploratory level. In December 2019, participating states released a draft TCI regional policy proposal as a memorandum of understanding (“MOU”) for public comment and input. In Spring 2020, participating jurisdictions plan to release a final MOU. Each jurisdiction will decide whether to sign the MOU and participate in the regional program. In Spring-Fall 2020, participating jurisdictions will develop a model rule and take any legislative steps needed to implement the regional program. In 2021, jurisdictions will adopt any regulations necessary to implement the program. As early as 2022, the program implementation would begin.

⁶² Regardless of whether Vermont decides to sign the MOU and participate in TCI, Vermont will probably experience higher wholesale costs that reflect the regional implementation of the program. We will feel the effects in higher prices – to what extent is not known, but the cost at the pump will increase because we are not an island and are part of the regional market at the wholesale level.

Funding: Like RGGI, annual or quarterly auctions could result in proceeds for Vermont to invest in transportation emission reduction programs. Annual auction proceeds will depend on the emission cap set by the participating states. Preliminary estimates of annual auction proceeds for Vermont range between \$20 million and \$40 million.⁶³

2. Public Transit Programs.

As required by 24 V.S.A. § 5083(a), Vermont’s policy is to “make maximum use of available federal funds for the support of public transportation” and “support the maintenance of existing public transit services and creation of new services.” These services include the following goals: (1) provision of basic mobility for transit-dependent persons; (2) expanding public transit service in rural areas and increasing ridership statewide; (3) access to employment, including creation of demand-response service; (4) congestion mitigation to preserve air quality, decrease greenhouse gas emissions, and sustain the highway network; and (5) advancement of economic development objectives, including services for workers and visitors that support the travel and tourism industry.

The Public Transit Section of VTrans provides financial and technical assistance to transit districts, transit authorities, municipal transit systems, and non-profit public transit systems. This function is carried out through the administration of state and federal programs related to general public transportation and transit programs specific to the needs of senior citizens and persons with disabilities.

The Transportation Fund includes an annual dedication to public transit programs. This annual amount includes funding for commuter programs, such as Go Vermont. Go Vermont is a “one-click/one-call” resource for efficient transportation options throughout Vermont, offering an automated carpool matching service, subsidized vanpools, and program support for the Way to Go! School challenge and regional Transportation Management Associations. Funds are used to invest in technologies such as trip planners and the Automated Vehicle Location services. Financial support is provided to Local Motion, the Vermont Energy Education program, and other organizations that support efficient transportation programs and approaches.

Funding: \$37 million for FY2020 from the Transportation Fund, including \$800,000 for Go Vermont.

⁶³ Workshop transcript 10/25/19 at 37-38 (Dan Dutcher, Vermont Agency of Transportation).

3. Bicycle and Pedestrian Program.

The Transportation Fund includes an annual dedication for the Bicycle and Pedestrian Program administered by VTrans. VTrans selects projects through a grant program that funds municipally managed bicycle and pedestrian infrastructure projects. The Bicycle and Pedestrian Program also includes studies to plan for those projects, and directly funds several other studies by other organizations. The goal of the Bicycle and Pedestrian Program is to support projects that complete critical gaps in local pedestrian or bicycle networks and solve critical safety problems. The program budget includes spending earmarked for safety education.

Funding: \$14.7 million for FY2020 from the Transportation Fund.

4. Rail Program.

VTrans oversees a rail program that is charged with doing maintenance activities and upgrades on 305 miles of active rail lines that are owned by the State of Vermont. VTrans is responsible for 172 rail bridges and more than 400 public highway rail crossings. Vermont also has two Amtrak passenger service routes that it helps support financially. These services run on both privately and publicly owned railroads.

Funding:

- Railroad freight lines (no passenger use): \$17,103,339 for FY 2020 from the Transportation Fund
- Passenger services and support projects: \$9,175,000 for FY 2020 from the Transportation Fund
- Rail lines that provide freight and passenger service: \$9,550,526 for FY2020 from the Transportation Fund.

F. Cross-Cutting Efficiency Programs.

1. Building Energy Standards.

Vermont has both residential and commercial building energy standards. The residential energy code has been in effect since 1997, the commercial energy code since 2007. Both standards are based on the widely used International Energy Conservation Code (“IECC”). The IECC is updated every three years, and Vermont statute calls for

an energy code update process to begin promptly thereafter.⁶⁴ The update process consists of a review of the new IECC and a presentation and discussion of its new provisions at public and stakeholder meetings, in order to gather recommendations for Vermont-specific modifications. Any modifications to the IECC may be adopted through the state rulemaking process. We note that because there is no statewide mechanism for enforcement of the building energy standards, the standards may not always be implemented.

The Department also adopted the first Vermont residential stretch code, which went into effect December 1, 2015. The Department was given the authority to adopt a residential stretch code through Act 89, passed in 2013.⁶⁵ Act 89 defines a stretch code as “a building energy code ... that achieves greater energy savings than the [Residential Building Energy Standard]” (the base code). There is no requirement for the code to achieve a certain percentage of greater efficiency. Act 89 required that the stretch code apply to all Act 250 projects, and it can also be adopted by municipalities. The Department has also developed Commercial Stretch Energy Guidelines, which will be used by the Natural Resources Board for commercial Act 250 projects.

Additionally, the residential stretch code and commercial stretch energy guidelines have electric vehicle charging requirements. These include having a socket capable of providing either a Level 1 or Level 2 charge for up to 4% of the total parking spaces. (The percentage varies in the commercial guidelines based on the type of facility.)

Funding: The Department funds the code update process through State Energy Program allocations.⁶⁶ Efficiency Vermont has budgeted funds for the 2018-2020 performance period for energy-standards-related work. This includes hosting the Energy Code Assistance Center, distributing energy-standards materials, and hosting trainings on the standards.

2. Low-Income Home Energy Assistance Program.

The Home Heating Fuel Assistance Program, known as the Low-Income Home Energy Assistance Program (“LIHEAP”), was created by 33 V.S.A. § 2604. LIHEAP assists low-

⁶⁴ See 30 V.S.A. § 51, Residential Building Energy Standards, stretch code; 30 V.S.A. § 53, Commercial Building Energy Standards.

⁶⁵ Public Act No. 89 (2013 Vt. Adj. Sess.).

⁶⁶ The Department serves as the Vermont State Energy Office under the U.S. Department of Energy, State Energy Program. The federal State Energy Program provides funding and technical assistance to states, territories, and the District of Columbia to enhance energy security, advance state-led energy initiatives, and maximize the benefits of decreasing energy waste.

income households in meeting their immediate home energy needs. Administered by the Vermont Agency of Human Services, the program provides federally funded assistance in managing costs associated with home energy bills, energy crises, and weatherization and energy-related minor home repair.

Congress established the formula for distributing funds to grantees based primarily on each state's weather, fuel prices, and low-income population. Home energy is defined as a source of space-heating or space-cooling in residential dwellings. Grantees can use funds to pay heating bills as well as up to 15% of their funding (or 25% with a waiver) for weatherization assistance. To be eligible for LIHEAP, participants' gross household income must be equal to or less than 185% of the federal poverty level, based on household size.

In Vermont, while 15% of LIHEAP funds are used for weatherization assistance, these funds are replaced with revenue from the Weatherization Assistance Program fund to provide home heating fuel benefits and program administration. Thus, LIHEAP participants are eligible for weatherization assistance, but the funding is ultimately provided through the Weatherization Assistance Program fund.

Funding: \$20,446,280 in total federal funding for FY2019.

