Act 199 study on manufacturing competitiveness and energy

Vermont Public Service Department
Agency of Commerce and Community Development

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During the 2014 legislative session, representatives of some large electricity users raised concerns about the high price of electricity as one factor contributing to overall high business costs in Vermont. In order to address those concerns, the Legislature included Section 13 in Act 199. In it the Legislature directed the Public Service Department (PSD) and the Agency of Commerce and Community Development (ACCD) to study electric rates, efficiency, retail choice and cost-shifts among customer classes. Over the intervening 18 months, the PSD and ACCD worked closely with stakeholders to identify the concerns and research them fully. This report presents the results of that study.

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Introduction

Act 199 required the Public Service Department and the Agency of Commerce and Community Development to investigate "how best to advance the public good through consideration of the competitiveness of Vermont's industrial or manufacturing businesses with regard to electricity costs."

The two agencies were required to consider eight items as a part of their investigation:

> (1) how best to incorporate into rate design proceedings the impact of electricity costs on business competitiveness and the identification of the costs of service incurred by businesses;
>
> (2) with regard to the energy efficiency programs established under 30 V.S.A. § 209, potential changes to their delivery, funding, financing, and participation requirements;
>
> (3) the history and outcome of any evaluations of the Energy Savings Account or Customer Credit programs, as well as best practices for customer self-directed energy efficiency programs;
>
> (4) the history and outcome of any evaluations of retail choice programs or policies, as related to business competitiveness, that have been undertaken in Vermont and in other jurisdictions;
>
> (5) any other programs or policies the Commissioner and the Secretary deem relevant;
>
> (6) whether and to what extent any programs or policies considered by the Commissioner and the Secretary under this section would impose cost shifts onto other customers, result in stranded costs (costs that cannot be recovered by a regulated utility due to a change in regulatory structure or policy), or conflict with renewable energy requirements in Vermont and, if so, whether such programs or policies would nonetheless promote the public good;
>
> (7) whether and to what extent costs have shifted to residential and business ratepayers following the loss of large utility users, and potential scenarios for additional cost shifts of this type; and
>
> (8) the potential benefits and potential cost shift to residential and business ratepayers if a large utility user undertakes efficiency measures and thereby reduces its share of fixed utility costs.

In December of 2014, PSD and ACCD released an interim report on the activities planned to address the requirements laid out in Act 199.

This report reviews the issues around electricity rates and the delivery of energy efficiency services but does not provide specific recommendations for action by the Legislature or Public Service Board (PSB). The issues are complex and there will need to be more discussion among the large energy users and their representatives including Associated Industries of Vermont and the Regional Development

Corporations (RDCs) as well as the PSD, ACCD, the distribution utilities, and the energy efficiency utilities to ensure that strategies to address these issues provide the maximum benefit for all Vermonters.

Engagement with Stakeholders and Businesses

As directed by the General Assembly in Act 199, the PSD and ACCD prepared this report in consultation with the Public Service Board, a private organization that represents the interests of manufacturers, a cooperative electric company, an efficiency utility, a shareholder-owned utility, the Vermont Public Power Supply Authority (VPPSA), a municipal utility that is not a member of VPPSA, and the Vermont Electric Power Company (VELCO). Stakeholders provided comments at a meeting in advance of the writing of this report and were offered the opportunity to comment on a draft.

The following persons and entities were provided an opportunity to provide input (written and or oral comments) into this investigation:

(1) Consumer and business advocacy groups;
(2) Regional development corporations and regional planning commissions; and
(3) Any other person or entity as determined by the Commissioner and Secretary.

Additionally, the PSD and the RDCs conducted an "Energy Listening Tour," a series of four focus groups around the state in 2015 to receive input on the range of issues identified by Act 199. The focus groups were held in Newport, St. Albans, Springfield, and Brattleboro and included a dozen businesses as well as the host RDCs. The sessions addressed the impact of electric rates on competitiveness, rate design, retail choice, and how to best facilitate increased energy efficiency in the manufacturing sector. ACCD also met with individual manufacturing businesses to discuss their particular concerns. An early draft of this report was circulated to stakeholders, including RDCs, for them to share with member businesses. Comments submitted in response to that draft report are available as Appendix A of this report. Some substantive aspects of this report were amended in response to comments, so comments may not reflect the current, final draft.

Rate Design and Competitiveness (item 1)

Electric Rates in Vermont

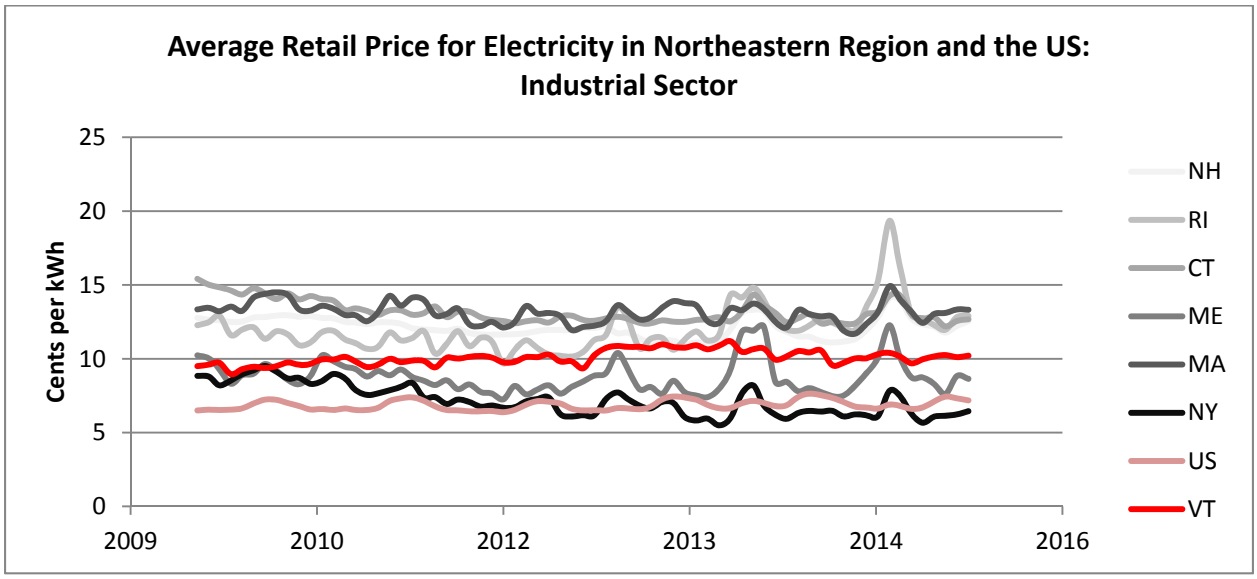
Vermont businesses must compete on a national and global basis. The relatively high cost of electricity in Vermont adds to other high costs faced by Vermont business that are the result of our geographic location and rural distribution of customers. Recognition of this challenge to competitiveness is important for all policy makers and is the basis for this report's conclusions regarding the need for steps to address future electricity prices.

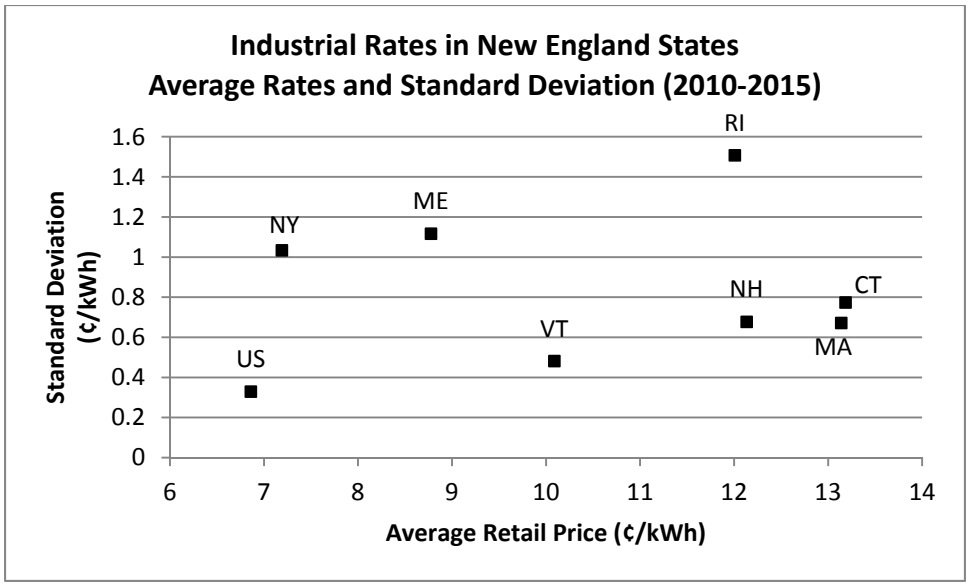
Other states in New England have higher costs for electricity than Vermont. Retail electric prices for industrial users in Vermont are second lowest in New England (with rates in Maine being lower during

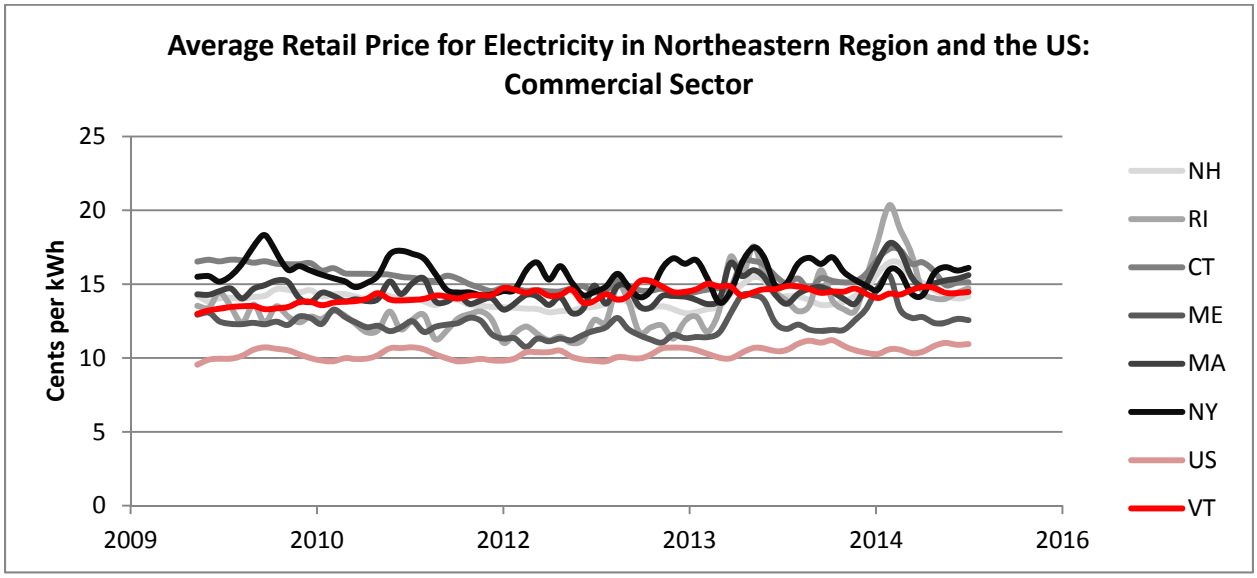
most of the year). During the period Jan. 2010-Sept. 2015, retail rates for industrial users in New England averaged $ 0.1155/kWh while Vermont's rates averaged $ .1008/kWh. Rates for industrial users in the US as a whole are much lower, at just $.0686/kWh. Some small manufacturers in Vermont fall into the "commercial" category because of their relatively lower usage. Commercial rates in Vermont averaged $ 0.1423/kWh (2010-2015), higher than New Hampshire, Rhode Island, and Maine, and lower than Massachusetts and Connecticut.

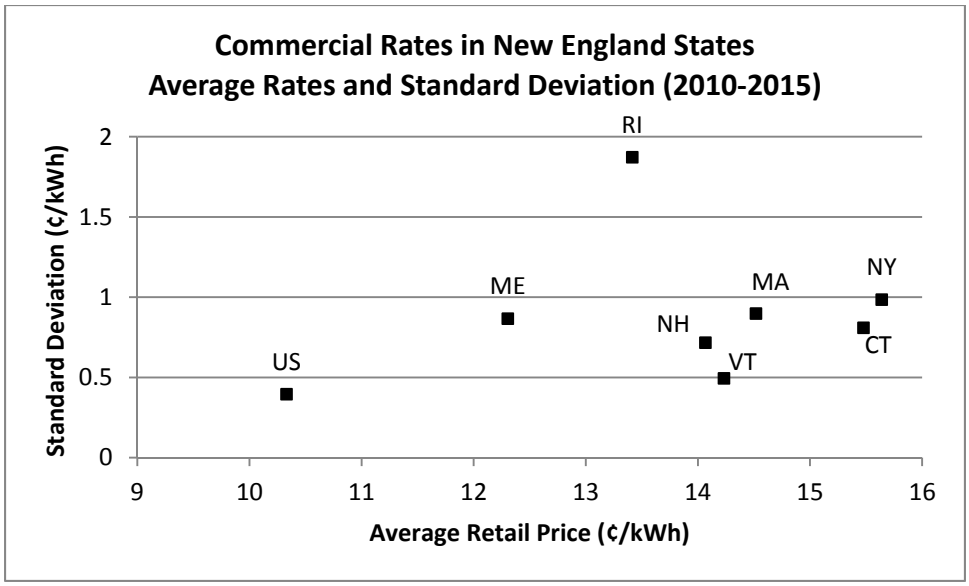
Rates in Vermont are also more stable than in other New England states. The standard deviation (a measurement of volatility around the average) of rates in Vermont over the period Jan. 2010-Sept. 2015 was the lowest in New England at $ 0.0048/kWh for industrial users and $ 0.0049/kWh for commercial users. In Vermont, fluctuations in the cost of providing electricity are smoothed out by utilities who take on the market risk associated with changing costs in energy supply. In other New England states rates were more volatile. For example, Maine had lower rates on average for industrial users, but rates were very volatile, swinging between a low of $ .0725/kWh and a high of $ 0.1225/kWh with a standard deviation of $ .0112/kWh.

Exhibit 1: Retail Prices and Standard Deviation for Electricity in New England and the US in the Industrial and Commerical Sectors, 2010-2015




Industrial Rates in New England States
Average Rates and Standard Deviation (2010-2015)
Standard Deviation (¢/kWh)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
6
7
8
9
10
11
12
13
14
Average Retail Price (¢/kWh)
RI
ME
NY
NH
CT
VT
MA
US


Average Retail Price for Electricity in Northeastern Region and the US:
Commercial Sector
Cents per kWh
25
20
15
10
5
0
2009
2010
2012
2013
2014
2016
NH
RI
CT
ME
MA
NY
US
VT



Source: EIA's Electricity Data Browser. Average Retail Price of Electricity. http://www.eia.gov/electricity/data/browser/

Rate Design

Cost of service is the primary driver of rates in Vermont. Efficiently-designed rates charge customers accurately according to the utility's cost to provide service to that class of customers ("cost of service" or "cost causation" ratemaking). Best practices, Vermont's statutes, and legal precedents set the stage for rate design in Vermont.

Utilities in Vermont provide electricity on a "least cost" basis, meaning that they evaluate energy and capacity supply as well as transmission and distribution options and choose the least-cost options (after safety is considered). "Cost" includes both economic and environmental costs.

The principles of "undue discrimination" and "cost causation" are longstanding rate design principles in Vermont and many other jurisdictions. Under "undue discrimination," the PSB and utilities strive to avoid cross-subsidization between rate classes. In other words, each customer class (residential, commercial, and industrial) is charged according to the costs the utility incurs to serve them. If one rate class were to pay less than it costs the utility to serve them, the other classes would be required to pay more than their fair share so that the utility could remain financially solvent.

In Vermont and elsewhere, industrial users pay for electricity at different, generally lower rates than residential customers. The fundamental premise behind rate structure is to make sure that each class of user is paying a rate that supports both the purchase of the electricity and its delivery to each user. Poorly designed rate structures result in cross subsidies where one class of user pays more than their share while another class receives the service at a lower cost. In addition to a lack of fairness, improper pricing provides the wrong price signals for electricity use and may unduly discourage investment in efficiency measures that make economic sense.

Some manufacturers are “transmission class” customers which means they maintain their own equipment to step down voltage from the subtransmission system. Rates in this class are lower because the utility does not incur the cost of maintaining a substation to step power down for those users. The user incurs the expense of acquiring and maintaining equipment directly, so although rates may be lower, transmission class customers bear the cost of maintaining their own transformers.

Rates take into account concerns about revenue, cost, and practicality including the following elements:

Revenue:

1. Effectiveness in providing revenues to the utility under a fair-return standard without undesirable social consequences
2. Revenue stability and predictability with a minimum of unexpected changes
3. Rate stability and predictability with a minimum of unexpected changes

Cost:

4. Efficiency in discouraging wasteful use
5. Reflection of all costs and benefits
6. Fairness of the specific rates in the apportionment of total cost service that avoids arbitrariness and capriciousness and attains equity
7. Avoidance of undue discrimination
8. Efficiency in promoting innovation and responding to changing demand and supply

Practicality:

9. Simplicity, certainty, understandability and public acceptability
10. Freedom from controversies as to proper interpretation

Within this costing and rate design framework there is a reasonable range of various outcomes that are possible in a regulated environment and they have an impact on each class of ratepayer and on the competitiveness of Vermont businesses.

While the basics behind electricity costs are relatively easy to describe, the details of determining the appropriate costs to be assigned to each user is a very complex determination. The actual generation and use of the transmission and distribution system varies minute to minute as generation is not constant and full system use has peaks and valleys. It is the role of the PSB to review the economics of electricity generation and delivery in order to develop a fair allocation of costs between different classes of users. The complexity of allocating costs allows for different perspectives with regards to the “appropriate” distribution. The fairness of those deliberations requires that the perspectives of different rate classes be well represented.

Rate class delineations

When rates are designed by utilities and reviewed by the PSB, rate classes are developed that group customers together according to their patterns of usage. Customers cause costs differently according to when and how much electricity they use. For example, customers who demand a high volume of electricity at any given point drive the costs of the distribution system because the system must be

sufficiently robust to deliver that high volume. Accordingly, customers are divided into classes based on how much power they use. Although rate classes are often referred to as "residential, commercial, and industrial," customers are, generally speaking, assigned to a class based on their maximum peak demand (measured in kW) in combination with total consumption (measured in kWh) rather than according to what type of activity they perform – industrial versus commercial for example.

This means that some small manufacturers in Vermont are classified as "commercial" users because their peak demand and total consumption do not rise to the threshold required to be classed as an "industrial" user. There are some cost drivers that may be different for small manufacturers than commercial users, so classifying them as commercial may not accurately reflect the costs they cause to the system. Without a specific cost of service study that analyses the costs caused by small manufacturers separately from commercial users, it is impossible to know whether the rates applied to them accurately reflect costs. We also do not know how many small manufacturers are operating under commercial rates. Depending on the profile of those users, an appropriate rate may be higher or lower than their current commercial rate class.

Green Mountain Power, Vermont's largest utility, is scheduled to conduct a full cost of service study and rate design in the fall of 2017 when they return to traditional cost of service ratemaking (or the fall of 2018 if their alternative regulation plan is extended). At that time, any party wishing to suggest an alternative delineation of rate classes in GMP's service territory will have an opportunity to do so before the PSB.

There is a natural tension between the need for simplicity in rate structure, with just a few rate classes, and capturing a high degree of granularity in cost-causation through many rate classes. On the one hand, dividing customers into many rate classes allows each rate class to more accurately reflect the costs caused by those customers. On the other hand, reducing complexity with fewer rate classes can create administrative savings and reduce customer confusion.

A third alternative is to provide more flexibility within each rate class so that rates vary by time of day according to the utility's cost to provide service at that time – so called "smart rates." In addition to better assigning costs to the customers who cause them, smart rates empower customers to lower their electric bills by changing their load shapes in ways that benefit the operation of the grid and lower costs for all. Rather than creating additional rate classes, the approach of PSD has been to encourage utilities to offer a range of smart rates and riders to customers that allow the customer to capture the value of when and how they use electricity. This does not rule out the option of designing and offering a separate rate class to small manufacturers, but it may effectively address their concerns.

Customer-owned generation, controllable loads, and smart rates

There are several recent technological advances that allow industrial users to lower their overall bills. Customer-owned generation through net metering, controllable loads, and smart rates are examples of measures utilities can implement to more accurately assign costs to customers who cause them

and allow customers to shape their load profiles to minimize costs and maximize value. These flexible, modern instruments of rate design present significant opportunities for bill savings.

Net metering represents an opportunity for industrial users to contribute value to the electrical grid and, in some cases, lower their overall electricity bills. Under net metering, users deploy solar or other small, renewable technologies, and receive credit for producing power on site. That credit is applied to the customer's bill on an annual basis, so excess production in the summer can cover shortfalls in winter.

Controllable loads that are possible through the use of new technologies may help to shift usage to times when distributed generation is producing excess power. The current distribution system has the capacity to both send and receive signals from generators and users. In the future, user and generator data will increase system efficiency by reducing redundancy and reducing the need for reserve capacity. For example, certain motor controls may receive a signal at times of system supply constraint to reduce power consumption. Similarly, energy storage through thermal, mechanical or chemical means can be triggered to receive "excess" system electricity.

Smart rate design will provide the proper price signals for installing and using the control equipment that will result in users modifying usage to improve system reliability and save on their bills. Smart rates allow the utility to charge higher prices to customers when the cost of power and delivery is high and offer lower rates to customers when the cost of power and delivery is low. Smart rates, combined with load control offer companies and individuals the chance to take advantage of market pricing, shifting their usage to lower-priced times of day. Almost all commercial and industrial users in Vermont have access to smart rates today. Access to load-control technologies is expected to improve in the future.

Factors Influencing Prices in Vermont

Prices for electricity are heavily influenced by the costs of generation (supply) and the cost of transmission, distribution and administration of the electric grid (T&D). New England is at a disadvantage in the average cost of generation because it does not have access to the large, low cost, often federally subsidized generation facilities that exist in other parts of the country. These include the projects supported by the Tennessee Valley Authority in the southern states and the Bonneville Power Authority in the Pacific Northwest. More locally, Vermont has very limited access to the Niagara-Mohawk projects in northern New York State. Some businesses in northern New York with greater access to that federally supported generation have electric energy costs (not including local distribution costs) below 2 cents per kilowatt-hour[1].

Putting Vermont at an even greater disadvantage is the dispersed distribution of electric users in the state. Distribution system costs are spread out over all users and a low number of users per mile results in higher customer costs to support the infrastructure.

[1] http://www.nypa.gov/RechargeNY/RNY-Tariff-2015.pdf

Despite the disadvantages, Vermont has been able to maintain steady electric rates over the past several years, largely due to the use of stable, long term contracts with large generators and demand management (efficiency) that have avoided investments in distribution infrastructure and reduced Vermont's share of regional transmission costs.

In general, larger users require less of the overall distribution network although specific local connection hardware is dedicated to their use. When large users change their operations, that can influence the need for transmission capacity and electric supply, so larger users are assigned "demand charges" based on their peak level of electricity used. Demand charges reflect long term contract obligations and specific distribution investments. Like all customers, large users also pay a usage charge to reflect the cost of electricity purchase and the fair share of transmission infrastructure necessary to provide electricity in a reliable fashion.

There are several factors affecting Vermont electric utilities that will need to be considered in the next round of ratemaking including to changes in the generation and delivery of electricity.

Distributed generation

Distributed generation is not new, but has grown rapidly in the past 5 years with the addition of new wind and solar generating capacity. Prior to this period, Vermont has accessed distributed generation from numerous small hydroelectric facilities. Together, small hydro, wind, and solar are "distributed" across the geography of the state in contrast to large base load plants that have provided the majority of electricity to Vermont and the northeast for several decades. In addition to the local nature of distributed generation, most wind, solar and small hydroelectric generation vary output across time of day and seasonally. Unlike peaking facilities, the generation from some distributed generation facilities is "must take" meaning the electricity is added to the grid regardless of the demand from users.

From the period of 2011-2016, more than 200 MW of distributed generation is expected to be added to Vermont's electricity portfolio. During periods of peak generation, this distributed generation accounts for an appreciable proportion of the overall load and may even lead to a situation when generation exceeds demand on some circuits or larger portions of the grid. These generators have close to zero marginal cost of operation due to their lack of fuel cost.

Increasing reliance on natural gas in the region

Vermont Yankee stopped providing power to the region in late 2014. This is one example of many in New England of base load generators retiring. Other nuclear plants and coal plants in the region have been or are scheduled to close in the next few years. In addition to the new generation represented by distributed systems described above, southern New England has installed and is planning for additional natural gas fired facilities to provide both base load electricity and short term "peaking" electricity during periods of peak demand. As of 2015, 44% of the installed electric capacity in New England was powered by natural gas. This is up from 18% in 2000. There is a complication in the use of natural gas for generating electricity in that the supply of natural gas is prioritized for heating in

southern New England. During very cold winter weather, the demand for natural gas by residential and commercial customers using gas for heat is elevated, putting a constraint on the use of gas for electricity generation. While Vermont does not have natural gas generators for winter use, market purchases of electricity are subject to high short-term prices and possible shortages during cold snaps when gas generators in New England have limited access to natural gas. ISO-NE has been encouraging plants to have dual-fuel capability, burning oil as well as natural gas.

