2023 Update to the

Triennial Plan

2021–2023

Prepared for the
Vermont Public Utility Commission

by

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November 1, 2022

Efficiency Vermont

This document is presented to the Vermont Public Utility Commission and to the Vermont Department of Public Service, in fulfillment of the regulatory requirement to submit an overview of Efficiency Vermont's 2021-2023 strategy for providing energy efficiency services.

Support for Vermont households and businesseses in a changing energy landscape

A message from Peter Walke
Managing Director, Efficiency Vermont

As we transition into the third year of this performance period, Efficiency Vermont is focused on helping all of our customers save money today, reduce carbon emissions, and perhaps most important - prepare for the future in a rapidly changing energy landscape. Volatility in fossil fuel prices over the last three years demonstrates the risks faced by Vermont households and businesses. Climate change will exacerbate that volatility and further challenge constrained resources. While building from the success of providing cost-effective energy efficiency to Vermont households and businesses since 2000, we continue to partner with the state and other stakeholders to help address Vermont's greenhouse gas emissions targets and center equity in our work.

It would be hard to find another three-year period where there was as much going on in the world: a global pandemic and the subsequent supply chain and workforce constraints, as well as the Russian invasion of Ukraine and subsequent disruptions to the global energy market and dramatic increases to the cost of fuel, to name just two. Despite these volatile conditions, Efficiency Vermont is committed to understanding the energy risks and opportunities of the future, and the steps we can be taking now to prepare for them. We can help Vermont households and businesses continue to work towards being "future-proof." While it may be aspirational, the opportunity cost is too high not to try.

In 2023, Efficiency Vermont expects to see ongoing challenges in the supply chain and a constrained workforce that impact customer priorities. Efficiency Vermont's deep relationships throughout the supply chain, from contractors to manufacturers, have helped our staff understand, predict, and find workarounds for equipment or workforce shortages. We will continue to work with customers to identify projects or work that can be performed even as supply chain disruptions continue, while helping them prepare for the long term.

Beyond its traditional functions, Efficiency Vermont has been stepping up to partner with the State on workforce development, indoor air quality, and electric transportation. The long-term theme of our work continues to be on providing solutions Vermont households and businesses need. As the refrigerant management program, the flexible load management program, and the transportation electrification program of the Act No. 151 pilot enter their third years, we are continuing to invest in the partnerships and expertise that make these programs effective drivers of greenhouse gas emission reductions and energy and cost savings - key themes as we engage with stakeholders to develop our Demand Resources Plan for the 2024-2026 performance period.

Improving energy equity and advancing energy justice go hand in hand with reducing emissions. As Efficiency Vermont supports the State in achieving its emissions reductions goals, we know efficiency solutions must be accessible to all Vermonters, regardless of race, income, ethnicity, geographic location, or homeownership status. Efficiency Vermont is committed to reducing energy burdens that disproportionately impact people of color in Vermont and low-income communities; focusing on diversity, equity, and inclusion in all aspects of our work and leveraging our resources to support and uplift historically disenfranchised communities[1]. We don't claim to have the answers; only the commitment to asking the right questions of the right people and listening carefully to what they tell us. We are here to serve everyone who lives here, and we are learning new ways to reach out and engage, while maintaining our tried and true practice in terms of helping customers save money and energy.

[1] A 2020 ACEEE study found that nationally, household energy burden is significantly higher for communities of color including Black, Hispanic, and Native American households, than it is for white households. American Council for an Energy-Efficient Economy, Ariel Drehobl, Lauren Ross, and Roxana Ayala, How High Are Household Energy Burdens? An Assessment of National and Metropolitan Energy Burdens across the U.S., September 2020.

2021-2023 Forecasted Impact

$648 million will be saved by Vermonters*

*Lifetime customer savings from 2021-2023 efficiency investments

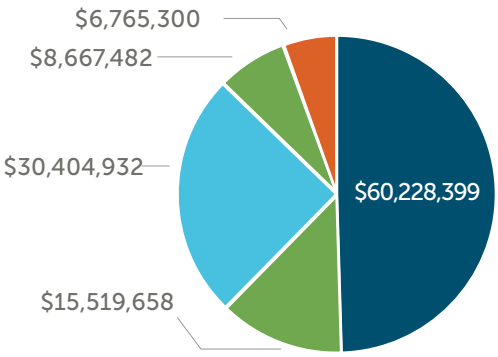
2,135,000 tons of greenhouse gas emissions will be avoided

or the equivalent of 46,000 passenger vehicles taken off the road for 10 years, from investments made in the 2021-2023 period

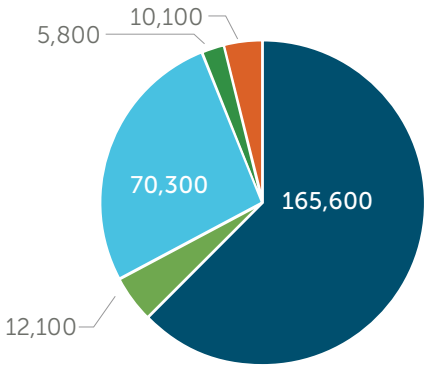
263,900 MWh will be saved by Vermonters

or the electricity to power over 4,000 homes for 10 years

Budget



Savings (MWh)



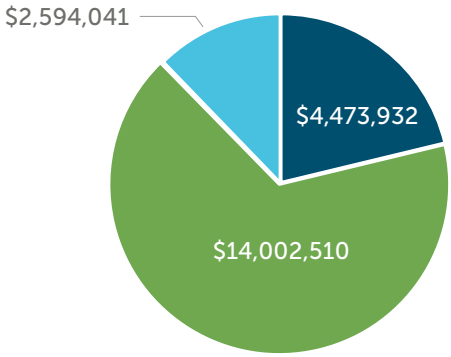
2021-2023
Electric major markets

- Business Existing Facilities
- Existing Homes
- Efficient Products
- Residential New Construction
- Business New Construction

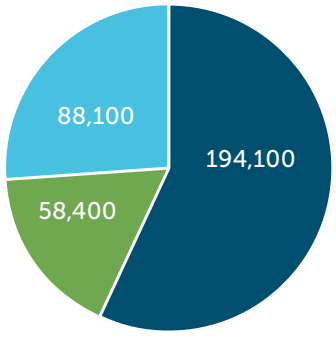
357,000 MMBtu will be saved by Vermonters

or the energy to power 415 homes for 10 years

Budget



Savings (MMBtu)



2021-2023 Thermal Efficiency & Process Fuels major markets

- Business Existing Facilities
- Existing Homes
- Efficient Products

Supporting business energy resilience

Business Existing Facilities

Efficiency Vermont's work with businesses prioritizes products and services with the greatest economic and environmental impact.

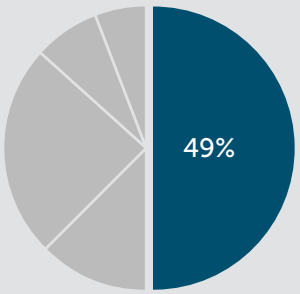
In this performance period, Efficiency Vermont will continue to develop partnerships with community-based organizations to design efficiency programs that are tailored to the needs of local businesses, helping them save energy and money, while reducing carbon emissions and becoming more resilient. Diversity, equity, and inclusion-based initiatives are of particular importance. Efficiency Vermont will work with partners to design and implement programs that advance three dimensions of equity: procedural, distributional, structural and transgenerational equity.[2]

Case Study: Partnering with Regional Development Corporations of Vermont

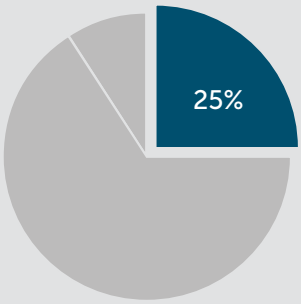
In the fall of 2021, the state's 12 Regional Development Corporations (RDCs) helped identify key local businesses that could benefit from energy efficiency improvements and connected them with Efficiency Vermont energy consultants. All told, 159 Vermont businesses received support (approximately $2.5 million in incentives and technical support) through this initiative with 85 percent of the projects now completed. This partnership is expected to save businesses a combined $285,000 per year.

[2] This framework of three dimensions of equity is based directly on the language and framing identified by the ACEEE paper "Leading with Equity Initiative: Key Findings and Next Steps" which is consistent with frameworks also identified in other key reference documents.

Budget



Electric Budget



TEPF Budget

Based on that budget, we anticipate that between 2021-2023, efficiency investments will help existing business facilities reduce their energy use by 181,400 MWh and 203,800 MMBtu each year.

Over the lifetime of those investments, business are forecasted to save:

$378,569,740
in energy savings

1,405,980 metric tons
in GHG reductions

That's like taking nearly 30,600 cars off the road for the next 10 years

Helping Vermonters stay warm and save money

Existing Homes

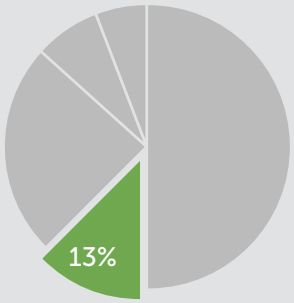
Efficiency Vermont recognizes the importance of equitable access to programs that improve the health, safety, comfort, and affordability of Vermon homes regardless of ownership status, or income level. By engaging with Efficiency Vermont and our partners, residents can have confidence in their total energy decisions and take action—resulting in healthier and more comfortable homes, lower total energy consumption, and reduced energy burden.

Case Study: Supporting low- and moderate-income families

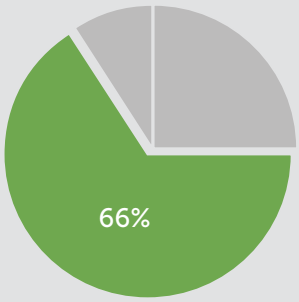
In the past four years, Efficiency Vermont has added new options for low- and moderate-income Vermont households to invest in energy efficiency. Energy efficiency can keep more money in Vermonters' pockets each month and reduce energy burden, or the percentage of income spent on energy bills each month. These offerings better respond to the unique circumstances and needs of Vermont households. The following offerings are continuing in this performance period:

- Low-income Electrical Efficiency Program (LEEP)
- Targeted High-Use programs
- Appliance vouchers
- Energy Savings Kits
- Support for multifamily property owners and renters
- Increased incentives for income-sensitive customers across all residential programs, including the comprehensive weatherization program, Home Performance with ENERGY STAR®
- No or low-interest Home Energy Loans

Budget



Electric Budget



TEPF Budget

Based on that budget, we anticipate that between 2021-2023, efficiency investments will help existing homes reduce their energy use by 12,100 MWh and 58,400 MMBtu each year.

Over the lifetime of those investments, Vermonters are forecasted to save:

$45,524,464
in energy savings

126,166 metric tons
in GHG reductions

That's like taking more than 2,700 cars off the road for the next 10 years

Efficiency in every room of the home

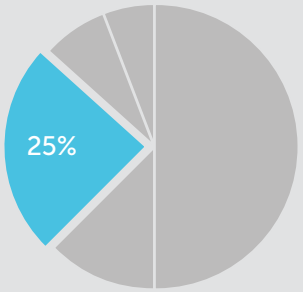
Efficient Products

A building's energy efficiency includes its thermal shell as well as the appliances and devices inside it. Through this program, Efficiency Vermont highlights and incentivizes efficient products such as heat pumps, refrigerators, clothes washers, dryers, and other everyday appliances which provide energy savings, improve home comfort and reliability, and meet customer demand. Low- and moderate-income Vermonters households will continue to have access to increased incentives for efficient products in this performance period.

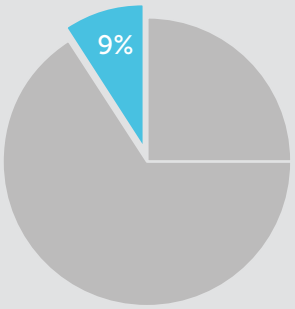
Case Study: Delivering heat pumps through utility partnerships

Efficiency Vermont's heat pump program provides opportunities for Vermonters households to invest in high efficiency heat pump systems for heating and cooling their homes. These systems maintain comfortable temperatures year-round, while using less energy than many other heating and cooling systems. Efficiency Vermont engages with the supply chain to ensure efficient equipment is in stock and to train and educate contractors and distributors on installation and maintenance. Efficiency Vermont also works closely with Vermont's electric utilities to educate Vermonters households and businesses on the benefits of heat pumps and incentivize products, and by providing joint rebates administered by Efficiency Vermont, thus enabling a more streamlined process for both customers and supply partners. This type of market transformation is at the heart of Efficiency Vermont's work to bring down the cost of innovative products with broad benefits. In particular, through coordination with the utilities, heat pumps have the potential to enable flexible load management, a key strategy for achieving grid-wide resilience.

Budget



Electric Budget



TEPF Budget

Based on that budget, we anticipate that between 2021-2023, efficiency investments will help Vermonters reduce their energy use by 70,300 MWh and 88,100 MMBtu each year.

Over the lifetime of those investments, Vermonters are forecasted to save:

$169,495,235
in energy savings

445,618 metric tons
in GHG reductions

That's like taking nearly than 9,700 cars off the road for the next 10 years

Building efficiency from the ground up

Residential New Construction

Efficiency Vermont works with homebuilders and homeowners to help their new homes achieve and exceed state energy goals. This includes educational materials to inform builders and design professionals; incentives to encourage homeowners to go further and aim for Net Zero ready; and support for multifamily new construction projects to help all families feel the benefits of efficiency in their new home.

Case Study: Zero Energy Modular Homes

In 2021, Efficiency Vermont partnered with Vermont Housing and Conservation Board, John Graham Housing and Services and KBS Homes, to support the design and development of three new, zero energy modular homes in Addison County Community Trust's KTP Mobile Home Park in Bristol, Vermont. All three homes meet the EPA's Indoor AirPlus and WaterSense standards, and incorporate an innovative HVAC system that combines an all-electric ducted air source heat pump with a fresh air ventilation system with heat recovery. Efficiency Vermont managed the projects, and with the team of partners spent time at the KBS factory during design and construction and worked closely during site preparation, delivery and set, and completion of the homes to ensure the design was executed as planned.

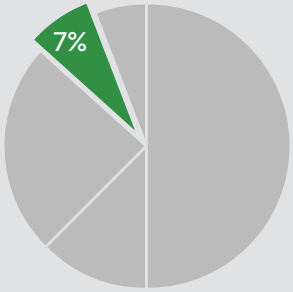
Business New Construction

Efficiency Vermont partners with architects and businesses who are building new facilities or completing major renovations. By engaging early in the process, Efficiency Vermont provides expertise on choosing the most cost- and energy-efficient systems and equipment to save businesses money and energy.

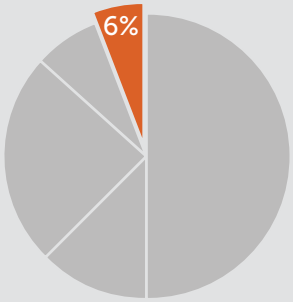
Case Study: Spaulding Educational Alternatives Facility

Efficiency Vermont partnered with the Barre Unified School District, David Laurin Architect, Swiftcurrent Engineering Services, and Mechanical Systems Engineers, to complete the 10,000 square foot facility. The building was designed and constructed to exceed energy code and included efficient: interior and exterior lighting systems, commercial kitchen equipment, air sealing, and HVAC upgrades such as heat recovery ventilation in all rooms. The building is mostly electrically heated. By working together early in the project, this team was able to pull together a cost-effective design that will benefit the school district for years to come.

Budget



Residential New Construction



Business New Construction

Based on that budget, new construction projects between 2021-2023 are forecasted to save 5,800 MWh for residential projects and 12,400 MWh for business projects each year.

Over their lifetimes, the new buildings are forecasted to save:

$54,328,744
in energy savings

157,574 metric tons
in GHG reductions

That's like taking more than 3,400 cars off the road for the next 10 years

New Programs: Flexible Load Management & Refrigeration Management

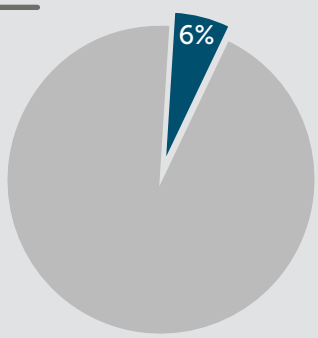
Flexible Load Management

- Advancing flexible load management allows Vermont households and businesses to share in the benefits created by intentionally shifting energy usage patterns at home or in businesses. Flexible load management provides utilities the ability to anticipate and plan for peak usage periods with customers. This helps proactively manage usage patterns and drive down costs for everyone.
- This program expands on the existing partnerships between Efficiency Vermont and the distribution utilities, in which Efficiency Vermont helps Vermont households and businesses access and understand technologies that can be used for load management.
- Flexible load management also has the additional benefit of reducing greenhouse gas emissions by shifting electric usage away from peak usage periods which is when power generation on the grid is supplied from resources with the highest carbon emissions.

Refrigerant Management

- Refrigeration is energy intensive and one of the biggest expenses for food and beverage industry businesses in Vermont. It is also one of the most significant global contributors to greenhouse gas emissions. Each pound of leaked refrigerant equates to 2,500 pounds of CO_2e (or 1.1 metric tons).
- Helping businesses manage refrigerant leaks increases the efficiency of their systems, reducing operating costs and their carbon footprint. If all Vermont's commercial refrigeration systems cut leaks in half, Vermont could avoid over 160,000 metric tons of CO_2e.
- This program expands on Efficiency Vermont's work and existing relationships with grocery and convenience stores in Vermont to repair and monitor refrigeration systems.

Budget



Flexible Load Management & Refrigeration Management Budgets

The Flexible Load Management and Refrigerant Management budgets are embedded in other Electric major market budgets.

Based on that budget, the Flexible Load Management program is expected to help install

2,700 kW
of flexible load

The Refrigerant Management program is expected to reduce energy use by 4,916 MWh each year, and to save:

$10,670,439
in energy savings

275,643 metric tons
in GHG reductions

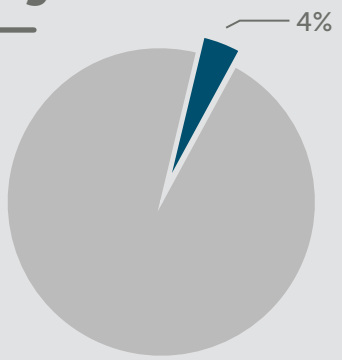
That's like taking nearly 6,000 cars off the road for the next 10 years, for just the refrigerant management program.

New Programs: Act No. 151

Transportation Electrification

- This program aims to increase adoption of electric vehicles (EVs) in Vermont. Efficiency Vermont will work to expand current EV supply chain development efforts and increase awareness of EVs through outreach and education.
- By engaging with vehicle dealers through outreach, trainings, and incentives, Efficiency Vermont will work to increase the number of new and used EVs owned or leased by Vermont households and businesses. This work includes will include research to understand existing barriers for auto dealers and training for dealers on selling EVs and understanding available incentives.
- Efficiency Vermont will partner with state agencies, utilities, and other stakeholders to help Vermont households and businesses learn more about EVs and their benefits. This will include advertising, digital resources for EV shoppers, and community engagement across the state.

Budget



Act No. 151 Budget

The Act No. 151 budget is embedded in the Efficient Products and Existing Homes Electric major market budgets.

Heating Electrification with Weatherization

Based on Efficiency Vermont's ongoing engagement with distributed utility partners, the Office of Economic Opportunity, and other stakeholders, Efficiency Vermont will implement in 2023 a program to support low-income customers in combining weatherization with heating electrification. In partnership with distribution utilities, Efficiency Vermont will install cold climate heat pumps in the homes of approximately 300 low-income customers at no cost to the customer. Eligible customers will include those previously served by Weatherization Agencies and whose primary heating source is currently fossil fuel based. Combining weatherization and heat pumps will help low-income families reduce heating bills, lower their carbon footprints, and improve comfort in summer and winter.

About This Plan

Plan Development

Efficiency Vermont's 2021–2023 Triennial Plan ("Plan") was developed in alignment with:

- The following Public Utility Commission Orders:
  - October 22, 2020 and May 27, 2021 Orders in Case No. 19-3272-INV regarding Efficiency Vermont's 2021-2023 Demand Resources Plan ("DRP") and associated budget, services and Quantifiable Performance Indicators (QPIs), including performance indicators (PIs) and minimum performance requirements (MPRs)
  - June 2, 2022 Order in Case No. 22-0946-PET approving Efficiency Vermont's request to carryover unspent energy efficiency charge (EEC) and thermal energy and process fuels (TEPF) funds. (The budgets in this 2023 Update to the Triennial Plan were updated to be consistent with this Order.)
- The updated triennial plan budgets provided in Efficiency Vermont's Revised 2021 Budget Variance Report filed on March 3, 2022 in Case No. 22A-0616. (The budgets in this 2023 Update to the Triennial Plan were updated to be consistent with the updated budgets filed in the Revised 2021 Budget Variance Report.)
- The goals of the 2008 Vermont Energy Efficiency and Affordability Act and Vermont's 2016 Comprehensive Energy Plan
- Vermont's Comprehensive Economic Development strategy, as applicable
- Vermont's Health in All Policies aims.

Plan Structure

The services discussed in this Plan are organized by the budget categories specified by the Commission in its regulatory processes:

- Resource Acquisition (RA) Budgets: Associated services are discussed in Sections 2-4.
- Development and Support Services (DSS) Budgets: Associated services are discussed in Section 5.

In this Triennial Plan, Efficiency Vermont presents information about planned RA service activities in five major markets: Business Existing Facilities, Business New Construction, Existing Homes, Residential New Construction, and Efficient Products; as well as Act No. 151 Programs and Flexible Load Management Programs In addition, Efficiency Vermont discusses its planned DSS activities. The descriptions of services, budgets, and projected results are organized into these groupings throughout the plan.