3. Energy Assistance Programs.

There are currently two utility energy assistance programs that assist lower-income Vermont households in affording their energy needs. The programs are available to GMP and VGS customers. GMP customers who have gross monthly household income at or below 150% of the federal poverty level receive a 25% discount on their customer and energy charges each month. VGS customers who have a gross monthly household income at or below 185% of the federal poverty level receive a 20% discount on their natural gas bill.

Funding: Costs are paid by GMP and Vermont Gas ratepayers.

V. Gaps in Current Programs and Funding.

Participants in the Commission's investigation identified a number of programmatic and funding gaps that hinder the State's achievement of its policy targets and goals for greenhouse gases, building efficiency, and renewable energy. Several participants also identified energy program goals established for affordability, economic development, least-cost service, and reliability contained in 30 V.S.A. §§ 202a, 218c, and 8001 as important principles necessary for

inclusion in any analysis of programmatic and funding gaps. In this context we analyze the following topics:

- Thermal efficiency through weatherization
- Transportation efficiency
- GHG reduction
- Beneficial electrification

A. Thermal Efficiency Through Weatherization.

To meet the goals established in 10 V.S.A. § 581 of 80,000 homes being weatherized by 2020, approximately 53,000 more homes would need retrofits in the next year. This will not happen. Since the goals were established, an adequate funding source has not been authorized by lawmakers. Compounding this problem, there is also an extensive backlog of customers waiting for weatherization services and a shortage of trained weatherization contractors. Without a stable and long-term funding source for thermal efficiency, weatherization contractors are hesitant to hire and train more employees or invest in equipment.⁶⁷

As discussed above in Section IV, current weatherization incentives for low-income homes heated with unregulated fuels are principally provided from thermal-energy and process-fuel (“TEPF”) funds pursuant to 30 V.S.A. § 209(e), the Vermont Home Weatherization Assistance Program Fund, and the U.S. DOE Weatherization Assistance Program Fund.⁶⁸ TEPF funds are dependent upon fluctuating proceeds from the Regional Greenhouse Gas Initiative’s (“RGGI”) quarterly auctions and the Forward Capacity Market.

Participants in this investigation generally support the need for a new or alternative funding source to support the cost of weatherizing homes heated with unregulated fuels and to promote non-electric technologies that support the attainment of Vermont’s building efficiency and greenhouse gas emission reduction goals.⁶⁹ Although this proceeding has not yet fully examined all approaches to the funding question with respect to reducing both fossil fuel use and greenhouse gas emissions in the heating

⁶⁷ *Building Performance Professionals Association of Vermont, Comments in Advance of Third Workshop*, Case No. 19-2956-INV, November 15, 2019 at 1-2.

⁶⁸ *Department of Public Service, Attachment A: Summary of Vermont Energy Services and Programs*, Case No. 19-2956-INV, September 16, 2019 at 6-7.

⁶⁹ *Efficiency Vermont Comments in Advance of Third Workshop*, Case No. 19-2956-INV, November 15, 2019 at 16.

sector, the Thermal Energy Task Force report of 2013 contains a comprehensive, in-depth analysis and set of recommendations that remain relevant for consideration.⁷⁰

B. Transportation Efficiency: Electrification and Upstream Support.

Transportation is the largest contributor to greenhouse gases in Vermont, producing approximately 47% of Vermont’s greenhouse gas emissions.⁷¹ As such, transportation carbon efficiency – using less carbon to provide the same transportation services – is an important component of carbon reduction and the attainment of greenhouse gas goals. A strategy to comprehensively transform the transportation sector and promote the widespread adoption of electric vehicles (“EVs”) in Vermont has not yet been implemented.⁷²

The Commission has identified many barriers and actions with respect to this transformation.⁷³ Workshop participants agreed that there is a gap in the marketplace for upstream programs that support transportation electrification, including working with manufacturers, creating dealer networks, training sales teams, strategic placement of electric vehicle supply equipment, and other supply-chain development activities to make EVs more readily available and accessible in Vermont. Such work could be coordinated with the distribution utilities’ Tier III programs.

At this juncture, the energy efficiency utilities are not authorized to work on transportation services other than electrification efficiency. Workshop discussions have included discussion of an expansion of the use of electric efficiency charge funds from electric vehicle charging to support upstream programs that are complementary to distribution utility Tier III energy transformation projects.⁷⁴

⁷⁰ *Thermal Energy Task Force: Analysis and Recommendations – A Report to the Vermont General Assembly*, January 2013.

⁷¹ *Promoting the Ownership and Use of Electric Vehicles in the State of Vermont, A Report to the Vermont State Legislature*, Vermont Public Utility Commission, June 27, 2019 at 1.

⁷² *Investigation Pursuant to Act 62, Comments in Advance of Second Workshop*, Efficiency Vermont, October 18, 2019 at 5.

⁷³ See, *Promoting the Ownership and Use of Electric Vehicles in the State of Vermont, A Report to the Vermont State Legislature*, Vermont Public Utility Commission, June 27, 2019.

⁷⁴ *Department of Public Service Attachment A Reply Comments*, Case No. 19-2956-INV, December 2, 2019 at 4-5; *Investigation Pursuant to Act 62, Efficiency Vermont Comments in Advance of First Workshop*, Case No. 19-2956-INV, September 16, 2019 at 21-22; *Efficiency Vermont Comments in Advance of Third Workshop*, Case No. 19-2956-INV, November 15, 2019 at 9; *Efficiency Vermont Reply Comments in Response to Third Workshop*, Case No. 19-2956-INV, November 29, 2019 at 4.

C. GHG Reduction Goals.

Vermont energy programs often do not specifically target greenhouse gas emissions when measuring performance, but instead focus on electric efficiency and load management as directed by 30 V.S.A. §§ 218c and 209.⁷⁵ Having a parallel set of greenhouse gas targets as a component of EEU performance metrics could be beneficial to achieving the State's greenhouse gas goals articulated in 10 V.S. A. § 578.⁷⁶ Some participants support the codification of a greenhouse gas goal so that the regulated electric distribution utilities and energy efficiency utilities would be enabled to work collaboratively toward maximizing greenhouse gas reductions.

D. Beneficial Electrification.

Beneficial electrification of the thermal and transportation sectors is a core component of meeting the State's energy goals. Strategies for beneficial electrification include the replacement of fossil-fuel-based energy uses with technologies such as cold-climate heat pumps, heat-pump water heaters, and EVs.⁷⁷ Vermont electric ratepayers have made, and will continue to make, substantial investments in renewable electricity, as required by the net-metering program, standard-offer program, and Renewable Energy Standard. As more of Vermont's energy uses become electrified, Vermonters will be able to take increasing advantage of their investments in renewable electricity.

Participants generally support the adoption of collaborative strategies and clearly defined roles and objectives that would allow energy efficiency utilities and distribution utilities to promote beneficial electrification technologies while avoiding cross-subsidization between fuels. There is also broad support for allowing the distribution utilities to lead because of their experience with energy transformation programs and the management of the electric grid.⁷⁸

⁷⁵ *Department of Public Service, Attachment A: Second Round of Comments, Case No. 19-2956-INV*, October 18, 2019 at 3.

⁷⁶ *Id.*

⁷⁷ *Department of Public Service Third Set of Comments, Case No. 19-2956-INV*, November 15, 2019 at 5.