Changes in peak usage

For many decades, Vermont electricity use had peaks of use in the winter. As the result of more air conditioning increasing summer demand and the gradual reduction of electric space heating and lighting improvements reducing winter usage, the highest electric use now occurs in the summer months. However, the combination of extensive solar generation that has higher summer production and the natural gas situation described above translates, not to an actual shift in peak usage, but a change in the market conditions between summer and winter peaks. Winter peaks for the past three years have resulted in short term price spikes while the summer peaks are more easily addressed with solar generation, natural gas peaking generation, and access to lower price purchase options.

Generator retirement is also creating a shortfall in the capacity market – this is the market that ensures there is enough generation capacity to meet peak loads in summer and winter. Regional summer peaks continue to drive this market, and costs for this component of energy supply are expected to nearly triple beginning in 2018. Rate structures reflect both local (winter, summer, monthly) and regional (summer) peaks.

Possible changes in overall demand – shifting from recent declines to possible future increases

Vermont has required lower amounts of electricity generation over the past few years after decades of increases. It is possible and envisioned in the updated 2016 Comprehensive Energy Plan that the long-term trend in electricity use will change again towards a pattern of increasing demand because of electrification of heating and transportation in the state. Planning and infrastructure investments are fundamentally different during times of increases compared with times of declining usage.

While greater use can require investments in infrastructure and does require the purchase of more generation, options exist to structure increased electric demand with the optimal utilization of existing infrastructure and power purchase contracts. As a result, it is possible that growing demand could potentially decrease per-unit electricity costs.

Economic Development Rates

The PSB has determined that some large commercial and/or industrial users should receive an incentive rate when tied to greater economic activity. These are often called “economic development rates.” A summary of economic development rates in other states is provided in Appendix B. The incentive rates are both recognition that the benefits of economic growth are enjoyed by all rate payers and may also be based on systems efficiencies that result from focused load growth reducing

the need for other rate payers to support the fixed costs of transmission, distribution and administration.

In orders 5569 (of 1992) and 6867 (of 2003), the PSB lays out clear criteria for economic development rates. Interested readers are encouraged to review the orders in full as this description is a simplification of the qualification process. In order to qualify for special economic development rates, businesses must meet 9 criteria:

1. Participate in efficiency programs.
2. If it weren't for the incentives provided, the firm would not locate (or expand) in Vermont (the "but for" test).
3. Apply for other state incentive programs such as tax incentives and training programs.
4. The firm could locate elsewhere because their operations are sufficiently flexible to do so.
5. Electric costs account for 2% or more of their total value of the output of production.
6. The firm is either located in Vermont, or considering locating in Vermont.
7. Demand of 100kW or 40,000 kWh per month.
8. Apply for the special rate at least 60 days before they commit to leasing or buying property for the relocation or expansion.
9. Produce new jobs certified by the regional economic development authority.

If the company were planning to locate or expand in Vermont regardless of whether they received the lower rate, the company should be required to pay the full retail rate for that class. Economic development rates are specifically designed to incent customers to locate or expand in Vermont who would not be able to do so otherwise (the "but for" test). This is in keeping with best practices and long-standing precedent.[2]

There are some states in which "retention rates" are offered to existing manufacturers. These are lower electric rates provided to manufacturers which are already located in the utility service territory when those manufacturers are "energy-intensive, trade-exposed" meaning that the process of production requires a great deal of energy and could be moved to another facility either in the U.S. or internationally. These types of firms may make location decisions based on the cost of energy, including electricity, natural gas, oil, and other fuel prices as well as other costs of production. In certain very limited cases where the price of electricity and other costs of doing business, such as taxes or workforce development, would be dispositive in a firm's relocation decision, retention rates could be considered.

Any use of retention rates should establish clear, verifiable evidence that the firm would relocate if it were not for the lower rate along with other economic incentives offered by the state. As is the case with economic development rates for new businesses, applicants for retention rates could show that the entire economic development package being offered by the state was instrumental in their decision to stay in the state. In some cases, offering additional energy efficiency services to those energy intensive,

[2] Best Practices Guide: Implementing Power Sector Reform. Regulatory Assistance Project. (2000). Available at file:///C:/Users/joanna.white/Downloads/RAP_BestPracticesGuideImplementingPowerSectorReform%20(1).pdf

trade-exposed industrial users may lower energy bills and the *energy costs per unit of production* even if *rates* remain the same.

Recommendations

PSD and ACCD remain committed to reviewing options for rate design to include economic development opportunities. A part of this commitment is a regular set of meetings that includes manufacturing businesses and their representatives.

Future rate designs should include a consideration of the relative benefits of economic development rates and whether greater use of those rates yields improved economic development outcomes that give an overall benefit for Vermonters.

At this time, specific recommendations for modifying the structure of electric rates in Vermont would be premature. However, a longer-term review of the rate structure is critical. ACCD, PSD, and manufacturing businesses need to engage in joint discussions to ensure a common understanding of how rate structure changes will allow for the most cost-effective future delivery of electricity services.

Vermont should pay attention to the discussions in other states that are facing many of the same issues we face in Vermont.

Options to consider for restructuring rates to maximize economic value for Vermont:

- Principles include system planning and stability
- Match economic development opportunities with changes in the electricity market
- Consideration of a “Vermont way” of partial deregulation
- Ongoing review of rate design deliberations in other states (esp. New York)

Energy Efficiency Programs, (items 2 and 3)

One component of the cost of electricity in Vermont is the Energy Efficiency Charge. This charge is used to fund the electric Energy Efficiency Utilities (EEUs”) – Efficiency Vermont (“EVT”) and City of Burlington Electric Department (“BED”). In some cases, the charge funds “self-directed” efficiency programs including the Customer Credit Program, and the Energy Savings Account program described in more detail below.

Energy Efficiency Charge (“EEC”) rates are based on annual energy efficiency budgets that are reviewed and approved by the PSB in its triennial Demand Resource Plan (“DRP”) proceeding. EEC rates are set by the PSB each year using the process and methodology set forth in PSB Rule 5.300. The Energy Efficiency Charge is expressed on customers’ bills in terms related to consumption.

Customers pay the EEC based on the number of kWh and, for customers served under a demand rate, the number of kW that they are billed for each month. This process results in rates for six classes of customers: residential, commercial demand-billed, commercial non-demand-billed, industrial demand-billed, industrial non-demand-billed, and unmetered street and security lighting customers. The rates

are the same for all members of each customer class, regardless of which electric utility serves that customer, with one exception. The PSB has established different rates for BED customers because BED implements the energy efficiency services in its service territory.

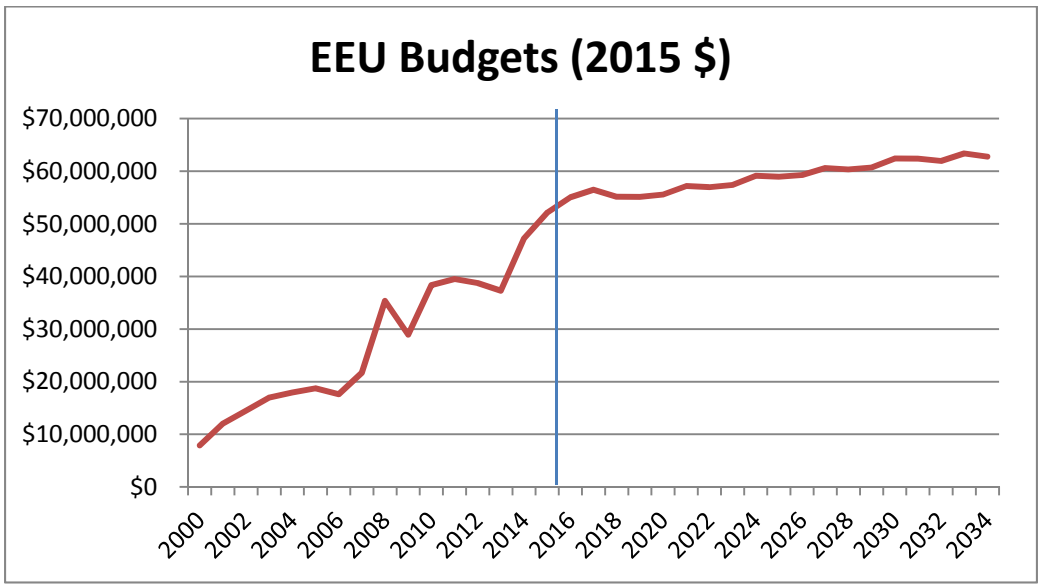
Energy Efficiency Utility (EEU) Programs

During the 1980s, regulators and utilities valued electricity efficiency based on impacts to stability and cost effectiveness of electricity services delivery. Efficiency is beneficial because all system users must pay for transmission and distribution infrastructure and investments in that infrastructure are reduced if overall use is reduced. The first phase of electric efficiency service delivery was based on each utility working with its customers to reduce use and maximize system effectiveness. After several years of this approach, it was clear that centralizing the functions of delivering energy efficiency through one entity would align the State's energy efficiency incentives and programs for delivering cost-effective efficiency measures.

In 1999, the PSB determined that electric efficiency services should be delivered by a single "efficiency utility" everywhere in the state except Burlington. Burlington Electric Department retained its independent successful efficiency program. At first, the franchise for Vermont's efficiency utility was granted as the result of a competitive process and Efficiency Vermont won a contract to provide these services to all Vermont electricity customers. In 2010, the PSB provided Efficiency Vermont (EVT) a longer-term agreement to allow for long term planning in the delivery of efficiency services; Efficiency Vermont is now explicitly a utility with a rolling twelve year Order of Appointment issued by the PSB rather than a state contractor.

In the most recent budget-setting process, which is revisited every three years and projects a 20-year time horizon, EEU budgets were projected to increase at a much lower rate starting in 2018.

Exhibit 2 – Actual and then projected budgets of the EEUs (2000-2034)



Data source: EEU Demand Resource Plan proceedings (2013-2014). Inflation assumed at 1.89%. Rates of increase slow after 2018.

The PSB requires that the EEUs provide services to each of the electricity customer classes based on funds received from each class via the Electric Efficiency Charge. The EEUs are also required to report the results of their efficiency services and incentives.

The EEUs provide services to all rate payers in two general categories. Technical assistance identifies specific efficiency activities that different customers may undertake. For industrial users, these may include efficiencies in the operations of a building (lighting and climate control) and industrial processes unique to each industrial business. The second category of service is a group of incentives for energy using equipment to buy down the payback period for new energy efficient equipment. Among the most well-known of these incentive programs is the reduced price for more efficient lighting. Beyond lighting and energy efficient bulbs, the EEUs provide incentives for equipment, motors, custom mechanical process improvements, and even some specialty items such as the snow-making guns used at Vermont ski areas.

Energy Efficiency Utility Program Options for Manufacturers

The most common way that manufacturers and businesses participate in efficiency investment is through their Energy Efficiency Utility (EEU): Efficiency Vermont or Burlington Electric Department. These EEUs maintain account managers who facilitate the identification of cost-effective energy efficiency opportunities for each firm and identify either prescriptive or custom incentives for energy efficiency opportunities. The EEUs provide incentives or assistance for improved:

- Processes, such as through “lean” improvements;
- Motors, drives and pumps;
- Compressed air systems;
- Lighting equipment, controls, and design;

- Heating, ventilation, and air conditioning (HVAC);
- Refrigeration and controls;
- Commissioning existing buildings;
- New construction and major renovation; and
- Insulation and air sealing.

In 2014, Efficiency Vermont launched an Industrial Peak Initiative[3] aimed at helping the state's largest electric customers reduce their peak energy use, resulting in customer savings as well as system-wide benefits in avoided infrastructure costs. On a life-cycle basis, energy efficiency resources acquired through these programs (or through the self-administered programs described below) are less expensive than electric energy supply resources that would provide the same energy service.

For example, from 2012 to 2014 Vermont's largest 300 businesses, which includes manufacturers as well as commercial customers, used approximately one third of all the electricity consumed in Vermont. Of 98 manufacturing firms in this group, 75 participated in energy efficiency programs during these three years. Approximately 460 individual projects were completed with these firms. The investments made at those 75 firms from 2012-2-14, are projected to yield an average net lifetime return on investment (L-ROI) of 116%. That is, for every dollar invested in energy efficiency the average gross monies returned on the investment to these companies is $2.16, for a net return of $1.16.

For these firms, investments in energy efficiency will deliver projected benefits for the lifetime of the efficient equipment (typically more than 12 years). For this analysis, benefits include only the projected electricity savings, fuel savings, and water savings associated with the installed measures (reduced operating and maintenance costs, increased productivity and non-energy benefits are not included). For participating firms which see a positive L-ROI, efficiency measures improve cash flow and allow these firms to spend less on energy and have more to invest in other capital improvements, new products and services, and their employees.

As a whole, participating firms experienced a wide range of L-ROI. The L-ROI for individual firms depends on a number of factors including the energy savings impact of the individual measures installed and frequency of participation. Even though on average the L-ROI was 116%, some firms had a much lower L-ROI, and others had a much higher L-ROI. For some firms, certain efficiency investments do not have a positive payback or the payback period was too long given their own discounting of future savings. Those firms reasonably would not elect to invest in those measures.

Because energy efficiency savings accrue for many years after the investment is made, it is necessary to model future savings to understand the L-ROI of efficiency measures. Although there can be some error in modeling as compared to actual results, modeling represents the best available information about individual measures and efficiency options. The EEUs regularly update models to reflect real-world, as-realized efficiency savings. The Department uses extensive sub-metering and real-world data to examine

[3] https://www.efficiencyvermont.com/blog/blog/2014/09/29/helping-vermont-s-largest-energy-users-save-money-and-stay-competitive

and verify EEU savings. In this case, a discount rate on future savings was not applied, though neither was an accounting for potential future rate increases which efficiency would offset.

Impact of Electric Efficiency Investments for All Customers

The savings acquired by the EEUs provide numerous benefits to Vermont's electric grid, Vermont ratepayers, and the Vermont economy. These benefits include:

- Significantly reducing the amount of electricity purchased to serve ratepayers. This is the largest source of monetary savings associated with efficiency. Purchasing wholesale electricity has been more expensive than paying for efficiency.

- Deferring or avoiding local or regional distribution or transmission projects. Infrastructure construction is expensive, and if targeted appropriately, energy efficiency can be an effective alternative.

- Reducing Vermont's share of the Regional Network Service ("RNS") charge. The New England states share the benefits and costs of reliability transmission projects completed in the region. These costs are significant, especially in the near term. Projected transmission projects may cost approximately $7 billion regionally, in addition to the more than $4 billion in investment already planned for the next 10 years. Vermont pays these costs based on its contribution to the peak New England load. Investments in energy efficiency reduce Vermont's share of the peak. Even small reductions in Vermont's load at the time of the New England peak create significant savings for Vermont ratepayers assuming other New England states do not reduce a similar or greater amount of load at the same time. For 2016, avoided RNS costs are expected to be approximately $.015 per kWh saved. In addition, the need for ancillary services provided by ISO-NE is shared across the region — another $.0066 per kWh saved. Taken together, each kWh saved avoids more than 2 cents in RNS and ancillary charges alone.

- Securing revenues from the ISO-NE Forward Capacity Market (FCM) to be used for thermal efficiency investments. A planned and verifiable reduction in load can bid into the FCM the same way that a power station can. Vermont's efficiency programs bid into the market and the state is paid as though it were a generating station providing energy to the grid. The revenue generated from that auction is applied to thermal efficiency investments in the state.

- Generating local jobs. Energy efficiency programs rely on local contractors, distributors, and retailers to facilitate service delivery. These stakeholders all benefit from increased private investment leveraged by efficiency.

- Reducing carbon emissions from electricity generation. Although Vermont has a relatively clean portfolio of electricity generation, energy efficiency reduces the need to purchase electricity from the regional market. Those generating units that deliver power at the time of peak usage, often from natural gas or oil-fired generation, produce significant carbon emissions. Efficiency investments reduce the need for these marginal generating units to be dispatched. The societal

cost of carbon dioxide emissions was recently estimated at approximately $100 per ton of CO2 equivalent.[4]

- Significantly reducing electric bills for customers who participate in programs, providing greater cash flow for commercial and industrial customers to reinvest in other business opportunities or needs, and providing more disposable income for residential customers to reinvest in the economy.

- Creating other, non-monetary benefits for participants, such as increased productivity, safety, and comfort. Health benefits may also be present. For example, the transition to LED lighting (replacing fluorescent bulbs on burn-out or early retirement) moves in a direction towards greater energy efficiency and reduces potential for human exposure to mercury found in CFLs and other fluorescent bulbs.

PSD estimates that from 2000 through 2014, EEU investments have avoided a cumulative total of more than 6.6 million MWhs of electric power generation.[5, 6] During this period the annual amount of electric energy saved by EEUs from current and past programs has steadily increased, from around 50,000 MWhs saved in 2000, to around 900,000 MWhs saved in 2014. This rapid year over year growth in electricity savings is a natural consequence of the long-lived nature of the return in investment in efficiency; measures installed in any one year will reduce electricity consumption for several years to come (for as many as 20 or 30 years for some measures). As EEU program budgets have grown and more efficiency measures have been installed, recurring electricity savings from ongoing investment in efficiency have accumulated to the point that retail consumption in 2014 was more than 13% lower than it would have otherwise been without this history of efficiency investments. Similarly, Vermont's peak demand for electricity in 2014—the level of consumption to which the grid must be built and maintained —was more than 100 MW lower because of EEU investments.[7]

In the absence of these efficiency savings, Vermont utilities would likely have relied on purchases from wholesale electricity markets to supply the power that was saved by efficiency investments. DPS estimates that the cumulative financial costs of those market purchases from 2000 through 2014 would have totaled more than $480 million (in 2015 dollars), an amount that ultimately would had to have been collected from ratepayers if not for the demand-side efficiency improvements enabled by EEU programs.

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[4] Rick Hornby, et al, Avoided Energy Supply Costs in New England: 2015 Report (for the Avoided-Energy-Supply-Component-Study Group, 2015), ma-eeac.org/wordpress/wp-content/uploads/2015-Regional-Avoided-Cost-Study-Report1.pdf

[5] For reference, Vermont utilities have sold almost 85 million MWh over this time.

[6] The Vermont Legislature's Joint Energy Committee recently requested an analysis of the economic impact of efficiency programs. For the complete report prepared by the Department, please see http://legislature.vermont.gov/assets/Documents/2016/WorkGroups/Joint%20Energy/January%2013/W~Jon%20Copans~Response%20to%20Joint%20Energy%20Commission%20Questions%20Regarding%20Energy%20Efficiency%20Investments~1-13-2016.pdf

[7] For reference, Vermont's peak demand in 2014 was around 950 MW.

These avoided power supply costs can be broken down into two separate categories: avoided market purchases of electric energy, and avoided market purchases of electric capacity.

Avoided electric energy purchases have been the dominant source of cost savings for electric utilities, totaling around $386 million cumulatively from 2000 through 2014 (in 2015 dollars). *Avoided electric capacity purchases* have historically been a smaller source of cost savings for electric utilities, totaling around $35 million cumulatively from 2000 through 2014 (in 2015 dollars).

In addition to avoiding wholesale market purchases, EEU investments have also reduced the charges that utilities must pay to cover the revenue requirement of the regional transmission owners in New England. These "Regional Network Service" (RNS) charges can be thought of as the local utility's share of the overall cost to maintain and upgrade the bulk transmission facilities relied on by all wholesale market participants in the New England region. Since 2000, Vermont utilities have paid more than $500 million in RNS charges (in 2015 dollars). DPS estimates that, were it not for EEU investments during this period, Vermont ratepayers would have paid about $52 million more for regional network service.

Exhibits 3 and 4 below present DPS's estimates of the total wholesale electricity cost savings in each year from 2000 through 2014 that have resulted from the avoided market purchases of electricity (energy and capacity) and avoided RNS charges that past investment in efficiency has made possible. In these Exhibits, it can be seen how the cost-savings from efficiency measures installed in a given year have recurred over subsequent years. For example the majority of the wholesale cost savings in 2005 were the result of measures installed years previous to 2005 (some having been installed even before 2000), but which were still saving significant amounts of electricity many years later.[8] The wholesale electricity cost savings from EEU investments have generally increased year over year as EEUs installed more and more measures that continue to reduce electricity consumption years after the those investments were made.[9]

[8] The measures installed before 2000 were done by BED. EVT was appointed an EEU in 2000 and does not claim any savings prior to 2000.

[9] In a given year, the total cost savings from avoided electric energy purchases depends both on the number of MWhs saved by EEU investments and the prevailing price of market electricity during the hours that those MWhs are saved. The average hourly market price of electricity since 2000 has ranged from as low as $38 per MWh to more than $94 per MWh (in 2015 dollars), and it is worth pointing out that there have been two instances in which the market price of electricity has fallen significantly enough to dampen the general trend of year over year increases in cost savings from avoided electric energy purchases; once from 2008 to 2009, when the average hourly price of electricity fell from $91 per MWh down to $46 per MWh (in 2015 dollars, a 50% decrease), and again from 20011 to 2012 when the average hourly price fell from $50 per MWh to $38 per MWh (in 2015dollars, a nearly 25% decrease).

Exhibit 3: Wholesale Costs Avoided through Energy Efficiency, 2000-2014

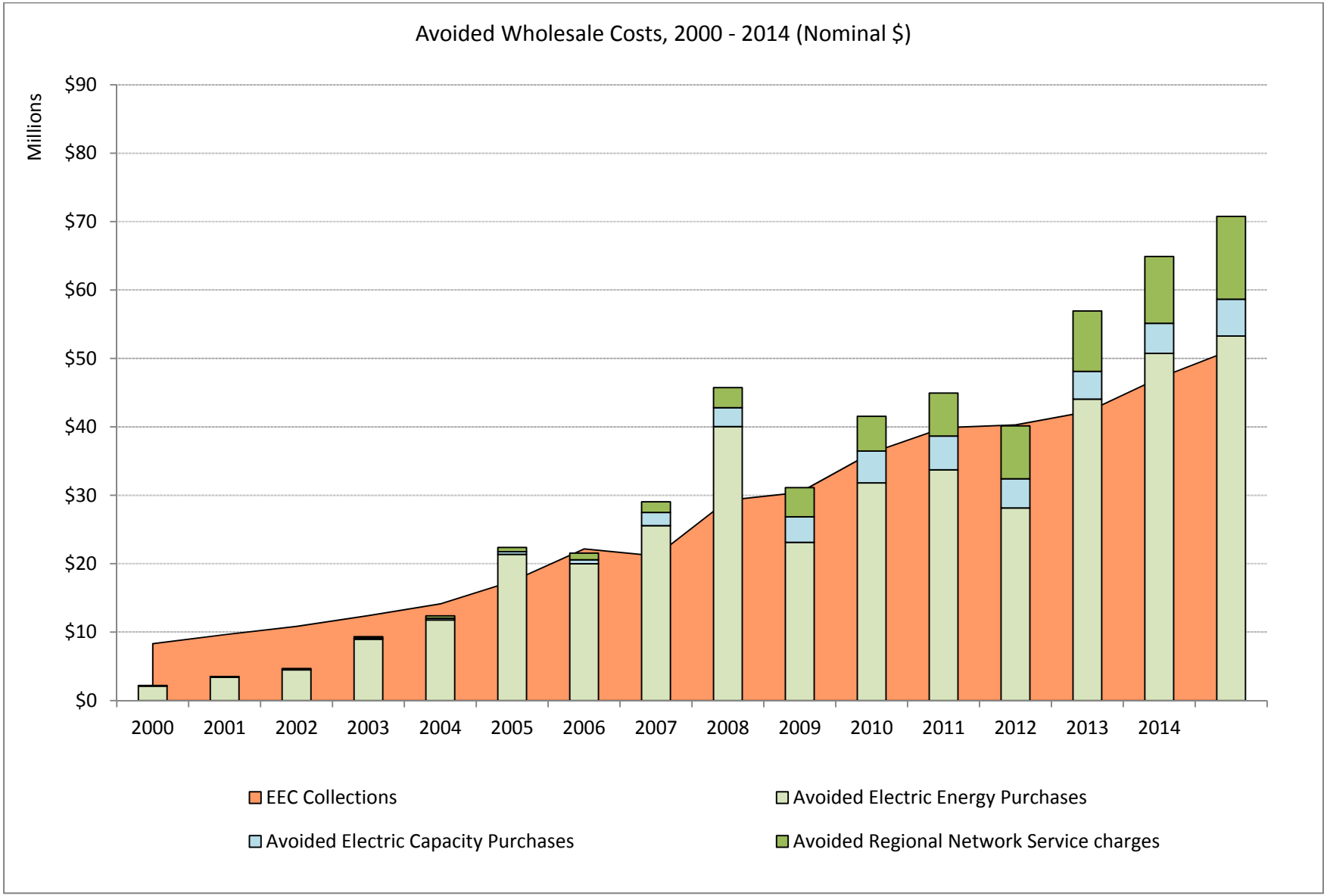


Exhibit 4: Wholesale cost saving and ratepayer expense, by year (millions of 2015 dollars)

Year	Avoided Wholesale Costs of Electricity (millions of 2015 dollars)				Collected from Ratepayers
	Energy	Capacity	RNS Charge	Total	
2000	2.9	0.0	0.1	3.0	11.2
2001	4.5	0.1	0.1	4.6	12.6
2002	5.8	0.1	0.2	6.0	13.9
2003	11.3	0.2	0.3	11.8	15.7
2004	14.6	0.3	0.4	15.3	17.5
2005	25.9	0.5	0.7	27.2	21.2
2006	23.7	0.7	1.1	25.5	26.2
2007	29.5	2.2	1.8	33.5	24.4
2008	45.0	3.1	3.3	51.4	32.9
2009	25.5	4.1	4.7	34.3	33.6
2010	34.8	5.1	5.6	45.4	39.6
2011	36.2	5.3	6.7	48.2	42.8
2012	29.6	4.5	8.1	42.1	42.3
2013	45.5	4.2	9.1	58.8	43.6
2014	51.4	4.5	9.9	65.8	47.8
Cumulative 2000-2014	386.2	34.9	52.1	472.9	425.3
Expected Value of Investment as of 2015	320	55	65	435	N/A
Cumulative 2016-2025	662	162	134	958	560

The cumulative value of all wholesale cost savings from 2000 through 2015 was $473 million (in 2015 dollars). In contrast Vermont ratepayers have paid about $425 million (in 2015 dollars) to fund the programs that avoided these wholesale costs.[10] Consequently, there has been a cumulative net savings to ratepayers as a whole of more than $50 million over this time (in 2015 dollars).[11]

[10] Individual customers that participate in EEU programs have also borne some of the upfront costs of reducing their electricity usage. From 2000-2014 these participant costs have totaled around $267 million (in 2015 dollars). This amount was not however, passed on to ratepayers. For a detailed breakdown of the composition of EEU spending, see Exhibit A-1 in the appendix to this document.