RA services are those that directly achieve energy savings.[1] DSS activities may not directly result in efficiency savings but represent valuable aspects of energy efficiency service delivery and

[1] Though Act No. 151 Programs are resource acquisition services, Efficiency Vermont is not claiming energy savings associated with these programs. (The distribution utilities are claiming savings for electric vehicle supply equipment and electric transportation measure as part of their Renewable Energy Standard - Tier III programs.)

development, and include activities in the following categories: education and training, applied research and development, planning and reporting, evaluation, administration and regulatory affairs, and information systems.

About Efficiency Vermont

Efficiency Vermont is helping the state transition to a more affordable and cleaner future. The work of Efficiency Vermont, which is enabled by the support of Vermont electric ratepayers, aims to reduce the cost of energy for all Vermonters, while creating good jobs, improving the economy, and lowering carbon emissions. Efficiency Vermont helps Vermont families, businesses, and institutions understand and make better use of energy, whether lowering the cost of heating and cooling buildings or adopting efficient appliances, lighting, and other technologies that drive down the total cost of energy. By engaging up and down the supply chain, Efficiency Vermont works with partners to lower the cost of energy efficiency solutions through the utilization of market transformation tools including incentives, training, and expert advice. These market transformation tools assist Efficiency Vermont in partnering with distribution utilities (DUs), heating fuel suppliers, building trades professionals, manufacturers, distributors, and retailers to save customers energy and money.

Efficiency Vermont operates in three-year periods with specific State-mandated performance goals linked to compensation. Efficiency Vermont was created by the Commission and the Vermont Legislature in 2000 as a statewide, third-party, objective resource to meet the public's need for energy services through the development and implementation of energy efficiency programs in Vermont. Since its inception, Efficiency Vermont has been administered by VEIC, which currently holds an appointment from the Commission to administer Efficiency Vermont through the end of 2033.

2021–2023 Triennial Plan

CONTENTS

2. Services for Business Customers

Efficiency Vermont services for business customers are segmented into two major markets: 1) business existing facilities; and 2) business new construction. Efficiency Vermont's approach to serving these markets focuses on the following areas: Vermont's largest energy users, small and medium-sized businesses, focused sub-markets, and key commercial technologies, which cut across both the business existing facilities and business new construction markets.

2.1 Business Existing Facilities

This category includes commercial, industrial, institutional, and municipal facilities. Electric and TEPF prescriptive rebates are available across a range of technologies for lighting; heating, ventilation, and air conditioning (HVAC); and refrigeration equipment. In addition, Efficiency Vermont offers customized efficiency incentives and financing to help business owners purchase and install specialized energy-saving equipment, and technical support for high-performance operations that match their unique needs. Also, see Efficiency Vermont's Flexible Load Management program in Section 4.8. Business services are tailored for businesses of all sizes and market sectors in Vermont.

Business Existing Facilities	**2021**	**2022**	**2023**	**2021-2023**
Electric[2]				
Budget	$17,537,779	$22,934,052	$19,756,568	**$60,228,399**
Annual MWh	38,035	55,300	72,265	**165,600**
Total Resource Benefits (TRB)	$32,784,511	$47,048,800	$ 61,008,889	**$140,842,200**
Summer kW	5,119	6,600	8,081	**19,800**
Winter kW	4,580	6,500	8,120	**19,200**
Lifetime MWh	483,496	718,600	944,904	**2,147,000**
Metric Tons CO_2e	24,107	31,400	38,493	**94,000**
Flexible kW[3]	1,163	287	350	**1,800**
Thermal				
Budget	$962,182	$1,755,875	$1,755,875	**$4,473,932**
MMBtu Savings	47,089	72,700	74,311	**194,100**
Metric Tons CO_2e	2,966	4,317	4,317	**11,600**

[2] Includes budget and savings for FLM and ESA Pilot activities. See Section 4.8 for the subset of the electric Business Existing Facilities budget and savings related to FLM activities. See Section 7.5 for the subset of the electric Business Existing Facilities budget related to the ESA Pilot.

[3] Attributable only to FLM activity in this market.

2.2 Business New Construction

Efficiency Vermont's support for the construction of efficient new buildings or major renovation of existing buildings will continue to focus primarily on the professionals engaged in design and construction. These include architects, engineers, specialty design service providers, contractors and practitioners of construction trades. Efficiency Vermont will also engage with developers, equipment suppliers, installation contractors, commissioning agents, appraisers, lenders, and real estate agents, as well as certain building owners as key members of project teams, particularly regarding construction undertaken by institutions, government agencies, and large businesses with multiple buildings. The Business New Construction budget is entirely funded by electric efficiency funds, not TEPF funds, unless the building is off-grid.

Business New Construction	**2021**	**2022**	**2023**	**2021-2023**
Electric				
Budget	$2,109,028	$2,467,956	$2,188,316	**$6,765,300**
Annual MWh	3,685	3,600	2,815	**10,100**
Total Resource Benefits (TRB)	$6,362,209	$1,489,200	$1,056,691	**$8,908,100**
Summer kW	569	500	431	**1,500**
Winter kW	582	400	218	**1,200**
Lifetime MWh	62,474	47,700	23,426	**133,600**
Metric Tons CO_2e	2,052	1,600	948	**4,600**
Flexible kW	25	0	0	**25**
Thermal				
Budget	$0	$0	$0	**$0**
MMBtu Savings	0	0	0	**0**
Metric Tons CO_2e	0	0	0	**0**

Efficiency Vermont will maintain its delivery of services that encourage the integration of energy efficiency decisions into the design and construction process and the inclusion of energy goals as part of the overall construction strategy. Efficiency Vermont will also continue to provide custom services from the earliest stages of a project, working with customers and design teams to increase the number of net-zero, net-zero-ready, and grid-integrated efficient buildings in the state.

Key aspects of ongoing efforts:

- Technical assistance throughout the design, construction, and post-construction phases.
- Analysis of efficiency options.
- Comprehensive services aimed at meeting different building performance levels, including net zero.
- Financial incentives for efficient approaches, equipment, and building operation systems.
- Post-occupancy energy performance tracking and engagement with building owners to identify ongoing and future savings opportunities, including energy use management.
- Training and information provision to a range of key parties involved in new construction projects.

- Application of flexible load management strategies to increase building grid optimization. See Section 4.7.1.
- Continued partnerships with national, regional, and international organizations, such as the American Council for an Energy-Efficient Economy, the Consortium for Energy Efficiency, the Construction Specifications Institute, the Institute for Market Transformation, the International Code Council, and the New Buildings Institute, as well as Vermont trade organizations representing design professionals (architects and engineers), contractors, builders, and code officials, on educational opportunities, trainings, research, and the promotion of high performance building design and construction.

2.3 Crosscutting Services for Existing Buildings and New Construction

2.3.1 Vermont's Largest Energy Users

In service to the state's largest energy users,[4] Efficiency Vermont will continue to take a customized approach, including in the following efforts:

- **Energy Savings Account ("ESA") Pilot:** In partnership with the Department of Public Service ("Department" or "DPS") and the Agency of Commerce and Community Development (ACCD), Efficiency Vermont will continue to administer a pilot initiative to help business customers invest in new kinds of projects, such as energy productivity, storage, and demand management. Eligible participants contribute $5,000 or more annually toward the energy efficiency charge. The program has been approved to operate from July 2019 through December 2023 .[5]
- **Account Management:** Designated Efficiency Vermont staff will continue to establish and maintain long-term, proactive consultative relationships with individual businesses. Account managers will offer help in creating portfolios of energy and greenhouse gas savings opportunities, technical and financial analyses, guidance in developing energy savings plans, financial incentives, assistance in identifying financing options, and guidance in assessing and utilizing energy usage data. These efforts will include a focus on electricity use, fossil fuel–powered industrial process and space heating equipment, and building-shell improvements.
- **Return-on-investment engagement:** Efficiency Vermont will continue to proactively identify and engage those the largest energy users whose returns on energy efficiency investments are low.[6] Efficiency Vermont will then identify and address barriers to greater savings, such as lack of capital and lack of energy savings opportunities. Solutions will be highly individualized in order to optimize energy and operational benefits and to motivate the customer to engage in long-term energy management.
- **Strategic Energy Management (SEM):** SEM is a comprehensive approach to energy management, which goes beyond implementation of discrete energy efficiency improvements. Efficiency

[4] Approximately 300 business customers in Vermont are account managed, and each consumes a minimum of 500 MWh of electricity per year.

[5] Efficiency Vermont's 2021-2040 Demand Resources Plan model includes electric resource acquisition costs and savings for ESA activities through the whole modeling period (2021 to 2040).

[6] Low returns on investment are defined as less than 50% within a rolling three-year period. Investments consist of customers' contributions to the Energy Efficiency Charge (EEC) and to their energy efficiency project costs. Returns consist of financial incentives and lifetime energy savings acquired through energy efficiency projects.

Vermont's SEM Direct Program is designed to help its customers integrate SEM as a core business practice to help achieve persistent reductions in energy use and sustained cost reductions.

- **Peak electricity use management:** Through smart meter and submeter data analysis, custom analytics tools, and support for optimal efficiency improvements, Efficiency Vermont will provide specific Vermont businesses with the ability to identify and mitigate the use of high levels of energy in small blocks of time, which accrue costly peak demand charges on electric bills. These efforts will be designed both to aggressively cut electricity costs for businesses and to help all electric ratepayers in Vermont by improving system reliability, reducing the need for system upgrades in Vermont, and lowering Vermont's share of New England regional transmission costs.
- **Focused equipment initiatives:** Efficiency Vermont will identify and provide support for investments in innovative equipment that present significant savings opportunities within high-use industries or that have broad applicability across business markets. Examples of technologies being investigated are industrial variable frequency drives, high-efficiency condensing units, refrigerant swap-outs, compressor leak detection tools, lighting controls, and advanced wood heat systems.
- **System optimization:** Efficiency Vermont will help large energy users acquire increased savings from the performance optimization of facility, data center, and process systems through such approaches as benchmarking, auditing, retro-commissioning, retuning, and submeter data analysis.
- **Peer-to-peer exchange:** Efficiency Vermont will continue to act as a catalyst for connections among large businesses and institutions by hosting gatherings of facility owners, managers, and other key decision makers in a variety of industries that have common challenges and opportunities, to foster information exchange and awareness of best practices for energy management. These exchanges will include:
    - Best Practices Exchange—This annual conference fosters peer-to-peer learning and engagement among large business customers and the many stakeholders in the public and private sector who serve them. Customers learn from peer businesses, policy makers, manufacturers' representatives, and contractors through a choice of workshops, product demonstrations, and panel discussions. The conference also recognizes companies that have made a significant contribution to energy management best practices. This unique conference brings together facility managers, decision makers, relevant product manufacturers, and the most experienced contractors from across the region.
    - Efficiency Connections - Efficiency Vermont's quarterly e-newsletter informs and engages large commercial and industrial customers. *Efficiency Connections* will continue to be one of several ways Efficiency Vermont works to provide peer-to-peer learning and information exchange. Editions will focus on customer projects, economics, and successes, and will provide updates or news about Efficiency Vermont services or events.
    - Kaizens - Also known as "energy treasure hunts," Kaizens are an effective tool in engaging Efficiency Vermont business customers' employees in energy management. Participants walk through facilities to identify efficiency opportunities in buildings and equipment, as well as spot behaviors that can easily be overlooked in day-to-day operations. Kaizens can uncover a host of energy savings opportunities that include low-cost / no-cost solutions such as settings adjustments, employee behavioral changes, equipment optimization, and added controls. Some Kaizens include multiple businesses at a given site, including those in the same industry as the host, providing a fresh perspective as well as industry-specific solutions applicable for all attendees.

- Sleeping plant tours - Building off the Kaizen approach, sleeping plant tours adopt a similar approach, but look for energy waste during off-peak times when operations are limited or stopped altogether. Often, a sleeping plant tour is taken after a Kaizen has been performed during normal operating hours. When one evaluates a plant during these shutdown periods, energy waste may appear differently than it does during normal operations.

2.3.2 Small and Medium-Sized Businesses

Efficiency Vermont will design and implement services targeting the needs of Vermont's small and medium-sized businesses (SMBs), including the following:

- **Technical guidance and education:** Efficiency Vermont will offer information about efficiency opportunities, technologies, and financial solutions through direct customer interaction and strategic outreach via numerous avenues, including chambers of commerce, business and trade associations, planning commissions, economic development groups, utility partners, and placements in business media.
- **On-site services:** Identify savings opportunities, make recommendations for energy-saving approaches, and provide guidance as needed to help customers complete projects.
- **Thermal efficiency services:** Help small businesses and residential rental property owners complete weatherization projects with members of Efficiency Vermont's network of local, certified Building Performance contractors.
- **Phone consultations:** Help businesses identify and prioritize savings opportunities and support owners through the project process.
- **Seamless delivery across Efficiency Vermont services:** Ease business owners' ability to access support regarding high-efficiency commercial equipment, retail efficient products, building improvements, new construction, and market-specific services, such as those described in Section 2.3.3.
- **Third-party financing:** Support energy-saving investments through the Business Energy Loan and other financing offerings discussed in Section 4.5.

2.3.3 Focused Markets

To address the needs and challenges of distinct business sectors, Efficiency Vermont will deliver technical guidance, financial incentives for recommended measures, and access to third-party financing for specific commercial and industrial (C&I) markets. These markets include agriculture (including indoor growing and product drying; a.k.a controlled environment agriculture), colleges and universities, hospitals, kindergarten through grade 12 (K–12) schools, leased commercial real estate, lodging facilities, municipalities, commercial kitchens, ski areas, manufacturing, and state buildings. Through an understanding of the characteristics common to each market, Efficiency Vermont will shape effective approaches to acquiring greater market adoption of efficient technologies than would be achievable through services offered only at the individual project level. Such common characteristics may include similar time and capital constraints; equipment; degrees of interest in energy efficiency; and connections to trusted service providers, suppliers, and information sources. Efficiency Vermont will maintain

awareness of evolving technologies, changing economic conditions, consumer demand, and a range of challenges and opportunities particular to specific sectors.

Efficiency Vermont will continue to develop partnerships with community-based organizations to design efficiency programs tailored to the needs of local businesses Diversity, Equity, and Inclusion-based initiatives are of particular importance. Efficiency Vermont will work with partners to design and implement programs that advance procedural, distributional, structural, and transgenerational equity needs.

2.3.4 Key Commercial Technologies

Efficiency Vermont researches, then promotes and incentivizes new, proven technologies that, if adopted widely in Vermont, would have a significant impact on energy savings. Efficiency Vermont works with the entire supply chain to increase new product availability and expertise, reduce prices, and drive demand among end users.

See Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC-R) in Section 4.8 and Refrigerant Management in Section 4.8.1

Commercial Lighting

Efficiency Vermont will continue promoting the below technologies, while working to expand their availability, lower purchase prices, and evaluate emerging technology options. Efficiency Vermont expects growth in adoption of these technologies, as their use in Vermont is currently low and customer interest is high.

- Overhead LED fixtures—delivering energy savings over fluorescents.
- Integrated controls—providing greater savings over full-room lighting controls by enabling lumen-level adjustment.
- Networked controls—increasing savings via advanced lighting controls or coordination with other building systems to cut energy use for lighting and other equipment. For example, a connected HVAC system can be alerted that a room is empty (as detected by lighting occupancy controls) and adjust output accordingly. Typically, this technology will be delivered in coordination with lighting designers.

To help Vermont businesses benefit from efficient lighting technologies and design, Efficiency Vermont will:

- Expand the scope of product supply chain engagement to reduce purchase prices and improve specific product availability.
- Provide training and support to lighting designers, contractors, and suppliers through Efficiency Vermont's Efficiency Excellence Network ("EEN") (see Section 4.2).
- Monitor and evaluate emerging lighting technologies for possible inclusion in offerings, including indoor horticultural lighting.
- Promote quality lighting products and initiatives in collaboration with the Consortium for Energy Efficiency (CEE), DesignLights Consortium®, ENERGY STAR (U.S. Department of Energy [DOE] and

Environmental Protection Agency [EPA]), and the Northeast Energy Efficiency Partnerships (NEEP).

Industrial Process Equipment

Efficiency Vermont will work with manufacturers and other businesses to identify efficiency improvements for pumps, motor controls, variable frequency drives, compressed air systems, and process heating and cooling systems that will lower their energy costs, increase production, and/or reduce carbon footprint. Efforts will include:

- Supply chain partnerships and feedback that helps improve programs and increases the availability, understanding and adoption of efficient technologies. Partner relationships and financial incentives together enable Efficiency Vermont to effectively manage the speed of adoption.
- Coordination with qualified auditors to take a system-wide or facility-wide approach to equipment auditing.
- Deepened engagement with the SMB sector by way of personalized walk-throughs
- Continued research and service development to deepen market knowledge, to further develop internal processes, and to increase customer engagement and optimized savings.

Combined Heat & Power (CHP)

To promote the use of best practices and best-in-class CHP systems, Efficiency Vermont will continue to engage with customers on lost-opportunity, customer-initiated, or vendor-initiated projects where CHP and distributed renewable generation technologies are being considered. These customers are often operators of wastewater treatment, agricultural, industrial, and institutional facilities that have: 1) on-site electricity generation capability, and 2) substantial heating needs. Customers will be encouraged to pursue any available funding or technical assistance from other sources. In addition, Efficiency Vermont will engage business such as farms and craft-breweries to implement smaller, anerobic digesters. Efficiency Vermont resources will focus primarily on the provision of technical assistance, although incentive funds for CHP projects may also be provided to customers when CHP systems meet requirements established by the Commission. Additionally, Efficiency Vermont will team up with other distribution utilities and community partners to promote CHP efforts. For more information on Efficiency Vermont's coordination with distribution utilities and other EEUs, see section 4.1.

3. Services for Residential Customers

The Existing Homes and Residential New Construction markets serve customers of all income levels and building types. *Single-family* refers to buildings with up to four units and *multifamily* refers to buildings with five or more units. Efficiency Vermont will continue to offer products and services for residential customers that support homeowners, particularly low- and moderate-income Vermont households[7]. Additionally, and in anticipation of declining TEPF budgets, particularly beginning in 2027, Efficiency

[7] Low-income is below 80% of area median income. Moderate-income is between 80% and 120% of area median income.

Vermont will continue to explore new and innovative ways to serve customers at lower costs; this could include exploring new approaches for partnering with stakeholders and financing options for customers.

3.1 Existing Market-Rate Homes

The existing homes TEPF and electric budgets will include services for homes that are retrofitted with new energy efficiency measures to make the homes more safe, durable, healthy, comfortable, and energy efficient. The budgets and savings include those for all income levels and building types.

Existing Homes	**2021**	**2022**	**2023**	**2021-2023**
Electric[8]				
Budget	$4,759,356	$5,107,003	$5,653,299	**$15,519,657**
Annual MWh	2,028	4,400	5,672	**12,100**
Total Resource Benefits (TRB)	$1,725,768	$2,354,000	$2,534,332	**$6,614,100**
Summer kW	132	200	268	**600**
Winter kW	460	700	640	**1,800**
Lifetime MWh	27,545	33,000	29,455	**90,000**
Metric Tons CO_2e	917	2,000	2,683	**5,600**
Flexible kW[9]	9	300	566	**875**
Thermal				
Budget	$4,684,903	$ 4,655,931	$4,661,675	**$ 14,002,510**
MMBtu Savings	20,837	19,300	18,263	**58,300**
Metric Tons CO_2e	1,213	1,300	1,387	**3,900**

Single-Family Homes

Efficiency Vermont will build upon effective approaches, such as offering incentives, financing, and technical assistance, to improve the energy efficiency, durability, safety, and comfort of existing residential buildings statewide. Efficiency Vermont will continue to expand its residential programs to enable more Vermont households to participate in and benefit from taking energy efficiency actions. These efforts will be designed to provide customers with greater ability to approach household energy performance improvement as a journey with multiple, often interactive opportunities rather than as a single project. This focus will empower customers to take control of household energy performance and to make informed decisions according to their priorities and budgets. For homeowners unable to afford whole house upgrades, Efficiency Vermont will continue to focus on approaches designed to improve homes over time.

[8] Includes budget and savings for FLM. See Section 4.8 for the subset of the electric Existing Homes related to FLM activities. Also includes budget for Act No. 151 Programs. See Section 4.10 for the subset of the electric Existing Homes budget related to Act No. 151 Programs.

[9] Attributable only to FLM activity in this market.

Efficiency Vermont will continue many of its existing and proven strategies:

- Support a network of contractors to identify and implement energy upgrades for homeowners. The Efficiency Excellence Network (see Section 4.2) provides contractors (including those that are Building Performance Institute [BPI] certified) and building professionals with ongoing support and resources as they engage with homeowners.
- Partner with Vermont banks and credit unions offering the Home Energy Loan, and collaborate with key stakeholders to explore feasibility of alternative energy efficiency financing products (see Section 4.5).
- Offer financial incentives for the completion of home improvement projects completed by Efficiency Excellence Network contractors, and encourage partnership among Efficiency Excellence Network contractors and others in the field through joint reporting.
- Motivate all Vermont households to weatherize their homes with incentives provided by the Home Performance with ENERGY STAR program, including focused support for moderate-income customers. Incentives for the Home Performance with ENERGY STAR work will be based on a customer's income level.[10]
- Encourage customer engagement with Efficiency Vermont by offering a limited rebate on selected do-it-yourself (DIY) projects.
- Increase householders' access to and awareness of high-quality efficient products and to lower consumer prices for efficient products as described in Section 3.4.
- Integrate principles of healthy buildings into program criteria.
- Offer a high-efficiency wood pellet boiler and furnace initiative providing financial incentives for whole house heating system replacements.