⁷⁸ *Department of Public Service, Attachment A: Second Round of Comments, Case No. 19-2956-INV*, October 18, 2019 at 6; *Investigation pursuant to Act 62 into the creation of an all-fuels energy efficiency program, Case No. 19-2956-INV*, 9/16/2019, *Comments of Burlington Electric Department* at 2; *Comments of Vermont Electric Cooperative, Inc.*, October 18, 2019 at 1-2 and December 2, 2019 at 2, *VPPSA, Case No. 19-2956; Investigation pursuant to Act 62 into the creation of an all-fuels energy efficiency program, expansion of energy efficiency utility programs and services, and funding options for those programs*, December 2, 2019 at 4.

VI. Preliminary Recommendations for Vermont.

For this preliminary report, Act 62 directs the Commission to report on its progress and any preliminary findings and recommendations as to subsection (a) of Section 2 of the Act, including recommendations as to subdivision (a)(3)(A) of Section 2 of the Act, and any findings and recommendations that may influence the scope and focus of Efficiency Vermont's 2021-23 Demand Resources Plan proceeding. Subsection (a) poses multiple questions focused on whether there should be an all-fuels efficiency program, whether to expand the programs and services that efficiency utilities may provide, and how best to fund existing efficiency programs and any new programs the Commission may recommend.

In this report we provide our preliminary recommendations with respect to program funding.⁷⁹ To date, none of the participants in the Commission's investigation has advocated for the creation of an all-fuels efficiency program.⁸⁰ The question of whether there should be an all-fuels efficiency program will be significantly informed by whether a new source of funding is authorized by lawmakers to support it. We will continue to analyze this question, whether to expand the programs and services that current efficiency utilities may provide, and the remaining topics of subsection 2(a) of Act 62 in the coming year.

A. How Best to Provide Consistent, Adequate, and Equitable Funding for Efficiency, Conservation, and Related Programs and Services.⁸¹

Our analysis of this question is divided into two categories: regulated fuels and unregulated fuels. Under Vermont law, "regulated fuels" means electricity and natural gas delivered by a regulated utility.⁸² "Unregulated fuels" means fuels used by thermal-energy and process-fuel customers other than electricity and natural gas delivered by a regulated utility.⁸³ For the purposes of this report and consistent with the intent of this investigation to consider *all* fuels, we use the term "unregulated fuels" more broadly to include not only common heating and process fuels like heating oil, propane, kerosene, and biomass, but also transportation fuels like gasoline and diesel.

⁷⁹ Section 2(a)(3) of Act 62.

⁸⁰ Section 2(a)(1) of Act 62.

⁸¹ Section 2(a)(3) of Act 62.

⁸² 30 V.S.A. § 209(e)(3)(E).

⁸³ 30 V.S.A. § 209(e)(3)(F).

1. Regulated Fuels.

As discussed in Sections IV(A) and (B), above, Vermont’s existing efficiency programs for regulated fuels—electricity and natural gas—are funded by an energy efficiency charge paid by the consumers of those fuels.⁸⁴ The amount of the energy efficiency charges for those fuels is determined by the Public Utility Commission pursuant to the requirements of 30 V.S.A. § 209(d)(3)(b). This law grants the Commission discretion to determine appropriate amounts to be collected for regulated energy efficiency services. Therefore, it is our assessment that existing law governing electric and natural gas efficiency programs provides consistent, adequate, and equitable funding for regulated energy efficiency services.⁸⁵ If evidence is presented to the Commission at any time indicating that the funding is not consistent, adequate, or equitable, the Commission may take corrective steps.

2. Unregulated Fuels.

As discussed in Section IV(B), above, Vermont’s existing efficiency, conservation, and weatherization programs for unregulated fuels are funded by multiple sources. Thermal-energy and process-fuels efficiency programs implemented by BED and Efficiency Vermont are funded by proceeds from RGGI and the ISO Forward Capacity Market. The Weatherization Assistance Program, which provides weatherization services to low-income Vermonters, is funded by a fuel gross receipts tax. Electric utility energy transformation programs under the Renewable Energy Standard are funded by electric ratepayers.

The funding levels for these programs are not anywhere near what is needed to meet the unregulated-fuels energy efficiency needs of Vermonters or to put Vermont on a path to achieving its environmental goals and commitments. The Department’s 2019 Annual Energy Report documents that Vermont is falling exceptionally short of its building weatherization goals and the Comprehensive Energy Program’s goals for the transportation sector. Significant additional funding is needed immediately. We therefore make the following recommendations with respect to energy program funding for the unregulated fuel sectors.

⁸⁴ Programs for these fuels may be supplemented by the regulated electric and natural gas utilities through additional efficiency programs of their own or through additional contributions to the efficiency utilities.

⁸⁵ The term “equitable” can have several meanings. As used here, “equitable” is meant to convey that the fuel types subject to the funding mechanism are also the fuel types that benefit from the programs and services that are funded, rather than subsidizing programs and services for other types of fuels.

1. It is necessary for lawmakers to identify and authorize new sources of consistent and adequate funding for unregulated-fuels efficiency and fuel-switching programs consistent with Vermont’s ambitious energy and environmental goals.

2. Beyond what is currently authorized by statute, Vermont electric and natural gas ratepayers should not subsidize new or expanded unregulated-fuels programs.

3. Any new or expanded programs, and any new sources of funding for those programs, should be sensitive to the needs of low-income Vermonters.

We expand on these recommendations, below.

B. Identify Funding for Unregulated-Fuels Efficiency and Fuel-Switching Programs to Make Progress Toward Vermont’s Economic, Health, and Environmental Goals.

The transportation and heating sectors are the largest consumers of fossil fuels and the largest emitters of carbon dioxide in Vermont. If Vermont is to make progress toward its environmental goals and commitments, it must establish and expand programs focused on reducing the emission profiles of these sectors. Most of the participants in the Commission’s investigation support this idea. There is currently not enough funding directed toward Vermont’s greenhouse gas goals, and additional funding and investment are necessary.

It is worth noting that while Vermont’s energy industry and environmental goals have evolved, funding mechanisms for expanding energy programs have not kept pace. Vermont’s funding policies should mirror the State’s clean energy and environmental goals.

1. Heating Sector.

In the 2019 Annual Energy Report, the Department highlighted that the heating sector is the second largest carbon emitter and is the sector with the greatest impact on vulnerable populations. Coupled with the fact that Vermont is falling well short of its weatherization and greenhouse gas emission reduction goals, it is evident that this sector should receive greater attention and funding than it does today.

a. Thermal Efficiency Task Force Report: Programmatic and Funding Assessment.

In 2013, the Department issued the Thermal Efficiency Task Force report. That thorough and comprehensive assessment of strategies for meeting Vermont’s thermal

efficiency building goals provides a suite of both programmatic and funding recommendations. The first strategy identified by the Task Force is to make buildings more energy efficient. The next strategy is to shift heating to more local, renewable fuel sources.

The Thermal Efficiency Task Force estimated that the investments it recommends would leverage private capital, increase the Gross State Product by \$1.47 for every dollar invested, save two dollars for every dollar spent, create approximately 800 job-years, and avoid 6.8 million tons of carbon dioxide emissions. To implement these strategies, the Task Force identified a portfolio of public funding and financing options.

In evaluating various funding options, the Task Force identified a set of guiding principles. The Commission agrees that the principles, listed below, provide an important set of considerations that lawmakers should incorporate into their evaluation of funding.