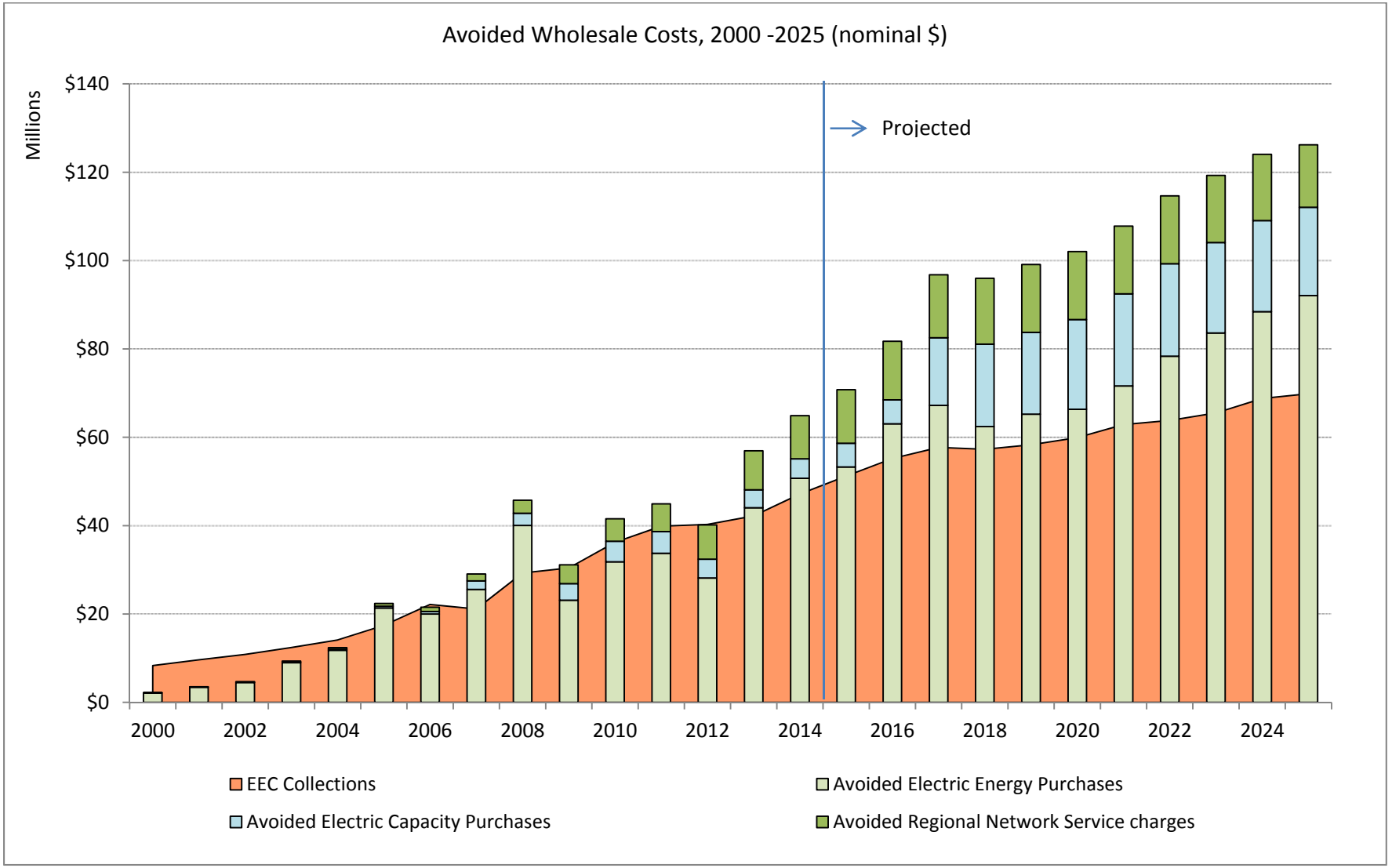
[11] In addition to avoided wholesale costs, efficiency investments are also likely to have avoided at least some amount of the ongoing cost of maintaining and expanding local transmission and distribution systems. Exactly how much "T&D" costs have been avoided by EEU investments is a complicated question requiring elaborate and

However, it is important to emphasize that this $50 million sum does not capture the full value of the EEU investments made since 2000, since many of the efficiency measures installed in the past will continue to save wholesale electricity costs for several years to come without any additional ratepayer funding. As of 2015, DPS expects that the EEU portfolio of active efficiency measures will save a total of almost 6 million MWh over the next three decades — almost as much electricity as has already been saved since 2000 — without the need for any additional program monies. Assuming current forecasts for wholesale electricity prices, DPS estimates that the present value (in 2015 dollars) of the future wholesale costs savings associated with EEU investments over the 2000-2014 time frame is in the range of $400 to $500 million. Factoring in the additional efficiency investments that EEUs are planning to make over the next 10 years, DPS projects that wholesale cost savings will continue to exceed the ratepayer costs required to fund EEU programs.

With today's price forecasts for electricity and capacity, the wholesale costs avoided by expected future EEU investments will increase faster than the growth in funding necessary to make those investments. As shown in Exhibit 5 below, by 2025, wholesale cost savings could be as much as 75% greater than the cost to run the program in that year (compared to a roughly 30% margin between savings and costs in 2014). The Department projects that the additional investments EEUs are planning to make over this horizon will be worth nearly $1 billion in cumulative avoided wholesale costs, an average of more than $90 million in wholesale cost savings each year through 2025 (in 2015 dollars). The cumulative ratepayer cost of funding this continued investment is expected to be about $620 million, an average of around $62 million collected from ratepayers each year. This would mean that over the next decade the cumulative net financial benefits to ratepayers will have risen from roughly $50 million in 2014, to more than $500 million by the end of 2025.

intricate analysis that has not been conducted for Vermont in almost a decade. For reference, in 2014 Vermont utilities spent over $143 million on local T&D. It is conceivable that without EEU investments, this total could have been 10% to 20% higher.

Exhibit 5: Wholesale Costs Avoided through Energy Efficiency, 2000-2025



In addition to avoiding wholesale costs, efficiency investments have also very likely avoided some costs associated with maintaining and expanding local transmission and distribution systems—known as "T&D" costs. These retail-side costs do not tend to vary much due to minor changes in electricity consumption so it is difficult to precisely estimate exactly how much cost-savings EEU investments might have caused since 2000. Utilities in Vermont spend well over $100 million per year on local T&D expenses (representing 10% to 20% of all utility costs), and it is conceivable that without EEU programs this total would have been anywhere from $5 to $20 million higher in each year since 2000. Without extensive additional analysis, it is not currently possible to reliably estimate the total retail costs that efficiency investments have avoided. DPS is planning to undertake such an analysis before the next cycle of EEU planning is complete but makes no attempt to estimate avoided T&D costs in this study.

Concerns Raised by Manufacturing Businesses

Even though the public reporting of benefits reflects the overall success of EEUs, including Efficiency Vermont, in delivering cost effective efficiency investments, several manufacturing businesses have raised concerns about the continuation and expansion of future investments and future payments through the Electric Efficiency Charge. Those concerns are summarized here. There were several comments on the draft report submitted by stakeholders which directly address the concerns raised by manufacturing businesses. Appendix A contains those comments (which given on an earlier version of this report).

Uneven distribution of benefits

All customers pay the Electric Efficiency Charge (though some larger customers participate in self-directed programs described below). Not all customers will take advantage of the efficiency services. As a result, the individual benefits from participating in efficiency activities are not uniform while the payments are. Therefore, businesses which participate benefit more from the program than others. Alternative market mechanisms would more closely tie the payments for efficiency with the benefits that result and lessen or possibly eliminate the difference in savings between "winners" and "losers".

In addition to winners and losers, the basic premise that a third party can identify efficiencies in a business about which they are not the primary experts is troubling to some customers. It is a primary goal of all businesses to identify and pursue cost savings investments, and some firms felt that an outside actor could not effectively assess efficiency opportunities as well as internal staff.

Some aspects of the work of EEUs are more applicable across different types of businesses. Building efficiencies such as climate control, lighting and general office operations are relatively uniform, and it is reasonable to assume that the EEUs have gained experience by working with many building owners and offer investment opportunities that will be cost effective. However, industrial processes are unique to each business. In fact, the operational activities are often the difference that positions a particular business at a competitive advantage to others in the market. Some business owners noted that it takes a significant amount of time to bring EEU consultants up to speed with respect to systems operations, and that time is not accounted for in the cost of efficiency investments.

The market and control

Manufacturing businesses often remark that the Energy Efficiency Charge is a mandated cost and that they can only receive services from a single efficiency provider (EVT for most customers, BED for others). This model is unlike the market approach for businesses to receive services outside the regulated energy sector. Competition among providers may allow businesses to better understand their choices in the purchase of a service. Having multiple vendors also adds comfort that the decision is theirs and not being imposed upon them.

The possibility that other efficiency providers could be availed to businesses with competitive costs and products increases the sense of market and control with which businesses are more comfortable in their operational decisions. Some users have hypothesized that competition would also put pressure on the EEUs to consider their own operational costs. Absent market pressures, some manufacturing businesses do not feel that those cost savings are being fully pursued.

Increasing Electric Efficiency Charge

The amount that all users have paid as their electric efficiency charge has increased from the advent of the EEUs to today and the PSB has approved continuing increases through 2017 with growth rates slowing in 2018. It is not obvious to industrial users that the opportunities for efficiency investments have increased or will increase to justify the rate increase. In fact, some customers suspect that the most cost effective investments have already been made and that future investments will have lower rates of return. Paying more for receiving less violates the basic market sensibilities of most business owners.

Financing assumptions

Another factor that differentiates the perspective of individual business owners from the societal view about the cost-effectiveness of any individual efficiency measure is the necessary rate of return for evaluating investment success. Most businesses interviewed for this report note that a payback period of two years or less is necessary for consideration of an efficiency investment. A three year payback was considered in some cases when additional factors like marketing the improvements are included. Deliberations before the PSB and reports from energy efficiency proponents assign a much longer payback period. The difference between these assumptions reflects a difference in the conclusions regarding what represents an economic choice around efficiency investments.

The role of the EEUs is to bridge the gap between the societal point of view on payback periods (represented by PSB rulings) and the business case for efficiency measures. For example, an efficiency measure may be economical from a societal point of view because of reduced emissions or other public goods, but it may not make business sense because the payback period is too long. The incentives offered by EEUs are intended to drive down the payback period to align public and private valuation of efficiency investments.

Lack of Trust

There are cases where industrial users do not believe that the savings promised or reported by the EEUs are actually realized. Savings calculations are often the product of modeled results. Reporting modeled rather than real-world results is a basis for skepticism among some users. In addition, EEUs are regulated by the PSB. A growing general skepticism among some customers regarding government decision making contributes to questions as to whether the EEUs are regulated effectively so as to identify and eliminate excessive costs.

Electricity and other forms of energy use

EEUs focus their efforts on electricity use. While they are participating in several activities that also accomplish reductions in fuel combustion, there is still a lack of clarity regarding when all fuels can be considered and when a particular efficiency program is exclusive to electricity use. However, if expanding the scope of the EEUs to include efficiency in fossil fuel combustion would require an increase in the Energy Efficiency Charge, industrial users would prefer that the EEUs continue to focus exclusively on electric efficiency.

Self-Directed Energy Efficiency Programs

For a small number of firms, retaining control over energy efficiency spending while forgoing some EEU assistance may be a viable option. There are alternatives in place to allow for companies to pursue electricity efficiency investments different from those provided through the Electric Efficiency Utilities. These alternatives recognize the creativity of individual businesses combined with possible outliers in industrial use patterns.

Self-Managed Energy Efficiency Program (Currently used by Global Foundries)

The SMEEP program, of which Global Foundries is currently the only eligible customer, completely separates the participant's energy efficiency program from the EEU and EEC structure, while requiring a substantial investment in cost-effective energy efficiency. The PSD is currently preparing an RFP for an evaluation of the SMEEP program.

Legislation 30 V.S.A 209(j) provides for very large users to design and carry out their own efficiency activities and not pay the Electric Efficiency Charge. This legislation was designed to provide an alternative to the unique situation at Global Foundries (previously IBM). Global Foundries has its own campus in Essex Junction and Williston and has a dedicated electricity distribution system. Since 2010 IBM/Global Foundries has carried out $6.1 million in efficiency investments, a sum roughly equivalent to what it would have paid for efficiency services under the pre-EEU model. IBM/Global Foundries also reports results to the PSB for each of year of its program and those reports have shown economic advantages to the company. No other company in Vermont meets the legal requirements which have allowed Global Foundries to develop its own efficiency program. Investments in efficiency under the SMEEP program also provide system benefits to all users.

Customer Credit Program (Currently used by OMYA)

The Customer Credit Program was created during the process of the creation of the 3rd party EEU structure. Global Foundries was a CCP participant until the creation of the SMEEP program. Omya, Inc., is now the only CCP participant. The CCP is similar to the Energy Savings Account program (described below) in that it allows participating firms to receive a portion of their EEC payments back in order to cover the costs of energy efficiency investments. It differs in that the range of possible energy efficiency expenditures is wider in some respects, up to 90% of the EEC may be returned, the firm may hold its portion of the EEC directly rather than asking for payments after the fact, and the EEU is not engaged in administration or assistance with the firm's efficiency implementation.

There has been limited interest from companies to pursue the Customer Credit Program based on a combination of the difficulty of meeting the qualifying requirements and a recognition that existing staff may not have expertise in efficient technologies. This underscores the value of EEU services and the difficulty of carrying out their own efficiency activities without technical support. Eligibility requirements limit participation in the Customer Credit Program. PSD and ACCD suggest that this program remain unchanged.

The CCP and SMEEP programs are designed for firms that have never received any assistance from their EEU and have demonstrated expertise in implementation of energy efficiency.

Energy Savings Accounts

Recognizing that certain business customers already may be committed to energy efficiency and have considerable expertise in implementing it, the energy savings account ("ESA") option allows eligible business customers to administer their own efficiency efforts instead of participating in EEU services. To date, there have been two participants in the ESA program. An Energy Savings Account (ESA) is a way for an individual company to set aside possible investment dollars for implementing efficiency improvements.

The ESA program allows participating firms to receive a rebate of up to 70% of their EEC expenditure over the course of 2 or more years for use in self-directed energy efficiency investments in their own facilities. The firm forfeits unused funds to be used by the rest of the EEU programs. The EEU provides some technical assistance and administers the program. Firms must pay at least $5,000 per year in EEC in order to be eligible for the ESA program.

As required by Vermont law, in 2009 the PSB established a process by which eligible customers may apply to the PSB for an energy savings account. Customers pay their EEC as usual, and can then apply for reimbursement of qualified expenses from their own funds. The law provides that the energy savings account contain a percentage of the customer's EEC payments for use in making energy efficiency investments, and that the remaining portion of the charge be used for system-wide benefits. These

provisions are codified in 30 V.S.A. § 209(d)(3)(B), described Appendix C, "Energy Savings Account Option for Customer Self Administration of Energy Efficiency" and on the PSB website.[12]

Like the Customer Credit Program, businesses have not expressed great interest in this approach for the same reasons. Qualifying for the program is seen as too difficult and interest in pursuing efficiency options without professional support is recognized as difficult.

On December 20, 2013, PSD filed with the PSB an evaluation of the ESA program conducted by Cx Associates.[13] The PSD subsequently proposed, and the PSB approved, several changes to the design of the ESA program resulting from that evaluation. The full final report of the Department's ESA program evaluation is attached to this report as Appendix D, "Energy Savings Account Program Process Evaluation." The final report includes an operational review of the ESA program, review of ESA participation, prospective ESA participant review, review of best practices for ESA-type programs, and recommendations.

Potential Changes to the ESA

The Department's investigation and research concludes that while the current ESA program offers benefits and may be of interest to potential participating customers, not all potential interested ESA customers have the capacity to administer and navigate it. Participation requires both energy efficiency expertise (including how to use various tools developed for use by the EEUs, such as the cost-effectiveness screening tool) and administrative capacity to handle the extensive requirements regarding how funds may be used and how savings are documented. In part due to these barriers, to date there have been only two participants in the ESA program.

As part of its investigation and research the Department has identified that there are several options worth exploring for changes to the ESA program. These options include changing to a performance-based structure, similar to what is in place for the EEUs, rather than a spending-based structure. For example, if a firm can achieve savings more cost-effectively in its own facility than the same investment could have achieved through the EEU, the firm should be encouraged to do so.

There may be more flexible options for a customer's ESA program cash flow and cash management. For example, a firm may be more likely to pursue efficiency if it has greater latitude in how to apply available ESA funds, and in how funds are accounted for financially. In addition, EEUs currently provide some technical assistance to ESA-participating firms, and those firms' efficiency acquisition counts towards the EEU's performance goals; further investigation could illuminate how to cost-effectively provide optimal level of both EEU and firm assistance to reduce costs.

For example, this could develop into an analog to the "special contracts" that distribution utilities can provide to deliver unique services to their customers; EEUs could develop individualized treatments of EEC and assistance for each participating ESA firm. By doing so, it may be possible to keep elements of

[12] http://psb.vermont.gov/sites/psb/files/orders/2014/2014-06/Attachment%20A%20ESAprogramDesign2014.pdf
[13] http://psb.vermont.gov/sites/psb/files/projects/EEU/ESAprogram/DPS-ESAProcessEvalFinalReport2013-12-20.pdf

the technical assistance and account management engagement model intact, while addressing issues for some large customers and providing greater control over their EEC. Each of these potential changes needs to be investigated and evaluated through dialog with stakeholders before it is implemented, in order to design a program that advances the public objective: cost-effective energy efficiency acquisition without lost opportunity resulting from program design.

Recommendations

Vermont's energy laws establish a goal of achieving all reasonably available cost-effective energy efficiency. Energy efficiency acquired by Vermont-based manufacturing firms provides benefits to both the firms (through increased productivity) and society at large (through shared electric grid and environmental benefits). The Public Service Department is interested in learning how the state can best design and implement programs that achieve this goal while also working with, appreciating, and harnessing the diverse operating regimes, capital and financial structures, and fiscal constraints of Vermont's manufacturers.

Most Vermont firms are well-served by the energy efficiency utility structure, in which they pay an EEC and are able to take advantage of technical and financial assistance from the EEUs; however some limited number of firms which do not currently invest in efficiency might choose to do so with some programmatic changes. PSD and ACCD are interested in learning how firms make decisions to change their production processes, buildings, or operations in ways that would increase energy productivity. Once we understand how these decisions are made (or why they are not made), we would like to design policies and programs that build from that knowledge, including self-directed programs discussed in more detail starting on page 28.

It is the PSD and ACCD's opinion that the statutory directives contained in 30 V.S.A. 209 establish a sufficient framework for the delivery, funding, financing, and participation requirements for energy efficiency programs. The PSD and ACCD do not recommend any changes to 30 V.S.A. 209 at this time.

While the interest in pursuing the self-directed programs is limited, the possibility that an alternative to the mandated approach represented by the Energy Efficiency Charge is still intriguing for some businesses. Considering a re-design of the Energy Savings Account may allow for increased uptake and those early adopters can be reviewed to determine if their participation leads to improved efficiency investments.

There is a belief that the current design of self-directed programs is based on a fear that their implementation may lead to less valuable efficiency investments, but until some real examples are pursued, those fears are unfounded.

Over the next year, the PSD and ACCD, the Regional Development Corporations, AIV, the EEUs, and other stakeholders intend to investigate updates to the Energy Savings Account program, including consideration of changes in the ESA program structure to allow it to work for a wider variety of firms, as well as the possibility of "special contracts" that work for particular firms.

With respect to self-directed energy efficiency programs, the PSD and ACCD anticipate relying on publications regarding best practices for self-directed programs, in addition to feedback from firms and other stakeholders. Of particular interest may be a recent summary of best practices published by the American Council for an Energy Efficient Economy (ACEEE).[14]

The list of best practices identified there includes:

- Develop a program structure that allows facility managers to treat their energy efficiency fee payments as dedicated funds for energy efficiency, either through dedicated escrow accounts, rebates earned only upon project completion, or rate credits earned concurrently with measurable energy efficiency investments and/or energy savings,
- Include a mechanism to recoup paid funds from self-direct customers if it is determined that savings were claimed erroneously or if planned savings did not actually occur.
- Collect and establish self-direct customers' baseline energy use data.
- Focus on energy savings rather than funds expended towards energy efficiency, so that each self-direct customer is held accountable to a certain level of energy savings rather than a level of spending.
- Measure and verify all claimed savings, using the same standards for data collection as industrial energy efficiency fee-funded energy efficiency programs.
- Retain a portion of a customer's energy efficiency fees to ensure self-direct customers contribute to funding a program's administrative costs and other prioritized program costs (such as low-income programming or market transformation) that all other customer classes pay for via their energy efficiency fees.
- Generally do not allow credit for efficiency investments made prior to the commencement of a self-direct program.
- Offer self-direct customers multi-year time frames (e.g., 4 years) in which to expend aggregated energy efficiency fees.
- Make any unused fees available to other customers for cost-effective projects.
- Employ the same cost-effectiveness tests for self-direct projects as are used for other fee-supported programs, and develop a reliable account of the cost of saved energy within the program.

The ACEEE also maintains a database of the self-direct or opt-out programs available in each state.[15]

Retail Choice Evaluations (item 4)

History and Background

During the late 1990's, many states considered the separation of electricity generation and distribution from utilities' regulated activities. As a result, the other New England states and others in the U.S. provided opportunities for electric users to "shop" for electricity purchases. The introduction of competition for electricity purchases combined with regulatory requirements led to short term reductions in electricity prices for many users throughout the region. However, after the regulatory

[14] Available at http://www.aceee.org/sector/state-policy/toolkit/industrial-self-direct

[15] Available at http://database.aceee.org/state/self-direct.

requirements lapsed, many users faced increased costs. The movement from traditional rate design to competitive pricing resulted in what, in retrospect, is a natural outcome – some users found cost savings, while others were required to shoulder more of the fixed costs of distribution utilities and saw price increases.[16]

Restructuring and retail choice have caused a great degree of uncertainty for users playing the electricity market and a general appreciation of stable electricity pricing for operational planning among many industrial users. Some users in Vermont have expressed interest in restructuring because they believe it may provide opportunities to lower their electric bills. In considering this issue, Vermont should learn from the 10 years of experience with partial deregulation in other states and identify best-practices and possible paths forward.

Retail Choice Issues and Progress

In most states, retail choice is available only for utility customers served by investor-owned utilities. While there are examples of electric cooperatives, municipal utilities, and government operated utilities that offer retail choice, state regulatory commissions have generally found retail choice to be disruptive to small utilities.