In 2021-2023, Efficiency Vermont will also:

- Work to develop a comprehensive smart connected home strategy that educates and encourages homeowners to increase their home's performance and efficiency through smart technology controls.
- Efficiency Vermont does not intend to provide a customer home energy use comparison to motivate household behavioral changes as originally planned. Efficiency Vermont does not plan to claim savings in 2021-2023 from these activities and will not be launching a redesigned home energy report program in 2021-2023 for single-family market rate customers. As a general matter, neighbor comparisons have been viewed by customers as negative and unwanted feedback, which is not compatible with the customer experience Efficiency Vermont is looking to cultivate through its various energy efficiency and home weatherization opportunities. Further, the process for verifying savings based on regression analysis requires too large a participation size to test pilots in a small state like Vermont. As such, Efficiency Vermont has not found a program design that would be both agreeable for participants and effective at reducing energy consumption. Rather, Efficiency Vermont will redirect the funding planned for this program to meet the high demand for other residential programs such as cold climate heat pumps, heat pump water heating, and other residential efficient products.[11]

[10] Previously, the amount of the incentive was based on the energy saved from the weatherization work.
[11] The 2021-2023 Demand Resources Plan budgeted $180,000 over the three-year period to this program, or .01% of the three-year budget, with an anticipated savings of more than 3,700 MWh over the three-years. Budget (and resulting savings) will be reallocated to Efficient Products programming.

- Continue to develop and launch new programs designed specifically for rental property owners. These programs will enable further adoption of efficient appliances - such as laundry equipment and heat pump water heaters - through enhanced product incentive structures and will increase access to efficiency projects through financing designed specifically for this market segment (also, see the Rental Property Loan in Section 4.5). Efficiency Vermont will also further develop and launch a non-incentive, technical-assistance based program designed to advise owners of multiple rental properties on how to prioritize efficiency upgrades across their portfolio to maximize both financial investment and tenant benefits. To maximize participation and reach for this traditionally underserved rental property owner market, these programs will be available to owners of single (1-4 units) and multifamily (5+ units) rental properties.

Multifamily Homes

Efficiency Vermont will offer rental property owners financial and technical assistance in support of efficiency improvements in their buildings (also, see services for rental property owners of multifamily [5+ units] in Section 3.1/Single-Family homes; as well as the Rental Property Loan in Section 4.5). As part of its efforts to inform and engage owners regarding this assistance, Efficiency Vermont will leverage relationships with market-rate property developers and operators, construction professionals, and other entities representing property owners and their building managers, so that property owners are aware of and can tap into these efficiency services when they are making design and construction decisions about their buildings. Efficiency Vermont will partner with Vermont Gas Systems on projects in buildings with natural gas service and with Burlington Electric Department on buildings in their service territory. These partnerships determine a joint incentive approach to maximize available funding while leveraging the technical assistance of Efficiency Vermont's energy consultants (see Section 4.1 for further details). Renters have access to all the Efficiency Vermont retail efficient products rebates and prescriptive incentives available to other residential customers, as well as energy savings kits containing LED bulbs, , an efficient showerhead, and faucet aerators through dedicated channels. Renters will be able to access financial and technical assistance through Efficiency Vermont for other direct services.

3.2 Existing and New Low-Income Housing

Efficiency Vermont will invest more than $15 million over the three-year performance period to help low-income households reduce their energy costs through long-standing partnerships with: 1) low-income housing and service providers, including the agencies of Vermont's Weatherization Program; 2) affordable housing funders, including the Vermont Housing & Conservation Board and the Vermont Housing Finance Agency; and 3) multifamily housing developers, including Evernorth (formerly Housing Vermont). Efficiency Vermont will continue to help the most vulnerable customers save money in the near term with as little out-of-pocket expense as possible.

Low-Income Efficiency Spending

Low Income Services	**2021**	**2022**	**2023**	**2021-2023**
Budget	$5,653,928	$5,990,200	$5,975,900	**$17,620,028**
MWh Savings	2,169	3,100	2,300	**7,569**
MMBtu Savings	8,924	5,900	5,400	**20,224**

Services in 2021–2023 will include:

- Installation of lighting, appliances, and—as applicable—cold climate heat pumps (CCHPs) to replace electric resistance heat, heat pump water heaters for electric resistance domestic hot water, and cost-effective custom measures in low-income households. The depth and range of service for which a low-income customer will qualify depends on the household's annual electric usage and electric energy burden. Eligibility criteria for comprehensive Targeted High Use (THU) services is greater than 5,000 kWh usage and greater than 6% energy burden.
- Continue to provide additional ways to serve low-income customers who do not qualify for Targeted High Use programming. These additional offers right size the depth of service based on both the degree of energy burden and available opportunities in the home, including: a lighter-touch version of targeted high use wherein customers can replace a single qualifying appliance or water heater identified during a home visit performed by a weatherization agency energy coach. Eligibility criteria will be determined based on usage relative to energy burden.
- Continued distribution of energy savings kits containing LED bulbs, an efficient showerhead, and faucet aerators through partner organizations, including the Vermont Foodbank, Habitat for Humanity, and housing authorities, to ensure their low-income customers and clients have access to efficient products.
- Improvement of the energy efficiency of buildings housing low-income customers through ongoing partnership with agencies of Vermont's Weatherization Program (this includes same suite of efficiency measures as THU described above) and directly with private rental property owners.
- Support for the application of design and construction approaches that result in housing that exceeds Vermont's Residential Building Energy Standards and ENERGY STAR specifications by partnering with Vermont's network of nonprofit affordable housing providers.
- A high-performance modular option for prospective mobile home buyers and renters, in partnership with the Vermont Housing and Conservation Board and other affordable housing developers. Efficiency Vermont plans to continue expanding production capacity by partnering with new high-performance modular home manufacturers. Efficiency Vermont also will continue to work toward testing the construction of a U.S Department of Housing and Urban Development (HUD)-compliant unit on a steel chassis with wheels, after codeveloping a specification with a HUD manufacturer using key targets for energy efficiency, health, and durability. As another option for energy efficient manufactured housing that is more cost attainable given the significant increases recently in labor and material costs, Efficiency Vermont will also continue the development of an Advanced Manufactured Home, which is close in alignment to the Vermont Residential Building Energy Standards.
- Technical and financial support for new construction and major renovations of multifamily properties developed by Vermont's affordable housing delivery network, which uses state and federal subsidies.
- Identification and implementation of innovative measures in focused high-performance multifamily buildings to support net-zero goals or Passive House standards.

- Continuation of an effort to increase access and reduce costs for the installation of new wood or pellet stoves for low-income customers. The program will aim to replace traditional wood or pellet stoves with stoves that are more efficient, safer, and cleaner to operate.[12]
- Continuation of the appliance replacement voucher program, which allows low-income customers who do not qualify for the comprehensive THU, THU Lite, or the Energy Savings Kit programs to replace one appliance in their home at no cost or substantially reduced cost, by redeeming a customized voucher at a participating retailer. Available appliances include refrigerators, freezers, washing machines, air conditioners, and dehumidifiers. Efficiency Vermont may recruit and train retailers as needed to ensure statewide coverage.
- See Section 4.10.2 and Appendix No. 2 for Efficiency Vermont's Act No. 151 Programs supporting low-income customers in combining weatherization with heating electrification.

3.3 Residential New Construction

Efficiency Vermont's support for the creation of efficient new homes will continue to focus on homeowners and the professionals engaged in design and construction (these include architects, engineers, specialty design service providers, and practitioners of construction trades). Efficiency Vermont will also engage with developers, equipment suppliers, installation contractors, appraisers, lenders and real estate agents, as key members of project teams, particularly regarding construction undertaken by developers/builders managing large portfolios/developments subject to Act 250.

Residential New Construction	**2021**	**2022**	**2023**	**2021-2023**
Electric				
Budget	$2,829,626	$2,921,810	$2,916,046	**$8,667,482**
Annual MWh	1,692	2,000	2,108	**5,800**
Total Resource Benefits (TRB)	$3,949,894	$7,149,700	$9,629,206	**$20,728,800**
Summer kW	98	100	102	**300**
Winter kW	305	300	295	**900**
Lifetime MWh	29,560	35,800	38,740	**104,100**
Metric Tons CO_2e	1,122	1,600	2078	**4,800**
Flexible kW	0	0	0	**0**
Thermal				
Budget	$19	$0	$0	**$19**
MMBtu Savings	0	0	0	**0**
Metric Tons CO_2e	0	0	0	**0**

The Residential New Construction budget will include services for homes that are built with new energy efficiency measures, to make the homes more safe, durable, healthy, comfortable, and energy efficient.

[12] At the time of the development of this Triennial Plan, Efficiency Vermont was evaluating a program implementation plan for this work in an effort to increase the number of customers served through this work.

The budgets and savings reflect all income levels and building types. The Residential New Construction budget is entirely funded by electric efficiency funds, not TEPF funds, unless the home is off-grid.[13]

To assist builders and owner–builders in meeting and exceeding Vermont Residential Building Energy Standards while promoting low-load and net-zero building practices, Efficiency Vermont will deliver a range of technical services appropriate to support the varying efficiency measures that Vermont households seek in their new homes. Efficiency Vermont will pivot away from project-level financial incentives to focus on measure-level incentives that encourage building best practices and focused technologies. For the market rate program, incentives and technical services will primarily be focused directly toward builders who are members of the EEN's residential new construction trade group. For income qualified projects, this program will remain unchanged. These projects will continue to be primarily in partnership with affordable housing organizations such as Habitat for Humanity.

To advance efficiency in the marketplace, Efficiency Vermont will:

- Collaborate with builders, appraisers, lenders, developers, and real estate agents through the Vermont Green Home Alliance, advocating for efficient new construction and promoting the value of efficiency in home sales
- Disseminate information about efficiency through media placements
- Support builders through the Efficiency Excellence Network (see Section 4.2)
- Partner with the Home Builders and Remodelers Associations of Vermont through trainings and events
- Continue outreach efforts with building supply houses and electric utilities, to share information with their customers
- Provide trainings for technical schools and other partners with a focus on workforce development
- Provide training and support to increase market capacity and demand for home energy ratings.

New Construction Information and Education

Efficiency Vermont will provide energy efficiency information and education to professionals and tradespeople involved in new construction and renovation projects through the Energy Code Assistance Center and the annual Better Buildings by Design (BBD) Conference. Discussion of these efforts can be found in Section 5.1. Efficiency Vermont will seek to develop a framework to capture the unique and long-term value achieved from and provided by energy code development and assistance to developers, builders, design professionals, and property owners.

3.4 Efficient Products

Efficient Products	2021	2022	2023	2021-2023
Electric				
Budget[14]	$10,091,145	$9,921,299	$10,392,488	**$30,404,932**
Annual MWh	24,063	22,100	24,137	**70,300**

[13] For more information on Residential New Construction funding, see Efficiency Vermont's October 11, 2019, "Response to requests made in the first workshop" in Case No. 19-2956-INV.

[14] Includes budget for Act No. 151 Programs. See Section 4.10 for the subset of the electric Efficient Products budget related to Act No. 151 Programs.

Total Resource Benefits (TRB)	$25,782,288	$15,267,300	$5,717,912	**$46,767,500**
Summer kW	1,637	2,000	2,563	**6,200**
Winter kW	5,026	3,900	3,474	**12,400**
Lifetime MWh	322,138	256,100	249,462	**827,700**
Metric Tons CO_2e	11,369	9,900	9,931	**31,200**
Flexible kW	0	0	0	**0**
Thermal				
Budget	$ 1,355,311	$632,778	$605,951	**$2,594,041**
MMBtu Savings	65,438	12,900	9,762	**88,100**
Metric Tons CO_2e	3,171	964	865	**5,000**

Efficiency Vermont will provide support for a range of consumer products that meet or exceed efficiency standards set by the U.S. DOE ENERGY STAR program. These products include lighting fixtures (ending 7/1/23 due to new federal lighting standards), appliances (including refrigerators with natural refrigerants as part of our refrigerant management initiative; see Sec. 4.9.1), air conditioners, dehumidifiers, heat pump water heaters, heat pump clothes dryers, smart thermostats, electronics, and indoor horticultural lighting. Services will be designed to motivate product purchases by increasing consumers' efficiency knowledge and reducing purchase costs for any customer making retail purchases for their homes and businesses. Support will include consumer rebates, price reductions at the manufacturer and retail level, midstream sales incentives that influence stocking practices, distribution of energy savings kits containing LED bulbs, an advanced power strip, an efficient showerhead, and faucet aerators through online customer order portal, point-of-purchase information, advertising, an online marketplace that scores the energy efficiency of products to inform customer buying decisions, and promotional and public information activities.[15]

Key to the success of these efforts will be Efficiency Vermont's continuing services to retailers and upstream partners in the product supply chain to ensure the availability of high-quality efficient products in Vermont stores. Efficiency Vermont field staff will deliver merchandising support, guidance on efficient product differentiation on the sales floor, and product knowledge training to the staff of efficient product retailers.

In 2021-2023, Efficiency Vermont will continue to place an increased emphasis on beneficial technologies, such as connected lighting, smart thermostats, and heat pump technology, and will explore expanded or new efforts for additional technologies as part of the smart connected home strategy (see Section 3.1 for more information about the connected home strategy). Also, Efficiency Vermont will continue to provide limited support for connected LED bulbs and certain low-income LED applications, and to raise awareness of ENERGY STAR lighting by helping buyers identify and choose high-quality screw-in LEDs over poor-quality options in the market.

[15] The online marketplace is on the Efficiency Vermont website at https://marketplace.efficiencyvermont.com/.

4 Activities in Service to all Major Markets

While serving specific markets, Efficiency Vermont will also provide services with an impact on multiple sectors and with the priority of serving all customers equitably. A key element of this cross-sector approach will be Efficiency Vermont's ongoing support for the businesses that customers turn to for efficient products and services. These businesses include retailers of appliances, lighting, and electronics; companies that manufacture, distribute, supply, install, and service HVAC-R equipment; firms that design and construct new buildings; and financial institutions. Efficiency Vermont's efforts in coordination with these businesses, although not always evident to the public, have a profound impact on customers' ability to lower energy use in their homes and places of business. Efficiency Vermont's services enable Vermont homes and businesses to have access to a valuable network of knowledgeable providers while driving business to these providers. Efficiency Vermont will also conduct a diversity, equity, and inclusion analysis of its program participation historically, to better understand how to improve the accessibility of its offerings in 2021-2023.

4.1 Coordination with Energy Efficiency Utilities and Distribution Utilities

Efficiency Vermont will continue efforts designed in response to customer interest in objective and consistent guidance on fossil fuel and electric energy consumption, generation, and load management for buildings and equipment, including vehicles. Customer choices made today in these matters will affect use of the electric system and all forms of energy within the state for years to come. Efficiency Vermont will continue to collaborate with distribution utilities and market actors to provide customers with optimally cost-effective approaches to energy use management, including energy efficiency, renewable generation, energy storage, demand response technologies, and other solutions as appropriate. These efforts to respond to customer interest in complete energy solutions will be incorporated into the framework of existing services.[16] Efficiency Vermont will provide customers with information about distribution utility programs, and other programs that can help them find comprehensive energy solutions. Notably in 2021–2023, Efficiency Vermont will invest in a Flexible Load Management (FLM) program to undertake the coordination activities and market transformation activities that will lead to the installation of load control measures in partnership with distribution utilities across the residential and commercial sectors. For more information on FLM services and Efficiency Vermont's collaboration with utilities, see Section 4.8.

Efficiency Vermont will continue its work with Vermont Gas Systems and Burlington Electric Department to ensure coordination in the implementation of Energy Efficiency Utility (EEU) services. Also, Efficiency Vermont will continue engaging in ongoing communications, coordination, and collaboration with electric distribution utilities across the state in support of efforts to meet the Renewable Energy Standard—Tier

[16] Efficiency Vermont will not use EEC or TEPF funds to provide technical assistance or incentives to customers with respect to renewable generation, transportation measures saving fossil fuels (except as approved under its Act No. 151 Programs which are described in Section 4.10 of this Plan), or storage measures. Efficiency Vermont's role will be to provide general information about these technologies and to direct interested customers to the appropriate distribution utilities or market actors for further information regarding incentives and programs administered by such entities.

III, which requires distribution utilities to implement programs intended to achieve fossil fuel reduction targets. Efficiency Vermont's collaboration with utilities includes customer engagement, program development, and project partnership. As this collaboration expands, Efficiency Vermont is supporting DUs with Tier III midstream and downstream rebate processing, which aims to improve customer experience and operational efficiency across shared programs. In addition to administering statewide Tier III rebates for all DUs, Efficiency Vermont will administer and process GMP's market and income eligible rebates, as well as a CCHP income eligible rebate bonus for VPPSA customers in Lyndonville, Hardwick, Morrisville and Ludlow. This income eligible bonus contains contributions from both VPPSA and Efficiency Vermont. As its collaboration with distribution utilities expands and matures, Efficiency Vermont will incorporate more strategic planning with partners to complement the operational and program implementation aspects of their work together. The teaming effort provides customers a more seamless experience while also maximizing the impact and value to customers. FLM will also expand beyond its current efforts to include exploration of how Efficiency Vermont can support statewide efforts for all distribution utilities as well as individual distribution utility goals. Both joint and individual discussions will help ensure Efficiency Vermont's FLM efforts are in direct support of distribution utilities' objectives and expectations. Efficiency Vermont will coordinate with distribution utilities so they can draw on one another's experiences and goals to design and implement programs that maximize the value delivered to shared customers.

4.2 Services to Contractors and Equipment Suppliers

The Efficiency Excellence Network

Efficiency Vermont will continue to coordinate and expand its EEN providing workforce development and promotional support for providers of efficient goods and services. EEN services will support the following sectors in identifying and promoting efficient approaches for their customers:

- Contractors: Electrical (lighting and electric vehicle charger installers), HVAC (whole building and mini-split heat pumps, heat pump water heaters, ground source heat pumps, advanced wood heat, oil and propane dealers, ventilation), controls, and refrigeration
- Designers (architects and engineers)
- Homebuilders (see Section 3.3 for a discussion of additional services to new construction trades and professions)
- Building improvement contractors
- Equipment manufacturers, distributors, and suppliers
- Electric Vehicle Auto Dealers (see Section 4.10 for discussion of electric vehicle services to the supply chain)

Efficiency Vermont will provide EEN members with:

- Workforce development:
    - *Training:* Technical , sales , and customer service training
    - *Professional education credits* and training for equipment installers, system designers, and service technicians, such as BPI, American Institute of Architects and Passive House Institute U.S, through Efficiency Vermont's annual Better Buildings by Design Conference

(see Section 5.1), monthly training offers, and collaborative trainings with manufacturers and distributors, and partner organizations
    - *Professional certifications,* in affiliation with the Building Performance Institute, to deliver retrofit efficiency services to Vermont homes (Home Performance with ENERGY STAR contractors) and small businesses and rental properties (Building Performance contractors)
    - *A designated website,* providing information about available services, training, and business opportunities, at https://contractors.efficiencyvermont.com/.
- Support for member businesses:
    - Extensive program promotion and access support
    - Recognition opportunities with innovation and partnership awards at the BBD conference
    - Customer financial incentives, and third-party financing options for projects completed by contractors in the EEN
    - Enhanced listings and an improved search tool for consumers via Find a Pro tool at https://www.efficiencyvermont.com
    - Frequent contact regarding program and partner updates
    - Cooperative advertising opportunities.
- Personal engagement: in support of the commercial and residential equipment supply chain, with:
    - Distributors, manufacturers, and suppliers, in order to reduce equipment purchase costs, ensure Vermont product availability to contractors and consumers, and reduce lead times for product ordering.
    - Manufacturers, regarding emerging and rapidly advancing efficiency technologies, such as lighting and heat pump technologies.

4.3 Trade Association Partnerships

In addition to engaging in direct customer interaction, Efficiency Vermont will work with professional and trade member organizations representing a wide range of constituents. By sharing focused information through these trusted channels, Efficiency Vermont will empower businesses with knowledge about best practices and resources that they can use to strengthen their bottom line. Channels will include association newsletters, websites, and technical materials, as well as event sponsorship, speaking engagements, conference and trade show participation, training workshops, and promotional and educational campaigns.

Partner organizations include, but are not limited to:

American Institute of Architects—VT Chapter	Vermont Apartment Owners Association
American Society of Heating, Refrigerating, and Air-Conditioning Engineers—VT Chapter	Vermont Association of Hospitals & Health Systems
	Vermont Association of School Business Officials
	Vermont Builders and Remodelers Association
Building Performance Professionals Association of VT	Vermont Fuel Dealers Association
Construction Specifications Institute	Vermont Green Building Network
Farm to Plate Network	Vermont Green Home Alliance
HVAC and Refrigeration Distributors International	Vermont Healthcare Engineers Society
	Vermont Hospitality Council
Home Builders & Remodelers Associations of VT	Vermont Independent Electrical Contractors Association
ICC Building Safety Association of VT	Vermont Maple Sugar Makers Association
Illuminating Engineering Society of North America	Vermont Rental Property Owners Association
Regional Development Corporations	Vermont Retail & Grocers Association
University of Vermont Extension	Vermont Ski Areas Association
Vermont Alliance of Independent Country Stores	Vermont Superintendents Association

4.4 Community-Based Activities

Efficiency Vermont will continue its engagement of focused areas of the state in community-wide efficiency efforts. Building upon prior successful efforts, Efficiency Vermont will partner with ACCD, the distribution utilities, the Vermont Council on Rural Development, the Vermont Energy and Climate Action Network, the Vermont Public Power Supply Authority, and others to select new communities, based in part on energy burden, to assist local businesses, municipalities, nonprofits, renters, and residential property owners, and occupants in saving energy. Efficiency Vermont will continue to offer services tailored to each community, potentially including:

- Enhanced incentives for municipalities and nonprofits
- Commercial and SMB energy walk-throughs (virtual or in-person, safety allowing)
- Customer referral and project completion bonuses for businesses
- Residential rental property energy walk-throughs
- Free efficient products for rental property owners and renters
- Enhanced incentives for renter property owners
- Virtual Home energy visits for both renters and residential customers
- Distribution of energy savings kits containing LED bulbs, an advanced power strip, an efficient showerhead, and faucet aerators through partners and other relevant channels.

Additionally, Efficiency Vermont will partner with the Vermont Public Power Supply Authority to offer customers of specific municipal utilities the following services:[17]

- Offerings and outreach tailored to respective municipal utilities specific needs, such as appliance coupons, tabling events, and presentations on efficiency and fuel switching
- A cold climate heat pump, plus weatherization, joint bonus offer

[17] These offerings represent a joint effort between Efficiency Vermont and VPPSA municipal utility members, including promotional offers for both the state-wide EEU and DU Tier III programs respectively.