1. Funding is sustainable and sufficient to meet the State's mandated goals.
2. Funding levels are also dynamic to ramp up and down over time as needed.
3. The level of funding balances short-term costs with the benefits of providing long-term affordability to all Vermonters; mechanisms will be put in place to minimize negative financial impacts on low-income Vermonters.
4. The funding source, like program delivery, is equitable across non-electric fuels and by customer classes (residential, commercial, etc.); cross-subsidization between fuels and customer classes is minimized; equitable treatment for in-state and out-of-state fuel providers is addressed.
5. Mechanisms that are administratively efficient to create and implement, simple, and auditable are preferred.
6. The collection mechanism, sources, and uses of public funding are transparent.
7. Price signals should support State energy policy goals.
8. Support the vibrancy of Vermont communities and competitiveness of Vermont

businesses.

9. Public funding is used in ways that leverage private sources of capital where possible, in order to get the best return on each public dollar invested.

10. Public funding is used only to the extent that it is needed to mobilize capital and meet private market shortcomings.

11. Protect existing stable taxes for the Low Income Weatherization Program.⁸⁶

The Task Force recommended that Vermont pursue a package of multiple funding options. The preferred options identified by the Task Force were those deemed to most closely match the principles. The full list of options is available in the Task Force report. We summarize two options identified by the Task Force that, among others, are worth additional consideration by lawmakers, and that we will consider as part of our ongoing Act 62 investigation.

- i. Fossil fuel excise tax, or thermal systems benefit charge, levied on fuel oil, kerosene, propane, coal, and natural gas, using the same basis – either a BTU energy content or CO₂ content.

According to the Task Force report, this mechanism would provide a path to fund thermal efficiency that is equitable and transparent. Based on the estimated fuel use at the time of the Task Force report, an MMBTU-based fee was calculated to annually raise \$10 million, \$20 million, and \$30 million combined from fuel oil, kerosene, propane, and natural gas.

Fuel	Unit	Tax/unit to raise \$10 million	Tax/unit to raise \$20 million	Tax/unit to raise \$30 million
Fuel oil	Gallon	\$0.041	\$0.081	\$0.122
Kerosene	Gallon	\$0.040	\$0.080	\$0.120
Propane	Gallon	\$0.027	\$0.054	\$0.081
Natural gas	Therm ⁸⁷	\$0.029	\$0.059	\$0.088

⁸⁶ Thermal Efficiency Task Force Report at 99.

⁸⁷ A “therm” is a unit of heat equivalent to 100,000 Btu, or approximately 100 cubic feet (ccf) of natural gas. One ccf equals 1.036 therms.

- ii. An energy efficiency resource standard that places an efficiency obligation on all suppliers of unregulated fuels.

Fuel dealers would have an annual savings target based on their previous year's sales. Fuel dealers could choose how to meet the standard – for example, by partnering with efficiency contractors, by providing weatherization services themselves, or by paying a compliance amount to another entity to acquire the savings for the dealer. We note that unregulated-fuels customers currently do not pay an efficiency fee. In their presentation to legislators last year, representatives of the Regulatory Assistance Project recommended that fossil fuels should contribute to efficiency at a level closer to electricity and natural gas.⁸⁸

The Task Force estimated that the total incremental public funding required to implement its portfolio of thermal efficiency recommendations would be approximately \$267 million, or about \$30-40 million per year between 2014 and 2020.

b. Other Unregulated Fuel Efficiency Analyses.

i. Additional Funding Sources.

The Commission has not independently assessed the level of funding or other interventions that would be necessary to put Vermont on a path toward its goals for this sector. However, participants in this investigation provided the Commission with data that we find reasonable and appropriate for the purposes of framing the question of how much funding or other interventions are necessary.

Nearly every participant in the Commission's investigation agrees that additional funding is needed to achieve Vermont's thermal efficiency goals. Efficiency Vermont supports the need for a new and alternative funding source to sustainably support the cost of weatherizing homes heated with unregulated fuels and to promote non-electric technologies that further the attainment of Vermont's goals. VPPSA advocates for a tax on heating fuels as the funding source for expanded thermal efficiency and weatherization services in Vermont, noting that no one has presented a rationale for using ratepayer funds for thermal efficiency. VPPSA and BPPA maintain that increasing the cost of fossil fuels is the most straightforward way to discourage their use. Capstone believes that fossil heating fuels should be regulated, and that Vermont should raise funds from these fuels at rates commensurate with the electric energy

⁸⁸ *Carbon Efficiency: Program Options for Economic and Energy Savings*, Richard Cowart, David Farnsworth, and Frederick Weston, February 2019 at page 17.

efficiency charge. The Department states that funding approaches that do not increase the cost of electricity are preferred.

The Conservation Law Foundation (“CLF”) suggests that future energy efficiency program budgets should include additional funds to reduce greenhouse gas emissions from the transportation and heating sectors. CLF states that funding should come from those sectors and can be raised in a manner similar to the energy efficiency charge that is paid by electric customers. CLF notes that an example of this model was provided to the Vermont Legislature’s Joint Fiscal Office in February 2019.

Approximately 2,000 residential housing units per year receive thermal efficiency services through comprehensive weatherization programs offered by the energy efficiency utilities and the Weatherization Assistance Program. According to Efficiency Vermont, the cost of an average project under its Home Performance with Energy Star program is \$7,000-8,000.⁸⁹ According to Efficiency Vermont, using an average cost for a comprehensive weatherization project of \$7,500, it would cost in excess of \$400 million to weatherize the 53,700 homes needed to meet the State’s statutory building efficiency goals⁹⁰ This cost does not consider program or incentive costs that may be used to amortize or reduce direct costs to consumers or costs associated with fuel switches or heating system improvements.

The average Efficiency Vermont incentive provided in 2018 was \$1,400 per home. According to the Department, based on 2018 data, the average incentive per project across all weatherization service providers was \$6,599, with average total cost per project at \$10,600. These averages are significantly influenced by the higher costs of 3E Thermal and Office of Economic Opportunity projects. The costs reported by Burlington Electric Department, Efficiency Vermont, and Vermont Gas are significantly lower. According to the Department, to weatherize approximately 53,000 homes to

⁸⁹ Efficiency Vermont and BPPA believe that the Thermal Efficiency Task Force report estimates remain a reasonable proxy of what is necessary to help Vermont to catch up on its building efficiency goals. That report concluded that an additional \$30-40 million per year would be necessary to meet the State’s weatherization goals. The report’s quantification of the cost to meet the State’s goals is a reasonable proxy once the number of homes remaining to be weatherized is updated to 2019 values.

⁹⁰ According to the Regulatory Assistance Project February 2019 report, the average capital cost of non-low-income weatherization is \$5,650 per home, while low-income weatherization projects cost an average of \$8,804 per home. Vermont Gas states that fuel needs are reduced on average by 18.4% for customers who use its comprehensive thermal efficiency services, which typically cost between \$1,500 and \$6,000.

meet the 10 V.S.A. Section 581 goals, at an average incentive cost of \$6,599, the total public investment would be approximately \$350 million.

Based on several different estimates, there are 54,000-58,000 low-income homes in Vermont. The State Weatherization Assistance Program has weatherized approximately 12,500 low-income homes, leaving approximately 41,500-45,500 remaining low-income homes eligible for State-funded weatherization support.

Given the above information, it is evident that additional funding is needed to put Vermont on a path to significantly increasing building weatherization. It will be possible to determine approximately how much funding would be required to achieve, for example, the building sector's share of the emission reductions required to achieve Vermont's Paris Climate Agreement commitment. However, it is beyond the scope of this preliminary report to recommend precisely the amount or the source of additional programmatic funding for the heating sector. We note that several promising concepts, including the recommendations of the Thermal Efficiency Task Force and the Regulatory Assistance Project, have previously been presented to lawmakers. The Commission intends to consider these and other options, including the Vermont Property Assessed Clean Energy (PACE) Program, on-bill financing, and Pay As You Save (PAYS), to inform the final Act 62 report.