In general, retail choice programs allow customers in all classes (*i.e.*, residential, commercial, and industrial) to choose their electricity supplier, although not necessarily in the same time frame. Some states have phased-in programs so that industrial and commercial customers were able to choose first, followed by residential customers.[17]

States implementing retail choice instituted both legislative and regulatory changes in order to "unbundle" market operations. First, before a state permits its retail customers to choose their electricity supplier, it unbundles or separates the utility's generation assets from assets for transmission and distribution services. Secondly, wholesale market reforms were often necessary. This included the creation of a functioning spot energy and operating reserve market, among others.[18]

The Retail Choice Option

The primary reason cited by state commissions, and customers for allowing customers to choose their electricity supplier was the expectation that increased competition would help to; 1) drive down high retail rates; and 2) improve market efficiency by providing better price signals, and 3) increase service innovations, such as green power and efficiency services.[19]

The states that have moved toward competition in electricity generation and retail marketing are in a transition period, during which retail price regulation continues as elements of competition are

[16] The U.S. Electricity Industry after 20 Years of Restructuring, Severin Borenstein and James Bushnell, May 2015

[17] Retail Competition, FTC, Washington, D.C., September 2001.

[18] The Difficult Transition to Competitive Electricity Markets in the U.S., Paul L. Joskow, MIT. May 2003

[19] Ibid.

introduced. The length of this transition period is typically determined by the length of time states have allowed utilities to recover previously-incurred investments (stranded costs).

Furthermore, this review found that states that have offered retail choice generally include all classes of customers, albeit with different transition periods.[20] Examples of retail choice offered to large industrial customers alone remain elusive. Given that retail choice states are in a transition phase, with a hybrid of regulation and competition, many of the expected price benefits of competition have not yet emerged.[21]

Business Competitiveness

Manufacturing retention, expansion, and attraction is impacted by perceptions of the state and site specific business conditions. Although the components of an attractive business climate are an evolving concept, it is clear that over the years, costs and infrastructure (including energy costs) are important site location factors. Therefore, reducing energy costs is a common business strategy to make businesses and industries more competitive with other states and regions. [22,23,24]

For most businesses in Vermont and elsewhere the cost of energy represents less than 10% of total operating costs; however, energy costs are geographically variable costs that can influence site location, investment and ultimately, jobs. To the extent that retail choice may affect energy costs, Vermont should continue to consider retail choice and monitor the impact of retail choice on other states in the region.

The Current Retail Choice Situation

Seventeen states and the District of Columbia have adopted electric retail choice programs that allow end-use customers to buy electricity from competitive retail suppliers. Overall, competitive retail suppliers provided 16% of total U.S. retail sales by volume in 2010. A majority of commercial customers have signed with competitive suppliers in 9 states and a majority of industrial customers signed in 12 states.[25]

In the ISO-NE region, four states (CT, MA, NH, RI) have an average of 73% of industrial and 54% of commercial retail sales purchased directly from competitive suppliers. (Maine, a retail choice state, is excluded because of data issues, while Vermont does not offer retail choice).[26]

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[20] Innovations in Retail Choice for Large Commercial and Industrial Customers, Hilke, J. & M. Wroblewski, Business law Brief, American University, Washigton, D.C. Fall 2005

[21] Retail Competition, FTC, Washington, D.C., September 2001.

[22] "Top States For Doing Business 2015", Area development, 2015(3).

[23] Best States For Business, Forbes, October, 2015

[24] Public Policy, State Business Climates, and Economic Growth." Jed Kolko, David Neumark, and Marisol Cuellar, National Bureau of Economic Research Working Paper No. 16968, April 2011.

[25] EIA-Can customers choose their electricity supplier?, U.S. Energy Information Administration, Washington, D.C. , December 2014

[26] EIA-Can customers choose their electricity supplier?, U.S. Energy Information Administration, Washington, D.C. , December 2014

Impact of Retail Choice and Competitiveness

As noted above, states are still transitioning to competitive markets making evaluations of retail choice difficult, at best. And, since states have deregulated all classes of customers it is even more difficult to assess the impact on manufacturing customers in particular.[27]

However, the American Public Power Association (APPA) recently analyzed U.S. Department of Energy's Energy Information Administration (EIA) data between 1997 and 2014 and found retail electric price increases, for all classes of customers, were higher in absolute terms in states with deregulated electric markets than in regulated states.[28]

Exhibit 6 - Average Revenue per Kilowatt-hour in Deregulated vs. Regulated States

	(in cents per kWh)		
	Deregulated	Regulated	U.S.
	States	States	Average
1997	8.6	5.8	6.8
2010	12.1	8.6	9.8
2011	12	8.8	9.9
2012	11.8	8.9	9.8
2013	12.1	9.1	10.1
2014	12.7	9.4	10.4
Chg (97-14)	4.1	3.6	3.6
Growth	2.3%	2.8%	2.5%

States that implemented retail choice generally had higher than average rates. In 1997, deregulated states had average rates 2.8 cents per kWh above rates in the regulated states (8.6 vs. 5.8 cents per kWh). By 2014 the gap between rates in regulated and deregulated states widened, with customers in deregulated states paying, on average, 3.3 cents per kWh above rates in regulated states (12.7 vs. 9.4 cents per kWh).

APPA attributes these higher price increases in deregulated states to retail choice programs that are influenced by volatile wholesale power prices and the absence of rate caps and other regulatory protections available under a regulated regime. Five of the deregulated states are in the ISO-NE region. The table below shows that rates for all five states were already well above the national average in 1997. Over the 1997-2014 year period, Connecticut, Massachusetts, and Rhode Island experienced rate increases significantly above the national average.

[27] Competition and Consumer Protection Perspectives on Electric Power Regulatory Reform: Focus on Competitive Procurement of Retail Electricity Supply: Recent Trends in State Policies and Utility Practices, S. Tierney and T. Schatzki, the National Association of Regulatory Utility Commissioners (NARUC), July 2008

[28] 2014 Retail Electric Rates in Deregulated and Regulated States, American Public Power Association, Published April 2015.

Exhibit 7 - ISO-NE Average Customer Electricity Rates

		(in cents per kWh)	
	1997	**2014**	**Diff**
Connecticut	10.5	16.9	6.4
Maine	9.5	12.6	3.1
Massachusetts	10.4	15.2	4.8
New Hampshire	11.6	15.2	3.6
Rhode Island	10.7	15.5	4.8
U.S. Average	6.8	10.4	3.7

Also, a study by the Michigan Public service Commission reports "that even in today's low natural gas price environment, electric rates are 30% higher on average in deregulated states than in regulated states. Because most of those states were higher-cost prior to selecting a deregulated structure, however, causation should not be inferred."[29]

Recommendations

In other states, the movement toward retail choice and competition in electric markets was done in anticipation of customer benefits in terms of lower prices, higher quality, and greater innovation than what could be expected in a regulated environment. Because regulatory reform remains a work in progress there is little current definitive or conclusive evidence that draws a clear connection between retail choice and lower rates for any customer class, including manufacturing businesses.

Cost Shifts (items 6, 7, and 8)

This section examines cost shifts that have occurred, or which may occur, between customer classes from new rate designs as well as programs and policies that are aimed at improving business competitiveness. Additionally, PSD and ACCD examined cost shifts that have occurred in the past with large customers acquiring significant levels of energy efficiency and from large energy users leaving a utility service territory. PSD and ACCD assessed to what extent costs have shifted to residential and business ratepayers following the loss of large utility users, and potential scenarios for additional cost shifts of this type as well as the potential benefits and potential cost shift to residential and business ratepayers if a large utility user undertakes efficiency measures and thereby reduces its contribution to fixed utility costs. None of the policies contemplated in this report impose cost shifts between customer classes, nor do they result in stranded costs which cannot be recovered by a regulated utility.

[29] Readying Michigan to Make Good Energy Decisions: Electric Choice, Michigan Public Service Commission & Michigan Energy Office, November 20, 2013.

Impact of Loss of Large Users

The PSD and ACCD have gathered historical information related to the loss of a large utility user, the former Ethan Allen facility in Beecher Falls. With the help of VEC we reviewed the impact of the reduction in load from the Ethan Allen facility. VEC provided an analysis of the impact of the loss of load associated with this account over the past ten years. The Ethan Allen is still a customer of VEC but their load has been significantly reduced. In order to complete the analysis VEC reviewed account data before the down-size and compare that to current status, normalizing for rate increases. The estimated impact to VEC members was $208,316 in income or approximately a one-time 0.275% rate impact.

Additionally PSD and ACCD have estimated the impact of the possible loss of other large users and the cost shift that would occur to other residential and business ratepayers on the GMP system. With GMP's help we created an estimate of the net revenue loss associated with the loss of a 1 MW manufacturing customer. The focus was on the power cost components that GMP would avoid and compared them to the current rate revenues that would be produced. PSD assumed a load factor of 55%, off-peak kW of 85%, and peak of 60%, and off-peak of 40% energy use. We believe that these are reasonable representations of a large manufacturing customer on legacy-CVPS Rate 4. The estimated impact to GMP is a loss of $244,952.

Impact of Efficiency Measures by Large Users

There are many potential benefits when large users undertake efficiency measures. These benefits are described above in discussion on energy efficiency programs.

The potential cost shift to residential and business ratepayers if a large utility user undertakes efficiency measures, and thereby reduces its share of fixed utility costs, does exist but is limited. Efficiency spending for each rate class is set by a budget approved by the PSB. This budget is partially based on the total revenues from each rate class and program spending is roughly equal for each rate class based on revenue. So there is little cost shift among rate classes because there is an equal amount of efficiency spending in each of the rate classes. To the extent there is a cost shift, it would mainly occur between participants and no-participants.

Where volumetric (per kWh) charges are used to recover part of a utility's fixed costs, energy efficiency programs that are aggressively reducing overall usage and customer bills can impact fixed cost recovery for the utility. GMP operates under alternative regulation system which provides GMP with some revenue decoupling. Revenue decoupling severs the link between profits and the volumetric sales of electricity. This decoupling does not discriminate between the reasons (weather, economic growth, and energy efficiency) for which required revenues were over- or under-collected. The rest of Vermont's electric utilities operate under traditional rate regulation where variations in revenues are absorbed by the utility until their next rate filing.

Even without revenue decoupling, energy efficiency programs, it can be argued, result in non-participants cross-subsidizing participants. This cross-subsidizing would likely continue until the utility's next rate design at which time it could be addressed through various means.

Large industrial customers experience much more variation in their electric usage patterns than customers in other rate classes, which may be due to a number of factors including changes in production, weather, and seasonality. For this reason, the impact of efficiency is best measured not at the plant level, but by calculating the energy usage required per unit of production. Under this framework, significant efficiency can drive improvements for the bottom line of the business, but when paired with increased production might not result in an overall reduction in electric usage, or a rate revenue impact for the utility.

Efficiency is also measured by reducing usage that would otherwise have occurred, without assistance from an efficiency program. For example, in the case of a new factory being built, an efficiency utility might offer incentives to encourage the installation of top of the line equipment that requires less electricity to operate than standard equipment that might be purchased for a lower up front cost. Under this scenario, significant efficiency savings could be achieved with no corresponding reduction in overall rate revenue for the utility – instead, future electric usage is lower than it otherwise would have been.

Customers who work closely with efficiency programs and focus on reducing use are generally able to reduce load by 1.5-2% per year. Aggressive energy efficiency work might result in reductions of 2.5-3% per year. The extent that usage reductions would impact utility rate revenue would be strongly influenced by the size of the revenue reduction compared to the utility's fixed-costs recovery. Small utilities might see a larger rate impact.

Appendix A
Comments on the Draft Act 199 Report

Vermont Public Service Department
Agency of Commerce and Community Development

January 22, 2016

A draft of this report was issued on December 17, 2015. ACCD and PSD solicited comments from stakeholders including the Public Service Board, electric utilities, energy efficiency utilities, manufacturers and their representatives, Regional Development Corporations, and Regional Planning Commissions. Several comments were submitted by December 31, 2015 and additional and revised comments were submitted by January 13, 2015. All comments were included in this appendix.

ASSOCIATED INDUSTRIES OF VERMONT

REPRESENTING THE VERMONT INDUSTRIAL AND BUSINESS COMMUNITY SINCE 1920

Comments on Draft Act 199 Study on Manufacturing Competitiveness and Energy

December 31, 2015

AIV appreciates the opportunity to provide comments on this draft report. Below are some general comments followed by more specific points by page. Please do not hesitate to contact us to discuss any of the comments or issues and questions raised below.

General Comments

AIV agrees that this report should be presented as the next interim step leading to further discussions and work between the PSD, ACCD, RDCs, AIV, and other stakeholders to develop more analysis and information to ultimately support substantive proposals. We would suggest emphasizing this to a greater extent in the introduction and the explicit inclusion of AIV and the RDCs among the parties to be involved in these ongoing efforts.

We would recommend the following areas to note as priorities for further investigation and development:

- Rate design options, including not only smart rates and economic development rates but also specific rate classes such as one or more manufacturing rate classes.
- Retail choice options, with a particular emphasis on considering options for phasing in limited choice options depending on customer size and/or sector.
- Alternatives to current EEU funding mechanisms, including not only modifications or additions to existing self-directed programs like ESAs but also greater exploration of on-the-bill financing and other loan-based options and tax incentives for commercial and industrial customers.
- Greater analysis and understanding of the full economic value of both job creation and job retention, as well as related investments and expenditures, in manufacturing and related sectors to better inform rate design and other cost shift considerations.

Walk-Through of Additional Comments

Page 4-5. Although noted in the draft report, it should be emphasized more strongly that comparisons to New England rates are of little relevance compared to national rates. Also, the draft report is likely underplaying the number of manufacturers that are subject to commercial rather than industrial rates, given the very small number of industrial customers in Vermont according to EIA statistics. Vermont's disadvantageous position compared to other New England states and states nationally would therefore be of greater significance and should be recognized. This likelihood should be noted for further investigation and understanding.

Page 5 and following. The draft report is likely overplaying the significance of the volatility of New England rates given not only the limited relevance of New England comparisons noted above but also the ability of commercial and industrial customers to limit their exposure to volatility through retail choice contracts. This latter possibility should be noted for further investigation and understanding.

Page 8. The report suggests that one downside of reducing the cost of electricity for manufacturers might be discouraging investment in efficiency. This suggests a negative downside to reducing electric rates. Given the high cost of electricity in Vermont and any realistic potential for reducing that cost, it is very hard to see a cost reduction large enough to have such an effect in a meaningful way. This reality-check should be included to offset what will otherwise be an unwarranted negative suggestion. Similarly, "discouraging wasteful use" is a dubious element to include in rationalizing the cost of electricity in this context.

Page 11 and following. The draft report discusses and Appendix A provides summaries of states' economic development rates, but in developing the authorizing legislation for this report and in initial discussions between AIV and the PSD, dedicated rate classes like manufacturing rates were supposed to be addressed, including with a review of other states' approaches. This is a significant omission from the current draft that should be addressed for the final report. (It would also be helpful to have a more comprehensive review of other state economic development rate programs than what is provided in Appendix A)

Page 12. The report states that "none of the factors considered in this report leads to specific recommendations to modifying the structure of electric rates in Vermont." Intentionally or not, this suggests that such modifications are not in fact warranted. While specific modifications might not be ready for proposal and require further investigation, we would strongly disagree with a message that they are not warranted. We would recommend that the final report be clear on its intended message and acknowledge that modifications might indeed be warranted.

Page 12 (and elsewhere). The report often refers to large users. However, the national and international competitive pressures and electric rate challenges also significantly impact smaller users. Given the large number of "smaller" manufacturers, they collectively make up a meaningful portion of our manufacturing base and should therefore be included throughout the report as well.

Page 12. As noted above, the list of options for consideration should include dedicated rate classes for manufacturers and related businesses. Also, a "Vermont way" is an imprecise term (among other problems), and the report should instead be more direct and clear about what is contemplated.

Page 15 and following. In discussing the costs and benefits of efficiency and the Energy Efficiency Charge, the report does not include two important considerations: 1) the lost opportunity costs related to what benefits could have been gained or needs addressed by using funds for purposes other than the EEC, including 2) the lost costs that result when the cumulative EEC costs exceed the dollar value of actual efficiency assistance or exceed cheaper alternatives for the same improvements and savings. The report should also be clear when discussing cumulative savings/avoided expenditures from efficiency whether and the extent to which those savings are based on modeling or real world data, and whether they take into account and exclude demand reductions resulting from lost economic activity unrelated to efficiency.

Page 19. AIV feels that the overview of concerns raised by stakeholders is a good summation of a number of key issues. We also understand that the PSD might not agree with them. However, it might be more appropriate simply to present them as being raised by stakeholders without suggesting that the PSD disagrees with them unless the report is going to be more specific about disagreements and allow for different perspectives to be explained. We suggest this for consideration and possible further discussion/clarification before the final report.

Page 22. AIV would suggest that it is premature to recommend that the CCP or other programs remain unchanged.

Page 25. Based on our own interactions with Vermont businesses, we do not believe there is a sufficient basis to say "There is not a strong voice from larger Vermont users to shift to retail choice". It is certainly a complex and uncertain issue, and it is fair to characterize it as such, but that is not the same thing.

Page 27. Intentionally or not, the report seems to suggest that something less than 10% of total operating costs is not necessarily significant. However, any one input in that cost range is in fact extremely significant, especially for manufacturers.

Page 29. The causation caveat at the top of page 29 should be emphasized more clearly in discussing this issue.

Conclusion

On balance, and with the comments and recommendations above, AIV believes that this report could be a good next step in this ongoing process. We look forward to continuing to work with the PSD, ACCD, RDCs, and individual businesses in further investigations, discussions, and recommendations.

Please don't hesitate to contact us to discuss these comments or related matters further.

Sincerely,

/s/

William Driscoll
Vice President

To: VT Department of Public Service
C/O Joanna White

From: Scott Ferland
Cersosimo Lumber Co. Inc.
Brattleboro, VT 05301

Cersosimo Lumber Co. has been engaged with Efficiency VT over the course of many years and many projects with great success. Many of the projects that have been completed would never have come to fruition without the technical and incentive support offered by EVT. It was recognized early in our relationship with EVT that they had a lot to offer us in managing and reducing one of our major overhead expenses as we continue to grow. It is important to our company that we get value from the dollars that we pay into the state efficiency program. By developing the sound working relationship that we have with EVT, we feel that that value continues to be accomplished. Every manufacturing project that our team begins to think about is soon being discussed with the EVT team. The input from our EVT account manager and project manager has helped us to remain competitive. EVT supports our managers with the proper data to pursue, or not to pursue, projects. Cersosimo Lumber Co. owns and operates manufacturing facilities in NH, MA and NY. Every state that we operate in has some form of efficiency program, we have found working with EVT to be the most straight forward and supportive. It is my hope that the program can grow in areas that help efficiency in other areas other than direct electrical efficiencies.

Respectfully,

Scott Ferland
Project Manager
Cersosimo Lumber Co.
802.254.4508

Comments on the Draft Report

Act 199 study on manufacturing competitiveness and energy

Dated December 17, 2015

These comments submitted by Janette Bombardier.

Regarding rate design and competitiveness

- The charts should show New York State also
- Any reference to price of electricity must also include the other charges the State of Vermont includes in electric bills, including the efficiency tax, as it directly relates to usage
- Data for large users (industrial and commercial) should clarify the difference as it relates to rate class in Vermont. At least GLOBALFOUNDIRES is a transmission class customer, which steps down all the voltage from 115kV system. Owning and operating this system is an additional cost that is additive to the rates stated.

Economic Development Rates

- Economic development rates must be available to the sustaining businesses and industries of Vermont. Any Vermont business that operates in more than one state is subject to routine comparisons between economic development programs in each state and utility rates in each state. Economic development programs for electricity must have focus on keeping the businesses that already exist, versus attracting new businesses.

Energy Efficiency Programs

- The rates, rate of increase and the use of funds collected by the current energy efficiency utility, Efficiency Vermont, are an issue. The Order of Appointment process has severely reduced the competition that would improve cost effectiveness of the efficiency tax. This is demonstrated by the following which should be included in the report
- Using data from the Efficiency Vermont Annual Report of 2014, Page 54, budget statistics in this report indicate the following:
    - The total Efficiency Vermont cost for 2014 for the Electric Resource Acquisition was $41,812, 241. Operating costs such as administration and planning was $9,960,610 or 23.8 percent of the budget. Support services, which are primarily payments to VEIC, which also are operating and planning type costs are $3,419,764 which is another 8% of the budget. **Only $22,884,463,or 54.7% of the monies collected actually make it to Incentives for projects. To that participants must add $22,482,896 to complete projects.**

- Statements that indicate “Vermont firms are well served by the energy efficiency utility structure” on Page 19 of the report are not addressing the millions of dollars being spent to administer the program versus real projects with real results.

- All references to ROI’s in this report must include the complete set of costs charged to a business. You must consider the efficiency tax, the contribution from the business and understand if this use of funds would have been the optimum decision for the company. And all savings calculations for the energy savings and cost per kwh must include all costs from EVT and the participant.

- Page 135 of the same report indicates that only 65 industrial users were supported in 2014. Page 15 of your report indicates 300 large users. There is a discrepancy.

- Page 135 of the same report also indicates that since 1/1/12, ninety-nine industrial users participated, with participants having to pay $16,218,141 while Efficiency Vermont only provided about half the funds at $8,204,558.

Self-Managed Energy Efficiency Programs

- Under NO CONDITION should your draft report on Page 21 use the phrase **“ while requiring a minimum investment in cost-effective energy efficiency” . We are required to commit on average ver $1,000,000 per year, and pay a $50,000 fee to have our program. This is not MINIMUM. It is excessive to run a competitive business.**

- Long term participants in energy programs of any types, will see the duration to see any ROI increase the longer they participate in an energy program. Required spending levels should be reduced as businesses need the flexibility to invest capital where it makes sense for their business and not some predetermined dollar amount. As long as companies demonstrate on going commitment to energy efficiency via ISO14001 or other recognized external benchmark, the amount to be spent should be left up to the business,.

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From Brenan Riehl of GW Plastics

<Brenan.Riehl@gwplastics.com>

Vermont should consider a nationally competitive economic development rate for “anchor tenant” companies such as GW Plastics who have operated successful job-creating businesses in Vermont for years. The requirement to meet restrictive contingency criteria to be eligible for economic development rates is out of touch with the realities of the marketplace. Vermont needs to do a better job in proactively helping “anchor tenant” job-creating or sustaining companies successfully compete in the marketplace through competitive energy rates. Moreover, placing most of the responsibility on businesses to prove why they deserve economic development rate incentives is short-sighted. Vermont should work to foster a nationally competitive cost structure for business or companies will have no choice but to go elsewhere.

The efficiency of Vermont charge should be eliminated for businesses who have demonstrated long-term sustainable job creation and a commitment to energy efficiency. In the case of GW Plastics, we would rather forgo the EVT charge in our electricity rates and self-fund energy efficiency projects. The rigors of the free market give GW and most manufacturers sufficient incentive to improve energy efficiency so that they can remain competitive in the global marketplace.

Douglas R. Hoffer
161 Austin Drive #71
Burlington, VT 05401
802.864.5711

To: Chris Rechia, Commissioner, Department of Public Service
Pat Moulton, Secretary, Agency of Commerce
Date: 29 December 2015
Re: Act 199 study on manufacturing competitiveness and energy

I offer the following comments on the Act 199 draft report. I am writing as an interested citizen and not in my capacity as State Auditor.

The section of the report on Business Competitiveness asserts that energy costs are an important factor in manufacturing retention, expansion and attraction.

> "*Although the components of an attractive business climate are an evolving concept, it is clear, that over the years, costs and infrastructure (including energy costs) are important site location factors. Therefore, reducing energy costs are a common business strategy to make businesses and industries more competitive with other states and regions*."[1]

According to national data from the Census Bureau's 2013 Annual Survey of Manufactures, the cost of purchased electricity is less than one percent of the total value of shipments for more than two-thirds of the manufacturing industries present in Vermont (see Appendix).[2] For only 5 of 72 manufacturing industries is the cost of electricity more than two percent of the value of shipments. Therefore, even if one could wave a wand and reduce electric costs for manufacturers by 10%, the practical effect for most industries would be savings of less than one tenth of one percent of the value of shipments.

The evidence cited in the report to support the assertion that lower energy costs will improve competitiveness and result in more manufacturing jobs includes a story in the publication *Area Development* describing the results of a survey of site consultants.[3] According to the survey (which is totally subjective), the top ten states for doing business are GA, TX, SC, TN, AL, FL, IN, NC, LA, OH and KY (AL and FL tied for 5th so there are actually eleven). The article made no effort to determine whether those states actually outperformed the others.

According to the Bureau of Labor Statistics, all but six states have lost manufacturing jobs since 1990 (see Table below), including all of the top eleven states identified by the site consultants. Vermont lost 27.9% of its manufacturing jobs from 1990 – 2015; the lowest percentage in New England and 24th in the country. Six of the eleven states cited as the "best for business" lost a higher percentage of manufacturing jobs than Vermont (NC, OH, TN, SC, FL and AL).