- Joint promotions and communications through utility bill inserts

Efficiency Vermont will also continue to engage with Vermont households and businesses interested in creating or joining efforts to reduce energy use in their towns, institutions, businesses, nonprofits, and homes. Efficiency Vermont will partner with, support, and collaborate with town officials, town energy committees, local organizations, non-profits, businesses, and other entities to increase the impact of existing efforts and statewide campaigns such as Button Up Vermont, or to support interest in creating new groups devoted to increasing the impact of efficiency efforts. Offered services will include educational and promotional materials, training on energy efficiency topics, and the contribution of efficient products for local energy-saving efforts.

4.5 Financial Services

In its ongoing commitment to help Vermont households and businesses overcome financial barriers to investing in cost-effective efficiency for their buildings and equipment, Efficiency Vermont will engage in the following efforts in 2021–2023.

Product and Service Price Reductions
To motivate customers to make energy-efficient choices in the marketplace, Efficiency Vermont will target specific products and services for purchase price reductions. Primary mechanisms will be: 1) negotiated cooperative promotions that provide incentives to manufacturers, distributors, and retailers—both independent and chain stores—to lower the purchase price of products, and 2) rebates and financial incentives for:

- Efficient products and equipment purchased at the retail level and through commercial suppliers and installation contractors
- Process equipment for businesses such as farms, manufacturers, and industrial facilities
- The incorporation of advanced cost-effective techniques and approaches that enable the design and construction of high-performance residential and commercial buildings
- Building shell upgrades made by Building Performance contractors in small commercial and multifamily properties
- Efficient home improvement projects conducted by Home Performance with ENERGY STAR contractors.

Financing for Energy Efficiency Projects
Efficiency Vermont will work with lenders to ensure the availability of cost-effective financing for energy efficiency projects. By including energy savings in the repayment formula, lenders may be able to provide funding for individuals and businesses not otherwise qualifying for financing. In many instances, such financing creates a positive cash flow for borrowers, because of monthly energy savings that are larger than the loan payments.

Efficiency Vermont will engage with third-party lenders regarding a range of financing vehicles, including:

- Business Energy Loan**:** Increasing opportunities for businesses, including agricultural operations, to finance efficiency projects by factoring energy savings into loan qualification calculations
- Home Energy Loan / Efficiency Excellence Network Partnership: Financing for efficient appliances and heating system purchases and comprehensive thermal efficiency projects completed by Efficiency Vermont's EEN contractors
- Rental Property Loan: Efficiency Vermont will explore the potential for a rental property loan product for private owners to help them finance efficiency projects on their rental properties.

In addition, Efficiency Vermont will continue partnering and collaborating with distribution utility partners, the other EEUs (VGS and BED), and the Vermont Housing and Finance Agency to explore innovative financing options, such as on-bill tariffed financing. It's anticipated that a pilot program will be launched in 2023, with a focus on supporting low- and moderate-income Vermont households and renters.

Financing Education and Analysis

To enable customers to be aware of, understand, and make decisions regarding financing options, Efficiency Vermont will provide easy access to information by phone, through its website, in printed materials, and in media placements. Efficiency Vermont will continue to provide financial analysis for custom business projects to help customers understand the financial aspects of efficiency investments. Efficiency Vermont will:

- Offer contractors tools to calculate and present financing options for their customers
- Provide listings of financing options and lenders through https://www.efficiencyvermont.com
- Make the discussion of cost-effective financing a standard part of service to customers lacking capital who can benefit from efficiency upgrades
- Present information on energy efficiency financing at community-based workshops in coordination with local energy committees
- Train customer-facing staff and contractors on financing options, how to effectively educate and explain financing options to customers, and how to use financing to move energy efficiency projects forward
- Conduct research and analysis of barriers faced by customers in using financing mechanisms, and explore non-loan approaches to financing energy efficiency projects, as part of its efforts to bring efficiency within reach to more Vermont households and businesses.

4.6 State, Regional, and National Partnerships

In service to Vermont households and businesses, and in support of the State's energy goals, Efficiency Vermont will continue to leverage the expertise and resources of entities engaged in a range of energy and efficiency endeavors, both in Vermont and outside the state. Efficiency Vermont will share its own expertise at regional and national gatherings, enabling Vermont to be both recognized for its innovations and informed by best practices in other states. Efficiency Vermont's regional and national work has influenced the establishment of product specifications that ensure that Vermont consumers have access to the highest-quality, most energy-efficient products. In Vermont, partners will include the Vermont Community Foundation, the Vermont Housing and Conservation Board, the Regulatory Assistance Project, and many others. On a regional and national level, Efficiency Vermont will maintain ongoing partnerships

with such organizations as the Northeast Energy Efficiency Partnerships, the New Buildings Institute, the Consortium for Energy Efficiency, DOE ENERGY STAR, Regional Energy Efficiency Partnership, and the American Council for an Energy-Efficient Economy, working to share information on best practices and to establish uniform product eligibility criteria and program designs.

4.7 Data Analytics Services

Efficiency Vermont will continue to host and manage a data platform to uncover, report on, and verify electric energy savings and insights derived from analysis of energy usage in Vermont households and businesses. These savings and insights serve organizational and partner needs in the areas of program and incentive design, customer insights, project-level analysis, focused outreach, and advanced measurement and verification. Data managed in this platform include Advanced Metering Infrastructure (AMI) data, billing and customer data directly related to it, and other data sets used in conjunction with these data to serve said needs, such as time series weather and emissions data.

Under the scope of these services, Efficiency Vermont will maintain the software, database, systems, and integrations necessary to collect, store, analyze, report on, and make available these this data safely and securely to staff and partners so they can deliver their energy services. Efficiency Vermont will additionally conduct analysis and data services to inform and drive energy decisions in the increasingly complex space of efficiency activities, interactions, and relationships between Vermont ratepayers, and the grid. Other initiatives under the scope of resource acquisition activities, such as business and residential services and FLM, also directly benefit from these data services.

Overall, this work will continue activities begun under the 2018–2020 cycle that took a contractor-hosted data solution in-house to reduce costs and fulfill obligations under Docket 8316. This action will continue to provide the alignment of collection and storage of the data with its use in Efficiency Vermont's portfolio of energy services and enable it to respond more nimbly to complex and ever-changing factors in the Vermont (and broader New England energy landscape affecting Vermont), as it more accurately and cost-effectively delivers on program, incentive, project, and outreach outcomes. Ongoing focus includes improving the reliability and efficiency of data ingest processes and further enhancements to user facing tools to better facilitate the use of AMI data to support resource acquisition activities.

4.8 Flexible Load Management

FLM programs utilize a combination of data analytics, system communication platforms, and load control measures in order to shift loads that are "flexible"[18] in commercial / industrial facilities and homes, from less optimal times of day to more optimal time periods. There is emerging consensus that distributed energy resources and load management will play an increasingly critical and valuable role in power cost reduction and the creation of headroom in the utility grid. Efficiency Vermont is uniquely positioned to encourage ratepayer adoption of interoperable and open-source load management technologies by undertaking the coordination activities and market transformation activities that lead to the installation

[18] This refers to the ability to alter the timing of energy use without sacrificing customer experience.

of these technologies. In 2021–2023, Efficiency Vermont will work to establish flexible load with large commercial and industrial, residential, and SMB customers. Efficiency Vermont and the distribution utilities agree that the responsibility for scheduling, operating, and incentivizing the behavior of any load control systems falls to the distribution utility, and that the full benefit from load control technologies may not materialize without the establishment of complementary distribution utility programs or protocols. Therefore, Efficiency Vermont will coordinate closely with distribution utility partners throughout program planning, design, implementation, and performance evaluation.

In 2021–2023, Efficiency Vermont will continue work to establish flexible load capability with commercial, industrial, and residential customers, while collaborating with distribution utilities to support the state. Strategies will include:[19]

- Working with utilities to understand both device-level and customer-level load shapes to assist in effective program planning that aligns with utility costs and greenhouse gas emissions reduction efforts
- Identifying and designing incentives that result in the installation of controllable equipment to enable shifting load
- Continuing partnership with utilities to implement programs that support installation of flexible, grid-enabled technologies that reduce customer and utility cost and greenhouse gas emissions, including a continuation of both the GMP FLM Innovation Pilot and the WEC PowerShift demonstration, a new demonstration project with VPPSA to explore open standards for EV chargers, a pilot to explore C&I FLM with Vermont Electric Coop (VEC), and additional opportunities that arise with other DUs
- Evaluating program activities and integrating learning into program design
- Operating as a strategic statewide partner, helping to define standards that ensure interoperability and good long-term investments for customers.

Flexible Load Management Budget	**2021**	**2022**	**2023**	**2021-2023**
Business Sector				
Existing Facilities	$464,008	$1,031,625	$1,031,624	**$2,527,257**
New Construction	$34,939	$35,000	$35,000	**$104,939**
Total Business Sector	**$498,947**	**$1,066,625**	**$1,066,624**	**$2,632,196**
Residential Sector				
New Construction	$0	$0	$0	**$0**
Efficient Products	$58,547	$200,000	$308,443	**$566,990**
Existing Homes	$16,634	$75,000	$150,000	**$241,634**
Total Residential Sector	**$75,181**	**$275,000**	**$458,443**	**$808,624**
Total Budget	**$574,128**	**$1,341,625**	**$1,525,067**	**$3,440,820**

[19] For more information on the FLM program, see Efficiency Vermont's FLM workpaper at https://epuc.vermont.gov/?q=downloadfile/407108/144020.

Flexible kW				
Business Sector				
Existing Facilities	1,163	400	162	**1,725**
New Construction	25	25	25	**75**
Total Business Sector	**1,188**	**575**	**37**	**1,800**
Residential Sector				
New Construction	0	0	0	**0**
Efficient Products	0	0	0	**0**
Existing Homes	9	191	700	**900**
Total Residential Sector	**9**	**191**	**700**	**900**
Total Flexible kW	**1,197**	**616**	**887**	**2,700**

4.9 Heating, Ventilation, Air Conditioning and Refrigeration

Efficiency Vermont will continue to place increased emphasis on HVAC-R technologies in order for customers to continue to benefit from deepening efficiency in their facilities. Key strategies will include expansion of the Efficiency Excellence Network (discussed in Section 4.2) to include entities throughout the equipment supply chain, with a focus on:

- Increasing the installation of high-efficiency equipment, such as hydronic circulator pumps, controls, high-efficiency evaporators, advanced wood heating systems, and heat pump water heaters.
- Optimizing entire systems through whole building practices, while ensuring adequate indoor air quality (IAQ), including ongoing system monitoring and management, building management system optimization and upgrades, building retuning, integration of HVAC controls with other systems (e.g., lighting controls), existing building commissioning, monitoring-based commissioning, benchmarking, and energy system optimization.
- Providing customers with guidance about heat pump technologies—including centrally ducted, air-to-water, and geothermal heat pumps—on-site interactions, or through the Efficiency Vermont Contact Center and website, at events, and via members of the Efficiency Excellence Network (see Section 4.2), in addition to providing incentives, developing related supply chains, and influencing standards for quality and efficiency in heat pump technologies.
- Continuing strong coordination with distribution utilities on program delivery and messaging about heat pumps. Efficiency Vermont will assist customers with information about:
    - How to determine if a heat pump is the right option to pursue, based on an analysis of existing and future fuel costs, building type, and other factors to provide a limited feasibility analysis
    - How heat pump technology works, and what units will look like when installed in a home or business
    - Products and qualified product lists
    - The benefits of building shell efficiency when coupled with the installation of a heat pump
    - The building types and locations in the home or business where heat pump technology solutions are most effective

- How to find local suppliers of efficient technologies
- Finding a contractor
- Available heat pump rebates and incentives
- All available financing options for heat pumps
- How best to operate heat pumps.

Toward these ends, Efficiency Vermont will:

- Expand the scope of equipment supply chain engagement to improve the quality of installation, increase efficient product availability, and leverage relationships in the delivery of efficiency information to customers
- Extend supply chain efforts, including upstream incentives, to an expanded range of technologies—most notably commercial refrigeration
- Continue to evaluate emerging technologies for inclusion in services, optimizing program delivery to scale up adoption of these technologies as they mature
- Maintain involvement with industry trade associations and marketing / buying groups.

4.9.1 Refrigerant Management

Due to the high prevalence of leaks in commercial refrigeration systems, and the economic and environmental impacts resulting from these leaks, Efficiency Vermont will work with customers to assist in refrigerant management. Refrigerant leaks cause equipment to operate inefficiently and eventually fail. The refrigerant itself is also a highly concentrated greenhouse gas, having a global warming potential (GWP) up to 14,000 times that of carbon dioxide. Following are the various strategies Efficiency Vermont will employ to address these issues:[20]

- Deploy permanent refrigerant leak detectors at selected large commercial customer sites to identify refrigerant leaks on a continuous basis
- Partner with contractors to help SMB customers identify and repair refrigerant leaks
- Help businesses install equipment utilizing natural refrigerants, such as CO_2 racks and condensing units and hydrocarbon reach-ins
- Engage with a new supply channel (commercial kitchen equipment) to promote midstream adoption of ENERGY STAR hydrocarbon reach-in refrigerators and freezers
- Assist customers to identify options to swap existing refrigerants for lower GWP refrigerant charge options for their commercial refrigeration needs
- Build the supply chain and partner with Vermont retailers to provide education about and access to residential refrigerators with natural refrigerants.
- Help businesses select and install low charge refrigerant systems as an alternative to systems with substantially more refrigerant (e.g. encouraging chillers over direct exchange equipment)

[20] For more information on the refrigerant management program, see Efficiency Vermont's refrigerant management workpaper at https://epuc.vermont.gov/?q=downloadfile/407116/144020.

4.10 Act No. 151 Programs

Efficiency Vermont's Act No. 151 Programs are focused on improving various aspects of transportation sector electrification, namely two focal points related to plug-in electric vehicle ("EV") market development: expanding current EV supply chain development efforts; and supporting consumer outreach and education.

Though the focus in 2021 will be on transportation-related initiatives, in 2022-2023 Efficiency Vermont will also offer an Act No. 151 thermal electrification program, in partnership with electric distribution utilities, that combine thermal efficiency with heating electrification for low-income customers.

As with all programs and services, Efficiency Vermont will continue to monitor market conditions as a foundation for any potential future program design decisions. As market conditions change and shift, future programs would be designed based on identifying key interventions to continue the work to increase and accelerate market adoption of EVs as well as other technologies and services that provide meaningful GHG reductions.[21]

In order to understand how the Vermont EV market is evolving, it is important to track a variety of market metrics that will help to determine the status of the market over time. Efficiency Vermont will track two types of metrics: program and market metrics.[22] The program metrics are tied to specific program activities and can be measured with Efficiency Vermont program data. Developed to support and align with the market metrics and goals, the program metrics in many cases represent "leading indicators" for desired long-term market results focused on two key areas of program activity: dealership engagement and consumer education. These metrics are meant to inform progress toward program objectives and evaluate program impact and success.

. The purpose of these metrics is to track general market trends that will inform Efficiency Vermont Act No. 151 EV program decisions and direction. These metrics will be tracked using data largely from outside Efficiency Vermont and will help Efficiency Vermont understand how the market is transforming, as well as assess whether its market interventions are appropriate based on market adoption trends.

See Appendix No. 1 for Efficiency Vermont's Act No. 151 electric transportation program metrics and targets that Efficiency Vermont will track for the 2021-2023 performance period. Efficiency Vermont will continue to work with the Department on the tracking and reporting of EV market metrics to understand how this market is evolving in Vermont. Those metrics are also provided in the appendix.

Act No. 151 Budgets	**2021**	**2022**	**2023**	**2021-2023**
Business Sector				
Existing Facilities	$0	$0	$0	**$0**
New Construction	$0	$0	$0	**$0**

[21] Efficiency Vermont's electric transportation programs are enabled by Act No. 151 for 2021-2023. To implement these programs beyond 2023 would require further legislative action to do so.
[22] Efficiency Vermont consulted with the Department on the development of these metrics.

Total Business Sector	**$0**	**$0**	**$0**	**$0**
Residential Sector				
New Construction	$0	$0	$0	**$0**
Efficient Products	$1,400,506	$1,718,834	$1,593,000	**$4,762,340**
Existing Homes	$4,660	350,000	$350,000	**$704,660**
Total Residential Sector	**$1,405,166**	**$2,068,834**	**$1,943,000**	**$5,417,000**
Total Budget	**$1,405,166**	**$2,068,834**	**$1,943,000**	**$5,417,000**

4.10.1 Electric Transportation

EV Supply Chain Support

Auto dealerships are a critical partner in advancing EV adoption in Vermont. Efficiency Vermont's stakeholder engagement revealed many EV supply chain initiatives undertaken by dealerships, automakers, electric utilities, DEV and others which have enhanced Vermont's EV sales network over the past ten years. However, there was also recognition that increased investment in the EV supply chain could be beneficial, particularly in expanding pre-owned EV sales. Therefore, Efficiency Vermont's Act No. 151 Programs include the following activities to further support development of a robust statewide EV supply chain:

- Development of an EV dealership network embedded within Efficiency Vermont's Efficiency Excellence Network. Efficiency Vermont's Act No. 151 EV dealer program features new and used car dealers who have demonstrated a commitment to promoting EVs, and in return receive benefits including:
    - Financial and technical support for dealership investments in EV charging and service infrastructure
    - Marketing support to help differentiate and promote dealers that support the adoption of EVs
    - Dealership and salesperson incentives designed to encourage sales staff to learn about and sell more EVs
    - Salesperson trainings that will provide Vermont-specific information on EV incentives, operating conditions and other sales-related issues of interest to both new and used car dealers
- Regular outreach to and engagement with dealer program members to understand challenges and barriers related to dealership preparedness for EVs. These market insights help inform program updates and changes that ensure that the program is aligned with dealer support needs for advancing EV sales

EV Consumer Education and Outreach

Efficiency Vermont will leverage the DEV website as well as Efficiency Vermont's own engagement channels to increase consumer awareness and knowledge of EV options available to Vermont households and businesses. Components of this work will include:

- A statewide EV consumer education and awareness campaign focused on the benefits of EVs and available federal, State, and utility incentives, created in partnership with DEV, utilities, and other stakeholders
- Research to inform campaign design, including better understanding issues of concern for Black, Indigenous, and People of Color (BIPoC) and low-and-moderate income customers who might consider an EV purchase
- Advertising across a variety of media outlets
- Website updates and resources for EV shoppers
- Community engagement and event support, including potential partnerships with utilities, the State of Vermont and others interested in accelerating EV adoption
- In-dealership materials & collateral and cooperative marketing support with dealers (as noted above).

4.10.2 Heating Electrification with Weatherization

Based on Efficiency Vermont's ongoing engagement with DU partners, Weatherization Agencies, and other stakeholders: Efficiency Vermont launched in 2022 and will continue implementing in 2023, a program to support low-income customers in combining weatherization with heating electrification. In partnership with distribution utilities, Efficiency Vermont will install cold climate heat pumps in the homes of approximately 300 low-income customers at no cost to the customer. Eligible customers will include those previously served by Weatherization Agencies and whose primarily heating source is currently fossil fuel based. Weatherization Agencies will mail eligible customers letters on behalf of Efficiency Vermont and DU partners inviting them to participate in the program by contacting Efficiency Vermont's customer support. Installations will be performed by EEN heat pump contractors who agree to participate in the program. On a limited basis, the program will also support electric panel upgrades required to accommodate the heat pump installation. The cost of the heat pump unit and installation will be shared between Efficiency Vermont and the customer's distribution utility.

4.11 2021–2023 Initiative-Specific Evaluation Activities

Initiative-level evaluation activities will be assessed and adjusted as needed to ensure their alignment with the goals and priorities outlined in this Plan. All efforts will be guided by process feedback and customer input.

Years	Activity	Description/ Intent
2021	**Weatherization**	Assess impact (energy and non-energy benefits, market transformation, public energy literacy); process (cost-effectiveness, operational efficiency, and data collection); and customer / partner satisfaction in order to inform future program offerings in pursuit of overarching state weatherization goals.
2021–2023	**Multifamily New Construction**	Assess impact (energy and non-energy benefits, market transformation, public energy literacy) and process (cost-effectiveness, operational efficiency, quality assurance, and quality control) of existing program approach. Results will inform future direction and how Efficiency Vermont will integrate and align multifamily efforts with all other new construction services.
2021-2023	**Single-family New Construction**	Assess impact (energy and non-energy benefits, market transformation, public energy literacy) and process (cost-effectiveness, operational efficiency, quality assurance, and quality control) of existing program approach. Results will inform future direction and how Efficiency Vermont will integrate and align single-family efforts with all other new construction services.
2021-2023	**Commercial Lighting**	Assess impact (energy and non-energy benefits, market transformation, public energy literacy); process (cost-effectiveness, operational efficiency, quality assurance, and quality control); and customer / partner satisfaction regarding Efficiency Vermont services, in order to steer continuous improvement efforts. Also, assess program impacts due to federal efficiency standards for lighting products that will end Efficiency Vermont's support of ENERGY STAR downlights and fixtures by July 1, 2023, and state law banning the sale of compact fluorescent bulbs (CFLs) beginning February 17, 2023 for screw-based CFLs and January 1, 2024 for general purpose four-foot long linear fluorescent tubes.[23]
2021-2023	**Commercial HVAC Programs**	Assess impact (energy and non-energy benefits, market transformation, public energy literacy); process (cost-effectiveness, operational efficiency, quality assurance, and quality control); and customer / partner satisfaction regarding Efficiency Vermont services, in order to steer continuous improvement efforts.
2021–2023	**Efficient Products**	Assess impact (energy and non-energy benefits, market transformation, public energy literacy) and process (cost-effectiveness, operational efficiency, quality assurance, and quality control). Results will inform product mix and service delivery of future programming.

[23] This also impacts residential downlights and fixtures.