One conclusion that we can offer at this time is that using the electric and natural gas energy efficiency charge funds for unregulated-fuels thermal efficiency is at cross-purposes with energy efficiency programs supported by those charges. Electric and natural gas energy efficiency programs have demonstrated success in advancing Vermont's goals, including reduced greenhouse gas emissions, due in no small part to being appropriately and equitably funded. If these programs are to continue on the same trajectory toward meeting or exceeding the State's statutory goals, then this funding must be maintained for its intended purpose.

ii. Additional Benefits of Weatherization.

The Commission has not independently examined the costs or benefits of increasing funding for building weatherization. In addition to the Thermal Efficiency Task Force report discussed above, previous reports have examined this topic as well.

In a December 2018 report, the Vermont Department of Health quantified some of the benefits that accrue from home weatherization. The Department of Health reported

that approximately 900 low-income homes are weatherized each year, a rate that is far below what is needed to meet the statutory building weatherization goal, citing lack of funding as a barrier. The Department of Health states that this is a missed opportunity for low-income Vermonters, who spend more of their income on energy and whose health is more likely to be affected by asthma, cold, and heat. The report notes that the average cost of a Vermont Weatherization Assistance Program project is \$8,500. If the rate of weatherization were increased to 2,000 low-income Vermont homes per year, the report estimates that 223 emergency department visits and 13 hospitalizations would be prevented over a 10-year period. The 10-year estimated value of energy and health benefits would be at least \$24,757 per household, almost three times the initial cost. According to the report, the benefits would exceed costs by year four.⁹¹

Building weatherization creates in-state jobs, grows the Vermont economy, saves Vermonters money, increases the comfort of Vermont homes, and provides substantial health benefits to residents. The fact that Vermont is falling well short of its building weatherization goals indicates that there continue to be barriers, including education, capital, and workforce. To overcome these barriers, the Commission recommends that lawmakers consider the funding options identified above. The Commission will continue to analyze these and other topics as this investigation progresses.

c. Economic Benefits and Energy Savings through Low-Cost Carbon Management.

In February 2019, the Regulatory Assistance Project provided an assessment of a study produced by Resources for the Future, which examined the possible methods, costs, and benefits of using carbon pricing to address the state's carbon emissions. The Regulatory Assistance Project report concludes that programs supporting carbon reduction would cost less and deliver more than a carbon pricing scheme alone. Vermont's electric portfolio is already relatively clean and will become cleaner over time. Thus, according to the Regulatory Assistance Project report, the essential next steps to meeting Vermont's climate goals were identified as energy efficiency and fuel switching from fossil fuel sources to beneficial electrification, including vehicles and home heating. The report includes studies of light-duty vehicle⁹² and building and heating strategies. It concluded that investments in these strategies would avoid significant greenhouse gas emissions at very favorable costs. In fact, the report finds

⁹¹ *Weatherization + Health, Health and Climate Change Co-Benefits of Home Weatherization in Vermont*, Vermont Department of Health, December 2018, at iii, 25

⁹² Personal vehicles – cars and light trucks.

that the building and heating strategies would avoid greenhouse gas emissions at a negative program cost – that is, the strategies make economic sense even when emission reductions are not accounted for as a program goal.

2. Transportation.

In Vermont, the transportation sector is the largest consumer of fossil fuels and the largest contributor to Vermont’s emission profile. Accordingly, as lawmakers consider solutions for all fuels, priority should be given to the transformation of Vermont’s transportation sector to one that is more efficient and one that increasingly reflects Vermont’s energy and environmental goals.

The Commission’s report to the Legislature “*Promoting the Ownership and Use of Electric Vehicles in the State of Vermont*” discusses the various barriers to electric vehicle adoption, including the uncertainty about how far an electric vehicle can travel on a single charge, limited availability of charging opportunities, and the upfront cost of electric vehicle ownership compared to internal combustion engine vehicles. That report concluded that bold legislation, including identifying and appropriating meaningful funds to enable additional electric vehicle adoption and charging station deployment, will facilitate the transformation of this priority sector of Vermont’s economy.

The Commission has not independently assessed the amount of funds that would be necessary to achieve this transformation, nor has the Commission yet assessed appropriate funding mechanisms. However, the Commission will address this topic as part of our continuing investigation into all-fuels efficiency programs. In the meantime, we provide several observations and one recommendation.

First, we note that several programs are underway in Vermont that address some of the barriers to widespread electric vehicle adoption. For example, most Vermont electric utilities offer limited incentives for electric vehicles or electric vehicle chargers as part of their Renewable Energy Standard energy transformation programs.⁹³ In addition, Vermont will be using part of its Volkswagen settlement money to spur this market. However, the Volkswagen funds are limited, temporary, and not sustainable.

⁹³ Renewable Energy Standard energy transformation incentives are limited by statute. Section 8005(a)(3)(C) of Title 30 requires that projects must be cost-effective and must cost the utility less per MWh than the alternative compliance payment rate.

Second, rather than use ratepayer funds to transform the transportation market, VPPSA states that a gas tax is the most appropriate mechanism for encouraging Vermonters to convert from gasoline modes of transportation to less carbon-intensive ones. VPPSA states that this construct is being considered under the Transportation Climate Initiative. It is beyond the scope of this report to summarize or offer an opinion with respect to the Transportation Climate Initiative. Instead, we defer to the multiple State agencies that are engaged in that effort. However, because the Commission is uncertain about how that program would work, whether and when it would be implemented, whether Vermont would be a net beneficiary, and how revenues would be spent, it appears reasonable for lawmakers to consider alternative or additional approaches, even if short-term in nature.

For example, the Regulatory Assistance Project February 2019 report considered the total public investment that would be necessary to implement strategies to significantly reduce emissions from on-road vehicles in Vermont in line with the State's goals and commitments. Transportation electrification was a key factor in the analysis. The authors assumed that most customers would not purchase electric vehicles unless they were at least equivalent in cost to conventional vehicles, and that therefore public investments would be required to incentivize electric vehicle adoption. That report concludes that \$70 million in total (2018 \$) would be required through 2030 to incentivize high levels of transportation electrification for light-duty vehicles. The report's light-duty vehicle strategy would avoid 4.4 million metric tons of greenhouse gasses over 10 years. The report notes that a \$0.02/gallon fee (adjusted periodically for inflation) assessed on all on-road gasoline and diesel sold in Vermont would be more than enough to fund the public investments necessary to promote high levels of light-duty electric vehicles in Vermont. Medium- and heavy-duty electric vehicle market transformation would come at a significantly higher price: \$564 million through 2030. According to the report, a \$0.15/gallon fee would be enough to fully fund light-, medium-, and heavy-duty transportation electrification through 2030, and to partially fund those markets between 2030 and 2050.

The above considerations readily lend themselves to helping drivers overcome the upfront cost and charging infrastructure barriers that are perceived to be among the leading obstacles to electric vehicle adoption. A parallel consideration, which the Commission recommends here, is that lawmakers also approve strategies aimed at

transforming upstream market barriers. There is a gap in the marketplace for upstream programs that support transportation electrification.

Insufficient attention has been given to increasing awareness of electric vehicles, working with manufacturers, creating dealer networks, training sales teams, the strategic placement of electric vehicle supply equipment, and other supply-chain development activities. The goal of this upstream market transformation would be to increase the availability of electric vehicles and to improve the capability of the salesforce to sell them. Energy efficiency utilities are currently not authorized to participate directly in supporting the electrification of the transportation sector. There is an identified need for a coordinated program focus on transportation market actors (such as manufacturers, distributors, and dealers). Therefore, the Commission supports a limited expansion of the use of the electric energy efficiency charge to fill this need.