In addition, almost half (19 of 41) of the states with lower industrial electric rates lost a higher percentage of manufacturing jobs than Vermont from 1990 – 2015.[4]

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1 2015 Act 199 draft report, page 26.
2 There is no state-specific data for this level of detail.
3 Top States for Doing Business 2015: Site Selection Consultants Survey Results, http://www.areadevelopment.com/Top-States-for-Doing-Business/Q3-2015/survey-results-landing-page-225757.shtml.
4 Electric rates from the Energy Information Administration, U.S. Dept. of Energy.

Another source cited in the draft report as support for the claim that energy costs are an important factor in manufacturing retention, expansion and attraction was Forbes' Best States for Business, 2015. The Forbes approach was better at identifying states that have performed well, but we don't know the extent to which electric costs mattered because

> "*…there is not sufficient detail available for Forbes' Best States for Business, making it impossible to evaluate how the index was generated in terms of variables, sources, weights, and aggregation methods*."[5]

The quote above is from the third work cited to support the claim about the influence of electric costs on the business climate. It is a working paper from the National Bureau of Economic Research (NBER), a very reputable source. It was the only one that was both transparent and methodologically sound. The authors found that

> "*State [business climate] rankings…vary wildly, raising questions about what the indexes measure and which policies are important for growth. Indexes focused on productivity do not predict economic growth, while indexes emphasizing taxes and costs predict growth of employment, wages, and output. Analysis of sub-indexes of the tax-and-cost-related indexes point to two policy factors associated with faster growth: less spending on welfare and transfer payments; and more uniform and simpler corporate tax structures. <u>But factors beyond the control of policy have a stronger relationship with economic growth</u> [such as industry mix and weather]*" (Emphasis added).[6]

Percent change in manufacturing jobs 1990 - 2015

1	NV	69.5%	26	NM	-28.5%
2	ND	62.3%	27	NH	-29.2%
3	SD	30.7%	28	AR	-30.6%
4	UT	21.4%	29	AL	-30.7%
5	ID	19.0%	30	FL	-32.6%
6	WY	6.5%	31	MO	-32.8%
7	IA	-2.4%	32	SC	-33.0%
8	NE	-3.2%	33	HI	-33.5%
9	MT	-5.1%	34	TN	-33.6%
10	OR	-6.9%	35	OH	-34.9%
11	MN	-7.7%	36	CA	-35.1%
12	AK	-8.9%	37	IL	-37.5%
13	KS	-9.2%	38	MS	-38.7%
14	WI	-9.6%	39	VA	-38.9%
15	TX	-10.3%	40	PA	-39.8%
16	KY	-10.4%	41	WV	-41.5%
17	AZ	-11.2%	42	NC	-43.0%
18	WA	-12.8%	43	ME	-44.7%
19	IN	-13.3%	44	DE	-45.3%
20	OK	-16.7%	45	CT	-45.5%
21	CO	-17.1%	46	MA	-46.9%
22	LA	-17.2%	47	MD	-47.4%
23	GA	-27.1%	48	NJ	-52.4%
24	**VT**	**-27.9%**	49	NY	-53.1%
25	MI	-28.5%	50	RI	-55.2%

Source: BLS, CES, seasonally adjusted (except AL & OK).

Not surprisingly, the NBER paper finds strong correlations between costs and preferred outcomes. But even though the authors investigated sub-indexes in the business climate rankings reviewed, they did not isolate electric costs and measure their impact on growth, jobs or wages. This is important because other business costs dwarf the impact of electric costs, especially labor costs.

Therefore, while all business costs are important, the draft report provided no evidence to support the assertion that underlies the purpose of the Act 199 investigation; namely, that electric costs are a significant factor in manufacturing retention, expansion and attraction. If not, there is no justification for potentially shifting costs.

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[5] Footnote 6, "Public Policy, State Business Climates, and Economic Growth." Jed Kolko, David Neumark, and Marisol Cuellar, National Bureau of Economic Research Working Paper No. 16968, April 2011. http://www.forbes.com/best-states-for-business/

[6] Ibid, NBER Abstract.

Appendix

Vermont Manufacturing Industries

Purchased electricity as a percentage of the value of shipments

Fiber, yarn, and thread mills	3.79%	Ship and boat building	0.73%
Glass and glass products	3.14%	Household and institutional furniture & kitchen cabinets	0.72%
Pulp, paper, and paperboard mills	3.12%	Hardware	0.70%
Veneer, plywood, and engineered wood products	2.38%	Office furniture (including fixtures)	0.69%
Cement and concrete products	2.05%	Motor vehicle parts	0.69%
Sawmills and wood preservation	1.91%	Dairy products	0.69%
Clay product and refractory manufacturing	1.87%	Leather and hide tanning and finishing	0.67%
Coating, engraving, heat treating & allied activities	1.80%	Architectural and structural metals	0.67%
Basic chemical manufacturing	1.80%	Electrical equipment, appliance, and components	0.67%
Plastics products	1.79%	Beverages	0.66%
Textile and fabric finishing and fabric coating mills	1.54%	Animal slaughtering and processing	0.66%
Steel product manufacturing from purchased steel	1.49%	Leather and allied products	0.59%
Apparel knitting mills	1.45%	Electric lighting equipment	0.58%
Resin, synthetic rubber, and artificial synthetic fibers & filaments	1.42%	Aerospace products and parts	0.56%
Other wood products	1.26%	Engine, turbine, and power transmission equipment	0.55%
Printing and related support activities	1.26%	Industrial machinery	0.54%
Nonferrous metal (except alum.) products & processing	1.24%	Paint, coatings, and adhesives	0.53%
Manufacturing and reproducing magnetic & optical media	1.21%	Ventilation, heating, AC, and commercial refrigeration equipment	0.52%
Rubber products	1.19%	Beverage and tobacco products	0.52%
Machine shops; turned products; screws, nuts & bolts	1.07%	Animal food	0.52%
Semiconductors and other electronic components	1.06%	Footwear	0.51%
Metalworking machinery	1.03%	Commercial and service industry machinery	0.48%
Other textile product mills	0.97%	Transportation equipment	0.45%
Fruit and vegetable preserving and specialty foods	0.97%	Apparel accessories and other apparel	0.45%
Converted paper products	0.96%	Medical equipment and supplies	0.45%
Grain and oilseed milling	0.96%	Pharmaceuticals and medicines	0.43%
Cutlery and hand tools	0.94%	Navigational, measuring, electro-medical & control instruments	0.42%
Other electrical equipment and components	0.94%	Cut and sew apparel	0.42%
Textile products	0.93%	Computer and peripheral equipment	0.39%
Other chemical products and preparations	0.92%	Other transportation equipment	0.36%
Spring and wire products	0.92%	Motor vehicle body and trailer	0.36%
Bakeries and tortilla manufacturing	0.92%	Agriculture, construction, and mining machinery	0.34%
Textile furnishings mills	0.90%	Petroleum and coal products	0.33%
Boiler, tank, and shipping containers	0.88%	Soap, cleaning compound, and toilet preparations	0.31%
Sugar and confectionery products	0.82%	Other furniture related products	0.29%
Other fabricated metal products	0.81%	Motor vehicles	0.17%

Source: 2013 Annual Survey of Manufactures, U.S. (Census Bureau

Home Energy Advocates

(802) 251-0502
118 Washington Street #2, Brattleboro, VT 05301
http://HomeEnergyAdvocates.com

December 23, 2015

Dear Joanna,

Below are my comments on the draft *Act 199 study on manufacturing competitiveness and energy*. I sit on the town of Brattleboro Energy Committee as well as the Windham Regional Commission Energy Committee. I do ecological engineering and work in the field of energy through my company Home Energy Advocates which helps homeowners and small businesses to undertake major energy conservation measures and implement renewable energy.

1) P. 20 - **Financing Assumptions**:
"Most businesses interviewed for this report note that a payback period of two years or less is necessary for consideration of an efficiency investment. A three year payback was considered in some cases when additional factors like marketing the improvements are included. Deliberations before the Public Service Board and reports from energy efficiency proponents assign a much longer payback period. The difference between these assumptions reflects a difference in the conclusions regarding what represents an economic choice around efficiency investments."
A two year payback period on an energy improvement measure represents a 50% Return on Investment on the cost of implementing an energy conservation measure (ECM). This is a phenomenal ROI for most investors, and it is all but guaranteed that the savings will occur. Homeowners that I work with are often happy buying a solar array that has a 12 year payback, or an 8% ROI. My understanding is that businesses are loathe to undertake ECM's that extent beyond two to three years because the standard business model places a higher importance on the use of capital to grow the business than on infrastructure improvements like energy conservation. It is a business and accounting 'norm.' In discussions that I have had with businesses concerning this 'norm' it has been stated that if different financing measures were available to pay for the ECM's, such as lease programs, a substantially longer payback might be acceptable to them. I would urge the PSD to explore this phenomenon more fully, describe it at length in this Report and work with stakeholders to develop the alternatives.

2) p. 21 - **Lack of Trust**
"There are cases where industrial users do not believe that the savings promised or reported from EVT are actually realized. Savings calculations are often the product of modeled results and real-world, as realized benefits are rarely calculated. Reporting modeled rather than real-world results is a basis for skepticism among some users."
In my own personal business experience I have found it to be true that savings are often not what has been projected by EVT modeling. I have also seen 3rd party studies by Navigant and West Hill Energy documenting a norm of unmet projections. The reasons for this disparity remain vague, and could be due in some part to client behavior changes after ECM's are implemented. Building energy modeling is a notoriously difficult and expensive process to perform accurately. I would urge the PSD to study this phenomenon at length in order to come to a better understanding of the causes, and to create modeling techniques and software that accurately project energy savings and engender participant trust. This process might be much easier now than in the past with the drop in price and increase in availability of WiFi enabled monitoring equipment.

3) p. 21 - **Electricity and other forms of energy use**
"*EVT focuses efforts on electricity use. While they are participating in several activities that also accomplish reductions in fuel combustion, there is still a lack of clarity regarding when all fuels can be considered and when a particular efficiency program is exclusive to electricity use."*
At present we have no state agency charged with energy conservation other than electricity. The legislature has allowed EVT to act in the area of thermal efficiency to a limited extent, but without substantial funding or a clear mandate. At the same time the state has set extremely ambitious goals for improved building energy conservation and greenhouse gas reduction state-wide. Until such time as a carbon tax is implemented, or a comparable funding mechanism is developed by the legislature, EVT will be filling this gap and should be allotted more resources to accomplish it. This also makes sense from an electricity conservation standpoint since air source heat pumps are blurring the line between electricity efficiency, thermal efficiency and greenhouse gas production. A holistic approach and understanding of these issues is necessary. While I support EVT and am grateful for their work, I also see shortcomings in having one large bureaucracy handle the vast majority of the energy efficiency work in Vermont. I would encourage the PSD to explore other options and proposals that come to your attention, such as the *Zero Energy Now!* program developed by the Building Performance Professionals' Association and the VBikes alternative transportation project.

4) **General Comment**
The competitiveness of business in Vermont with regard to electricity prices depends to a very large degree of how the world, and the United States in particular, deal with the issue of global climate change. If the world and the U.S. take up the challenge and move aggressively toward implementing conservation measures, building out renewable energy and discouraging the use of fossil fuels, Vermont will be seen as a leading innovator and an excellent place to do business. If the world falls short, and fossil fuels continue to be subsidized and used to meet much of our energy demand, Vermont could be seen as idealistic, backwards and discouraging of business growth. The recent COP21 summit in Paris points to the former, but much will hinge on the next president of the U.S. Close to home, the proposed carbon tax presently before the legislature will provide a watershed moment for our state, and the next person who we elect governor will have a major impact.

Sincerely,

Tad Montgomery

Revised 1/13/2016

Comments on Act 199 report
David Snedeker dsnedeker@nvda.net
Tue 12/22/2015 1:48 PM

Hello:

Please accept the following comments on the Act 199 report. NVDA is the regional development corporation serving businesses in counties of Caledonia, Essex, and Orleans. We have solicited comments from many businesses in the region and these will be forwarded separately.

Pp 4-5: "Vermont businesses must compete on a national and global basis... Other states in New England have higher costs for electricity than Vermont....Rates in Vermont are also more stable than in other New England states." - *While it is nice that VT fares well for electricity pricing in New England, that doesn't mean we shouldn't try to do better as the report begins with an acknowledgement that businesses compete on a national and global basis. There are businesses in the Northeast Kingdom of moving work to other facilities they have outside of New England and the U.S....*

P. 7: "Utilities in Vermont provide electricity on a "least cost" basis, meaning that they evaluate energy and capacity supply as well as transmission and distribution options and choose the least-cost options." - *As VT attempts to achieve its goal of 90% renewable generation by 2050 through its mandates to local utilities, we should remember that renewable generation has come at a higher than market rate cost in some instances as we "guarantee" developers a price for power (see SPEED program). Least cost options are growing fewer than before due to mandates.*

P. 9: "Distributed generation is not new, but has grown rapidly in the past 5 years with the addition of new wind and solar generating capacity... Unlike peaking facilities, the generation from some distributed generation facilities is "must take" meaning the electricity is added to the grid regardless of the demand from users.." - *An electric utility in northern VT has publicly expressed that if it is forced to accept new wind and solar (intermittent) generation resources, it may have to back off its purchase of other (base-load) generation resources like Hydro Quebec. Distributed generation has not always been located near end-users as it should be.*

P. 11: "A summary of economic development rates in other states is provided in Appendix A." - *appendix A was not included with the report. Is this available?*

P. 12: "Economic development rates are specifically designed to incent customers to locate or expand in Vermont who would not be able to do so otherwise." - *There should be exceptions available for allowing economic development rates to retain jobs, especially if it keeps significant jobs in VT.*

P. 13: "In 2010, the Public Service Board provided Efficiency Vermont (EVT) a longer-term agreement to allow for long term planning in the delivery of efficiency services; Efficiency Vermont is now explicitly a utility with a rolling twelve year Order of Appointment issued by the Board rather than a state contractor." - *as the budget of Efficiency VT has grown significantly every year since its creation (even with budget surpluses on hand), the PSB should consider making the delivery of efficiency services a competitive again to ensure ratepayer funds are being used effectively.*

P. 19: "The basic premise that a third party can identify efficiencies in a business about which they are not the primary experts is troubling to some customers. It is a primary goal of all businesses to identify and pursue cost savings investments, and some firms felt that an outside actor could not effectively assess efficiency opportunities as well as internal staff." - *Agree. We have heard this from some manufacturers in NE Vermont.*

P. 20: "Large users often remark that the Energy Efficiency Charge is a mandated cost and that there is only a single efficiency provider (EVT for most customers). This model is unlike the market approach for businesses to receive services." - *Agree. There may be industry-specific efficiency experts that bring more value to some manufacturers.*

P. 21: "EVT focuses efforts on electricity use." - *Agree. In VT, many manufacturing facilities are older buildings that are less efficient than what might be built today. Thermal efficiency investments may yield greater benefits.*

P. 22: "The energy savings account ("ESA") option allows eligible business customers the option to self-administer their own efficiency efforts instead of participating in EEU services and initiatives. To date, there have been two participants in the ESA program." - *I have not found one manufacturer in NE Vermont for which this program has been recommended. EVT does not promote this. In looking at the Eligibility and Program guidance, the process also looks complicated and time-consuming. This needs to be simplified.*

Thanks for your consideration.
Regards.

David

--
David Snedeker
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Comments: Act 199 draft study
Avram Patt APatt@leg.state.vt.us
Tue 12/29/2015 4:07 PM

Please accept these comments regarding the draft Study on Manufacturing Competitiveness and Energy which was called for in Act 199 of the 2014 Legislative session.

By way of disclaimer: Although I have was involved in energy issues in a number of capacities for many years, including management of an electric utility, I retired from Washington Electric Co-op in June 2013, and did not begin serving in the House until 2015. I was not involved in any discussion or activity leading up to the inclusion of this study in Act 199, did not participate in any stakeholder processes, nor do I presently serve on a House committee dealing with either economic development or energy. My comments are as an interested individual reviewing the draft report for the first time.

The comments are in two areas: First, a concern about the assumption(s) which motivated the inclusion of this study in Act 199 and the draft report's response to that. Second, some comments about basic terminology which I think need to be clarified in order for the report to be accurate and to be better understood.

Assumption:

There appears to be an assumption underlying the language in Act 199 that Vermont's electric rates and/or costs (more on the distinction further on) put Vermont industrial customers at a competitive disadvantage. The draft does address comparative *rates* between Vermont and other states, regionally and nationally. But the draft does not address what industrial users' electric *costs* represent as a percent of their total cost of business, or as a percent of the cost per manufactured unit. In other words, are manufacturers' electric costs a real factor, a perceived factor, or not a factor in the business choices firms make regarding locating in Vermont or elsewhere? My sense is that it's the latter two, at least in many cases. But in any event, the draft does not really address this. Other energy costs (fuels) may or may not be a factor, perhaps a more significant one for some manufacturers. The report limits itself to discussing electricity per Act 199, but it should discuss how big a deal electric costs really are or are not in relation to manufacterers' total cost.

Rates, Rate Revenue, Bills and Costs

This is not just a picky semantic comment. In my utility job, I would often repeat something I had heard a former Public Service Board Chair say in legislative testimony and in other forums: "We pay bills, not rates." Unfortunately, the draft consistently muddles these terms and can result in unclear conclusions that don't help readers better understand. (A parallel would be to do an analysis of property tax impacts focusing only on tax rates without including appraised

property values in determining what property taxes actually cost taxpayers, in absolute dollars or as a percent of income or cost per manufactured unit.)

Rates and rate structure are the framework that is applied the same to all ratepayers in a rate class. It does not tell you what their electricity usage costs them.

Usage/consumption is the equally important factor in determining cost to the consumer. In the residential class (which I'm most familiar with), there is regularly published comparative state data on average *bills.* What this shows is that while Vermont's residential electric rates may be higher than many other states, our average bills are not and in fact are significantly lower in many cases. (The reasons why would be the subject for another report.) I recognize that apples-to-apples comparative data may not be as available or as clear for industrial customers, but the report should at a minimum acknowledge this matter. My basic point is that the draft does not clearly distinguish between what rates are and what costs are. It may be that in the industrial area, higher rates consistently cause higher electric costs, or that may not be true. We can't tell from the report.

My suggestion is to be more careful and precise in the use of these terms, for clarity. I do not believe it would materially alter the substance of the report itself.

Thank you for the opportunity to comment.

_____

Representative Avram Patt
Lamoille-Washington District
Morristown, Elmore, Woodbury, Worcester

I for one was a non-believer. I could not be bothered with another City, State, Federal or even a non-profit run program. Someone to come in to my facility, and tell me that they are here to help me save energy, had to be looking to sell me something or worse, trick me into some long-term contract…

However, I was wrong, so wrong that as I write this I am quite proud and shameful at the same time. Proud that I allowed EVT a chance to explain to me about their program. Shameful that I did not see that right from the start. My company has been working with EVT for over four years now, and I see no end in sight at stopping.

The reason why is because they not only have been great resources, they have also been great to work with. I cannot speak for their entire organization, but I can speak for David, Brad and Ethan, who I have worked with extensively on multiple projects. My only criticism is that EVT has to come up with a better slogan, catch phrase, or something that gets the intended audience attention. I myself assumed they were selling something, far from knowing they are saving something. As you will see by the file that I attached, we are saving money annually from our investments. At first, it may not look like a lot, but I see it as a way that we are protecting jobs in Vermont that we have now, and will provide the foundation to add jobs in the future.

Efficiency Vermont has given us the tools, the support, and I have to shamefully admit again, the courage to take the chance in investing in the future of conserving energy, more than just trying to find cheaper energy.

Completed Projects.xlsx

Robert Ridley
Director of Operations
Tantalum Capacitors
Cell: 802-379-4356
Office: 802-440-8538

Vishay Tansitor Completed Projects					Annual Savings					
Project Description	**Project Number**	**Date Completed**	**Project Cost**	**Incentive**	**Resource Savings $**	**kWh**	**kW (summer)**	**kW (winter)**	**MMBTU**	**CO2 (Tons)**
Vishay Tansitor - Rx HVAC 1	6013-J528	Nov-10	$1,000	$800	$332	2,679	0.8	0	0	
Vishay Tansitor - Lighting Retrofit-378557	6012-F341	May-11	$69,121	$15,000	$12,522	117,101	31.6	21.7	-111	
Vishay Tansitor - HVAC 2-407318	6013-O994	Feb-12	$1,000	$800	$288	2,189	0.6	0	0	
Vishay Tansitor - CAS B	6012-J225	Jul-12	$2,750	$1,375	$0	0	0	0	0	
Vishay Tansitor - Lighting 2	6012-L127	May-13	$67,297	$10,000	$7,740	71,401	13.7	8.8	-55	
Vishay Tansitor - Programmable Thermostats-423912	6012-T529	Jul-13	$9,900	$1,000	$23,524	162,442	0	32.4	420	
Vishay Tansitor - RTU Pilot-425477	6012-U054	Apr-15	$38,403	$19,895	$4,591	40,634	1.6	9.2	0	
Vishay Tansitor - RTU15 Replacement	6013-Y672	Jun-15	$15,840	$3,000	$2,658	28,136	0.4	9.9	0	
		Totals:	**$205,311**	**$51,870**	**$51,655**	**424,582**	**48.8**	**82**	**254**	**211**

VEIC Comments on Draft Act 199 Report (1/5/16)

Energy efficiency delivers a great deal of benefits to Vermont ratepayers that are discussed in this report. It would be beneficial to also discuss the benefits to ratepayers of the current EEU structure, as the most efficient and equitable way to deliver energy efficiency services across the state. Customers of Vermont's utilities now have access to the same set of services and programs designed to help them use less energy, spend less on energy bills, and reduce their environmental impact. The current suite of comprehensive services would not have been possible when efficiency programs were delivered through individual utilities. The economies of scale that come from unified service delivery allow for Efficiency Vermont to work directly with manufacturers of efficient technologies, distributors, and throughout the supply chain to maximize the value being delivered to Vermonters.

For example, during the "snow gun round up" of 2014 Efficiency Vermont engineers independently tested new efficient snowmaking technologies on Vermont's mountains, and shared the results with ski resorts to help inform their purchase decisions. Then Efficiency Vermont bargained with snow gun manufacturers to drive deep discounts on the technology. This brought additional value to ski areas before incentives were applied. Lastly, Efficiency Vermont engineers used their in depth knowledge of the new technology to help ski resorts get the most out of their new equipment, through data analytics systems and process improvements. We often apply this same approach vertically in the market to deliver energy saving results based on industrial process, energy data sub-metering, compressed air, and industrial-scale refrigeration. This market-based approach to energy efficiency, which enables aggressive results and maximizes ratepayer value for dollars invested, is possible because efficiency is delivered at scale and without duplication of efforts and services. In short, the EEU ensures Vermonters get access to more and better efficiency services for a lower cost.

The section on "Factors Influencing Prices in Vermont," makes a strong, well-sourced statement: "…Vermont has been able to maintain steady electric rates over the past several years, largely due to the use of stable, long term contracts with large generators and demand management (efficiency) that have avoided investments in distribution infrastructure and reduced Vermont's share of regional transmission costs." This is important comparative information for understanding the report, and placing the questions posed by Act 199 in appropriate context. In particular, it is a strong counterpoint to the erroneous assumption that reducing investments in energy efficiency would somehow lead to savings for ratepayers.

The report provides a good overview of the factors involved in rate making, and helpful background to place Vermont's electricity costs in a regional and national context. Greater depth on this would be of value for assessing concerns and recommendations raised in the report – for example, the "business competitiveness" section notes that "For most businesses in Vermont and elsewhere the cost of energy represents less than 10% of total operating costs…" Do the PSD and ACCD have more specifics on this – in particular the typical operating costs driven by electricity usage?