5 Development and Support Services

Efficiency Vermont will continue to engage in efforts that build customer awareness, knowledge, and motivation regarding energy use reduction; support efforts to shape energy efficiency policies; and identify approaches for optimal service development, delivery, and improvement. DSS activities may not directly result in efficiency savings but represent valuable aspects of energy efficiency service delivery and development, and include activities in the following categories: education and training, applied research and development, planning and reporting, evaluation, administration and regulatory affairs, and information systems. In 2021–2023, the below activities will be essential to Efficiency Vermont's efforts to deepen energy savings and to have a lasting, positive impact on Vermont households, businesses, and communities. DSS activities are funded through a combination of electric and TEPF budgets. The three-year budgets by category and initiative follow.

	2021	2022	2023	2021-2023
Education & Training				
Codes & Standards Support - Residential	$19,602	$17,600	$18,200	**$55,402**
Codes & Standards Support - Business	$10,077	$11,200	$12,100	**$33,477**
Energy Literacy Project	$114,438	$136,000	$136,000	**$386,438**
General Public Education	$66,624	$66,700	$66,700	**$200,024**
Better Buildings by Design Conference	$59,567	$0	$0	**$59,567**
Customer Support	$185,761	$217,400	$217,400	**$620,561**
Building Labeling and Benchmarking	$19,455	$21,700	$21,600	**$62,755**
Sub-Total Education & Training	**$475,624**	**$470,600**	**$472,000**	**$1,418,224**
Applied Research & Development				
Technology Demonstrations	$171,164	$174,100	$174,100	**$519,364**
Sub-Total Applied Research & Development	**$171,164**	**$174,100**	**$174,100**	**$519,364**
Planning and Reporting				
Annual Plan	$19,927	$31,400	$36,500	**$87,827**
Demand Resources Plan	$45,557	$254,700	$373,400	**$673,657**
Vermont System Planning Committee Participation	$8,620	$20,300	$11,000	**$39,920**
ISO NE Forward Capacity Market Administration	$107,701	$133,500	$135,200	**$376,401**
External Reporting	$91,265	$102,900	$102,900	**$297,065**
Non-Regulatory Reporting	$60,258	$76,600	$76,600	**$213,458**
Sub-Total Planning and Reporting	**$333,329**	**$619,400**	**$735,600**	**$1,688,329**
Evaluation				
Savings Verification	$33,452	$33,300	$33,400	**$100,152**
Technical Advisory Group	$53,808	$58,100	$58,100	**$170,008**
Technical Reference Manual	$222,243	$243,800	$243,800	**$709,843**

ISO-NE Forward Capacity Market				
Metering/M&E	$82,607	$122,900	$118,000	**$323,507**
Quality Management	$8,265	$28,400	$35,500	**$72,165**
Sub-Total Evaluation	**$400,375**	**$486,500**	**$488,800**	**$1,375,675**
Administration & Regulatory Affairs				
Public Affairs	$100,797	$103,100	$103,100	**$306,997**
Regulatory Affairs	$437,135	$327,400	$264,100	**$1,028,635**
General Administration	$109,221	$114,900	$114,900	**$339,021**
Sub-Total Administration & Regulatory Affairs	**$647,153**	**$545,400**	**$482,100**	**$1,674,653**
Information Systems				
Core Business Software Applications	$881,546	$1,037,800	$1,037,800	**$2,957,146**
Utility Data Management	$119,946	$130,633	$130,833	**$381,413**
Reporting and Business Intelligence	$170,619	$183,000	$183,000	**$536,619**
Sub-Total Information Systems	**$1,172,112**	**$1,351,433**	**$1,351,633**	**$3,875,179**
Total Development and Support Services	**$3,199,757**	**$3,647,433**	**$3,704,233**	**$10,551,424**

5.1 Education and Training

Codes and Standards Support—Residential and Commercial and Industrial

To help Vermont households and businesses comply with, or surpass, State energy codes for new construction and renovation projects, Efficiency Vermont will provide a range of services, including key training and technical assistance for customers involved in the design, construction, renovation, sale, and ownership of new and existing homes and commercial buildings.

- Energy Code Assistance Center
  - *Technical assistance*—For 2021–2023, Efficiency Vermont expects to provide approximately 500 technical assists, or more, through the Energy Code Assistance call center
  - *Distribution of code materials*—In 2021–2023, Efficiency Vermont expects to distribute approximately 1,500 code handbooks and other energy code–related materials.
  - *Connection to State goals* – develop and deliver market-specific training that articulates linkage of energy code to Vermont's Comprehensive Energy Plan, and Climate Action Plan in support of the Vermont Office of Professional Regulation.
- Energy code training and market partner support
  - *Training for building professionals, real estate professionals, and municipal staff*—For 2021–2023, Efficiency Vermont expects to facilitate 15 building energy code training sessions, and to train more than 500 contractors.
  - *Advisory support for market groups and partners*—For 2021–2023, Efficiency Vermont expects to participate in at least six advisory group meetings.
  - *Blower door training*—For 2021–2023, Efficiency Vermont expects to facilitate options for building professionals to attain blower door training , offering six or more trainings

- For 2021–2023, Efficiency Vermont expects to assist approximately 150 partners including Vermont agencies, town energy committees, and commercial and industrial customers, to discuss best building practices for meeting code requirements.

Energy Literacy Project

In collaboration with Vermont's K–12 associations in every county of the state, nonprofit organizations, government agencies, and utility providers, Efficiency Vermont will continue to deliver the Energy Literacy Project through its implementation contractor. The project will provide information about energy, its use, and the impact of energy consumption to students, educators, and staff of Vermont's K–12 schools. The aims of the project are to promote energy literacy and to transform energy-related behaviors both within and beyond the classroom. This project will provide:

- Teacher training on incorporating energy literacy into all subject areas in all grades
- Support for the establishment of educator / peer learning groups specific to teaching energy literacy
- Continuing education credits and an Energy Literacy Certification program for teachers
- Learning resources for students and teachers such as curriculum-based workshops, hands-on learning, and energy management practices.

Efficiency Vermont will collaborate with schools and intends to deliver workshops that are equitably distributed across the state. These workshop topics may include how the sun and wind provide renewable energy, and home heat transfer, and will be in alignment with the split electric and TEPF funding (discussed in the Section 5 introductory paragraph above). Efficiency Vermont also intends to design deliverables specifically for schools in lower-income areas, and schools that have not participated in Efficiency Vermont programs in at least five years.

General Public Education

In alignment with the Commission's directive to provide general information to the public in order to increase customer awareness and understanding of the benefits of reducing energy use, and of the best technologies available to the public, Efficiency Vermont will provide information through:

- Participation in and sponsorship of mission-aligned events throughout the state. Through this work, Efficiency Vermont staff will connect with Vermont households and businesses throughout the state.
- Proactive efforts with the media to develop stories that highlight how Vermont households and businesses can participate in and benefit from Efficiency Vermont services, and how their participation supports other customers through lower energy costs and other benefits. Efficiency Vermont will issue multiple statewide press releases that highlight new customer services and resources, customer success stories, and other information of benefit to Vermont households and businesses. These stories will illustrate the value of energy efficiency and generally encourage customer participation in Efficiency Vermont programs.
- Relationships with strategic partners whose missions align with the overall objectives of Efficiency Vermont.
- Efficiency Vermont Marketplace, an online tool that customers use to research appliances in a variety of categories including electronics, heating & cooling, home and office, and laundry. The Efficiency Vermont Marketplace is a collaboration between Efficiency Vermont and a company

that provides a suite of software applications and services designed to drive more energy-smart decisions from consumers.

General public information—via partnerships and outreach designed to create awareness and understanding—is distinct from the information found in Efficiency Vermont program marketing materials, which are intended to promote participation in specific resource acquisition activities.

To ensure that all information efforts have an optimal impact, Efficiency Vermont uses testing and insights to support the creation of focused messaging and materials, and to measure their effectiveness.

Better Buildings by Design Conference

Efficiency Vermont presents its Better Buildings by Design Conference annually. This two-day gathering is the region's premier design and construction conference, serving as a key resource to approximately 1,000 construction and design professionals, as well as equipment installation and service contractors. The conference focuses on best practices for building durability, superior performance, energy efficiency, and value for both residential and business new construction and retrofit projects. Attendees prioritize the conference to come spend the day with their peers, learn and stay up-to-date on the latest energy efficiency best practices from concept to application, and earn continuing education credits.

In addition to typically 40 workshops and hands-on demonstrations given by industry leaders, the conference hosts a trade show of typically 70 exhibitors of efficient technologies and presents its *Best of the Best* awards for exceptional achievement in new and renovated high-performance buildings and homes.

The 2023 conference is expected to be in-person.

Customer Support

Customer Support responds to general questions and requests for information, training, and/or event staffing as required to meet or exceed the quantitative performance indicators for the Service, Quality, and Reliability Plan. Vermont households and businesses will continue to have easy access to expert energy efficiency information and guidance through Efficiency Vermont's multichannel Contact Center. Efficiency Vermont anticipates that the Contact Center will respond to more than 30,000 inquiries from existing and new customers about energy use and management each year of the 2021–2023 performance period. Staff respond to inquiries via phone, e-mail, and website live chat, as well as in person at community events and presentations.

When questions are not directly tied to an Efficiency Vermont resource acquisition program, the Contact Center will support customers with information and technical support about topics including electric and thermal energy use and related technologies; energy efficiency; and transportation.

Additionally, the Customer Support team will coordinate and communicate with distribution utilities and other partner organizations on customer-related training and communications.

Building Labeling and Benchmarking

Efficiency Vermont will continue to support activities that increase the visibility and valuation of energy efficiency improvements in the market, including the issuance of certificates, energy labeling, and benchmarking of commercial buildings. Examples of activities:

- Coordination with partners and stakeholders to support statewide labeling and benchmarking activity
- Outreach and education for real estate industry stakeholders including real estate professionals, appraisers, and home inspectors
- Marketing and promotion of home energy labels
- Support and training for creating home energy labels
- Coordination with entities supporting IT systems and tools for labeling and benchmarking buildings
- Work with labeling partners to evaluate labeling activities and impacts.

5.2 Applied Research and Development

Efficiency Vermont will engage in a range of technology demonstration projects in its research and development "R&D" effort and will conduct ongoing assessment to ensure alignment with the goals and priorities outlined in this Plan.

Technology Demonstrations

Technology demonstrations funding supports research, development, and demonstration for optimizing the creation of cost-effective solutions for meeting Efficiency Vermont's long-term resource acquisition goals. Efficiency Vermont will plan these activities to advance the goals of sound product and program design over time through field testing, technology demonstrations, and research concerning emerging technologies and implementation strategies.

The work in this initiative allows Efficiency Vermont to:

- Create space for innovation that would not otherwise achieve investment
- Drive evolution of Efficiency Vermont's services to better help ratepayers
- Focus staff and resources on strategic areas that need investment.

Technology demonstrations work is crucial to long-term resource acquisition savings and as an investment in the organization's knowledge. Both outcomes benefit customers and trade allies. They are also key to understanding and developing the next generation of energy savings technologies, service delivery approaches, and enhanced customer engagement strategies for integration into the resource acquisition portfolio. Effective technology demonstration–tested approaches proceed into larger pilots with the goal of full integration and deployment through new or existing programs. Working with manufacturers, customers, and trade allies, staff drive these approaches by proposing projects that show promise for positive impacts. Outcomes of these R&D efforts are not pre-determined to have savings or impact; instead, they are designed to assess untested new concepts that ideally will enter the portfolio to procure savings and secure beneficial impacts in the future. These efforts are also proposed for this budget to

experiment with and test unproven concepts that are core to innovation and redefine the future value of efficiency to Vermont households and businesses.

This initiative involves managing the annual process for soliciting and approving R&D demonstration projects, selection committee work, and implementing approved projects. Project work involves all project planning, implementation, evaluation, and development of recommendations. Each year, these initiatives will be defined and budgeted on the basis of specific supporting projects. The annual cycle affords a refresh to the approaches and tight annual timelines to complete the selected projects.

Greenhouse Gas Reduction: Efficiency Vermont will continue work that began in 2019 to assess new and innovative greenhouse gas (GHG) reduction strategies related to energy efficiency with the potential to influence manufacturing and supply chain processes for efficient products, Vermont business and building-level GHG footprint calculations, and incentive programs. From 2019 to 2021, the work was based primarily on research in specific project areas such as insulation materials, natural refrigerants and mechanical systems, and began testing with customers to calculate the impacts of the installation of efficient products and services.[24] That existing research and the customer pilots helped Efficiency Vermont understand some of the potential impacts of efficient technology on the greater GHG landscape. Efficiency Vermont wants to build on this work to explore even deeper system connections of the products and services used to map product life cycles, application and sourcing footprints, and greater whole system monitoring for GHG minimization. Examples include: partnering with distribution utilities to identify potential residential rate plans that incentivize carbon reduction and save customers money through energy efficient technologies and flexible load management of those technologies; analysis of customers based on load profile characteristics to identify customer groups most suitable for flexible load management and energy efficiency to drive time of use carbon savings; and modeling, forecasting and assessing GHG reduction in Efficiency Vermont's portfolio.

How recent applied R&D focused on GHG Reductions is impacting 2021-2023 resource acquisition plans:

Efficiency Vermont will share learnings from prior research with industry professionals to inform their decisions about product selection and use with respect to embodied GHG. One example: selecting one insulation material over another in order to reduce the embodied GHG of a project while maintaining the same energy efficiency performance.

Efficiency Vermont may modify incentivized measures based on GHG impact to further reduce the non-energy GHG impact of program portfolios. Efficiency Vermont will begin tracking the non-energy GHG impacts of refrigerants through the new GHG reduction QPIs.

Healthy Buildings: In alignment with customer interest and national trends, Efficiency Vermont will continue evaluating the potential impacts of energy efficiency services on health in commercial buildings. During the 2018–2020 performance period, opportunities were evaluated for commercial health partnership opportunities that positively influence building occupant health through the energy-plus-

[24] Final Reports for Efficiency Vermont's applied R&D projects are available at

health interventions performed at the time of efficiency improvements. Out of this evaluation, a potential 2021–2023 commercial pilot has been identified to evaluate the health impact of air sealing, controlled ventilation, and spot humidification on reducing viral spread in schools.[25]

How recent applied R&D focused on "Healthy Buildings" (including R&D formerly titled "Healthcare partnerships") is impacting 2021-2023 resource acquisition plans:

In 2021–2023, Efficiency Vermont will partner with healthcare providers to receive referrals for Healthy Home Energy Visits and indoor air quality monitor loans to test the potential for these services to engage customers in energy-plus-health improvement projects and behavior change. Interested customers will receive further referrals to EEN Healthy Homes contractors for comprehensive Healthy Homes energy assessments and energy-plus-health home performance projects. Efficiency Vermont will also support the Department in a statewide weatherization plus health pilot program. Additionally, Efficiency Vermont will continue to increase customer awareness of the connections between energy efficiency, building performance, and occupant health.[26]

Efficiency Vermont will share research findings with school administrators and facility managers to better equip them with information regarding the healthfulness of school buildings. Efficiency Vermont will include carbon dioxide ventilation sensor calibration checks in the school controls preventive maintenance program and will encourage ongoing indoor air quality monitoring.

Resilience Investigations:

Efficiency Vermont will continue researching resilience investments such as phase change materials, thermal envelope, storage, microgrids, direct-current power supply, artificial intelligence, controller programs, renewables, and cybersecurity for customers.[27] Efficiency Vermont will add new projects supporting resilience such as developing a large-scale vehicle-to-grid modeling plan in partnership with the distribution utilities (e.g., town-wide, commercial fleet, transit hub, or prominent workplace), and researching innovative non-electrochemical (i.e., not lithium ion) storage opportunities. The goal will be to identify energy-related design decisions on resilience, and to optimize building energy use. The outcomes of this project will help guide future summer and winter peak demand savings programs and thermal and electric savings programs.

How recent applied R&D focused on "Resilience Payback" is impacting 2021-2023 resource acquisition plans:

[25] The final report for research conducted in 2020 is available at https://www.efficiencyvermont.com/news-blog/whitepapers/healthy-buildings-vermont-2020.

[26] The final report for research conducted in 2019 is available at https://www.efficiencyvermont.com/news-blog/whitepapers/healthy-homes-vermont-2019. The final report for research conducted in 2020 is available at https://www.efficiencyvermont.com/news-blog/whitepapers/healthy-homes-vermont-2020.

[27] The final report for research conducted in 2020 is available at https://www.efficiencyvermont.com/news-blog/whitepapers/energy-resilience-return-on-investment.

[28] See the discussion (above) for how the following applied R&D projects are impacting 2021-2023 resource acquisitions plans: GHG reduction, Healthy Buildings (this includes the R&D formerly titled "Healthcare partnerships") and Resiliency Investigations.

The results of past projects will inform technical assistance to customers who are looking for behind-the-meter energy resilience solutions and want to identify a system configuration that will serve resilience goals and meet economic goals. The calculation tool will help customers identify the variables that affect the payback, including advising on energy efficiency efforts to reduce overall costs, and will provide the framework for providing customers with technical assistance to evaluate the technology options.

Justice: Efficiency Vermont will explore opportunities for enhancing diversity, equity, and inclusion in programs. Efficiency Vermont will combine existing datasets to estimate portfolio performance, review program designs for enhancing just and equitable outcomes, and research and pilot new equity metrics for one or more efficiency programs.

Efficiency Vermont will assess available tools for improving program design to drive participation, and to enhance intake, survey, and evaluation resources to collect additional data to quantify program outcomes. The project will seek to identify diversity, equity, and inclusion metrics that can be quantified from existing and new data sets to further track project impacts on marginalized groups including BIPoC communities, low-income residents, youth, the elderly, recently arrived immigrants, those with limited English proficiency, people with disabilities and/or the homeless. The project will collaborate with customers and stakeholders to understand and evaluate their perspective and prioritization of these metrics. For example, Efficiency Vermont may partner with a business with high economic impact in a local community to assess the justice-related societal impacts of an efficiency project located at the business on the greater community. Another example is exploring the affordability versus liquidity for low income households to purchase electric vehicles and other capital-intensive efficiency measures.

How recent applied research and development projects are impacting 2021–2023 resource acquisition plans:[28]

Emerging Data Services

Description: Emerging data services efforts explored new approaches and technologies showing promise for increasing energy savings, decreasing delivery costs, and strengthening customer engagement and satisfaction. This work enabled Efficiency Vermont to continue leveraging Vermont's investment in smart grid infrastructure, connected devices, inexpensive submetering technology, and other emerging data innovations. It also permitted unique information technology investments in research and development that improve Efficiency Vermont's ability to manage large and complex data resources and to build systems that use data to help achieve energy savings goals. This exploration involved three basic scenarios that could lead to transformation in the ways energy services are provided: 1) investigating novel data applications for which no prior research exists; 2) analyzing an emerging data application for which prior research exists; and 3) creating applications to be supported under RA or the core business software applications DSS budgets.

In 2021–2023: Efficiency Vermont will leverage research and development previously conducted in smart grid infrastructure, connected devices, inexpensive submetering technology, and other emerging data

[28] See the discussion (above) for how the following applied R&D projects are impacting 2021-2023 resource acquisitions plans: GHG reduction, Healthy Buildings (this includes the R&D formerly titled "Healthcare partnerships") and Resiliency Investigations.

innovations to inform and deliver expanded RA services, including data analytics services (Section 4.7). Particular work includes the use of Advanced Metering Infrastructure (AMI) data to inform program and incentive design, customer insights, whole building efficiency evaluation, and focused outreach through the analysis of energy characteristics.

Demand Response Capability and Effectiveness Assessment

Description: This project involved coordinating with the Department and distribution utilities to review and finalize a catalog of demand response measures commissioned by the Department. Efficiency Vermont, the Department, and distribution utilities wanted to assess the potential value—for ratepayers, distribution utilities, and the grid—of combining energy-efficient approaches with demand response–capable equipment. The project began with a thorough literature review of demand response measures and continued with identification (in partnership with one or more distribution utilities) of efficient consumer products, energy management systems, and commercial equipment with demand response capabilities and applicability in Vermont, and assessment of consumer informed-consent standards relevant to demand response–capable equipment. Utility partners then tested the capabilities and reliability of controlling residential technology. One pilot conducted in partnership with Washington Electric Co-op (WEC) tested both electric resistance and heat pump water heater demand response abilities. Efficiency Vermont supported WEC in exploring the addition of new electrification efficiency measures for the demonstration, such as electric vehicle charging equipment and cold climate heat pumps, analyzing the measures' ability to respond to demand events and their flexibility in supporting the grid during times of constraint, as well as overall management for greater beneficial outcome. The outcomes of this project will guide future summer and winter peak demand savings programs.

In 2021–2023: After the 2018 literature review, Efficiency Vermont and Washington Electric Co-op partnered on a two-year (2019-2020) project named PowerShift, which sought to demonstrate the potential for water heaters and electric vehicle chargers to function as "virtual batteries." The 2019–2020 final report is available here https://www.efficiencyvermont.com/news-blog/whitepapers/research-development-2019-2020-final-report-for-powershift. The success of this demonstration project led Efficiency Vermont to include a Flexible Load Management (FLM) program in its 2021–2023 Demand Resources Plan. The 2018–2020 Demand Response Capability and Effectiveness Assessment was the springboard that enabled the newly minted portfolio of FLM measures that will be implemented alongside and in coordination with Efficiency Vermont's distribution utility partners in 2021–2023. See section 4.7.1 for more information on FLM services.

Deeper Energy Savings through Advanced Regression Modeling

Description: Efficiency Vermont worked with commercial, industrial, and small business customers to explore the benefits of using advanced machine learning modeling tools to capture energy savings. These tools provide higher accuracy than conventional linear regression modeling but tend to be more opaque. The goal of this project was to determine whether the savings measured by these methods were significantly better than what could be captured using linear regression modeling. Efficiency Vermont also explored the most effective ways to make these "black box" methods interpretable to a large audience, as well as the most effective approaches for communicating the results to customers. The results of this research helped inform Efficiency Vermont's continuous energy improvement (CEI) RA programs as well as its FCM savings calculations.