Currently, the transportation class of electric customers pay the electric energy efficiency charge, but do not receive a direct benefit from their contribution. Increased supply-chain development will benefit current electric customers by enabling more Vermont drivers to purchase electric vehicles, which would lead to more charging and the potential for downward electric rate pressure. However, it is important that electric ratepayer funding for this service be limited to efficiency charge funds collected from electric vehicle charging in order to avoid cross-subsidies between energy sources. At present, it is estimated that this equals approximately \$120,000 per year. It will also be important for any transportation market services to be complementary to existing electric vehicle programs and services, rather than compete with them. Finally, participants in this Act 62 investigation were split as to whether an incumbent efficiency utility should be appointed to provide these services, or whether proposals for these services should be solicited. If lawmakers adopt the Commission's recommendation to allow transportation market services to be funded using the electric energy efficiency charge, it would be consistent with the current implementation of Section 209(d) to preserve the Commission's jurisdiction to appoint an entity to provide this service, rather than appoint an entity through legislative action. To effectuate this recommendation, the Commission offers the following statutory amendment for consideration:

30 V.S.A. § 209(d)(2)(A):

Electricity and natural gas. In place of utility-specific programs developed pursuant to this section and section 218c of this title, the Commission shall, after notice and opportunity for hearing, provide for the development,

implementation, and monitoring of gas and electric energy efficiency and conservation programs and measures, including programs and measures delivered in multiple service territories, by one or more entities appointed by the Commission for these purposes. The Commission may include appropriate combined heat and power systems that result in the conservation and efficient use of energy and meet the applicable air quality standards of the Agency of Natural Resources. Except with regard to a transmission company, the Commission may specify that the appointment of an energy efficiency utility to deliver services within an electric utility's service territory satisfies that electric utility's corresponding obligations, in whole or in part, under section 218c of this title and under any prior orders of the Commission. Programs approved by the Commission may support transportation electrification upstream programs that are complementary to distribution utility energy transformation projects under Section 8005 of this title. Funding for upstream transportation electrification programs that is collected via Section 209(d)(3) of this title shall be limited to the actual or estimated electric efficiency charge revenues collected from electric vehicle charging.

C. Do Not Use Electric or Natural Gas Ratepayer Funds to Subsidize Programs for Unregulated Fuels.

Nearly every participant in the Commission's investigation advocated that Vermont should minimize cross-subsidies across fuel types and ratepayer classes. Vermont electric ratepayers already pay an efficiency charge to support electric efficiency, and also bear the cost of Vermont's renewable electricity policies. Additionally, electric ratepayers support unregulated-fuels programs through electric utility energy transformation projects and, arguably, through the revenues received from RGGI and the ISO Forward Capacity Market. Similarly, Vermont Gas customers already pay an efficiency charge to support natural gas efficiency services.

It is not a long-term viable strategy to extract additional dollars from ratepayers to provide more funding for additional unregulated-fuels energy efficiency or fuel-switching programs. Therefore, new funding for programs that reduce fossil-fuel use and greenhouse gas emissions from the heating and transportation sectors should not come from electric or natural gas customers, especially if there is not a direct nexus to electricity or natural gas efficiency. Instead, policymakers should consider how to fund

increased weatherization and fuel-switching programs for unregulated fuels in a way that matches the funding source to the beneficiaries.

Vermont's efforts to decarbonize its total energy portfolio is likely to rely heavily on the electric sector for both heating and transportation. The electric energy efficiency charge functions as an additional fee on kWh sales. Therefore, it would be counterproductive to Vermont's decarbonization efforts to tax the commodity—electricity—that Vermont wants consumers to use more of.

In addition, the electric energy efficiency charge is a "systems benefits charge." The programs and services funded by the charge are intended to provide financial benefits to all electric customers. The same cannot be said for thermal efficiency services aimed at reducing direct fossil fuel use. VPPSA contends it would be troubling to collect revenue from all electric customers to provide financial benefits to only a subset of those customers. VPPSA states that a tax on fossil fuels would be more equitable and would provide a financial incentive for customers to use less fossil fuels. Electricity should be maintained as an affordable alternative by not adding to the public programs that electric ratepayers must support.

When electric energy efficiency charge dollars are redirected, services and benefits are taken away from other areas that may have equally compelling needs or that provide greater societal benefits. For example, when the Commission recently approved electric energy efficiency budgets for Efficiency Vermont and Burlington Electric Department, it found that investments in electric energy efficiency have the potential to reduce the size of future power purchases, reduce the generation of greenhouse gases, limit the need for electrical system upgrades, and minimize the costs of electricity.⁹⁴ These investments are expected to provide long-term benefits to all Vermont ratepayers. If electric efficiency dollars were redirected to other purposes, these benefits would be tenuous or forgone completely, yet the rate impacts would remain. In addition, the revenues that Vermont receives from the ISO-New England Forward Capacity Market for Vermont's electric efficiency resource capacity – which by law is directed to thermal-energy and process-fuel efficiency – would be jeopardized or reduced.

It is worth noting that electric and natural gas ratepayers fund meaningful efficiency budgets that are subject to regular, periodic Commission review. The Commission-

⁹⁴ *In Re: 2016-2017 Demand Resources Plan Proceeding*, EEU-2016-03, Order of 7/7/17 at 32-36.

approved budgets are intended to capture the reasonably available, cost-effective energy efficiency potential for those fuels. By contrast, unregulated-fuels customers are not subject to an efficiency obligation or an efficiency fee. As a result, there remains meaningful, cost-effective efficiency potential for unregulated-fuels customers. By failing to pursue these savings, Vermont is forgoing substantial economic benefits.⁹⁵

D. Low-Income Consideration.

A key consideration for any plan to address the transportation and heating sectors is to avoid adding a burden on those who can least afford it. This was an important message provided by multiple participants and shared by the Commission.

Capstone Community Action recommends that funds for program services should be available on an income-sensitive scale or should be disproportionately targeted to households with the highest energy costs relative to their income (i.e., with the highest energy burden). The Vermont Electric Cooperative believes that initiatives that support low-income weatherization and efficient transportation should be given the highest priority in any new program design. Lower-income and rural Vermonters have unique needs and barriers as they work to transition toward cleaner fuels and technologies. Some Vermont electric utilities already reflect this fact in their energy transformation programs. For example, some utilities offer additional, larger financial incentives to low-income Vermonters for the purchase or lease of new electric vehicles, or offer financial incentives for the purchase of used electric vehicles.

One of the recommendations of the Vermont Climate Action Commission to the Governor -- in fact, the first recommendation for homes -- was to double low-income weatherization through the State Weatherization Assistance Program. The Climate Action Commission offered that this doubling could be accomplished through a bond or through an increase in funding for the Weatherization Assistance Program.⁹⁶

In its 2019 Annual Energy Report, the Department highlighted that expansion of the State Weatherization Assistance Program through new financing and funding options holds promise. The Department notes that expanding the Weatherization Assistance

⁹⁵ See, e.g., *Potential for Unregulated Fuel Efficiency Savings in Vermont*, prepared for the Vermont Department of Public Service by Optimal Energy, February 18, 2015.

⁹⁶ Vermont Climate Action Commission, *Report to the Governor*, July 31, 2018 at 13.