The delivery of energy efficiency services through Efficiency Vermont has enabled the attainment of aggressive savings goals for Vermont's electric system while avoiding inefficient investment of ratepayer

dollars through duplicative parallel programs. Many of the issues and recommendations raised under the "Concerns Raised by Stakeholders" section of the report would undermine this approach and create a system that imposes greater costs on ratepayers. VEIC provides the following counterpoints as responses to the specific issues raised in the report:

- Efficiency Vermont response to *Uneven Distribution of Benefits:* Efficiency Vermont is required to deliver services to all ratepayer classes – but we recognize that there are unique challenges faced by large industrial customers. To that end, Efficiency Vermont has developed nation-leading programs and service offerings to give these customers more opportunities to benefit, including, but not limited to, the Continuous Energy Improvement and Industrial Peak Initiative pilots; a suite of data analytics tools; a dedicated Account Management team to address the needs and concerns of Vermont's 300 largest electrical users; and a group of industrial engineers with deep technical expertise and industry experience to provide support to customers.
- It does take time for Efficiency Vermont staff to embed themselves in a business and develop deep understanding of its process and operational activities. But that investment of time, from both Efficiency Vermont and the customer, can often provide additional value to customers – by carrying through consistent knowledge and experience with a facility, even when a large industrial customer has turnover on their plant operations staff. This consistency can have a great deal of long term value, and can be a critical factor in ensuring that large industrial customers are able to continue making energy efficiency a priority, participating in Efficiency Vermont programs, and maximizing their savings.
- Efficiency Vermont response to *The Market and Control*: As noted above, delivery of energy efficiency services through a single provider ensures that all ratepayers have access to equal services, and that they are not paying for duplicative programs. It also allows Efficiency Vermont staff to play a critical role in the market as independent third party providers of guidance and technical assistance, while supporting customers in bringing in subcontractors when they are seeking additional insight or expertise on their operations. Efficiency Vermont staff are not trying to "sell" their customers on any particular product or service provider. Indeed, in some cases this means dissuading customers from making efficiency investments that will not be cost-effective. In one recent case, this meant dissuading a customer from buying an expensive piece of equipment that would only run for a couple hours per day. The vendor selling the equipment was acting in a competitive marketplace, and the equipment would have saved energy, but not on a scale that would make the customer's investment worthwhile – and the customer's only source of objective guidance on how to get the most return on investment was their Efficiency Vermont Account Manager. Multiple competing efficiency providers would by necessity be forced to focus on selling their services and completing more projects rather than providing objective guidance.
- Efficiency Vermont response to *Increasing Electric Efficiency Charge*: Efficiency Vermont operates under performance metrics that are established under a proceeding by the Public Service Board. Furthermore, the programs and budgets of Efficiency Vermont are subject to oversight by Vermont regulators to ensure cost-effective delivery of services and accuracy of claimed energy savings. Vermont has set aggressive goals for energy savings – effectively determining how much efficiency should be purchased each year as part of the state's overall power resource mix. In 2014 energy efficiency cost 4.9 cents per kwh versus 8.3 cents per kwh of comparable electric supply. Increasing investments in energy efficiency reflect that it is a better deal for ratepayers to purchase more of the power resource that costs less, which is

consistent with Vermont's least-cost planning principle. We recognize that the system-wide benefits are not easily seen or felt by individual customers, but for the investments they make in energy efficiency. That is why we look to provide each of our large customers a direct ROI for their EEC contribution through savings, incentives and on-site engineering assistance. The sole purpose of our dedicated account management and engineering team is to deliver a level of direct value commensurate with each customer's EEC contribution.

- Efficiency Vermont response to *Financing Assumptions*: Understanding that cost is a barrier that can prevent large businesses from investing in energy efficiency, Efficiency Vermont's Account Management team places a strong focus on recommending measures that meet the two year payback criteria, using financing and incentives to help meet the needs of the customer and get them to take action. In addition, extensive pre- and post-installation verification takes place to determine that the measure is meeting its payback requirement.
- Efficiency Vermont response to *Lack of Trust*: Efficiency Vermont employs a rigorous and continually-improving process to model savings results for customers. Each customer presents a unique challenge for Efficiency Vermont to predict real-world results, which may be further complicated by exogenous factors such as weather and changes to a production schedule. However, it's worth noting that despite these challenges Efficiency Vermont maintains a rigorous verification process of claimed savings that comports to the ISO-New England standard for ensuring that savings are delivered on a system wide level. This allows Efficiency Vermont to bid energy savings into the regional Forward Capacity Market, and reinvest the earnings back into other efficiency projects.

VEIC looks forward to discussing opportunities to improve and refine self-direct options with the PSD, ACCD and other stakeholders over the coming year. The ACEEE best practices identified in this report provide a great framework for that process.

Addendum 1/13/16

VEIC submits the following, in response to comments submitted by other parties to the Act 199 process.

It is not accurate to represent project incentive dollars as the sole stream of value from Efficiency Vermont to its customers. Some examples of how non-incentive costs add significant value for customers include, but are not limited to, the following:

- An engineer who meters a facility and analyzes energy usage data to look for low and no cost opportunities to change a manufacturing process;
- A program manager who negotiates with national efficient product manufacturers and distributors to inform product designs and ensure they will make their products available in Vermont first (for example cutting-edge heat pump dryer technology);
- An energy consultant who visits a customer and provides advice, support, and technical assistance to their contractor so they can construct their new home to the highest level of energy efficiency;
- A customer support representative, who fields a call from a small business owner looking to upgrade their refrigeration equipment, helps them develop a scope of work for the project,

connects them with trained contractors, and evaluates bids on the project so they can complete the work;
- An account manager who works with a customer to pursue a technical assessment of their facility and creates a prioritized action plan for completing efficiency projects that aligns with the customer's long-term business strategy and capital planning process.

Efficiency Vermont is required to provide opportunities for all ratepayer classes to reduce their energy costs. For some markets, such as large commercial and industrial, that means engaging directly with customers on a regular basis to look for opportunities and complete projects. For residential customers, the most cost effective way to help more Vermonters participate is to invest up front to evaluate technologies and engage with the supply chain. Far from being added costs, these program operations activities are critical to reaching and helping more Vermonters through streamlined and cost effective programs that deliver results.

The ROI references in the draft Act 199 report were calculated based on the full contributions from customers – including their EEC payments and costs to complete projects that were not covered by incentives.

The analysis of ROI in the draft Act 199 report was based on projects completed by Vermont's 300 largest electric consumers over Efficiency Vermont's last three-year performance period from 2012-2014. Efficiency Vermont's 2014 Annual Report only presents data from 2014, which is why the numbers in the draft Act 199 report are different from those in the Annual Report.

Appendix B
A Survey of Utility Economic Development Programs in Other States

Vermont Public Service Department
Agency of Commerce and Community Development

January 22, 2016

Some states offer economic development rates to manufacturers and other large users of electricity. This Appendix presents a survey of programs available in Maine, Minnesota, and New York.

Maine

CENTRAL MAINE POWER COMPANY

OPTIONAL TARGETED SERVICE: PINE TREE DEVELOPMENT ZONE (PTZ)
GENERAL SERVICE - ECONOMIC DEVELOPMENT RIDER

AVAILABILITY

Customers must meet all applicable eligibility requirements described below. The rider is only available to those customers providing proof that the Department of Economic and Community Development has certified them as a qualified Pine Tree Development Zone business, pursuant to applicable statutes and regulations. This rider is available to customers taking service under the following general service delivery rate schedules.

Electric delivery service must be taken on a continuous year-round basis by any one customer at a single service location and does not apply to customers taking short-term delivery service.

ELIGIBILITY CRITERIA FOR EXISTING CUSTOMERS

The rider is available for an existing customer's incremental electrical usage at a certified Pine Tree Development Zone facility where the customer takes delivery service from the Company. In addition, at the facility, the customer must increase its annual electrical usage (as measured in kilowatt-hours) by at least 10%.

ELIGIBILITY CRITERIA FOR NEW CUSTOMERS

The rider is also available for the entire load of a new customer within a Pine Tree Development Zone. A customer purchasing an existing, fully operational facility will not be considered a new customer.

BASIC RATE PER MONTH

EXISTING CUSTOMERS

For existing customers expanding total operations, the Company and the customer will contract for a fixed annual baseline level of energy delivery using the customer's electric energy delivery history for the twelve months immediately preceding the effective date of the Customer Service Agreement between the Customer and the Company.

The customer will take service at the applicable general service delivery rate. At the end of each twelve-month period, the customer's usage will be compared to the baseline levels. If an existing Manufacturing customer qualifies under the eligibility criteria, the customer will receive a credit on its next monthly bill. For customers who begin taking service under the Rider before August 15, 2013, the amount of the credit will be the customer’s total incremental kilowatt-hour usage for the preceding twelve-month billing period multiplied by the appropriate amount from the following credit schedule. For customers who begin taking service under this Rider on or after August 15, 2013, the amount of the credit will be the lesser of (1) the customer’s stranded cost contribution for the preceding twelve-month

billing period or (2) the customer's total incremental kilowatt-hour usage for the preceding twelve-month billing period multiplied by the appropriate amount from the following credit schedule. Eligible non-Manufacturing customers will receive a discount based on the incremental CMP revenue. For purposes of this Rider, "Manufacturing" shall have the meaning set forth in 30-A M.R.S.A. § 5250-I or any successor provision.

Year 1	$0.015
Year 2	$0.010
Year 3	$0.005
Year 4	$0.005

For customers who begin taking service under the Rider before August 15, 2013, the amount of the credit for non-Manufacturing businesses will be the amount determined using the following credit schedule. For customers who begin taking service under the Rider on or after August 15, 2013, the amount of the credit for non-Manufacturing businesses will be the lesser of (1) the customer's stranded cost contribution for the preceding twelve-month billing period or (2) the amount determined using the following credit schedule:

Year 1	5.0% revenue reduction
Year 2	2.5% revenue reduction

NEW CUSTOMERS

At the end of each twelve-month period, new customers qualifying under the total load criteria of the rider will receive a credit on their next monthly bill for delivery services. For customers who begin taking service under the Rider before August 15, 2013, the amount of the credit will be the customer's total incremental kilowatt-hour usage for the preceding six-month billing period multiplied by the appropriate amount from the following credit schedule. For customers who begin taking service under the Rider on or after August 15, 2013, the amount of the credit will be the lesser of (1) the customer's stranded cost contribution for the preceding six-month billing period or (2) the customer's total incremental kilowatt-hour usage for the preceding six-month billing period multiplied by the appropriate amount from the following credit schedule. The amount of the credit will follow this methodology for businesses deemed to be Manufacturing:

Months 6 and 12	$0.015
Months 18 and 24	$0.010
Months 30 and 36	$0.005
Months 42 and 48	$0.005

For customers who begin taking service under the Rider before August 15, 2013, the amount of the credit for non-Manufacturing businesses will be the amount determined using the following credit schedule. For customers who begin taking service under the Rider on or after August 15, 2013, the amount of the credit for non-Manufacturing businesses will be the lesser of (1) the customer's stranded cost contribution for the preceding six-month billing period or (2) the amount determined using the following credit schedule:

Months 6 and 12	5.0% revenue reduction
Months 18 and 24	2.5% revenue reduction

CONTRACT

The customer and the Company will enter into a Customer Service Agreement specifying, among other things, that the customer will take service under the rider for a period not to exceed four (4) years for Manufacturing customers and two (2) years for non-Manufacturing customers.

SPECIAL CONDITIONS

Customers taking service under the rider are not eligible for service under any other Optional Targeted Service rate offered by the Company.

To remain eligible for the rider, the Customer must remain a certified Pine Tree Development Zone business.

Notwithstanding the core delivery rate schedule under which the customer receives service, after six months of taking service under the rider, if a change in usage would require the Company to place the customer on a different delivery rate schedule, the customer can elect to remain on the core delivery rate schedule, as it may vary from time-to-time, under which it had been receiving service at the time of change in usage, for the term of the agreement.

METERING

If service under this rider requires metering facilities in addition to, or in substitution of, the standard facilities that the Company would normally install to provide firm delivery service, the Company may provide the additional or substitute metering, and the customer may be subject to an additional monthly charge in accordance with Section 13 of the Company's Terms and Conditions.

OTHER FACILITIES

Any other facilities required for service under the rider in excess of those needed for service under the applicable general service rate schedule shall either be furnished, owned, and maintained by the customer or shall be furnished, owned, and maintained by the Company, and the customer may be required to pay an additional monthly charge in accordance with Section 13 of the Company's Terms and Conditions.

TERMINATION DATE

This rate schedule will automatically terminate on the earlier of (a) December 31, 2014 or (b) the termination date of the Pine Tree Development Zone program established by the State of Maine, unless otherwise renewed or modified by the Company.

Minnesota

Minnesota's Energy-Intensive, Trade-Exposed Rate Reduction

Minnesota's legislature recently enacted a policy that Minnesota Power, which serves the northeast part of the state, to give a rate reduction to certain energy-intensive, trade-exposed industries. Those are industries which require a great deal of energy and are subject to national and international competitive pressure.

ELIGIBILITY:

Industrial customers who use more than 2,000 kW and have an MPUC-approved contract of at least two years, and meet one of the following four criteria: 1) taconite mines, 2) paper mills, 3) steel mills or 4) 10,000 kW plus 80 percent load factor.

RATE:

The proposed rate will lower electric supply costs for these industrial customers by approximately 5 percent. These rate reductions may vary between industrial customers and are contingent on the customers operating in an energy-intensive manner to receive the monthly discount.[1]

CROSS-SUBSIDY:

In order to offer the discounted electricity to large users, residential and commercial users will experience a dramatic rate increase. Residential users will see a 14.5% rate increase while commercial users will see a 1-4% rate increase.

New York State

Purpose--The New York Department of Public Service oversees utility rate payer funded Economic Development Programs in the following utility service territories: Central Hudson Gas and Electric Corporation, National Grid, National Fuel Gas Distribution Company, New York State Electric and Gas Corporation, and Rochester Gas and Electric Corporation. These programs provide utility incentives and/or rate reductions to help attract new business and new businesses to New York, retain certain commercial and industrial customers or help this customer group expand their businesses.

[1] Information on eligibility and rates taken from Minnesota Power's website at http://www.mnpower.com/CustomerService/EITE.

Central Hudson Gas and Electric Corporation

Central Hudson has several Economic Development Programs to help Commercial (non-retail) and Industrial customers relocate or expand in the Hudson Valley including:

- Job creation utility credit based on the number of new jobs created
- Energy rebate on targeted substations and gas mains extensions, which are significantly under utilized
- Revitalization rate discounts, which can provide up to a 10% rate discount on qualified vacant buildings of 25,000 square feet or more
- Provision for up to 50% of the cost of a NYSERDA audit and up to 50% of the cost of recommended audit improvements
- Eligibility: Non-residential customers of Central Hudson.

National Grid

The National Grid Economic Development program focuses on site development, urban revitalization, strategic marketing, and facilitating customer growth through infrastructure assistance, energy efficiency and productivity improvement. The Plan also reflects an increasing emphasis on sustainable development, the efficient use (and re-use) of existing energy infrastructure, and the strategic deployment of renewable generation technologies.

- The Business Attraction program offers discounts to prospective customers who are evaluating locations both inside and outside National Grid's service territory. It is also open to new businesses considering a start-up of operations in the National Grid service territory. There are two levels of attraction discounts, the deeper of which is available to more energy intensive manufacturers.
- Business Expansion program is available to current National Grid customers (25 kW or larger) who are evaluating an expansion of their existing usage—either through physical expansion (i.e., increase in kW) or increased utilization (i.e., higher kWh usage). The customer's existing usage is "baselined," and discounts are applied above those historical levels of usage. Certain growth thresholds must be hit in order to qualify for discounts.
- The Revitalization program is designed to retain large manufacturing facilities in danger of closure due to financial distress. In order to qualify for discounts, customers must provide detailed financial information that demonstrates financial distress, identify and implement non-energy cost savings, and develop a comprehensive revitalization plan that will return the company to profitability within the five-year discount period.
- The Relocation program offers larger industrial customers discounts to prevent the relocation of manufacturing facilities to areas outside the National Grid service territory. In order to qualify, customers must demonstrate that they have an economically viable relocation alternative. And in recognition of the fact that electricity cost by itself is seldom the only factor driving a relocation challenge, the discount must be part of a comprehensive competitiveness plan that includes public involvement in the form of state and/or local incentives or concessions.
- The Capital Investment Incentive program provides grants to fund electric and natural gas improvements on National Grid owned or required natural gas and electric infrastructure for certain businesses projects that involve major capital investment in plant and equipment. Specifically this program supports business attraction or expansion projects located in the service territory of National Grid. The projects must demonstrate that they have not been able to secure sufficient funding through federal, state or local economic development programs.

- The Industrial Building Assistance program provides grants of up to $250,000 to building owners undertaking efforts to retrofit the interior electric and gas infrastructure required to convert these buildings to multi-tenant industrial use. The grants will be made through local industrial development agencies or other quasi-public development corporations.
- The Brownfield Redevelopment program provides grants to fund utility related infrastructure improvements and other costs that are necessary to progress the redevelopment of a brownfield site or vacant building.
- Eligibility: Non-residential customers in National Grid's upstate territory.

National Fuel Gas Distribution Company (NFG) Area Development Program

NFG offers a grant program designed to help address the poor economic conditions upstate. ADP provides NFG with tools to help make its service territory a more attractive place for business, thereby protecting and expanding employment opportunities and new investments.

- Eligibility: Commercial and industrial gas companies in the NFG service territory

New York State Electric and Gas Corporation (NYSEG)

NYSEG provides rate discounts and funding assistance as economic development incentives .

- Incremental Load Incentive (ILI) program provides a reduction from the standard tariff rate, on a per kilowatt-hour basis, for non-retail businesses locating or expanding in NYSEG's service area.
- Empire Zone Incentive (also known as the "Economic Development Zone Incentive" or EDZI) provides a reduction from the standard tariff rate, on a per kilowatt-hour basis, for businesses locating or expanding in a designated Empire Zone.
- Competitive Pricing: Electricity and Natural Gas- Under special tariffs, NYSEG can provide negotiated prices to new customers or for qualified expansions by existing customers. Eligibility is contingent upon the applicant having: A competitive alternative to NYSEG services; A minimum connected load; and, consideration of appropriate energy efficiency measures
- Brownfield/Building Redevelopment program provides funding assistance, on a per project basis, to encourage the redevelopment of a "brownfield" site or vacant building within NYSEG's electric service area.
- Utility Infrastructure Investment program supplements funding from other sources, on a per project basis, of new electric delivery related facilities involving existing or prospective manufacturing or large non-retail commercial customers with electric demand of 100 kilowatts or more, if a minimum of $1 million is invested in a new or expanded facility.
- Capital Investment Incentive program provides financial assistance, on a per project basis, for electric delivery related infrastructure to encourage additional capital investment to an eligible facility. In addition to manufacturing and non-retail customers, other eligible businesses include colleges, universities, medical hospitals and laboratories.
- Agriculture Capital Investment program provides funding assistance, on a per project basis, for electric delivery related infrastructure for smaller farms having incremental electric demand of at least 25 kilowatts after new capital investment of at least $50,000.
- Business Energy Efficiency Assistance is a program which NYSEG partners with the New York State Energy Research and Development Authority (NYSERDA) on several programs to encourage energy efficiency.

- Economic Development Outreach program allows NYSEG to supplement other economic development funding, on a per-initiative basis, for strategic outreach projects that will primarily focus on attracting new business investment into the NYSEG service area.
- Gas Infrastructure Investment program provides funding assistance for new gas delivery related facilities to manufacturing or non-retail commercial customers making a minimum capital investment of at least $250,000 and increasing gas usage by at least 50 Therms per hour.
- Power Quality/Reliability program allows NYSEG, in consultation with the customer and/or its representatives, to pay up to 50% of equipment costs required for power reliability or quality improvements to be installed behind the meter.
- Eligibility: Participants vary by program but can include: gas and electric manufacturing and non-retail customers, farms, colleges, universities, medical hospitals and laboratories in NYSEG's service territory of upstate New York.

Rochester Gas and Electric Corporation (RG&E) Economic Development Programs and Incentives

Rate discounts and funding assistance for gas and electric customers in the RG&E Service territory including:

- Capital Investment Incentive Program provides grants to fund improvements for electric-related infrastructure for certain business projects that involve major capital investment. This funding may be on equipment either owned by RG&E or the customer (as directed by RG&E). This program supports both business attraction and expansion projects that involve an existing or prospective customer with a monthly incremental electric demand after capital investment of at least 100 kilowatts (kW). To be eligible, total project cost must also involve capital investment of at least $1 million.
- Utility Infrastructure Investment Program provides funding for new electric-related infrastructure to assist in the development of certain sites or buildings. These sites represent the service area's best potential for development opportunities. Primary focus is on sites which are: state-designated as Shovel Ready, located in an Empire Zone, part of the City of Rochester Renewal Community, or included in RG&E's own Prime Sites Program. Other sites are considered based on economic impact to the community. This program supports both business attraction and expansion projects that involve an existing or prospective customer with a monthly incremental electric demand after capital investment of at least 100 kilowatts (kW). To be eligible, total project cost must also involve capital investment of at least $1 million.
- Brownfield/Building Redevelopment Program provides on a per project basis, grants to fund electric-related infrastructure improvements and other costs necessary for the redevelopment of brownfields or vacant buildings. The program targets Empire Zones or qualified areas in the City of Rochester designated as a Renewal Community. Funds may only be utilized for up to 10% of the redevelopment costs and cannot exceed the estimated cost of the electric delivery-related infrastructure improvements.
- Business Energy Efficiency Assistance Program is a joint venture with RG&E and the New York State Energy Research & Development Authority (NYSERDA) on several programs to encourage energy efficiency. Under these NYSERDA programs, the applicant will be required to make their own financial contribution of at least 33 1/3% to the total investment made. Through NYSERDA's Energy Audit Program, RG&E will provide up to 50% matching funds, with a $10,000 maximum contribution against the total investment made as a result of an energy audit.
- Through either NYSERDA's Flexible Technical Assistance Program (Flex Tech) or New Construction Program, RG&E will pay up to 33 1/3% of the cost of a feasibility study or analysis,

not to exceed $20,000 per study/analysis. If the applicant decides to make investments as a result of a study or analysis, RG&E will provide up to $50,000 toward total investment made.

- Empire Zone Incentive Program - Businesses that are Empire Zone certified by New York State are eligible for a discounted electricity and natural gas delivery rate on new load for up to 10 years, providing that the customer's certificate remains valid. A new Empire Zone customer is eligible for the reduced delivery rate on 100% of their demand and energy consumption. An existing RG&E customer located in or moving into a Zone is eligible for the discounted rate on qualified load. Qualified load is electric demand (kW) or natural gas usage (therms) that exceed a predetermined baseline (historical) usage by 25%. For more information on the NYS Empire Zone program, visit their Web site.
- Incremental Load Rate Incentive - Businesses that add a minimum of 25 kilowatts (kW) of electric load may be eligible for a discounted electricity delivery rate for a four-year term. The rate is limited to businesses in the following industries: Agriculture, Forestry, Fishing, Mining, Manufacturing, Wholesale trade-durable goods, Wholesale trade non-durable goods, Finance, Insurance, and Real Estate or Business Services.
- Under special tariffs, RG&E can provide negotiated prices to new customers or for qualified expansions by existing customers. Eligibility is contingent upon the applicant having a competitive alternative to RG&E and minimum connected load.
- Eligibility: Participants vary by program but can include: gas and electric non-residential customers in RG&E's service territory of upstate New York.

Appendix C
Energy Savings Account Option for Customer Self Administration

Vermont Public Service Department
Agency of Commerce and Community Development

January 22, 2016

This is a program guide for the Energy Savings Account program which describes eligibility, program administration, and evaluation.

ENERGY SAVINGS ACCOUNT OPTION FOR CUSTOMER SELF ADMINISTRATION OF ENERGY EFFICIENCY

Introduction:

The Energy Savings Account (ESA) program recognizes that certain large business customers already may be committed to, and possess considerable expertise regarding energy efficiency. The ESA allows eligible business customers the option to self-administer their own energy efficiency efforts instead of participating in the statewide services and initiatives provided by the State's Energy Efficiency Utilities (EEUs).

Eligibility:

Customers are eligible for the ESA option if they have made payments to the Energy Efficiency Charge (EEC) of at least $5,000 in the 12 months preceding the customer's request to participate. In addition:

1. A single business (a single legal entity) with more than one electric account may combine the EEC amounts paid on multiple accounts to determine this eligibility.

2. A business shall be eligible if the annual average of the EEC for the 36 months prior to the customer's request to participate is equal to or greater than $5,000.

3. A customer in a new building shall be deemed eligible to participate if its projected EEC payment will be equal to or greater than $5,000, as determined by the Energy Efficiency Utility with input from the Department of Public Service (DPS or Department) and in consultation with the Customer.

Program Design:

Customers that are approved by the Public Service Board ("Board") to self-administer energy efficiency projects using an ESA may use funds collected through EEC payments for "Qualified Expenses" associated with energy efficiency projects provided that total "Qualified Expenses" in any period does not exceed 100% of "Available Funds." "Qualified Expenses" may be incurred in the following project categories: market driven, retrofit, planning, and prescriptive.

1. For **market-driven** projects, "Qualified Expenses" are defined as up to one hundred percent (100%) of the **incremental** costs associated with identifying, investigating, analyzing, designing, implementing, and/or installing societally cost-effective electric efficiency projects at facilities owned, operated, or controlled by the participating customer.
    a. For market-driven projects, incremental costs are defined as the difference between the actual cost of the equipment, installation labor, engineering, design, and commissioning and the cost of the equipment, installation labor, engineering,

design, and commissioning that would meet the current design and construction standard practice (the "baseline cost").

b. These costs may include the customer's internal design and engineering labor, outside design, engineering and installation labor and equipment costs. However, costs other than actual incremental material and installation labor costs shall be treated as "Planning Expenses" as described below.

2. For **"retrofit"** projects, "Qualified Expenses" are defined as costs associated with identifying, investigating, analyzing, designing, implementing, and\or installing societally cost-effective electric efficiency retrofit projects at facilities owned, operated or controlled by the customer and where the ESA is in effect.
    a. These costs may include the customer's internal design and engineering labor, outside design, engineering and installation labor, and equipment costs. However, costs other than actual material and installation labor costs shall be treated as "Planning Expenses" as described below.
    b. "Qualified Expenses" for retrofit projects shall be capped at an amount equal to the contribution to total project costs that would result in an estimated 18-month simple payback on the customer's project investment. Payback shall be calculated based on anticipated energy and non-energy benefits, including, but not limited to, reductions in operating and maintenance costs, fossil fuel savings, electricity savings, environmental compliance cost savings, labor savings, and savings from avoidance of future equipment replacements.