In 2021–2023: Initial results demonstrate that these approaches provide significantly better accuracy and lower uncertainty than Efficiency Vermont's existing regression modeling approaches. These tools would allow Efficiency Vermont to calculate facility savings more precisely, with a lower margin of error. Once the validity of these approaches has been confirmed in the TAG review process, Efficiency Vermont will begin using these methods to calculate energy savings for CEI cohort members, pay-for-performance customers, and FCM enrollees.

Phase Change Materials in Refrigeration

Description: Efficiency Vermont worked with customers to deploy phase change material retrofit projects for refrigeration efficiency. Phase change materials (PCMs) store energy in the form of latent heat. They are typically constructed with salt hydrates, paraffin, or some other bio-material. When the PCM changes from a solid to a liquid, it absorbs and stores heat energy from the outside air. When it changes from a liquid to a solid, it releases that energy back into the air. The goal of the project was to determine the design, cost, and performance considerations for this new technology, including how the technology can impact time-of-use energy consumption. The outcomes will help guide future summer and winter peak demand savings programs.

In 2021–2023: Phase change materials are becoming popular nationwide and have emerging opportunities in efficiency, greenhouse gas reduction, and FLM. Efficiency Vermont may incentivize PCM refrigeration units with known energy savings.

5.3 Planning and Reporting

Annual Plan

This initiative complies with requirements in the *Process and Administration of an Energy Efficiency Utility Order of Appointment* document. Efficiency Vermont will prepare and submit to the Commission an annual plan by November 1 prior to each plan year. The Annual Plan initiative involves the planning and development of filed documents and tasks associated with coordinating plans with the Department, and preparing and presenting plans to the Commission. Annual Plan primary activity includes:

- Gathering data and compiling final narratives, spreadsheets, and other pertinent data to be contained in the final document
- Creating for and delivering a presentation to the Commission
- Coordinating with the Department.

Demand Resources Plan (DRP)

The DRP for the 20-year electric and 10-year TEPF efficiency forecasting periods involves:

- The development and submission of a comprehensive DRP proposal to the Commission
- Preparation and review of yearly budgets and energy savings goals for electric and TEPF activity
- QPIs to measure EEU results for the 2024–2026 performance period
- Preparation and review of plans and budgets for DSS activities
- EEU compensation and performance award structure
- Development and review of EEU compensation.

The Commission's triennial DRP Proceeding (DRPP) is a public process in which the DRP will be determined by a PUC order. The proceeding involves public workshops to facilitate stakeholder, Department, and EEU input, and public dissemination of information and data used to establish the DRP. The proceeding can involve consideration of new market realities and technologies, subject to discussion among the Commission, Department, the EEUs, and stakeholders.

Efficiency Vermont will undertake the work of modeling 20-year projections of the electric energy efficiency savings and 10-year projections of the thermal energy efficiency savings expected from system-wide programs. Efficiency Vermont will provide the Commission, the Department, and Vermont's utilities with these savings projections. During the DRP process, Efficiency Vermont will engage in efforts regarding the following:

- The establishment of annual budgets and energy savings goals for electric and TEPF resource acquisition activities in the 2024–2026 performance period
- QPIs to measure EEU results for the 2024–2026 performance period
- Plans and budgets for DSS activities
- Compensation and performance award structure.

Vermont System Planning Committee Participation

As a participant in the VSPC and pursuant to the Memorandum of Understanding (MOU) in Docket 7081, Efficiency Vermont staff attend meetings and assist in fulfilling subcommittee charters. Efficiency Vermont supports the VSPC in its effort to provide formal input to Vermont's electric transmission organization, Vermont Electric Power Company, in the development and review of the Vermont Long-Range Transmission Plan. Efficiency Vermont also provides expertise on such topics as non-transmission alternatives and the planning of geographic targeting for energy efficiency initiatives. VSPC involves Efficiency Vermont staff participation in VSPC quarterly and subcommittee meetings and Efficiency Vermont staff data analysis, research, collaboration with subcommittee members, and presentations at VSPC meetings.

Independent System Operator–New England (ISO-NE) Forward Capacity Market (FCM) Administration

Efficiency Vermont will continue to represent the interests of Vermont ratepayers by participating in the ISO-NE FCM, in which energy efficiency savings are bid as a resource for the regional grid.

Efficiency Vermont will prepare and submit bids to provide capacity savings as an electricity demand resource in FCM auctions. Activities will include capacity forecasting, resource qualification, bid development, and auction bidding. Efficiency Vermont will track and report resource development, submit claims during capacity delivery periods, deliver reports to ISO-NE and Vermont stakeholders, and undertake all other activities required to support this market participation.

Efficiency Vermont will perform all necessary administrative and fiscal activities associated with these responsibilities, including budgeting and revenue forecasting. Efficiency Vermont will also continue to participate in rule-making processes established by ISO-NE regarding the establishment and operation of the FCM and other responsibilities associated with being a participant in the New England Power Pool.

Net revenues generated from FCM auctions are directed into Efficiency Vermont's TEPF programs and services.

External Reporting
This function captures all required regulatory reporting costs associated with Efficiency Vermont activity. Efficiency Vermont submits these reports (and other relevant material) to the Department and the Commission:

- The Annual Savings Claim—submitted each spring
- The annual highlights brochure—submitted each spring
- The Annual Report—submitted each fall
- Quarterly reports
    - Spending and Performance Status
    - Budget Variance Report
    - Activity Highlights
    - Program Change Notice
- Voice of the Customer reports—submitted each quarter
- Annual budget variance reports
- Ad hoc reporting requests
- EEU audit requests
- Financial component of the EEU Overall Performance Assessment.

External reporting activity primarily involves:

- Drafting narratives, spreadsheets, and other data to be contained in reports
- Coordination with the Department on changes or questions
- Final review, production, and distribution of hard and electronic copies.

External Non-Regulatory Reporting
Efficiency Vermont external non-regulatory reporting involves:

- Community energy reporting (for example, Energy Action Network reporting)
- Utility data analysis and reporting, and efficiency savings reporting, to support Vermont's growing regional and municipal level energy planning needs
- ISO-NE FCM and Regional Greenhouse Gas Initiative (RGGI) reports related to revenue, spending, and benefits
- Regional and national reporting of Efficiency Vermont results (ACEEE, NEEP, DOE, etc.)
- Additional support of Vermont distribution utility tracking and reporting, including requirements specified under Vermont Act 56's Renewable Energy Standard Tier III provisions, including:[29]
    - Negotiating and executing annual MOUs for program design, work scope, customer outreach, and shared savings
    - Coordinating performance feedback and program adjustments
    - Attending workshops and procedures related to these activities, sometimes requiring legal assistance and/or representation

[29] The estimated cost for these activities is less than $52,000 annually over the three-year performance period.

- Designing and conducting database modifications and maintenance to enable internal and external reporting for Efficiency Vermont and distribution utilities
- Processing the utility portion of incentives and rebates for shared measures

5.4 Evaluation

Evaluation work supports Efficiency Vermont's compliance with the Ongoing Monitoring, Savings Verification, and Evaluation requirements in the *Process and Administration of an Energy Efficiency Utility Order of Appointment* (P&A) document. Efficiency Vermont engages in several evaluation-related activities to meet these requirements and ensure the accuracy of the program's reported savings claims, including:

- Working with the Department and its third-party evaluation contractors as they conduct their annual savings verification to review Efficiency Vermont's initial savings claim in order to certify annual performance and progress toward meeting QPIs.
- Participating in the Technical Advisory Group with the Department, Burlington Electric Department, Vermont Gas Systems, and other stakeholders. The Technical Advisory Group: 1) reviews and approves the methods and associated assumptions underlying measure savings calculations contained in the Technical Reference Manual (TRM); 2) functions as a general forum for technical issues related to EEU savings claims and methods; 3) resolves issues arising from annual savings verification; and 4) is a proactive mechanism for developing energy characterization and savings calculations.
- Maintaining and updating the TRM, which characterizes energy-saving measures based on several parameters: Annual electric savings, annual coincident peak savings, annual fossil fuel energy savings, incremental costs and measure lives, and other applicable resource savings such as water savings and operational and maintenance cost savings.
- Performing metering, monitoring, and evaluation activities related to ISO-NE FCM participation, which enables revenue generation supporting the majority of TEPF funding.
- Conducting quality management activities that align with Efficiency Vermont's SQRP. Quality management will support SQRP-related QPI compliance and continuous improvement activity. Efficiency Vermont's SQRP establishes performance standards and supports associated reporting requirements for its energy efficiency services. Under the SQRP, Efficiency Vermont is committed to meeting or exceeding performance metrics in four service categories: 1) general customer satisfaction (surveys are performed every three years by independent, third-party research professionals); 2) project customer satisfaction (in-house surveys are performed upon completion of projects); 3) incoming call responsiveness (all calls received each quarter are monitored automatically in terms of answer time and percentage of calls answered or abandoned); and 4) complaint rate and resolution. Efficiency Vermont tracks SQRP satisfaction and performance data closely to monitor process health, identify performance gaps, and evaluate trends in interest and satisfaction.

2021–2023 Portfolio-Wide Evaluation Activities

Annual Savings Verification

Savings verification involves coordinating and carrying out the annual evaluation of Efficiency Vermont's reported savings and other performance metrics. The Efficiency Vermont evaluation, measurement, and

verification team fulfills this scope, coordinating with the Department and third-party evaluation contractors. Annual savings verification has three tasks:

- Savings preparation—involving data collection from the Efficiency Vermont database and creating a savings sample plan
- Savings review—involving receipt, review, and feedback on preliminary project reports from the Department
- Savings finalization—involving a final conference to resolve any outstanding program or project issues, and issues and developing a "realization" spreadsheet to be applied to Efficiency Vermont's database.

Technical Advisory Group (TAG)

The TAG consists of representatives from the Department, Vermont's EEUs, and other stakeholders. It reviews and approves the methods and associated assumptions underlying measure savings calculations in the Technical Reference Manual. In addition, TAG has functioned as a general forum for technical issues related to EEU savings claims and methods. TAG also resolves issues that arise from annual savings verification and is a proactive mechanism for developing energy characterization and savings calculations.

Efficiency Vermont anticipates that work in the TAG will fall primarily into the following areas:

- TAG Coordination: TAG coordination consists of scheduling monthly meetings, updating the TAG tracker, and coordinating communications around proposals and responses.
- Review and Approval of TRM Measure Characterizations: Efficiency Vermont staff members submit proposals for new measure characterizations via TAG. The Department and other relevant stakeholders review these characterization drafts and agree on measure assumptions and savings estimates before incorporating new measure characterizations into the TRM. This coordination and collaboration can involve general scoping meetings, measure research, and surveys that provide information to shape programmatic proposals.
- Savings Verification Recommendations: TAG tracks issues that arise from annual savings verification, including recommendations for process improvements and updates to savings characterization and calculations.
- Program Implementation Procedures: For measures or programs that require a more comprehensive review of savings delivery methodology, EEU program staff document program implementation details and explain inputs and methods used to calculate savings. External evaluators and other stakeholders use these documents to understand how a program or measure works, so that they can evaluate the savings claim accordingly.
- Adjustments Due to Outcomes: Assumptions and measure characterizations in Efficiency Vermont's savings database and energy analysis tools need to be modified and revised after the Department and Efficiency Vermont reach agreement. This activity is a collaboration among Efficiency Vermont information technology, operations, and technical staff.

The TAG may also explore issues related to EEU savings claims and methods not directly covered by the five TAG categories.

Technical Reference Manual

The TRM provides reliable, standard savings values for prescriptive efficiency measures. The TRM scope of work is based on frequent, rigorous TRM review during the three-year performance period, in the

context of new measures designed to support program efforts and updates of existing measures to reflect changes in standards, technology, costs, and other factors. TRM work is broken down into the following categories:

- TRM Management: This activity involves managing submission of measure characterizations and updating the TRM road map to track TRM updates related to program changes and reliability. Managing the TRM also involves the re-characterization of measures and savings methods to be applied to Efficiency Vermont's prescriptive tools for savings upload and calculation.
- TRM Development and Research: Revisions to the TRM reflect research in new technologies and changing market conditions. All measure characterizations require considerable research, ensuring that assumptions accurately reflect the most current savings determination methods that incorporate efficiency evaluation findings from other states and those at the national level.
- TRM Reliability: This activity involves the annual updating of existing measure characterizations, based on findings during savings verification. It also involves changes to baselines or potential market transformation as a result of new evaluations. All measure characterizations receive a review and reliability update, as necessary, at least once every three years.
- TRM Review: Efficiency Vermont internally reviews all updated TRM measure characterizations prior to submitting them to the Department for comment and approval. The review group is composed of technical staff, planning and development managers, and subcontractors.
- TRM Meetings and Workshops: These meetings, between Efficiency Vermont and Department staff, are convened as needed for in-depth discussions, separate from the normal TAG review process. Efficiency Vermont assumes the historical frequency of these meetings will persist through the performance period and throughout the respective forecasts.
- TRM Pilots: To develop measure characterizations for new technologies where no readily available data on energy performance exist or where there are conditions of variable savings and a high degree of uncertainty, Efficiency Vermont might conduct pilot measurement and verification studies to gather the information necessary to accurately estimate savings.

ISO-NE FCM Metering, Monitoring, and Evaluation

Efficiency Vermont participates in the New England Power Pool market via the ISO-NE FCM. It's performance in this market is measured and verified via a collaborative effort between Efficiency Vermont and a Department- appointed consultant. The majority of the ISO-NE FCM metering, monitoring, and evaluation work involves development and execution of triannual sampling plans for small, medium-sized, and large Efficiency Vermont custom business projects, and consists of the following four activities:

- Measurement and Verification: Efficiency Vermont creates and reviews metering plans to ensure that Efficiency Vermont uses the correct approach for the selected large projects identified in the sampling plan. This implementation begins with the development of an initial sampling plan representative of the entire Efficiency Vermont portfolio. Subsequently, metering plans are developed and reviewed to ensure that the correct approach is implemented for the projects in the sampling plan. Activities entail implementing the metering plan, installing meters on customer equipment, verifying installed equipment models and quantities, run hours, documenting non-route adjustments, collecting metered data, and removing the meters.
- Measurement Review and Analysis: All project meter data undergo review for reliability and validity. This includes analyzing meter data at intervals varying from 1 to 15-minute intervals across a season, with two weeks to six months of data pre and post meter installation depending

on the type of measure. Additionally, a review of engineering assumptions and measure characterizations is undertaken when required.

- Measurement and Verification Finalization: As in the annual savings verification process, realization rates are calculated and are applied to power (kW) reductions claimed in Efficiency Vermont's savings database. Efficiency Vermont analysis tools might be amended to reflect updated measure assumptions.
- Equipment and Calibration: Efficiency Vermont purchases metering equipment to conduct testing and analysis of projects identified in the sampling plan. All equipment used is purchased and maintained to an accuracy level necessary to ensure adherence to ISO-NE requirements.

Recent Evaluation Activities Impacting 2021–2023 Resource Acquisition Plans

2021 Program Year Savings Verification

Description: In order to certify achieved savings toward Efficiency Vermont's performance goals, the Department is required to verify the energy, coincident peak, and TRB savings claimed by Efficiency Vermont on an annual basis. For the 2021 savings verification, the Department contracted with Cadmus to conduct these verification efforts. Cadmus reviewed the preliminary savings claim put forward by Efficiency Vermont, including the program tracking database and sampled project data, in order to develop realization rates for energy (kWh), winter and summer peak demand reduction (kW), and thermal savings (MMBtu).

Evaluation Activities: The savings verification evaluation is primarily a paper review. Cadmus reviewed sampled project files and an extensive database of claimed measure data to verify that savings values and calculations had been applied correctly, and to calculate evaluated savings that incorporated any necessary corrections. The evaluation did not include conducting surveys or site visits to verify the installation or correct operation of products or to verify baseline conditions. Similarly, no metering was performed, though the evaluation used available AMI data to verify and adjust savings where practical for evaluated custom commercial and industrial projects.

Evaluation Results: Evaluation results showed relatively few errors in Efficiency Vermont's savings claim, with realization rates of 97.1% for kWh, 99.5% for winter kW, and 95.8% for summer kW. MMBtu realization rates for TEPF-funded measures were evaluated at 99.7%. In addition to the realization rate results, Cadmus provided several recommendations to further improve savings documentation and the program process moving forward. These recommendations focused on Efficiency Vermont's custom projects, prescriptive measures, and database:

- *Custom Projects*
  - Consistently collect invoices for installed equipment
  - Consistently document baseline equipment and operating conditions
  - Document existing equipment and operating conditions
  - Avoid use of TRM assumptions
  - Improve post-installation measurement and verification
  - Consistently provide thorough overview documentation
  - Simplify and clarify appropriate use of load shapes.
  - Continue to improve clarity of analysis files and calculation workbooks for all projects.

    - Use more robust methods to determine compressed air leakage savings
- *Prescriptive Measures*
    - Ensure database values allow as many significant digits as the TRM
    - Increase rigor in applying the TRM methods when practical.
- *Database Review and Generation*
    - Update database documentation.

Following verification of results and the finalization of realization rates for the 2021 savings claim, Efficiency Vermont applied the savings adjustments to its project tracking database to develop a final verified savings claim. Efficiency Vermont has also been focused on reviewing the evaluation recommendations and implementing improvement processes to address these issues. Ongoing continuous improvement efforts include training sessions on the custom project process and documentation best practices for engineering staff, development of custom project analysis guidelines for inclusion in future program documentation, updates to TRM measures where applicable, and a streamlined process for the transfer and documentation of claimed program savings. These efforts are expected to continue into the 2021–2023 performance period.

Evaluation of Continuous Energy Improvement

Description: Efficiency Vermont launched a CEI pilot in late 2013. The pilot targeted energy savings for large account managed commercial and industrial (C&I) customers through the implementation of energy management programs in customer facilities. Following the Consortium for Energy Efficiency Strategic Energy Management Minimum Elements, pilot participants committed to operational and facility management changes focused on effectively and continuously improving their energy performance.

The Department contracted with Cadmus to conduct an evaluation of the pilot with the following research objectives:

- Measuring savings for program participants
- Verifying Efficiency Vermont's estimates for site-specific operations, maintenance and behavior; capital measures; and total pilot savings
- Assessing savings persistence
- Measuring the pilot's overall cost-effectiveness
- Assessing customer satisfaction and the perceived value of the program
- Developing recommendations for improving the pilot data collection, measurement and verification (M&V), and impact evaluation approaches
- Identifying potential operations, maintenance and behavior savings for future program planning.

Efficiency Vermont recruited pilot participants using a cohort model, with customers attending joint training and information sessions throughout their pilot participation. Cadmus's evaluation efforts included review of customer activities and savings for the 2014 cohort of large C&I managed customers and the 2015 cohort of dairy manufacturers, which had a refrigeration technology focus.

Evaluation Activities: The evaluation conducted by Cadmus included a review of energy savings, interviews with Efficiency Vermont staff and program participants, and a cost-effectiveness analysis for the program.

Evaluation Results: The evaluation found an electric realization rate of 98%, concluded that the pilot was cost-effective assuming a two-year measure life, and found a high level of customer satisfaction. Cadmus did not recommend any changes to Efficiency Vermont's savings estimation process, but did provide several recommendations for improving program implementation and customer engagement, including:

- Improving modeled savings and data collection
- Changing the assumption of CEI measure life from one to two years
- Developing a list of technical advisors and experts in order to improve Efficiency Vermont's response to participant questions and level of technical support
- Creating Webinars to share participant lessons learned
- Making improvements to year-end process and savings claim reporting
- Support for the cohort model.

The evaluation recommendations were used to transition CEI from a pilot to a part of Efficiency Vermont's program portfolio, with savings claimed in program year 2019. The study's findings and recommendations regarding savings calculations and persistence will continue to be applied to CEI efforts in the future.

5.5 Administration and Regulatory Affairs

General Administration

Efficiency Vermont incurs general administration costs in operating the statewide EEU. These costs involve Efficiency Vermont's senior management staff in preparing for and administering general staff meetings; coordinating program implementation; and managing, monitoring, and internally communicating overall performance and spending. General Administration activities include:

- Creating and executing cost allocation contracts with the other two EEUs
- Participating in the required EEU overall performance assessment
- Participating in the annual EEU financial fund audit
- Directing and carrying out confidential information management systems staff training and stewardship
- Efficiency Vermont management and staff meetings
- Staff and organizational communications
- RA and DSS budget management
- Annually calculating and proposing energy efficiency charge (EEC) rates for the upcoming year using the Commission-approved methodology.

Regulatory Affairs (Non-DRP Proceeding)

Efficiency Vermont's Regulatory Affairs department is responsible for:

- Working with the Department to write, revise, and maintain governing documents necessary for the EEU to operate as a regulated utility
- Participating in Commission proceedings that affect energy efficiency implementation in Vermont, including proceedings determining avoided costs and Vermont screening values,

proceedings related to the RGGI and FCM, OPA proceedings, VSPC proceedings, AMI activity, and Act 62 proceedings[30]

- Reviewing and advising on regulator-required, coordinated services and initiatives with the other Vermont EEUs and weatherization assistance program agencies to provide seamless, cost-effective, statewide energy efficiency programs
- Overseeing VEIC interactions in the regional energy markets to ensure regulatory compliance and to help secure financial benefits from energy efficiency in New England
- Working closely with RGGI Inc. to help inform its Model Rule, report GHG reductions as a result of Vermont's RGGI-funded programs, and help maximize efficiency benefits from regional cap-and-trade activity
- Developing and supporting policy instruments that can be useful tools for electricity and TEPF savings through voluntary action or government adoption
- Researching regulatory policies to support best practices for efficiency programs, to enable continuous improvement in Efficiency Vermont's services, and to support Vermont's prominence as a national leader in energy efficiency ideas and practices
- Pursuing regulatory approval of flexible and robust strategies to cost-effectively avoid or control capacity and energy supply, in support of electric distribution utility integrated resource planning
- Reviewing and providing guidance on Efficiency Vermont internal policies to ensure regulatory compliance
- Managing regulatory requests for data, analysis, and comments
- Participating as a party in the review of triennial distribution utility integrated resource plans, annual energy transformation plans, updating of avoided costs, and all other Commission-opened proceedings that could affect energy efficiency service delivery.