Program using a bonding strategy or increasing the amount of funding “could prove beneficial where there are long term returns that yield health impacts and energy savings along with improved affordability and improvements to quality of life for Vermont’s most vulnerable families.”⁹⁷

E. Other Considerations.

Participants submitted many additional suggestions that the Commission has reviewed and concludes are not ready for inclusion in this preliminary report. Even so, we summarize below some of these suggestions to inform lawmakers of topics that stakeholders may bring to them during the 2019-2020 biennium or that the Commission may continue to pursue as this investigation continues.

- VPPSA contends that the framework and service delivery for regulated entities is working reasonably well and suggests that it should be applied to the unregulated-fuels sector.
- Efficiency Vermont proposes that its role should shift from providing energy cost and MWh reduction to providing energy cost and greenhouse gas reduction. Greenhouse gas emission targets could be added to energy efficiency program performance metrics in the context of the Demand Resources Plan proceeding.
- Efficiency Vermont believes that Title 10 Section 578 should be used as a basis for program and service approval.
- Efficiency Vermont and the Department believe that electric energy efficiency charge funds should be available for weatherization services for homes and businesses where 51% or more of the thermal load is provided by electric heat. In the 2019 Annual Energy Report, the Department recommended that the electric energy efficiency charge associated with the kWh used by heat pumps should be ear-marked for weatherization efforts. According to the report, this would provide consistency between the fee that is assessed and the programs funded by the fee because heat pumps are a significant heat source.⁹⁸
- BPPA notes that significant expansion of contractor and labor capacity will be needed to meet weatherization goals. A stable and long-term assurance of funding is necessary for contractors to invest in staff, training, and equipment.
- BED seeks regulatory flexibility to pursue programs that would reduce emissions and fossil-fuel consumption as part of Burlington’s Net Zero Energy roadmap.

⁹⁷ 2019 Annual Energy Report, at 32.

⁹⁸ 2019 Annual Energy Report, at 32.

While BED has not clearly defined the regulatory flexibility it seeks, BED suggests that part of the flexibility would allow it to invest electric energy efficiency charge funds in “non-traditional” electric measures, such as electric vehicles, and would allow it to creatively invest thermal-energy and process-fuels funds in aggressive fossil-fuel reduction projects. Currently the Commission is unable to make specific recommendations regarding BED’s proposal. We understand that BED may present its proposal to legislators, and where appropriate BED may pursue its goals through existing regulatory procedures.

- GMP suggests that the energy efficiency utilities and electric distribution utilities could have shared performance targets based on carbon-reduction metrics. GMP suggests this may require additional flexibility in the charters of utility organizations to develop and deliver carbon-reducing programs focused on the transportation and thermal heating sectors. GMP states that current regulatory restrictions constrain its ability to engage in such programs and recommends that the constraints be examined and made more flexible, where appropriate. GMP has not identified the specific regulations that restrict those partnerships or offered specific amendments. Therefore, the Commission is unable to make specific recommendations regarding GMP’s proposal. As this investigation continues, the Commission will seek additional detail from GMP on the constraining regulations and seek recommendations and comments on whether and how to amend those regulations.
- The Department suggests consideration of “white certificates” — i.e., mandatory efficiency obligations placed on gasoline and diesel providers and delivered-fuel suppliers or retailers, as used in some European countries. For entities that do not meet their efficiency mandate, alternative compliance payments could be an option. This may be similar to or implemented in conjunction with an energy efficiency resource standard.

VII. Conclusion.

The case has been made to Vermont lawmakers and to politicians and policymakers across the globe that it is imperative to reduce reliance on fossil fuels and their attendant greenhouse gas emissions. Consistent with this message, Vermont has adopted ambitious policies for greenhouse gas reduction, building weatherization,

energy efficiency, and renewable energy. However, only a small portion of Vermont’s economy and energy end-uses are covered by programs that address those policies.

In order to achieve Vermont’s greenhouse gas emission reduction goals, it is estimated that Vermont will need to reduce its emissions by approximately 3.22 million metric tons of CO₂e by 2028 and by 7.85 million metric tons of CO₂e by 2050. In order to achieve its Paris Climate Agreement commitment, it is estimated that Vermont will need to reduce its emissions by approximately 2.53 million metric tons of CO₂e by 2025.⁹⁹

In February 2019, the Regulatory Assistance Project provided its “Economic Benefits and Energy Savings through Low-cost Carbon Management” report to lawmakers. That report estimated the greenhouse gas reductions that would result from investments in the thermal-energy and transportation sectors. The following table summarizes the report’s findings.

MEASURE	ESTIMATED ANNUAL PUBLIC INVESTMENT REQUIRED OVER THE NEXT 10 YEARS (IN MILLIONS OF 2018 \$)	LIFETIME CO ₂ REDUCED OVER 10 YEARS (MILLIONS OF METRIC TONS OF CO ₂ E)	\$/TON OF LIFETIME CO ₂ REDUCED (TOTAL COST PERSPECTIVE)
Non low-income weatherization	\$18	1.46	\$75
Low-income weatherization	\$18	0.82	\$84
Cold-climate heat pumps	\$19	1.80	\$8
Heat-pump water heaters	\$3	0.31	\$97
Wood pellet boilers for schools	\$2	0.34	\$131
Light-duty (personal) electric vehicles	\$7	4.4	\$16
SUBTOTAL	\$67	8.73	

⁹⁹ Efficiency Vermont’s November 15 comments at 14-15.

Medium- and heavy-duty electric vehicles	\$56.4	1.0	\$560
TOTAL	\$123.4	9.73	

The Commission has not independently assessed these results. However, they illustrate that a portfolio of thermal-energy and transportation measures could be employed to meet Vermont’s emission goals. A comprehensive approach to reducing greenhouse gas emissions should consider a larger portfolio of programs and measures to provide opportunities for more Vermonters to participate.¹⁰⁰

To put Vermont on a path to realizing its economy-wide goals, the Public Utility Commission recommends that Vermont lawmakers identify adequate and stable funding sources to transform Vermont’s transportation and heating sectors, which are by far Vermont’s largest energy-use sectors. With appropriate funding identified, Vermont can rely on its decades of experience implementing energy programs to craft efficiency and fuel-switching programs for all fuels. “Vermont is widely known for leadership in energy and environmental policy, based both on direct evidence and the state’s reputation for resourceful thinking. Vermont now has the opportunity to extend that leadership, influencing reductions in climate pollution far beyond its own carbon footprint.”¹⁰¹ The work presented by Act 62 provides Vermont an opportunity to further its reputation as a leader in developing innovative, reasoned energy programs. Beyond the significant environmental benefits, we know that such programs will spur economic activity, grow Vermont businesses, create more clean energy jobs, make homes more comfortable and affordable, and offer opportunities for all Vermonters to participate.

¹⁰⁰ The Commission understands that the Department of Public Service’s 2020 Annual Energy Report, which is expected to be issued on the same date as this report, will include an analysis of energy programs and measures on a cost-of-carbon-avoided basis. This information should be reviewed in conjunction with the information provided in this report.

¹⁰¹ *Economic Benefits and Energy Savings through Low-Cost Carbon Management*, Regulatory Assistance Project, February 2019, page 7.

Appendix A History of PUC Case No. 19-2956-INV

The Commission initiated Case Number 19-2956-INV on July 11, 2019, in response to Section 2 of Act 62 (H.63) of the 2019-2020 Vermont legislative session. The investigation was conducted as a series of workshops and several rounds of written requests for information and recommendations, each addressing one or more specific topic areas.