3. For "**Planning**" projects, "Qualified Expenses" may include:
    a. Upon initial ESA program enrollment, or upon approval of this Order for currently enrolled Customers, and not more frequently than every three years, up to 100% of costs associated with development of an "Energy Efficiency Investment Plan" (EEIP) intended to guide project implementation for the next three years, provided that the costs for an EEIP do not exceed the expected ESA Customer Available Funds accrued in first 12 months or $10,000, whichever is less. An EEIP, at a minimum, shall consider:
        i. Baseline energy usage and data including trends; analysis or plan for analysis of the data;
        ii. Establishment of energy performance goals; and
        iii. Creation of an Energy Efficiency Action Plan to guide project implementation.

    b. For a customer's internal or external project design and engineering expenses associated with a market-driven or retrofit project:
        i. 50% of incurred expenses for project design and engineering may be considered Qualified Expenses and reimbursed through the ESA at the time they are incurred.
        ii. The remaining project design and engineering planning expenses may be considered Qualified Expenses upon the completion of the project. If the project has multiple phases, then the remaining 50% of project design and engineering expenses may be considered qualified expenses in

proportion to the expected MWh savings associated with each phase of the project[1].

4. For "**Prescriptive**" projects, defined as electric projects or measures where a prescriptive rebate offer is available from the Energy Efficiency Utility to non-ESA customers, "Qualified Expenses" are defined as the level of EEU prescriptive rebate available to non-ESA customers.
    a. The customer's internal design and engineering labor, outside design, engineering and installation labor, and/or equipment costs not included as part of the prescriptive incentive are not eligible as Qualified Expenses for prescriptive projects.
    b. If the project is a stand-alone retrofit project where prescriptive incentives are available to non-ESA customers, then the 18-month payback requirement in provision 2.b. above shall not apply to those measures with prescriptive incentives.
    c. If the project is a mix of retrofit and market opportunity projects the 18-month payback requirement in provision 2.b above shall apply to non-prescriptive measures.

5. Consistent with current EEU practice, participants may choose to undertake projects in phases. Each element of a phased project must meet the requirements for project completion as defined in "Program Implementation", part 8, in order to qualify for reimbursement.

6. The final determination of whether the project represents a "market-driven", "retrofit", or "prescriptive" project, the electric avoided-cost benefits, assumptions regarding baseline design and construction standard practice, the amount needed to result in an 18- month payback on retrofit projects, and the reasonableness of planning cost estimates shall be determined by the EEU that serves the customer, in consultation with the customer. The EEU, in consultation with the customer, shall be responsible for the review and approval of costs associated with a customer's Energy Efficiency Investment Plan (EEIP). In the event of a dispute between the customer and the EEU, the dispute resolution process identified below will be followed.

    Any party may propose to the Public Service Board a method of third-party certification of the above-described project elements if that method appears likely to provide benefits to ratepayers. The Public Service Board, after opportunity for comment, shall determine if any changes are warranted.

7. Determination of project eligibility for projects that received or will receive EEU services will be made as follows:

[1] **For example, if a project is expected to get 100MWh of savings in phase 1, 50MWh in phase 2, and 50MWh in phase 3, then 50% of the initial costs would be reimbursed at the time incurred, 25% at completion of phase 1, and 12.5% for each of phase II and phase III, for full reimbursement.**

a. Completed Customer Projects, as determined by receipt of incentive payments from an EEU prior to the initiation of a customer's ESA shall not be eligible for reimbursement as a Qualified Expense.
b. For phased project implementation, specific measures that have not previously received financial incentives from an EEU shall be eligible under the ESA option.
c. Projects that have received technical assistance prior to the initiation of a customer's ESA will remain eligible for reimbursement as a Qualified Expense. However, the technical assistance costs incurred by any third-party contractor through an EEU shall be factored into cost-effective analysis as appropriate.
d. New Construction projects are eligible for Qualified Expenses. All New Construction efficiency measures will be considered "market-driven," and subject to restriction of "Planning Expenses" as described above.
e. If an EEIP is conducted, the customer may be eligible for technical assistance on a project-specific implementation basis pursuant to an EEIP. Determinations of eligibility shall be made by an EEU.

8. As a minimum requirement, all customers completing projects through the ESA option must achieve an average net present value of electric benefits per dollar of "Available Funds" used that is greater than or equal to 1.2 times the utilized "Available Funds." Failure to achieve this standard will be cause to discontinue customer's participation in the ESA option. Multiple projects may be aggregated within a three-year participation period in order to meet the net present value threshold. Costs associated with development of the EEIP shall not be included in the calculation of average net present value of electric benefits per dollar of "Available Funds" spent.

9. Upon receipt of a customer's request to self administer through the ESA option, the customer's premises and accounts associated with the ESA will not be eligible for EEU electric efficiency incentives for market-driven or retrofit projects, products, or service offerings other than technical assistance and prescriptive incentives as described in Provision 4 of Program Design. The customer shall remain eligible for EEU incentives, technical assistance, products, or service offerings for Thermal Efficiency and Process Fuels measures that are funded through non-EEC revenues.

Available Funds:

"Available Funds" to a customer participating in an ESA are defined as seventy percent (70%) of the EEC that the customer has paid since its ESA start date, or is projected to pay to its distribution utility through the EEC, for a three-year maximum period, net of taxes.[2]

[2] The EEC includes a one percent tax comprised of the gross revenue tax (30 V.S.A. § 22) and the fuel gross receipts, or "weatherization," tax (30 V.S.A. § 2503). Thus, the maximum that a customer may receive is 70% of 99% of its total monthly contribution to the EEC, or 69.3% of that contribution.

1. Available Funds, upon enrollment, shall include funds from the current calendar year and the next two calendar years.

2. Available Funds may include those from the preceding calendar year, the current calendar year, and the next calendar year; however, no funds will be available from periods prior to enrollment.

3. For purposes of ESA future "Available Funds" estimates, a customer's future energy and demand consumption (kWh and kW) will be assumed to be equal to that of the latest full calendar year, unless the customer and the EEU mutually agree on a different projection. For new construction projects or major renovations that qualify as new construction projects, projected energy and demand consumption will be determined by the EEU in consultation with the customer and with input from the Department.

4. If a customer participating in the ESA option does not use Available Funds within twenty-four months of the date they have been allocated into the customer's ESA, those funds shall be forfeited by the customer and they shall be available for use by the EEU for other purposes authorized by the Board.

    a. Under extraordinary circumstances beyond the control of the participant, a customer may apply for a waiver from the Board to extend the time period before which Available Funds will be forfeited. The request shall:
        i. Be made as soon as extraordinary circumstances become known to the participant and at least 45 days prior to any forfeiture of Available Funds,
        ii. Describe the extraordinary circumstances that will prevent the participant from using the Available Funds,
        iii. Describe other future projects planned under the ESA option.
    b. If an EEIP identifies long-term projects that would require forfeiture of funds that would otherwise be Qualified Expenses within the twenty-four-month window for expenditure of ESA funds, a customer may apply for a waiver from the Board to extend the time period before which Available Funds will be forfeited.
    c. The Board will solicit comments from the Department and the EEU before making a determination.
    d. In making its determination, the Board shall take into account whether approval of a waiver request would impact the ability of an EEU to achieve its performance goals. An EEU shall not be adversely affected in regard to its performance goals by an approved waiver.
    e. Any disputes shall be settled by the dispute resolution processes outlined below.

5. Following the successful completion and verification of at least four (4) projects and at least two (2) three-year ESA periods, a customer may apply to the Board to increase the percentage of the EEC that may be considered Available Funds. In reviewing any such application, the Board shall consider the customer's completed ESA projects, the EEU and DPS costs associated with the customer's ESA participation, and other information as it deems prudent.

Program Implementation:

The process by which customers may choose to self-administer energy efficiency through the Energy Savings Account option is defined below:

1. Eligible customers who desire to participate in the ESA option must file a request with the Public Service Board and provide a copy of the request to the Department and the Energy Efficiency Utility. The request may be made at any time. In its filing, the customer must:

    a. Provide documentation of the EEC paid or expected to be paid that demonstrates eligibility for the ESA option.
    b. Identify the premises and electric utility accounts that will be the subject of the ESA.
    c. Identify the customer's energy policy, if any, and/or the commitment of the organization to managing energy. This may include the dedication of an energy manager or team, if any, and roles and responsibilities of various entities as they relate to energy use.
    d. Describe the general strategy for acquiring energy efficiency resources in the customer's facility or facilities. This strategy may include the development of an EEIP.
    e. Agree to the policies and procedures of the ESA option as specified herein and in any other Board Order or Rule.

2. Within 30 days of receipt of a customer's filing requesting to utilize the ESA option, the Department will verify that the customer meets the eligibility criteria and recommend to the Public Service Board to certify a start date as appropriate. The customer may choose to secure this verification prior to filing its request. The Public Service Board shall inform the customer, the affected EEU, the DPS, the customer's Distribution Utility, and the Fiscal Agent of the start date if the application is approved.

3. Following receipt of the customer's filing and certification of eligibility, the start date determined by the Public Service Board shall be the first customer bill on or after either the beginning of the 2nd calendar quarter (April 1st) or the 4th calendar quarter (October 1st), whichever is first.

4. ESA participants will continue to pay 100% of the billed EEC, with ESA amounts ("Available Funds") held by the Fiscal Agent and accounted for separately from other EEU funding.

    a. The customer must provide monthly documentation of its EEC to the EEU. Upon request, such documentation must also be provided to the Department.
    b. Upon request, Distribution Utilities shall provide the EEU and Department with confirmation of customer bills and payment.

5. At any time following proper notification to the EEU of its intent to participate in the ESA option, a customer may submit a description of a cost-effective energy efficiency project to the EEU, including all necessary data needed to review assumptions and estimates including, but not limited to: work papers, drawings, contractor estimates, operating data, and equipment specifications. The project description shall include a statement of whether the project is an EEIP, market-driven, retrofit, or prescriptive. A list of Qualified Expenses associated with the project along with supporting documentation, an estimate of energy and non-energy savings associated with the project, the projects' expected lifetime, and a description of the "baseline" if a market-driven project.

6. All market-driven and retrofit projects under the ESA option must pass the same cost-effectiveness screening requirements set by the Public Service Board for the EEU and Vermont utilities.

7. The EEU will review the project information submitted by customers and screen projects for societal cost-effectiveness using the statewide screening tool and avoided costs, and notify the customer in writing within 30 days if: the project meets the cost-effectiveness screening criteria and is an eligible project; the EEU needs additional data to screen or review the project; the EEU agrees or disagrees with any or all of the customer's assumptions and estimates; the EEU needs additional time to review the submission. The notification will also include the amount of Qualified Expenses. The EEU may request additional information on projects as may be reasonably required to (a) carry out assessment of cost-effectiveness, and (b) report on costs and savings of proposed projects.

8. Once an approved project installation is complete:

    a. The customer shall notify the EEU of completion.
    b. The EEU may inspect to assure that the project has been installed as specified.
    c. The customer shall provide the EEU with dated, project-specific cost documentation. Lack of such documentation from the customer may result in denial of reimbursement for those costs.
    d. Based on review of final installation and cost information, the EEU will reimburse or appropriately credit the customer for Qualified Expenses pursuant to Provision 9 below. The EEU will seek reimbursement for those payments from the EEU Fiscal Agent on its monthly invoice.

9. Reimbursement to the customer will be in an amount not to exceed that which is currently available in the customer's ESA Available Fund balance. If the customer's ESA Available Fund Balance is less than customer's Qualified Expenses at the time of reimbursement, the customer may receive a monthly credit that will be issued by the Fiscal Agent as the customer's ESA funds become available, up to the amount allowed for the project. The monthly credit would be applied only up to the amount of the customer's Available Funds for the three-year period.

10. Any interest earned on ESA funds will remain in the Electric Efficiency Fund and be available for use as determined by the Board.

11. The EEU and the ESA program participant must document projects, to the extent possible, following the guidance by the Department of Public Service for purposes of project savings verification.

12. The EEU will report, in a format and frequency agreed upon by the DPS and the EEU, all costs incurred and savings achieved by the ESA projects.

Dispute Resolution Procedures:

1. In the event the customer disputes any EEU determination, the customer may make an appeal to the Department, who shall seek to resolve the complaint. If no such resolution occurs within thirty (30) days, the Department shall refer the complaint to the Public Service Board.

2. A customer may also make an appeal directly to the Public Service Board.

Program Discontinuation:

The following provides guidance on discontinuation of customer participation in the ESA option.

1. Once a customer is enrolled under the ESA option, the customer will continue to be enrolled until the ESA option is no longer available, the Board determines that the customer is no longer eligible, or the customer notifies, in writing, the Public Service Board, the Department of Public Service, and the EEU of its desire to discontinue participation.

2. The Department may recommend to the Public Service Board that a customer's ESA be discontinued if:

    a. A customer has forfeited any Available Funds.
    b. A customer should no longer participate in the ESA program for cause.

3. A recommendation from the Department to discontinue a customer's ESA may be appealed by the customer to the Board.

4. In case of termination of customer participation in the ESA program, any unspent "Available Funds", as determined by the DPS and approved by the Board, would then return to the EEU fund for use by an EEU to acquire electric efficiency resources. If a customer had used forecasted "Available Funds" for a project, the customer would continue to recoup Qualified Expenses.

Customer Confidentiality:

1. For program administration purposes, the Board will not consider the names of ESA participants to be confidential.

2. The EEU and the DPS will be obligated to maintain customer confidentiality under the same terms as are established for customer information provided by distribution utilities to the EEU. At the request of a customer, the EEU may execute a separate confidentiality agreement, upon terms mutually acceptable to the customer and the EEU, covering any aspect of a proposal submitted to the EEU for which the customer seeks special confidentiality treatment.

DPS Verification:

Customers choosing to self-administer through an ESA will be required to agree to allow the Department of Public Service and/or its consultants and the EEU, subject to appropriate confidentiality agreements, the right to review all project data, and to perform onsite inspections and/or metering, as necessary, to verify measure installation and performance, operating parameters, and cost documentation.

Energy & Capacity Savings:

1. Savings results (annualized energy savings, summer and winter coincident peak reductions, Total Resource Benefits, etc.) from completed ESA projects shall count toward EEU performance targets. If the total estimated service territory ESA funding (expended and available) for an EEU performance period exceeds one percent of the resource acquisition budget in the third year of that performance period as approved by the Board, the EEU and the Board will agree to examine the possible effects on the EEU's Performance Goals and consider appropriateness of adjustments.

2. As part of the EEU Demand Resource Plan proceedings, the DPS and the EEUs will review participation and performance to date in the ESA option and recommend to the Board whether savings shall continue to count toward EEU contractual or other performance goals. If savings continue to count toward EEU performance goals, parties shall determine whether the process to adjust savings and goals as outlined above is reasonable.

3. An EEU will hold the sole rights to any electric system capacity credits and/or environmental credits associated with an ESA efficiency project. These credits shall be used for the benefit of Vermont ratepayers, as directed by the Public Service Board and/or the Vermont General Assembly.

Program Evaluation:

1. No later than three years after initial Board approval of the ESA option, and every three years thereafter or at any time by request or its own initiative, the Board shall initiate a process to review program performance to date and consider any changes that may be proposed by interested parties. Evaluation of the ESA option shall include, but not be limited to consideration of:

    a. Participation and experience with the ESA option.
    b. Re-consideration of any third-party certification processes that may provide benefits to ratepayers.
    c. Savings and capacity credit allocations.

Appendix D
Cx Associates Report on the Energy Savings Account Program: Process Evaluation

Vermont Public Service Department
Agency of Commerce and Community Development

January 22, 2016

In 2013, Cx Associates, a consulting firm, prepared a report for the Public Service Department on the Energy Savings Account which suggested several programmatic changes. Many of the changes suggested in this report were ordered by the Public Service Board in docket number EEU-2014-02 in a final order dated 6/6/2014.[1]

[1] That order is available on the Board's website here: http://psb.vermont.gov/sites/psb/files/orders/2014/2014-06/OrderApprovingESAProgramModifications.pdf

December 20, 2013

Report for

Vermont Public Service Department
Energy Savings Account Program
Process Evaluation

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Table of Contents

I. Introduction

This report presents the findings of the process evaluation of the State of Vermont's Energy Savings Account (ESA) program. This process evaluation report fulfills a statutory requirement for the Vermont Public Service Board (PSB) to evaluate "participation and experience with the ESA option,"[1] and fulfills one evaluation component included in the Department of Public Service's (DPS) Board approved EEU evaluation plan[2]. The scope of this evaluation includes an investigation of the ESA program statutory requirements to date, an operational review of the ESA program administration by Efficiency Vermont (EVT), an assessment of the experiences of ESA program participants, and elicitation of insights from potential program participants. The perspectives of non-participants, participants, and EVT were gained through stakeholder interviews. The interview findings informed the development of the recommendations for the ESA program.

A. Report Organization

Following this introduction is a description of the methodology employed for the evaluation. The next section provides background information on the ESA program, including the program's statutory requirements and objectives, the procedural history to date, and program design considerations and participation limitations. Section IV presents an operational review of the ESA program, a description of EVT roles and responsibilities, and an assessment of challenges and opportunities for the program. Section V is a technical review of past and current ESA program participation, including a review of ESA participant account histories. Section VI presents a review of insights from prospective ESA participants. Section VII provides a high-level review of best practices for ESA-type programs. The report concludes with a presentation of recommendations for improving the ESA program design and administration.

II. Methodology

This ESA program evaluation included the following key elements:

1. Research into the ESA program statutory requirements and program design,
2. High-level review of best practices for ESA or other similar program implementation in other states,
3. In depth interviews with:
    a. Program participants
    b. Non-participants that are qualified to participate
    c. Efficiency Vermont (EVT) personnel responsible for ESA program management and implementation
4. Review of ESA program documentation including customer level tracking and reporting documents

The EVT interviews and data reviews provided insights into EVT roles, processes, challenges, and opportunities for the success of the ESA program. The participant and non-participant interviews were designed to elicit perspectives on the ease of participation, barriers to entry, the overall value of the

[1] State of Vermont Public Service Board, "Energy Savings Account Option for Customer Self-Administration of Energy Efficiency," Attachment A. 12/22/2009.

[2] State of Vermont Public Service Board, "Vermont Department of Public Service Electric Energy Efficiency Evaluation Plan, 2012-2014." 4/1/2011.

program, and recommended program design modifications. The research findings were summarized and synthesized into recommendations for improving the ESA program design and administration.

III. Background

This section provides a review of ESA program statutory requirements and objectives, and the procedural history to date, including program design considerations and participation limitations.

A. Statutory Requirements and Objectives

The Vermont Energy Savings Account (ESA) program is a self-administered[3] efficiency incentive program for improved energy efficiency among Vermont energy utility customers that are required to pay the state Energy Efficiency Charge (EEC). The State of Vermont Public Service Department (PSD) is responsible for evaluating the ESA program as part of the PSD's overall authority to protect the public interest in state-wide energy efficiency. The ESA program was established on December 31, 2009 through Public Act 45, § 14a. (Vermont Energy Act of 2009) and Vermont Statute Title 30 V.S.A. § 209. The program is funded by ratepayers via the state EEC, which is designed to serve several important state objectives[4]:

- Reducing the size of future power purchases;
- Reducing the generation of greenhouse gases;
- Limiting the need to upgrade the state's transmission and distribution infrastructure;
- Minimizing the costs of electricity;
- Providing efficiency and conservation as a part of a comprehensive resource supply strategy;
- Providing the opportunity for all Vermonters to participate in efficiency and conservation programs; and
- Targeting efficiency and conservation efforts to locations, markets or customers where they may provide the greatest value.

Per Vermont Statute Title 30 V.S.A. § 209, Vermont Public Service Board (PSB) is charged with ensuring participation in efficiency programs, which is in-line with the state's objectives for the EEC. Specifically, the PSB shall:

> "Ensure that all retail consumers, regardless of retail electricity, gas, or heating or process fuel provider, will have an opportunity to participate in and benefit from a comprehensive set of cost-effective energy efficiency programs and initiatives designed to overcome barriers to participation."[5]

To that end, the statue requires the PSB to:

> "Promote program initiatives and market strategies that address the needs of persons or businesses facing the most significant barriers to participation."[6]

The stated intent of the Vermont ESA program recognizes "that certain large business customers already may be committed to, and possess considerable expertise regarding energy efficiency."[7] The creation of

[3] Although categorized as "self-administered", EVT administers the program and provides support to participants.
[4] State of Vermont Statutes: Title 30 V.S.A. §209(d)(4)
[5] State of Vermont Statutes: Title 30 V.S.A. §209(e)(1)
[6] State of Vermont Statutes: Title 30 V.S.A. §209(e)(4)
[7] State of Vermont Public Service Board, "Energy Savings Account Option for Customer Self-Administration of Energy Efficiency," Revised Attachment A. 1/28/2011.

the ESA Program is an alternative path to participation designed to increase flexibility for larger commercial and industrial (C&I) customers.

B. Procedural History to Date: Program Design Considerations and Participation Limitations

The ESA program has been executed through orders issued by the Vermont PSB, notably the "Order Establishing an Option for Certain Business Customers to Self-Administer Energy Efficiency through the Use of an Energy Savings Account" (12/22/2009) and its attachment "Energy Savings Account Option for Customer Self-Administration of Energy Efficiency." These program design documents specify eligibility and application requirements for participants; define "Qualified Expenses" and "Available Funds" for participants; define the roles of the PSB, the PSD, the energy efficiency utilities (EEUs) and the participants; as well as provide guidance for termination of participation and dispute resolution. Energy and demand savings achieved through ESA projects count toward EEU contractual performance goals and all Quality Performance Indicators (QPI) and minimum QPI..

Vermont utility customers who pay an average annual EEC of at least $5,000 (preceding 12 month period or the average of the preceding 3 year period) may apply to the Public Service Board to self-administer energy efficiency through the ESA[8]. The "Available Funds" for ESA program participants are limited to 70 percent "of the EEC that the customer has paid since its ESA start date, or is projected to pay to its distribution utility through the EEC, for a three-year maximum period, net of taxes"[9]. The remaining 30 percent of EEC funds are to be used by the EEU to achieve system wide benefits[10]. Participants may request an increase in their available funds upon completing at least four ESA projects with verified savings after at least two three-year ESA periods. Available Funds not utilized by a participant within a 24 month period will be forfeited back to the EEU for other purposes authorized by the PSB.

Eligible customers apply to the ESA program by submitting a written request to the PSB, PSD and EEU. Once participation is authorized, the ESA participant can submit projects for review by the EEU. Proposed efficiency measures/projects must have a simple payback period greater than or equal to 18 months to receive incentives. All ESA measures/projects must pass the cost-effectiveness screening requirements established by the PSB for all Vermont EEUs. The EEU reviews the application for cost-effectiveness (up to 60 days). ESA funds are disbursed to participants as reimbursements, following notification to the EEU that the project is complete and pending final review by the EEU of project costs and estimated energy savings.

Since the time of establishment in 2009, the ESA program has been subject to several proposed modifications. These modifications include:

- Proposed and Accepted:
    - Allowing participants to receive technical assistance from EEUs[11]

[8] State of Vermont Statutes: Title 30 V.S.A. §209(d)(4).

[9] State of Vermont Public Service Board, "Energy Savings Account Option for Customer Self-Administration of Energy Efficiency," Attachment A. 12/22/2009.

[10] State of Vermont Public Service Board, "Order Establishing an Option for Certain Business Customers to Self-Administer Energy Efficiency through the Use of an Energy Savings Account." 12/22/2009.

[11] State of Vermont Public Service Board, "Order Modifying the Option for Certain Business Customers to Self-Administer Energy Efficiency through the Use of an Energy Savings Account." 1/28/2011.

        - *Proposed by DPS, EVT, Burlington Electric Department (BED), and Associated Industries of Vermont (AIV) on 10/22/2010.*
        - *Accepted by PSD on 1/28/2011*.
    - Allowing EEUs to review project costs for reimbursement, thereby eliminating duplicate effort of EEUs' Fiscal Agents[12]
        - *Proposed by DPS, EVT, BED, and AIV on 10/22/2010.*
        - *Accepted by PSD on 1/28/2011*.
- Proposed:
    - Relaxing the 18 month minimum payback period for project screening
        - *Proposed by Champlain Water District (CWD) on 5/29/2013*.
    - Adoption of a third ("Prescriptive") category of measures for the ESA program, in addition to "market opportunities" ["market-driven"] and "retrofit". The intent is to reduce EEU screening efforts and to advance simplicity and transparency[13]
        - *Proposed by CWD on 7/5/2013*.