Public Affairs

Efficiency Vermont's Public Affairs work supports participation in important energy and policy discussions in Vermont. The work in this subcategory also involves public outreach to provide full and timely information regarding Efficiency Vermont's work and customers. This participation occurs across a wide range of activity:

- Working with government officials, regulators, businesses, and community organizations as a resource for information about energy, efficiency, and the EEU
- Responding to requests for briefings from stakeholders including the Vermont General Assembly, other government officials, and other energy efficiency partners and constituencies
- Analyzing federal legislation and how it impacts the energy efficiency landscape in Vermont. This includes responding to requests for information and briefings on this topic from the Vermont General Assembly, other government officials, and other energy efficiency partners and constituencies.
- Assisting with the review and development of policy proposals related to the Efficiency Vermont scope of work
- Drafting papers, blog posts, and social media copy on major Efficiency Vermont initiatives
- Engaging with potential partners and stakeholders to expand the influence of Efficiency Vermont's customer programs

[30] On July 1, 2019, Act 62 of the 2019-2020 Vermont legislative session went into effect. Section II of Act 62 requires the Commission to conduct a proceeding which the Commission opened by Order issued July 11, 2019, in Case No. 19-2956-INV.

- Presenting information about Efficiency Vermont at public forums and meetings.

In these ways, Efficiency Vermont can add to an understanding among policymakers and the public about the broad policy, statutory, and regulatory bases for the EEUs' work, and about the services and benefits Efficiency Vermont provides to ratepayers.

5.6 Information Systems

Core Business Software Applications

Core business software applications enable Efficiency Vermont program delivery and value through the development, maintenance, and integration of software applications and associated database systems. The chief priority is to design and maintain the mission-critical energy savings system of record used daily by nearly all Efficiency Vermont staff. The system involves the primary tracking database application, as well as the software necessary to develop energy savings estimates; to track measure, project, and customer information; and to upload those that data into the tracking system. Other priorities involve a broad range of functionalities enabling Efficiency Vermont to plan, analyze, and manage portfolio, program, customer, measure, and energy data—as well as modernization and integration of Efficiency Vermont's line of business software applications with the goal of improving process efficiency and the external customer experience. Essential activities include:

- Development, maintenance, and support of existing and new software applications, in response to changes in program delivery methods, tracking and reporting, and other user, partner, vendor, or regulatory requirements
- Requirements, analysis, and application road-map planning
- User training and documentation
- User support and issue intake, bug fixes, and developer on call on-call developers
- Integration of third-party software solutions
- Participation in data security initiatives.

Utility Data Management

A central repository of distribution utility data allows Efficiency Vermont to fulfill its responsibilities as an EEU. Department-mandated tracking of efficiency measure installations and evaluations could not be achieved without the integration of Vermont distribution utility data into the tracker database and existing business processes. Many of Efficiency Vermont's performance metrics rely on the availability of accurate and up-to-date electric utility billing data (customer and monthly usage). Construction and maintenance of dashboards and reports that track and report Efficiency Vermont's QPIs, including performance indicators and minimum performance requirements, rely on this information. Utility billing data allows Efficiency Vermont to both meet reporting objectives and better serve ratepayers. Utility account-level data is required to accurately attribute usage to a specific meter at a specific customer's premise and better estimate the outcomes and cost savings that a specific customer will achieve.

Billing data has become an essential part of project analyses, review, and savings verification, allowing for better coordination with both electric and gas DUs and EEUs. Utility data improves outcomes and allows Efficiency Vermont staff to better serve Vermont ratepayers. Improved utility data also enhances

customer relationships and provides many administrative efficiencies. Utility data acquisition, transfer, and management includes:

- Development and maintenance of utility data documentation such as EEU data transfer standards, data definitions, and data models
- Technical guidance and support activities related to Docket 8316
- Regular coordination and communication with 16 Vermont distribution utilities and Vermont Gas Systems to ensure iterative transfer of weekly, monthly, and quarterly billing data files
- Implementation of cybersecurity measures, privacy practices, and secure transfer protocols
- Management of billing data transfers (customer and monthly usage consumption) from Vermont distribution utilities
- Development and maintenance of custom integrations designed to standardize, clean, and ingest Vermont distribution utility billing data into Efficiency Vermont's database and data reporting warehouse.

Reporting and Business Intelligence

Data storage, management, and access are critical functions that support EEU operations and enable the continued success of all programs and services offered by Efficiency Vermont. As the volume of data and number of business software applications have grown, so has the need to provide scaled data systems and architecture to support this growth. Activities relate to management, analysis, and reporting of data that exists in Efficiency Vermont's various software applications, rather than development and maintenance of the software systems. In the 2021–2023 performance period, Efficiency Vermont's baseline activities will include:

- Data life-cycle management and database infrastructure and services (server database administration and management; data warehouse specification, design, and support; data acquisition and customer integration support; data governance and security)
- Regulatory and operational reporting (regulatory reporting maintenance and support; financial and budget reporting; portfolio, program, and initiative level reporting; data quality and integrity reporting)
- Business intelligence (working with Efficiency Vermont leadership and staff to analyze business processes, gather reporting requirements, and design and implement the required business intelligence solutions to meet the needs of the business and VEIC order of appointment).

6 Energy Efficiency Utility Funding

The Commission has specified that the funding sources for Efficiency Vermont's electric efficiency and TEPF services be separate and distinct. Electric services will be funded through the EEC, whereas TEPF services will be funded by a combination of Vermont's RGGI revenues and revenues generated by Efficiency Vermont's bidding of electricity capacity savings into the ISO-NE FCM. Additionally, in close coordination with utility partners Efficiency Vermont looks forward to launching and running the pilot enabled by Act No. 151 to utilize up to $2,000,000 of Efficiency Vermont EEC funds annually to help Vermont households and businesses reduce transportation and thermal costs, – the sectors that cost the most for customers and have the highest greenhouse gas emissions, while maintaining core services. (See

Section 4.10 for Efficiency Vermont's Act No. 151 Programs). Efficiency Vermont will strive to ensure that from the customer's perspective, the provision of services is seamless, regardless of the funding source.

TEPF services will support Vermont state energy policy goals as outlined in Section 581 of Act 92 (the Vermont Energy Efficiency and Affordability Act, enacted in 2008) and Vermont's Comprehensive Energy Plan. A key provision of Act 92 is improving the energy fitness of 80,000 homes. Although TEPF funding levels will not be sufficient on their own to achieve this goal, Efficiency Vermont will design its TEPF services to be scalable to levels consistent with these public policy goals.

7 Efficiency Vermont Budgets

Efficiency Vermont has historically been very focused on managing budgets, both RA and DSS, and has been successful in delivering benefits to Vermont households and businesses while doing so. Efficiency Vermont is committed to continue to operate efficiently and effectively, and to provide quality service at least-cost. Its performance-based compensation structure encourages greater savings at lower cost. The 2021-2023 Efficiency Vermont budgets are described in detail below.

7.1 Electric Efficiency Budgets

Electric Efficiency Budgets	**2018–2020**	**2021–2023**
Resource Acquisition	$131,061,107	$121,585,771
Development and Support Services	11,464,873	8,997,529[31]
Base and Performance Compensation	6,135,815	6,231,749
Total	**$148,661,795**	**$136,815,048**
Change		**(8.0%)**

Efficiency Vermont acknowledges that Vermont is making a significant investment in the services provided by Efficiency Vermont. The recent COVID-19 pandemic and State of Emergency in Vermont changed the overriding conditions of the State's economy and marketplace for efficiency activity in the near term as the impacts extended into the 2021-2023 performance period. Accordingly, electric efficiency RA budgets were developed with a sensitivity to the economic concerns of Vermont households and businesses; the budgets sought to stabilize the EEC rates.

To maintain a high level of RA performance with flat year-over-year annual budgets in the 2021-2023 period, Efficiency Vermont will find internal efficiencies throughout its operations that offset inflationary costs for labor and expenses for the performance period. Efficiency Vermont estimates that it will need to find efficiencies of approximately 2% per year in the RA budget to offset the cost of inflation. The DSS budget includes a 22Yes% budget reduction in 2021-2023 compared to the budgets in 2018-2020,

[31] The 2021-2023 electric DSS budget was updated pursuant to the Commission's 6/22/22 Order in 22-0946-PET approving unspent 2021 electric DSS funds to be applied as a credit to 2022 EEC rates.

necessitating additional operational efficiencies and other adjustments (discussed in Section 7.3). Efficiency Vermont is up to this challenge and takes seriously its responsibility for fiscal prudence.

As Efficiency Vermont will be showing in its forthcoming 2021 Annual Report, Vermont households and businesses will collectively save more than $$179 million over the lifetime of their 2021 investments in efficient equipment and buildings.[32] Additional benefits appear to customers through lower electricity bills, reduced capacity charges in wholesale electricity prices, reduced transmission and distribution costs through deferral of new infrastructure development, and societal and health benefits achieved through cleaner air and healthier buildings. Efficiency Vermont has a long history of reducing energy bills for customers and enhancing local economic development through strong trade ally relationships. All customer classes have access to Efficiency Vermont programs and services: residential customers of all income levels as well as small, medium-sized, and large commercial, industrial, and institutional customers.

Efficiency Vermont projects that the energy efficiency resource being provided to ratepayers today through its services is sustainable over the long term, and creates significant quantifiable benefits. The scale of Efficiency Vermont programs and customer services today is well suited to the needs of the market in Vermont.

The 2021-2023 resource acquisition budgets contain four elements: energy efficiency, ESA pilot, FLM, and Act No. 151 Programs. The ESA budget enables participants to access their full EEC funds[33] for reimbursement of expenses related to qualifying energy efficiency projects at their sites. The FLM budget is restricted for use on projects that allow for load management and controls enabling lower-cost power purchases. The Act No. 151 Programs budget is also restricted for use on improving various aspects of transportation sector electrification, namely two focal points related to plug-in electric vehicle ("EV") market development: expanding current EV supply chain development efforts; and supporting consumer outreach and education. Energy efficiency is the core work completed by Efficiency Vermont in reducing energy (kWh), peak kW demand, and other energy and non-energy benefits for ratepayers. The three-year budgets for each element are as follows:

Electric Resource Acquisition	**2021-2023 Budget**
Energy Efficiency	$106,727,950
Energy Savings Account	$6,000,000
Flexible Load Management	$3,440,820
Act No. 151 Programs	$5,417,000
Total Electric RA Budget	**$121,585,770**

[32] This is based on Efficiency Vermont's2021 verified savings results approved by the Commission in its August 26, 2022 Order *Approving Efficiency Vermont's 2021 Savings Verification and Annual Performance Compensatio*, in Case No. 22-1108-PET.

[33] The net amount available to participants is the value after the payment of the Gross Receipt Tax (0.525%), the State Weatherization Tax (0.50%), and funding of the Department's EM&V work associated with ESA projects.

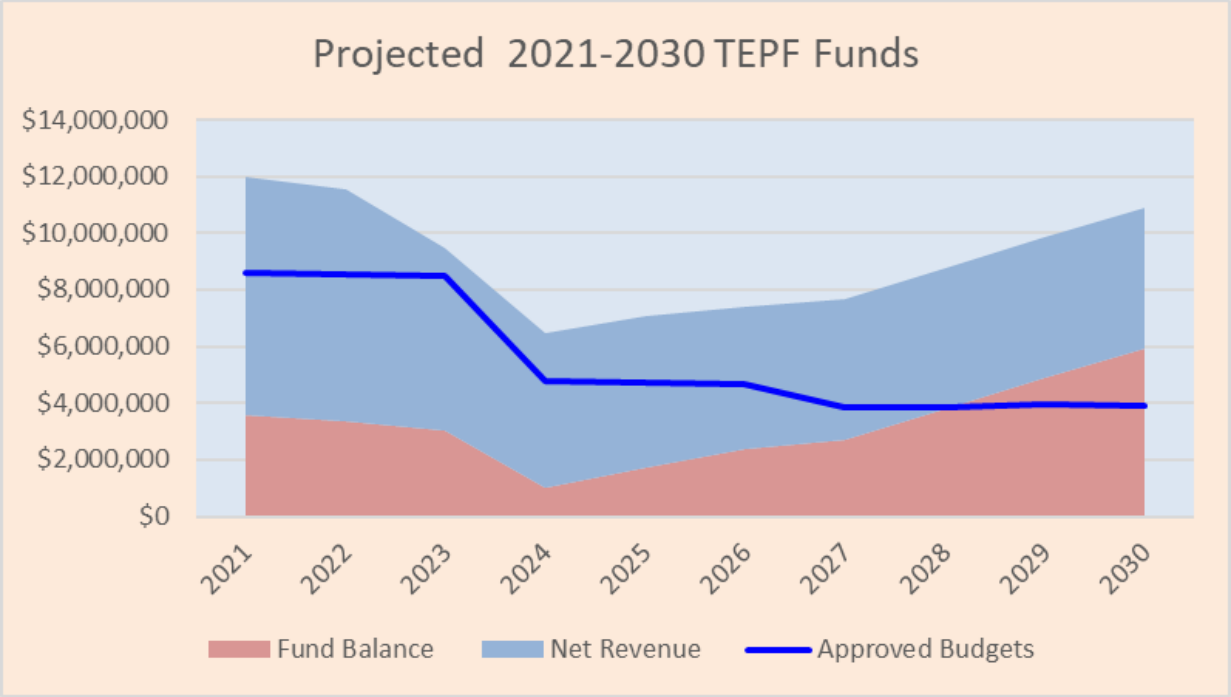
7.2 Thermal Energy and Process Fuels Budgets

Thermal Efficiency Budgets	2018-2020	2021-2023
Resource Acquisition	$26,500,000	$21,070,500
Development and Support Services	2,348,227	1,553,900
Base and Performance Compensation	1,298,170	1,132,908
Total	**$30,146,397**	**$23,757,308**
Change		**(21.2%)**

Efficiency Vermont's TEPF funding is composed of revenues from the RGGI and FCM auctions. There have been steady declines in auction prices—and, therefore, auction revenues—in recent years. This trend is forecasted to continue for the FCM revenues in the foreseeable future. RGGI prices rebounded in 2020, 2021, and 2022 and the Department's June 18, 2021 filing in Case No. 21-1616-PET increased the TEPF revenue forecast by nearly $500,000 per year for the 2021-2023 performance period. While this change reduced the downward revenue trends, it did not overcome spending reductions. The Commission approved 2021-2023 TEPF resource acquisition budgets fall by 21% as compared to 2018-2020. In developing its 2021-2023 performance period budgets, Efficiency Vermont assumed level RA funding across the 3-year horizon. The balanced budgets create a sustainable portfolio of programs and services that result in greater predictability for customers and across the marketplace. However, lower TEPF budgets have impacted Efficiency Vermont's ability to drive the weatherization market in Vermont during 2021-2023. If the adjusted revenue forecast materializes, and budgets are not adjusted, then Efficiency Vermont may not utilize all available TEPF funds by December 31, 2023. Remaining funds would therefore be used to supplement RGGI and FCM auction revenues in the 2024-2026 performance period.

The figure below illustrates the difference in annual revenue projections relative to Efficiency Vermont's budgets. Revenue projections reflect a steady decline between 2021 and 2027. While the budgets exceed revenue during 2021-2023, the gap in funding is filled from existing fund balances derived from excess revenues accrued during the 2018-2019 period. It is anticipated that fund balances will be approximately $1M at the end of 2023, so beginning in 2024, the budgets were developed to mirror the revenue Commission's approved forecast[34]. Unlike the electricity budgets, which did not account for inflationary factors in 2021-2023, the TEPF budgets include the impacts of a projected inflation rate of 2% annually.

[34] The approved budgets for 2027-2030 exclude Department evaluation and Efficiency Vermont compensation budgets which will be determined in future regulatory proceedings when revenue and budgets are updated.



Efficiency Vermont 10-year TEPF RA budget, relative to revenue projections

In response to stakeholder input regarding the prioritization of the continuation and expansion of weatherization services in the TEPF budget, Efficiency Vermont is aiming to prioritize weatherization in the TEPF resource acquisition budget by targeting 75% of available funding for residential and commercial weatherization activities. To achieve this spending target, the number of comprehensive single-family, multifamily, and commercial weatherization projects will be increased. Efficiency Vermont will also continue to support the organizational and workforce development infrastructure needed to ensure moderate-income customers have consistent access to weatherization.

7.3 Development and Support Services Budgets

There are six categories of DSS that support RA activity for Efficiency Vermont programs and initiatives. Within each DSS category are multiple initiatives and a total of 25 initiatives across all categories. Efficiency Vermont continues to reduce the budget for DSS where possible through efficiency improvements and careful scope planning. Efficiency Vermont has worked during the 2018-2020 period to streamline and reduce DSS costs, and this proposal reflects a continuation of those efforts and commitments. The DSS budgets have been reduced over the three-year period by approximately $3 million or 21%, from $13.8 million in the 2018–2020 period to $10.6 million in the 2021–2023 period.

To achieve the lower budgets, Efficiency Vermont reduced, eliminated or moved expenses from the DSS budget to the RA budget. Three sets of activities and budgets were shifted from DSS to RA including:

- Financial Leveraging – These activities have been moved to the RA budget to reflect the development of this initiative into one that encourages program participation and leads to

resource acquisition. Efficiency Vermont currently offers two financial products in partnership with local lenders: the Home Energy Loan (formerly called the Heat Saver Loan), and the Business Energy Loan. These products continue to be refined to ensure access and ease-of-use for customers as well as lenders.

- Emerging Data Services: This initiative moved from DSS to RA. The justification is that the systems maintained under this budget provide information, analysis, and insights about Vermont household and business energy usage and the conditions in which that energy usage exists, providing the data necessary to drive customer incentive and outreach targeting based on energy characteristics. These activities are better aligned with other resource acquisition activities.
- Advanced Metering Infrastructure costs:[35] AMI includes a number of activities essential to the storage, management and use of customer billing and AMI data to properly track and report customer participation in Efficiency Vermont programs and to provide insights central to program design and project-specific analysis. These costs are in direct support of the acquisition of customer savings.

Other notable changes include:

- Energy Literacy Project ("ELP"): Although the fundamental nature of the ELP work will remain the same for the 2021-2023 performance period, proposed budgets are approximately 34% less than the 2018-2020 budget. Efficiency Vermont will continue to provide the existing services with an eye on increasing its reach and impact in geographic areas with the highest energy burdens, and/or in K-12 schools with the highest percentage of students receiving free or reduced-price lunch. Efficiency Vermont and its contractor will collaborate to seek operational efficiencies through program and geographic coordination to optimize contractor staff time, including travel and other outreach activities as well as standardization, where appropriate, of curriculum development and delivery materials.
- General Public Education: The General Public Education budgets for 2021-2023 period are significantly reduced compared to 2018-2020 budgets. The focus of this work – primarily media and online outreach – is on the education of end-use customers. This budget funds labor costs associated with planning, content development and outreach, as well as production costs of educational materials, and is lower than the 2018-2020 budget. This is due to operational efficiencies such as utilizing standard tools and templates for production of content, updating and reusing existing content where appropriate rather than creating new, and reducing the scope of content to the most important and relevant topics. General education around specific technologies and/or improvements (i.e., cold climate heat pumps and weatherization) is increasing and is included in resource acquisition activities.
- Better Buildings by Design Conference: Beginning in 2021, Efficiency Vermont will have a goal of generating revenue from the conference equal to the costs necessary to deliver the conference. In other words, the goal is to be "revenue neutral" for the conference such that net DSS funds will not be necessary to bring this important and well attended education and training opportunity to participants.
- Evaluation: All initiatives in the DSS Evaluation category have reduced in cost based on efficiencies gained from the use of improved processes, tools, tracking, and reporting; better communication and collaboration with internal and external partners; and the benefit of increased staff

[35] In 2018-2020, these costs were billed to the DSS IT budget.

experience in the roles and responsibilities of this work. These improvements result in less time needed to accomplish stated outcomes.

- General Administration: Efficiency Vermont incurs general administration costs in operating the statewide EEU. These costs involve Efficiency Vermont's senior management staff in preparing for and administering general staff meetings; coordinating program implementation; and management, monitoring, and internally communicating overall performance and spending. The proposed budget for General Administration is 40% lower than the budget approved for 2018-2020. Efficiency Vermont continues to focus on reducing administrative costs. This is accomplished by reducing meetings where appropriate, reducing senior management staff time on administrative tasks where possible, relying on better communication systems, and providing clear and specific organizational direction that guides managers and junior level staff in their work.
- Regulatory Affairs (non-DRP): The Regulatory Affairs budget for 2021 and beyond is increased compared to 2018-2020 given the increased number and complexity of regulatory proceedings that are currently expected to be in process related to Efficiency Vermont. Increased regulatory agenda by both the Commission and Department, including studies required by the Legislature and the increased use of contested case formats, is resulting in additional necessary labor hours and expenses.
- Public Affairs: This budget has moved from the Education and Training category to the Administration and Regulatory Affairs category because the scope of work more closely aligns with administration and regulatory affairs rather than education and training

Through a combination of operational efficiencies, restructuring and reassignment of costs, Efficiency Vermont has been able to reduce the 2021-2023 DSS budget by approximately $3.2 million as compared to the 2018-2020 DSS budget.

7.4 Compensation

Efficiency Vermont is regulated as a performance-based utility, under an Order of Appointment issued by the Commission pursuant to 30 V.S.A. § 209(d)(5). VEIC is the entity appointed by the Commission to administer Efficiency Vermont. VEIC's total compensation structure for the administration of Efficiency Vermont and delivery of services contemplated in the Demand Resources Plan (DRP) is described in the Order of Appointment issued on February 12, 2016, in Docket 8455, Section III: Compensation. The compensation requirements stipulate, in part:

> The structure of VEIC's compensation for the provision of services and initiatives under this Appointment shall be composed of:
>
> A. Reimbursement of actual costs incurred (direct labor and expenses and allocation of eligible indirect and fringe costs) for both RA and DSS activities
> B. Performance compensation to be paid based on the attainment of QPI targets established under the DRP proceeding, from funds collected through EEC or other sources under the jurisdiction of the Commission and withheld from the budget for this purpose
> C. Operations fees that may be charged as a percentage of all or a portion of reimbursed costs, on both RA and DSS activities.