Workshops were conducted as follows:

Date	Topics Addressed
September 24, 2019	(1) The current statutory policies and goals that guide Vermont’s energy programs; (2) the current portfolio of energy programs and services that are available to Vermonters; (3) the current source(s) of funds for these programs and services; (4) proposed definitions of terms such as “electrification” and “efficiency”; and (5) innovations in energy program and service delivery models, goals, and funding sources in other jurisdictions
October 25, 2019	(1) The Transportation Climate Initiative; (2) Burlington Electric Department Net Zero Energy Roadmap; and (3) Efficiency Vermont’s straw proposal for the modernization of Efficiency Vermont
November 22, 2019	Participants’ recommendations for the Commission’s preliminary report

Written comments were solicited as follows:

Date	Topics Addressed
July 9, 2019	Recommendations on the goals, scope, structure, and schedule of this proceeding
August 9, 2019	(1) Identification of current programs, services, policies, and funding sources; (2) identification of gaps that may impede progress toward Vermont’s legislated goals; and

Date	Topics Addressed
	(3) innovations in other jurisdictions' energy program and service delivery models, goals, and funding sources
October 4, 2019	(1) Efficiency Vermont's interpretation of Section 209(e)(2); (2) the strengths and weaknesses, or advantages and disadvantages, of current energy program delivery mechanisms and funding sources; (3) gaps in current programs, services, and funding; (4) preliminary recommendations for the Commission to consider as part of its report; and (5) several specific questions related to unregulated-fuels programs, funding of efficiency programs, fuel substitution regulations, green banks
October 30, 2019	(1) Final recommendations for the Commission to consider, including factual and policy reasons supporting those recommendations and any proposed statutory or regulatory amendments; and (2) several specific questions related to home weatherization, demand for thermal efficiency services, funding necessary to meet the State building efficiency goals, funding necessary to accomplish Vermont's statutory goals and commitments, and options for funding sources dedicated to reducing fossil-fuel use and greenhouse gas emissions for the transportation and heating sectors

The workshops were conducted as presentations and discussions addressing specific issues. Materials were often filed with the Commission in advance of the workshops to allow the Commission and participants to develop questions in advance of a workshop. The written requests for information were used to elicit specific information and recommendations, to help prepare for workshops, or to obtain information to supplement the information provided during workshops.

Commission staff also engaged in a significant amount of self-directed research during this investigation. As part of its research, Commission staff reviewed the following sources,¹⁰² among others:

Vermont Greenhouse Gas Emissions Inventory Update: Brief 1990-2016, Vermont Department of Environmental Conservation Air Quality and Climate Division, January 2020

Vehicle Feebate and Vehicle Incentive Programs Funding Report, Vermont Agency of Transportation Policy, Planning, and Intermodal Development Division, Report to the Legislature Pursuant to Act 57 of 2019 Section 46, October 2019

Transforming our buildings for a low-carbon era: Five key strategies, Dave Hewitt, Susan Coakley, The Electricity Journal, August-September 2019

Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation, and Related Issues, Rulemaking 13-11-005, Public Utilities Commission of the State of California, Decision 19-08-009, Decision Modifying the Energy Efficiency Three-Prong Test related to Fuel Substitution, August 1, 2019

Next-Generation Energy Efficiency Resource Standards, Rachel Gold, Annie Gilleo, and Weston Borg, American Council for an Energy-Efficient Economy, August 2019

A New Tool to Improve Energy Efficiency Practices, American Council for an Energy-Efficient Economy, July 2019

Promoting the Ownership and Use of Electric Vehicles in the State of Vermont, A Report to the Vermont State Legislature, Vermont Public Utility Commission, June 27, 2019

Decarbonising heat in buildings – a comparison of policies in Germany and New England, Dr. Jan Rosenow and David Farnsworth, Regulatory Assistance Project, May 2019

The Benefits of Achieving Vermont's Energy & Emissions Commitments: 2018 Annual Progress Report, Energy Action Network, March 4, 2019

Economic Benefits and Energy Savings through Low-Cost Carbon Management, Richard Cowart, David Farnsworth, and Frederick Weston, Regulatory Assistance Project, February 2019

¹⁰² Listed by publication date, beginning with the most recent.

An Analysis of Decarbonization Methods in Vermont, Marc Hafstead, Wesley Look, Amelia Keyes, Joshua Linn, Dallas Burtraw, and Roberton C. Williams III, Resources for the Future, January 22, 2019

2019 Annual Energy Report, Department of Public Service, January 15, 2019

Beneficial Electrification of Transportation, David Farnsworth, Jessica Shipley, Joni Sliger, and Jim Lazar, Regulatory Assistance Project, January 2019

Beneficial Electrification of Water Heating, David Farnsworth, Jim Lazar, and Jessica Shipley, Regulatory Assistance Project, January 2019

Cost-Effectiveness Tests: Overview of State Approaches to Account for Health and Environmental Benefits of Energy Efficiency, American Council for an Energy-Efficient Economy, December 2018

Weatherization + Health, Health and Climate Change Co-Benefits of Home Weatherization in Vermont, Vermont Department of Health, December 2018

Beneficial Electrification of Space Heating, Jessica Shipley, Jim Lazar, David Farnsworth, and Camille Kadoka, Regulatory Assistance Project, November 2018

Report to the Governor, Vermont Climate Action Commission, July 31, 2018

Renewable Thermal in State Renewable Portfolio Standards, Samantha Donalds, Clean Energy States Alliance, Revised, July 2018

Preliminary Recommendations of the Vermont Climate Action Commission Executive Order 12-17, Vermont Climate Action Commission, December 29, 2017

2017 Update of the Regional Climate Change Action Plan: Building on Solid Foundations, Conference of the New England Governors and Eastern Canadian Premiers, August 28, 2017

Comprehensive Energy Plan 2016, Vermont Department of Public Service

Mapping Total Energy Burden in Vermont, Geographic patterns in Vermonters' thermal, electric, and transportation energy use, prepared by Vermont Energy Investment Corporation Transportation Efficiency Group, Justine Spears, July 2016

Report to the House and Senate Committees on Natural Resources and Energy, the House Committee on Commerce and Economic Development, and the Senate Committee on Finance on the Efficient Use of Unregulated Fuels, prepared by the Public Service Board Pursuant to Section 29 of Act 89, December 15, 2013

Meeting the Thermal Efficiency Goals for Vermont Buildings, Report to the Vermont General Assembly by the Thermal Efficiency Task Force, January 2013

Affordable Heat: Whole-Building Efficiency Services for Vermont Families and Businesses, Ajith Rao and Riley Allen, Regulatory Assistance Project, June 2011

Funding for Energy Efficiency Programs for Unregulated Fuels, U.S. Department of Energy Technical Assistance Program, April 2011

Appendix B Participants in PUC Case No. 19-2956-INV (*listed alphabetically*)

Efficiency Vermont

Energy Futures Group, Inc.

Green Mountain Power Corporation

Green Mountain Transit

Michael Wickenden

New Leaf Design, LLC

Renewable Energy Vermont

Recurve

RSG, Inc.

Senator Christopher Bray

Shoreham Planning Commission

Sunrun Inc.

Utility Services, Inc.

Vermont Agency of Agriculture, Food, and Markets

Vermont Agency of Human Services, Office of Economic Opportunity

Vermont Agency of Natural Resources

Vermont Agency of Transportation

Vermont Department of Health

Vermont Department of Public Service

Vermont Electric Cooperative, Inc.

Vermont Electric Power Company, Inc.

Vermont Fuel Dealers Association

Vermont Gas Systems, Inc.

Vermont Public Power Supply Authority

Vermont Vehicle and Automotive Distributors Association