The performance award is calculated as a percentage of the total approved budget and sets the maximum financial award to which the Efficiency Vermont administrator is entitled for attainment of specific performance indicators. The role of the performance award is to create an incentive for achieving the quantitative and policy goals that are established in the QPIs (performance indicators [PIs] and minimum performance requirements [MPRs]). Beginning in 2021, Efficiency Vermont will have an opportunity to earn a portion of the performance award after the Commission's verification of Efficiency Vermont annual and three-year performance.

The operations fee is a fixed percentage of the total approved budget and is applied to all Efficiency Vermont expenditures[36]. In contrast to the performance award, the role of the operations fee is to provide financial stability to the operator of Efficiency Vermont in the years when performance awards are not distributed. The revenues received via its operations fee represent vital cash flow that enables the organization to efficiently administer Efficiency Vermont without increasing its credit lines. Lowering the cost of debt is directly beneficial to ratepayers. These revenues are also used by VEIC to further its public interest mission. An example of one of VEIC's mission-related activities is the VEIC Founders' Fund, which was launched in 2018 to allow the organization to directly support Vermont community organizations and individuals in making clean energy choices and working on projects that further VEIC's mission.

In effect, the performance award and operations fee make up the operator's total allowable earnings for the administration of Efficiency Vermont in the performance period. The combined maximum compensation for the operator if it achieves the maximum performance award is 4.8% of the total RA and DSS budgets[37]. The operations fee will be reduced over the three-year period from 1.35% in 2021, to 1.0% in 2022 and to 0.75% in 2023. The maximum performance award rate conversely increases from 3.65% in 2021, to 4.0% in 2022 and to 4.25% in 2023.

The remainder of Section 7 presents a budget summary and more detailed budgets.

7.5 2021–2023 Resource Acquisition and Development and Support Services Budget Summary

Resource Acquisition	2021	2022	2023	2021-2023
Electric EEU Funds				
Energy Efficiency	$34,974,558	$36,314,741	$35,438,650	**$106,727,950**
Electric Flexible Load Management	$574,128	$1,341,625	$1,525,067	**$3,440,820**
Electric Energy Savings Account Pilot	$373,081	$3,626,919	$2,000,000	**$6,000,000**
Act No. 151 Programs	$1,405,166	$2,068,834	$1,943,000	**$5,417,000**
Total Electric EEU Funds	**$37,326,933**	**$43,352,119**	**$40,906,717**	**$121,585,770**

[36] Operations fees and performance awards are not earned on the Energy Savings Account pilot budgets.
[37] No compensation is earned on the Energy Savings Account pilot, but the rate on all other Efficiency Vermont budgets is 5%, yielding an effective rate of 4.8%.

Total Thermal Energy and Process Fuel Funds	**$7,002,415**	**$7,044,585**	**$7,023,500**	**$21,070,500**
Total Resource Acquisition Budget	**$44,329,349**	**$50,396,704**	**$47,930,217**	**$142,656,270**
Development and Support Services				
Electric EEU Funds	$2,731,712	$3,108,703	$3,157,114	**$8,997,529**
Thermal Energy and Process Fuels Funds	$468,045	$538,730	$547,120	**$1,553,895**
Total Development and Support Services Budget	**$3,199,757**	**$3,647,433**	**$3,704,233**	**$10,551,424**
Operations Fee	$636,606	$504,172	$372,258	**$1,513,037**
Subtotal	**$48,165,712**	**$54,548,310**	**$52,006,709**	**$154,720,731**

7.6 2021–2023 Budget by Market and Initiative

EFFICIENCY VERMONT 2021-2023 BUDGET

RESOURCE ACQUISITION ACTIVITIES

Electric Efficiency

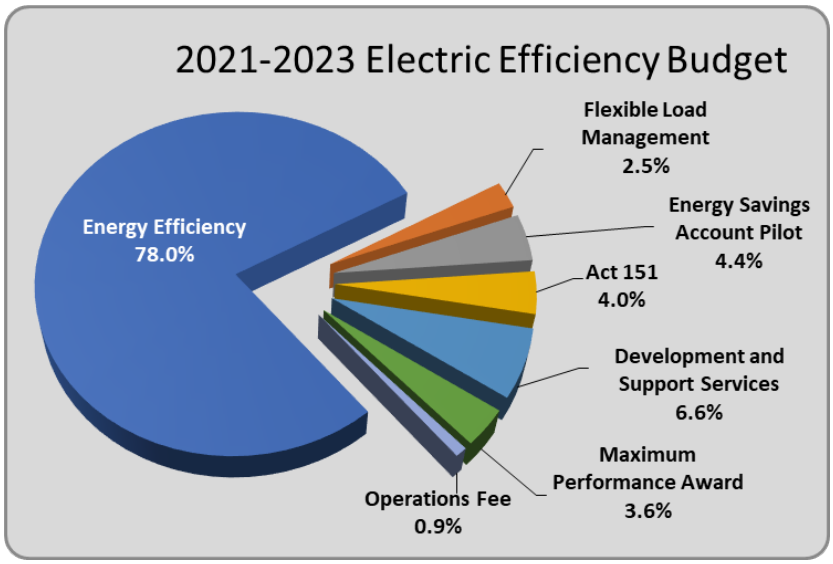
Business Sector	**2021**	**2022**	**2023**	**2021-2023**
Business Existing Facilities[38]	$17,537,779	$22,934,052	$19,756,568	**$60,228,399**
Business New Construction	$2,109,028	$2,467,956	$2,188,316	**$6,765,300**
Subtotal Business Sector	**$19,646,807**	**$25,402,008**	**$21,944,884**	**$66,993,699**
Residential Sector				
Efficient Products[39]	$10,091,145	$9,921,299	$10,392,488	**$30,404,932**
Existing Homes	$4,759,356	$5,107,003	$5,653,299	**$15,519,658**
Residential New Construction	$2,829,626	$2,921,810	$2,916,046	**$8,667,482**
Subtotal Residential Sector	**$17,680,126**	**$17,950,112**	**$18,961,833**	**$54,592,071**
Total Electric Efficiency	**$37,326,933**	**$43,352,119**	**$40,906,717**	**$121,585,770**
Thermal Energy and Process Fuels Efficiency				
Business Sector	$962,182	$1,755,875	$1,755,875	**$4,473,932**
Residential Sector	$6,040,233	$5,288,710	$5,267,625	**$16,596,568**
Total Thermal Energy and Process Fuels Efficiency	**$7,002,415**	**$7,044,585**	**$7,023,500**	**$21,070,500**

[38] Includes budget and savings for FLM, and ESA pilot, activities. See Section 4.8 for the subset of the electric Business Existing Facilities related to FLM activities. See Section 7.5 for the subset of the electric Business Existing Facilities budget related to the ESA pilot.

[39] Includes budget for Act No. 151 Programs. See Section 4.10 for the subset of the electric Efficient Products budget related to Act No. 151 Programs.

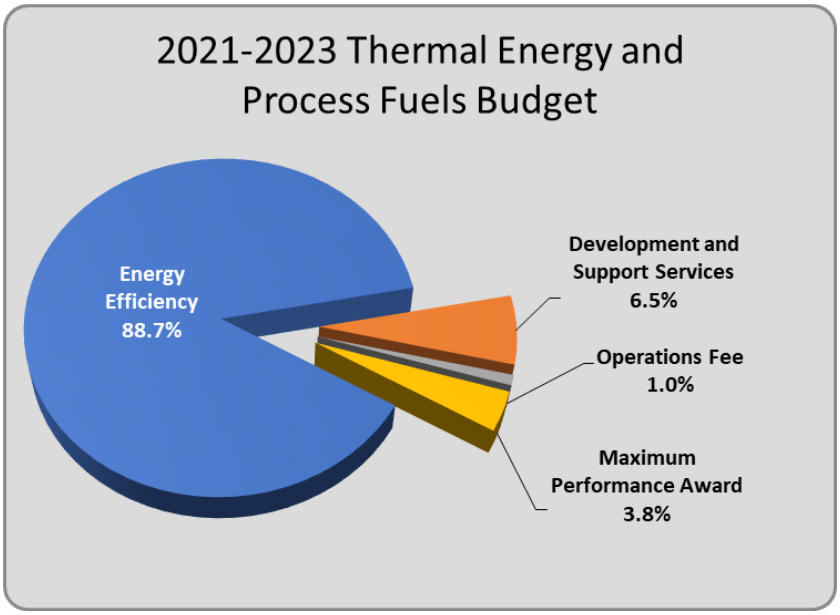
TOTAL RESOURCE ACQUISITION ACTIVITIES	**$44,329,349**	**$50,396,704**	**$47,930,217**	**$142,656,270**
DEVELOPMENT & SUPPORT SERVICES	**2021**	**2022**	**2023**	**2021-2023**
Education and Training	$475,625	$470,600	$472,000	**$1,418,225**
Applied Research and Development	$171,164	$174,100	$174,100	**$519,364**
Planning and Reporting	$333,329	$619,400	$735,600	**$1,688,329**
Evaluation, Measurement, and Verification	$400,375	$486,500	$488,800	**$1,375,675**
Administration and Regulatory Affairs	$647,153	$545,400	$482,100	**$1,674,653**
Information Systems	$1,172,112	$1,351,433	$1,351,633	**$3,875,179**
TOTAL DEVELOPMENT & SUPPORT SERVICES	**$3,199,757**	**$3,647,433**	**$3,704,233**	**$10,551,424**
Operations Fee	$636,606	$504,172	$372258	**$1,513,037**
Performance Award	$1,721,200	$2,016,700	$2,109,500	**$5,847,400**
TOTAL BUDGET	**$49,886,912**	**$56,565,010**	**$54,116,209**	**$160,568,131**

7.7 2021–2023 Electric Efficiency Budget[40]



[40] Act No. 15 programs are funded by EEC funds and are focused on improving various aspects of transportation sector electrification which is discussed in Section 4.10

7.8 2021–2023 Thermal Efficiency Budget



8 Quantifiable Performance Indicators

Efficiency Vermont performance compensation is determined by results in 24 performance indicators. Performance targets are established through a modeling exercise that creates a portfolio of measures and programs within the defined budget. Modelers incorporate past program activity, future opportunities, market factors, new technologies, and Commission-ordered policy assumptions that strive to maximize QPI performance while ensuring the achievement of sector and income equity constraints with MPRs. The remainder of this section provides descriptions and targets for Efficiency Vermont QPIs, including PIs and MPRs.

8.1 2021–2023 Electric Efficiency Performance Goals and Minimum Performance Requirements

QPI#	Title	Performance Indicator / Milestone	100% Target
1	Total Resource Benefits	Present worth of lifetime electric, fossil, and water benefits	$223,860,700
2	Annual Electricity Savings	Annual incremental net MWh savings	263,900
3	Statewide Summer Peak Demand Savings	Cumulative net summer peak demand kW savings	28,400
4	Statewide Winter Peak Demand Savings	Cumulative net winter peak demand kW savings	35,500

5	Lifetime Electricity Savings	Lifetime incremental net MWh savings	3,302,400
6	Greenhouse Gas Reduction	Electric energy and non-energy benefits (metric tons of CO_2e)	140,200
7	Flexible Load	Annual kW of flexible load (controllable load)	2,700
8	Administrative Efficiency	5% administrative cost reduction	$988,600

MPR#	Title	Minimum Requirement	Minimum
9	Minimum Electric Benefits	Total electric benefits divided by total costs	1.2
10	Threshold (or Minimum Acceptable) Level of Participation by Residential Customers	Total residential sector spending	$37,989,000
11	Threshold (or Minimum Acceptable) Level of Participation by Low-Income Households	Total low-income single and multifamily services spending	$11,480,000
12	Threshold (or Minimum Acceptable) Level of Participation by Small Business Customers	Total number of non-residential premises with annual electric use of 40,000 kWh / year or less that acquire kWh savings	2,000
13	Geographic Equity – County	Total Resource Benefits amount for each geographic area is greater than values shown on geographic equity-county table	(See Section 8.2)
14	Geographic Equity – Utility	Customer Lifetime Savings for each distribution utility is greater than values shown on geographic equity-utility table	(See Section 8.3)
15	Service Quality	Achieve 92 or more metric points	92
16	Resource Acquisition Performance Period Spending	Total spending for a three-year performance period (including applicable operations fees)	<$124,004,000
17	Development and Support Services Performance Period Spending	Total spending for a three-year performance period (including applicable operations fees)	<$11,071,000

8.2 2021–2023 Electric Minimum Total Resource Benefits (TRB) per Geographic Area - County

Geographic Area*	Required TRB per Geographic Area**
Addison	$8,929,033

Bennington	$10,499,973
Caledonia	$6,053,370
Chittenden	$29,862,922
Essex / Orleans	$7,766,941
Franklin	$15,072,873
Grand Isle / Lamoille	$8,136,246
Orange	$5,189,836
Rutland	$16,858,625
Washington	$14,142,821
Windham	$15,708,749
Windsor	$15,812,773
Total	**$154,034,164**

* All geographic names above refer to Vermont counties.

8.3 2021–2023 Electric Minimum Customer Lifetime Savings per Geographic Area – Utility

Distribution Utility	% EEC by Utility[41]	Minimum Lifetime Customer Savings[42] for MPR #13
VPPSA Aggregate[43]	7.7%	$10,782,391
Barton Village, Inc. Electric Dept.	0.3%	$420,093
Enosburg Falls Water & Light Dept.	0.6%	$840,186
Hardwick Electric Dept., Town of	0.8%	$1,120,248
Jacksonville Electric Company, Village of	0.1%	$140,031
Johnson Water & Light Dept., Village of	0.3%	$420,093
Ludlow Electric Light Dept., Village of	1.1%	$1,540,342
Lyndonville Electric Dept., Village of	1.4%	$1,960,435

[41] % EEC by Utility is the average percent contributed by ratepayers in each distribution utility for the period 2016-2018 per the annual December reports issued by the Fiscal Agent.
[42] Minimum Lifetime Customer Savings values are the sum of customer electric, water and fuel cost savings at DPS approved retail rate averages over the lifetime of the efficiency measures.
[43] Minimum Lifetime Customer Savings for VPPSA is an aggregate target for all VPPSA members.

Morrisville Water & Light Dept., Village of	1.0%	$1,400,311
Northfield Electric Dept., Village of	0.6%	$840,186
Orleans Electric Dept., Village of	0.3%	$420,093
Swanton Village Inc. Electric Dept.	1.2%	$1,680,373
Green Mountain Power Corporation	79.0%	$110,624,536
Hyde Park Electric Dept., Village of	0.2%	$280,062
Stowe Electric Dept., Town of	1.7%	$2,380,528
Vermont Electric Cooperative, Inc.	9.7%	$13,583,013
Washington Electric Cooperative, Inc.	1.7%	$2,380,528
Total		**$140,031,058**

8.4 2021–2023 Thermal Energy and Process Fuels Performance Goals and Minimum Performance Requirements

QPI#	Title	Performance Indicator / Milestone	100% Target
1	Thermal & Mechanical Energy Efficiency Savings	Annual incremental net MMBtu savings	340,600
2	Residential Single-Family Comprehensiveness	a. Average air leakage reduction per project	34%
		b. Percentage of projects with square feet of insulation added equivalent to at least 50% of the home's finished square feet of floor area	44%
		c. Percentage of households (premises) that implement shell measures, and also have a heating system measure installed within three years of the shell measure	16%
3	Housing Units Weatherized	Number of Residential Housing Units comprehensively weatherized	4,400
4	Greenhouse Gas Reductions	TEPF energy and non-energy benefits, in metric tons of CO_2e	20,400

MPR#	Title	Minimum Requirement	Minimum
5	Threshold (or Minimum Acceptable) Level of Participation by Residential Customers	Total residential sector spending as a percentage of total TEPF Fund expenditures	>62.5%
6	Threshold (or Minimum Acceptable) Level of Participation by Low-Income Households	Total low-income spending as a percentage of total TEPF Fund expenditures	>17%

7	RA Performance Period Spending	Total spending for a three-year performance period (including applicable operations fees)	<$21,500,000

9 Addendum: Overview of Updates to the Triennial Plan

This Plan, as a 2023 update to the 2021-2023 Triennial Plan, includes changes to the aforementioned 2021-2023 document. This addendum is provided to characterize changes made to that document. The following list is provided to enable easy identification of areas of this Plan that reflect significant changes to, or new plans for, services and activities.

Executive Summary (Section 1)

- Message from Managing Director, Peter Walke
- Heating Electrification with Weatherization (See "New Programs: Act No 151")[44]

About This Plan (Section 1)

- Updated budgets (Section 1/Plan Development)[45]

Crosscutting Services for Existing Buildings and New Construction (Section 2.3)

- Strategic Energy Management (Section 2.3.1/Vermont's Largest Energy Users)
- Best Practices Exchange (Section 2.3.1/ Vermont's Largest Energy Users)
- Developing partnerships with community-based organizations (Section 2.3.3/Focused Markets)

Services for Residential Customers (Section 3)

- Intro paragraph (Section 3)
- Alternative energy efficiency financing projects (Section 3.1/Single-Family Homes)
- EEEN contractor partnerships (Section 3.1/Single-Family Homes)
- Program for rental property owners (Section 3.1/Single-Family Homes)
- Advanced power strips (Section 3.2/Existing and New Low-Income Housing)
- Advanced manufactured home (Section 3.2/Existing and New Low-Income Housing)
- Appliance replacement voucher program (Section 3.2/Existing and New Low-Income Housing)
- Residential new construction market rate incentives and technical assistance (Section 2.3/Residential New Construction)
- Federal lighting standards (Efficient Products/Section 3.4)

Activities in Service to all Major Markets (Section 4)

- CCHP income eligible rebate bonus for VPPSA customers in Lyndonville, Hardwick, Morrisville and Ludlow (Section 4.1/Coordination with EEUs and DUs)

[44] Also see Section 4.10.2 Heating Electrification with Weatherization.

[45] The budget tables throughout the plan were updated, including: the major market and low-income tables in sections 2-3; FLM and Act No. 151 tables in sections 4.8 and 4.10; DSS budget table in section 5; and budget tables in section 7.

- Access support, and innovation and partnership awards for EEN member businesses, and heat manufacturer engagement (Section 4.2/Services to Contractors and Equipment Suppliers)
- Rental property owner support, home energy visits (Section 4.2/Community-Based Activities)
- Technical and financial analysis for (residential) customers, on-bill tariffed financing pilot (Section 4.5/Financial Services)
- VEC FLM pilot (Section 4.8, FLM)
- Auto-dealer engagement (Section 4.10.1/Act No. 151 programs)
- Heating electrification with Weatherization program (Section 4.10.2/Act No. 151 programs)
- Assess impacts to lighting programs due to state and federal legislation (Section 4.11/Initiative specific evaluation activities)

Development and Support Services (Section 5)

- Code training tied to State energy goals (Section 5.1/Codes and Standards Support)
- Print and electronic materials, content for Watts New, and Efficiency Vermont Marketplace (Section 5/1/General Public Education)
- Modeling, forecasting and assessing GHG reduction in Efficiency Vermont's portfolio (Section 5.2/Technology Demonstration-Greenhouse Gas Reduction)
- Explore opportunities for enhancing diversity, equity, and inclusion (Section 5.2/ Technology Demonstration-Justice)
- Analyzing federal legislation (Section 5.5/Public Affairs)

Thermal Energy and Process Fuels Budgets (Section 7.2)

- Moderate income weatherization (Section 7.2)

Efficiency Vermont Act No. 151 Electric Transportation Program: Objectives & Metrics (Appendix No. 1)

Appendix No. 1: Efficiency Vermont Act No. 151 Electric Transportation Program: Objectives & Metrics

The letter in parentheses next to each metric indicates reporting frequency. Q = quarterly; A = annually.

Program Element	Program Objectives	Program Metrics	Measured By	Long-Term Market Impact	Market Metrics
EV Supply Chain Support	1. Establish network of dealers committed to promoting EVs and supporting EV sales	a. 40-60 dealerships enrolled in EEN EV Dealer network by the end of 2023. At least 20% are used car dealerships b. At least 50% of participating dealers report that the program had an impact on the number of EVs they stock and sell	a. # of participation agreements signed 2021-2023 (Q) b. Participating dealer survey (A)	Growth in EV supply chain capabilities and EV availability	Number of dealerships selling at least 1 EV, statewide and by county (A)
	2. Support growth in EV sales at participating dealerships	a. 100% of participating dealers complete at least one EV Readiness project at their facility by the end of 2023 b. 2000 EVs associated with Dealership/Salesperson EV Sales Incentive by the end of 2023	a. # of EV Readiness projects per dealer 2021-2023 (Q) b. # of EV Sales Incentives paid 2021-2023 (Q)		Number of EVs sold by all VT dealerships (A) Number of EVs sold by EEN EV Dealers (A)
	3. Increase salesperson knowledge of EV technology and customer benefits	a. 80-120 salespeople attend EV Sales Training 2021-2023 b. 90% of attendees pass the post-training evaluation (first attempt) c. 90% of attendees report satisfaction with any training	a. # of attendees (Q) b. Post-training evaluation (Q) c. Post-training evaluation (Q)		Number of EV registrations, statewide and by county (A) EV market share, both new and used vehicles (A)
EV Consumer Awareness and Education	4. Increase consumer awareness of and interest in EVs	a. 20% increase in digital engagement b. 20% increase in EV-related contacts c. Vermont customers report 20% more likelihood in purchasing an EV	a. Number of sessions (Q) b. CS contact volume (Q) c. EVT Brand Awareness survey (A)	Growth in consumer EV awareness, familiarity, and interest	Percent of consumers with interest in purchasing an EV; statewide and by county (A)

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