In response to the stakeholder-proposed modifications that have not yet been accepted, and in fulfillment of its evaluation plan and program requirements, the PSD has outlined the following items for evaluation[14]:

- "Whether prescriptive measure incentives currently offered by an ESA participant's EEU should serve as a not-to-exceed limit for reimbursing participant investments in the these same measures;
- The appropriateness of relaxing or waiving the '18 month payback' requirement for these prescriptive measures;
- Whether the 18 month payback should be modified for other measures; and
- Other program design modifications as deemed necessary."

IV. Operational Review of ESA Program

This section provides an overview of the interviews conducted with Efficiency Vermont (EVT) personnel who are actively engaged in managing the ESA Program and managing the ESA customer accounts. Efficiency Vermont is the only EEU with ESA participants. The ESA is available to customers of the Burlington Electric Department, but there are no participants with that EEU. The interviews investigated the reporting and technical functions of EVT with respect to the ESA program. This section summarizes EVT roles, processes, challenges, and opportunities for the success of the ESA program.

A. EEU Roles and Responsibilities

As an energy efficiency utility (EEU), the primary roles and responsibilities of EVT with respect to the ESA program are to:

[12] Ibid.

[13] Vermont Energy Investment Corporation, correspondence: "Re: EEU-2013-02 ESA Limitation on Qualified Expenses." 7/5/2013.

[14] State of Vermont Department of Public Service, correspondence: Re: EEU-2013-02 ESA Limitation on Qualified Expenses." 7/5/2013.

1) Educate eligible customers of program opportunities;
2) Assist customers with the identification of energy efficiency investment opportunities[15];
3) Review customer applications for energy efficiency funding; and
4) Administer customer-level and program-level tracking, reimbursement, and reporting of expenditures

The Board Order creating the EEU allows for the EEU to claim savings generated under the ESA and states that those savings count toward the EEUs goals.[16] The Board Order also includes a provision to renegotiate goals for the EEU should the amount in the fund exceed 1% of the EEUs annual budget.[17]

The following is a discussion of relevant insights into each of these roles and responsibilities. At the conclusion of this section is a summary of the challenges and opportunities associated with EVTs roles and responsibilities in the ESA program

1) Educate eligible customers of program opportunities

At the time of the ESA program's establishment, EVT executed an initial outreach to customers about the ESA program opportunities and processes via a mass mailer, and via in-person meetings between interested customers and EVT account managers. EVT account managers were internally trained on outreach to ESA participants. The training and subsequent initial outreach was focused primarily on the content of the "Comprehensive Guide for Energy Savings Accounts" document. This 16-page "Comprehensive Guide" refers to ESA program documents, and augments these documents by providing an outline of application rules, requirements, and examples. The "Comprehensive Guide" is also available on EVT's ESA program website[18]. Both the EVT's website and the PSD's website[19] contain a link for the "Agreement to Terms and Conditions for Energy Savings Account Participation." The "Terms and Conditions" document provides a succinct, 2-page outline of the roles, responsibilities, and rules for both the applicant and the EEU.

EVT account managers have established relationships and dialogue with customers throughout the state, and discussion of ESA program opportunities will occasionally arise out of customer interest. EVT engages customers with ESA program assistance once customers apply for the program and their eligibility has been approved by the PSB. EVT does no ongoing promotion of the Program. If they receive an inquiry from a potential participant, they respond by sending out a packet of information. The Account Manager will follow up with a one-on-one discussion if desired by the customer. There so far have been very few direct inquiries from customers to EVT regarding the ESA program.

2) Assist customers with the identification of energy efficiency investment opportunities

Although the ESA program is designed to allow customers to independently identify and develop energy efficiency opportunities, EVT actively assists ESA customers in identifying opportunities using the same methods and processes as are used for non-ESA customers including:

- EVT maintains an account manager who works with the participants on a periodic basis to identify potential opportunities.

[15] This is a voluntary role that is not required under the Board Order.
[16] *Order Establishing an Option for Certain Business Customers to Self-Administer Energy Efficiency Through the Use of an Energy Savings Account*, Vermont Public Service Board, 12/22/2009, p5
[17] While the language in the Order is temporally specific it seems clear to the evaluation team that should the trigger of 1% EEU funding in the ESA be met, that a renegotiation of EEU goals would be appropriate.
[18] http://www.efficiencyvermont.com/about_us/energy_initiatives/ESA.aspx
[19] http://publicservice.vermont.gov/topics/energy_efficiency/esa_program

- EVT personnel perform a "walk-through" at a customer's facility to help identify opportunities with the customer.

In general, ESA participants mostly identify "market opportunity" measures for systems and equipment that are near the end of their useful service life and are in need of replacement. EVT assistance generally spurs the identification of "retrofit" opportunities for efficiency upgrades. Additionally, EVT may assist customers to engage specialized engineering consultants for process-specific efficiency analyses/studies.

In some cases an outside engineering or vendor study may help to support investment into a retrofit. Such studies are a common part of the non-ESA programs. In one case, an outside vendor promoted services typically available to non-ESA customers to an ESA customer, presuming the same level of EVT incentive would be available for the engineering study as was provided for non-participant projects. EVT has no record of the study proceeding under the ESA rules which prohibit any upfront payment for engineering or vendor studies. No measures on the affected system were pursued under the ESA indicating that the study may not have proceeded.[20]

3) Review customer applications for energy efficiency funding

ESA program participants pursuing funding for energy efficiency projects must submit their project applications to their EEU for review. EVT performs a technical review of project applications and evaluates projects per the requirements of the ESA program (e.g. 18 month payback threshold and cost-effectiveness). EVT personnel regard cost-effectiveness as the pre-eminent criterion for evaluating efficiency measures across all energy efficiency programs.

Each efficiency project implemented under the ESA is counted towards EVTs system-level tally of kWh savings, summer kW savings, and resource benefits. There are no energy or demand savings goals for the ESA program, and there has so far been no goal setting performed with ESA program participants. Nevertheless, capacity reductions count toward EVT statewide goals and applicable Geographic Targeting (GT) goals, and are bid into Forward Capacity Market (FCM) savings.

The EVT technical review process for applications is typically iterative. Upon initial review of ESA projects, there is typically a need for additional supporting information or revisions to the estimates, which the Account Manager pursues with the participant. EVT account managers do not view the ESA review process as onerous or inefficient relative to other programs. They do indicate that a considerable amount of "hand-holding" is required and provided throughout the application process to bring projects to implementation.

The interviews with EVT account managers included a high level review of the tracking database documenting the extensive communication with ESA participants regarding their submitted projects and culminating in the issuance of a rebate check.

4) Administer customer-level and program-level reporting of expenditures

EVT reports the expenditures of ESA program funds at both the customer-level and program-level. Customers are responsible for reporting expenses to the EEU. EVT provides monthly reporting of participant expenditures and available funds to the PSD and the participants. Review of the monthly

[20] The evaluators attempted to investigate the study directly with the customer, but the participant was unavailable to participate in an interview.

customer reports indicated that in general the reports include the necessary data to determine the expenditure and availability of the customer's ESA funds. The review found a data entry error and an error regarding the point at which ESA funds would be forfeited. Neither of these issues had any direct impact on the customer accounts. Upon notification of the issues, EVT corrected the reports and the revised reports were verified as correct by the evaluators. EVT expenditures for the ESA program including staff time and incentives are not tracked separately from other programs. There are no separate invoices or reports for the ESA at the program level[21].

B. EEU Input on ESA Program Design

The interviews with EVT personnel investigated ESA program design elements that are of particular interest to our process evaluation:

1) Appropriateness of the 18 month payback threshold
2) Appropriateness of a "prescriptive" option
3) Reimbursement amount and timing for engineering studies

The following is a synthesis of the interviews with EVT. The recommendations of the evaluators are presented in Section VIII.

1) Appropriateness of the 18 month payback threshold

The 18 month payback threshold for "retrofit" projects is designed to encourage larger, more capital intensive projects that may not otherwise be completed. Additionally, the 18 month payback threshold may help to reduce free-riders in the ESA program. Since the 18 month threshold applies only to "retrofit" projects, it does not apply to "market opportunity" projects. The ESA program is the only efficiency program to employ an 18 month screening requirement. Non-ESA projects, notably those under custom programs, employ other screening considerations such as time and labor to implement and capital cost. ESA and non-ESA projects are all subject to a cost-effectiveness criterion (i.e. the State Screening Tool), and cost-effectiveness effectively serves as a universal criterion for project evaluation.

The 18 month payback threshold can have the effect of either disqualifying cost-effective projects from receiving incentives[22], or providing an overly generous incentive for projects with a longer payback period. EVT notes that relaxing or eliminating the 18 month payback requirement could stimulate more participation in the ESA program. An increase in the number of participants would consequently increase the administrative burden (i.e. accounting and reporting tasks) of the EEUs.

2) Appropriateness of a "prescriptive" option

EVT personnel regard a "prescriptive" option within the ESA program as an opportunity to significantly reduce management/administrative costs for EVT/EEUs while increasing the ability of customers to participate. There was discussion of how such an option might work as it would be infeasible to include an 18 month payback criteria with prescriptive rebates and deemed savings measures.

[21] ESA-specific expenditure tracking, reporting, and invoicing are not required by the PSB.

[22] EVT claims savings for projects that do not receive incentives due to a payback of less than 18 months. This is because EVT provides a significant level of customer engagement. Should ESA participation increase significantly or other EEU customers engage in the program, future evaluations should investigate this practice in more depth.

3) Reimbursement amount and timing for engineering studies

It is suspected that the 25% reimbursement limit for engineering studies may impact ESA program participation and/or project development. EVT suggested that a participant's risk of 0% reimbursement for studies of projects that are not implemented may present another barrier for participants. It is known that at least one engineering study was contracted (a compressed air system study) for a measure that ultimately was not implemented. It should be noted that other EVT efficiency programs do not carry a 25% limitation on engineering study reimbursement, and that custom programs typically provide 25 – 100 percent reimbursement for such studies. EVT reportedly has more engagement in determining the focus of these studies and expressed the need to ensure that initiated studies are focused on efficiency, as opposed to industrial process improvements in general.

Pros and Cons of Increased Participation

The interviews with EVT investigated the potential impacts of significantly increasing participation rates in the ESA program that could result from potential redesign of the Program. The following is a synthesis of the impacts on EVT that were identified by EVT:

- *Increased administrative costs*. The tracking of ESA funds is manual – customers report their charge to EVT on a monthly basis based on their actual electric utility bill; EVT maintains a spreadsheet in which they record the monthly EEC data and any ESA qualified expenditures which have been paid out. These spreadsheets are updated and sent to the customers and PSD on a monthly basis. Handling this tracking and reporting on a manual basis is viable for the EEU with a small number of ESA participants. If the number of participants increased significantly the administrative burden would be significant and an automated tracking and reporting mechanism would likely need to be developed.
- *Potential for higher participation for currently non-engaged customers*. EVT indicated that there are a limited number of customers with managed accounts who are not actively engaged with their account managers. It is possible that relaxing the ESA program requirements could result in these customers enrolling in the ESA program and undertaking measures on their own.
- *Potential for an increased number of smaller customers to enroll*. Smaller C&I customers often don't have the capacity to self-administer which could result in lack of savings both for the customer and the EEU.
- *Lack of control over project completions and achievement of savings goals.* If a large number of customers enrolled in the ESA, the EEU would have a reduced ability to manage performance relative to spending, energy savings goals, and other QPIs (Quality Performance Indicators)[23].

While relaxing the program requirements could increase participation in the ESA, it was unclear that the benefits would outweigh the potential negative impacts on the EEU[24]. These questions were further investigated through interviews with both active and potential participants.

Findings

The interviews with EVT personnel revealed significant challenges and opportunities for EVT processes, and for the ESA program as a whole. The following is a synthesis of the discussions with EVT and are not

[23] Cx Associates and the PSD note that if a large number of customers enrolled in the ESA program, it would give individual customers more control and EEU performance may positively impact EEU performance.

[24] Cx Associates and the PSD note that the primary goal of the program is to provide an opportunity for participation in energy efficiency incentives. Impacts on the EEU are a secondary consideration which could be addressed by not linking ESA project performance to EEU performance goals.

recommendations of the evaluators. The recommendations of the evaluators are presented in Section VIII:

1. Delayed notification from the PSB to EVT regarding approval of participant eligibility in the ESA program can delay administration of EVT processes.
    - The engagement of EVT with the customer has in at least one instance been delayed by several weeks. Such delays may impact project planning and momentum.

2. EVT noted that accounts associated with new construction projects have not yet paid an EEC, and are therefore ineligible for participation in the ESA until a year or two after completion. A review by the PSD revealed that customers in a new building may in fact be deemed eligible based on projected EEC payments. This option should be reviewed with EVT account managers.

3. From an administrative perspective, the ESA program tracking and reporting presents an additional burden on EVT/EEU resources. However, because of the current low participation rate, this burden is relatively small.

4. The requirement for customers to compile their EEC information in order to apply for eligibility in the ESA program may have the effect of discouraging enrollment. This can be especially burdensome for customers that have a large number of utility meters.
    - Utility assistance in compiling this data on behalf of the applicant may help to facility program participation. Currently, utilities provide EVT with only demand and consumption data (no billing data).

5. Cx Associates observed that the EVT website[25] could be updated with the more recent, revised PSB "ESA Order" documents, and a link to the PSD's ESA website. The EVT website's content mirrors the PSD's ESA website[26], which could also benefit from an update of document links. The online source of the latest program documents is currently the Board's website[27], which is not directly linked to either the PSD or EVT website.

6. Higher available incentive amounts in non-ESA custom programs may be a barrier to participation.

7. The length of time available for customers to use funds may be a barrier to both participation and project funding.

8. The level of engineering study funding and the requirement that the project be implemented prior to any incentives being provided likely limits investment in engineering studies and likely the identification of cost effective opportunities.

9. Although approximately 300[28] customers may qualify for eligibility in the ESA program, very few customers reportedly have the resources/staff to self-manage energy efficiency projects. Only a handful of customers have energy efficiency managers on staff.

[25] http://www.efficiencyvermont.com/about_us/energy_initiatives/ESA.aspx
[26] http://publicservice.vermont.gov/topics/energy_efficiency/esa_program
[27] http://psb.vermont.gov/projects/eeu/selfadministeredefficiency
[28] EVT interviews revealed a range of estimated number of participants and or sites from 300 – 5,000. Because many larger customers have multiple meters, the lower limit is used in this report.

10. EVT personnel suggest that raising the eligibility threshold above $5,000 could help ensure that the participants have enough financial resources available to implement projects through the ESA and that they are more likely to have the capacity to develop and implement projects more independently.

V. Review of ESA Program Participation

The past and current participants in the ESA program were contacted for interviews, with the purpose of assessing ease of participation, barriers to entry, the overall value of the program, and recommended program design modifications. There have been only two active ESA participants and only one participant was available to provide their firm's perspective.

A. Review of ESA Participant Account Histories

In addition to the participant interview, the account histories of both participants were reviewed to assess the pace of fund accrual in accounts compared to implementation of projects. As noted above, the review identified some errors which were resolved by the EEU. One additional issue is that both participants indicated that they did not always receive a monthly account statement. One participant indicated they had not received an account update since May of 2013[29].

Table 1 below summarizes the ESA program participation in terms of number of participants, number of energy efficiency projects, total program energy savings, and energy savings per year of program participation. We have also provided reported savings from the Efficiency Vermont 2012 annual report which shows a lower cost per MWh for the entire Business Existing Facilities offerings, than was claimed for all ESA projects completed since program inception, including any ESA projects that completed in 2012. Data is reported in kWh due to the relatively small scale of the ESA participant projects. Because of the very small number of participants and projects, there is limited data on which to base any conclusions regarding program performance. The magnitudes of savings are reasonably consistent with the size of firms that are participating in the program.

[29] The evaluators were unable to determine if there was in fact a hiatus in EVT issuing the reports or whether there was an issue with the transfer of the reports within the participant's operations. However, both participants independently reported a lapse in reporting by the EEU.

Table 1: Overview of ESA Program Participation

ID	No. of Projects	Gross Annual Savings (kWh)[1]	Savings per Year of Participation (kWh/yr)	Total Incentive Cost	Incentive Cost per kWh[1]	Total Customer Investment	Customer Cost per kWh
1	4	51,317	23,685	$12,611	$0.25	$23,648	$0.46
2	1	14,762	4,662	$4,800	$0.33	$2,571	$0.17
ESA Program[2]	5	66,079	28,347	$17,411	$0.26	$26,220	$0.40
Business Existing Facilities Program[3]		50,395,000	NA	$9,788,637	$0.19	$13,400,590	$0.27

1. Includes project claimed by EEU that did not receive incentives due to short payback period
2. ESA numbers are since inception; first participant enrolled in October 2010 (38 month period)
3. Efficiency Vermont Annual Report 2012 (12 month period) provided for reference. Includes any qualifying ESA projects completed in that year.

The evaluators conducted a census review of the Comprehensive Analysis Tools used by EVT to quantify savings, costs and incentives for the ESA projects. This review indicated that incentives were appropriately calculated to provide an 18 month payback and the measures were typically lighting which would have qualified as prescriptive, and in most cases, would receive lower incentives under a prescriptive program.

There is no requirement for the EEUs to track overhead costs associated with administering the ESA separately, therefore overall program administrative costs could not be assessed. However, as noted above, EVT has chosen to provide a higher level of customer engagement and support for ESA participants than is typical of a "self-direct" program which likely increases the cost of administration.

Program Participant Findings

The following is a summary of the findings from the participant interview and review of the account histories.

1. Communication with EVT is prompt, efficient, and helpful.
2. Customer account reporting could be more consistent (some monthly reports not received).
3. One participant has forfeited funds from their ESA accounts.
4. Application process could be improved by providing applicants with immediate acknowledgment of application submission and a timeline for review/approval.
5. It is helpful to have outside technical consulting for developing project details, and then bring in EVT for project screening.
6. A prescriptive incentive format can make project applications much easier.

7. It has been difficult to develop project concepts within the time period available for fund expenditure. There is concern that eventually the firm will not be able to come up with project concepts and will forfeit subsequent funds.

8. Reduction of the 18 month payback period criterion would help to support lighting retrofit projects.

9. Up front reimbursement for engineering studies could be helpful for developing projects.

VI. Prospective ESA Participant Review

Senior facility management personnel from several industrial firms who are eligible to participate in the ESA, but are not participating (potential participants) were interviewed to gain insights in opportunities from improving the ESA program. The firms include both firms that have expressed interest in entering the ESA program, but have not applied and firms that are eligible, but have not necessarily expressed interest in the program.

Prospective Participant Findings:

The following is a summary of the findings from the non-participant interviews. The interviews with non-participants of the ESA program revealed challenges and opportunities for serving the needs of potential ESA program participants:

1. The reimbursement limitation for engineering studies (25% of total project cost), may be restrictive for low-capital projects and therefore smaller-scale facilities and organizations.

2. One customer had no knowledge of the ESA prior to be contacted for the interview. Additional communication regarding the Program would be helpful for business managers.

3. A “cheat-sheet” with side-by-side comparison of ESA program vs. other program(s) may help organizations evaluate their participation in the ESA program.

    a. It is difficult to tell how the administration of project design and implementation compares between ESA and non-ESA programs.

4. More clarity on the participant exit process would be helpful for evaluating participation.

5. It is possible for customers active in non-ESA programs to receive more incentive dollars than are they pay into the EEC on an ongoing basis.

6. Firms familiar with the ESA program believe that non-ESA programs offer more incentives and administrative support.

7. The state could/should be able to directly obtain billing data for administrative/application purposes, rather than requiring applicants to gather and submit such data.

8. In some cases, an 18 month payback period is an acceptable requirement, since some non-ESA programs/projects utilize a 24 month payback period. A 2-year payback is a common, corporate screening requirement for efficiency investments.

9. The requirement to spend funds within a 24 month period is unattractive. Large projects take several years to plan and implement.

10. Most large efficiency projects are multi-year projects, so the limit on using ESA funds for projects that have already received efficiency program funds is perceived as a barrier to participation in the ESA program.

11. The payment structure for engineering study reimbursement is generally unattractive, given how long it takes to receive funds and given the risk of no funding.

12. Some firms have not seen measurable energy savings resulting from their participation under the non-ESA programs. Thus, there may be a need for clearer communication of project/account performance.

13. One firm indicated that their annual charge is so large that it is infeasible for them to invest 70% of that money and the additional capital required to fund efficiency projects on an annual basis in their facility. This customer indicated that they have worked with EVT, and their total energy use per unit of production has not decreased and together they have been unable to identify projects that cost even close to 70% of their EEC charge.

VII. Review of Best Practices for ESA-Type Programs

A review of the ACEEE (American Council for an Energy Efficient Economy) meta-study of ESA-type programs was conducted to identify best practices. The findings from this review were used to guide the investigation and subsequent recommendations for the VT ESA program. The following are best practices which are either currently incorporated into Vermont's ESA program or may have bearing on any potential modifications to the program[30]:

- Setting energy savings goals with participants can help to improve the working relationship between the customer and the program administrator.
- Give CFOs a reason to care about EECs and programs: "A good self-direct program moves the fee [EEC], and energy efficiency funding generally, out of the O&M budget and into the capital expenditures budget. It does this by separating the fee [EEC] from the rest of the utility bill and showing the customer that the self-direct-able portion of the CRM [cost-recovery mechanism] fee is a dedicated amount of money specifically able to fund energy efficiency projects."[31]
- "Use it or lose it" arrangements and competitive bid arrangements can help to encourage investments, particularly those with a low IRR. For example, Puget Sound Energy uses a competitive bid process to award any remaining, non-committed funds at the end of their 5-year program cycle. This practice has reportedly dramatically increased participation.
- It is generally recommended that the following data be collected from program participants: the type of investments, the cost of each investment, the overall cost of the energy saved, the amount of energy saved by each individual measure, and the overall amount of energy saved. [32]
- Strong relationships and direct communication can be helpful for participation. For example, Xcel Energy engages customers early in the process and requires pre-installation energy monitoring.

[30] American Council for an Energy Efficient Economy, "Follow the Leaders: Improving Large Customer Self-Direct Programs," Report No. IE112. October, 2011.
[31] Currently part of EEC process.
[32] Currently part of EVT process.

- Program success may be more directly measured by energy savings rather than expenditures or number of participants.

VIII. Recommendations

The following recommendations have been developed out of the evaluation interviews and research into efficiency program best practices. These recommendations encompass improvements to both the program design and program administration. The recommendations are organized under the following categories: Administration, Program Design and Evaluation In each section, the recommendations are organized with the highest priority recommendation first.

A. Administration

1. Finding: Participants don't always receive ESA statements

    - *Recommendations: Ensure the statements are sent to the correct person and investigate the viability of providing online access to ESA account information to eliminate the need for mailed or emailed statements.*

2. Finding: potential participants were not fully aware of the ESA and those that were aware found it difficult to compare ESA and non-ESA program benefits.

    - *Recommendation: Provide customers with more frequent and accessible information regarding the ESA option including:*
        - *A side-by-side comparison between the ESA and other incentive programs.*
        - *Annual outreach from EEUs explaining the ESA option, similar to the initial outreach communication at the program inception.*

3. Finding: There is no ESA specific reporting of customer or program savings.

    - *Recommendation: enhance the monthly statement to ESA customers to include project information including project costs, savings, incentives and net payback. This will help customers understand the benefits they are receiving through the ESA and will support future evaluations.*

4. Finding: Monthly reporting is onerous for the participants and the EEUs.

    - *Recommendation: Investigate the feasibility of automated electric utility reporting of monthly ESA charges to the customer and the EEU to streamline access to the EEU of the monthly EEU charge and minimize impact on customers.*

B. Program Design

1. Finding: In order to effectively "self-direct" funds, customers need to invest money in planning and include projects in their capital budgets to ensure funding is available to overcome the 18 month investment threshold for ESA funds. Two years is inadequate

for the development and funding of large projects; planning would support longer term assessment and funding for efficiency investments.

- *Recommendation: Support the integration of ESA project funding and energy savings with participant's capital budgeting by allowing ESA fund expenditure for the development of a customer specific Energy Efficiency Investment Plan (EEIP) that can be incorporated into the business capital budget.*
    - *Earmark a percentage of participant's ESA funds for developing the EEIP documenting fund expenditures and capital investments necessary to procure energy savings.*
    - *The EEIP should be conducted soon after approval of eligibility in the program and should provide an opportunity for a participant to assess continuation of participation.*
    - *Require plans to be completed within first year of ESA participation.*
    - *Tie funds available to support planning costs to both a reasonable threshold that will support planning and the customer specific ESA contribution.*
    - *Use filed EEIPs to guide customer specific modifications to the 2 year period for expenditure of ESA funds.*
    - *Under this process, a modification of the 18 month payback is not recommended.*

2. Finding: There was mixed feedback regarding whether the 18 month payback criteria represents a barrier to participation. Review of participant projects indicates that the one submitted project that did not receive funding had a payback of about four months; easing the payback threshold would be unlikely to result in incentives for such projects. Other programs outlined in the ACEEE paper have thresholds of 12 months.

   The intent of the ESA program is to support relatively large and complex efficiency projects for larger customers. The largest customers interviewed reported internal investment criteria consistent with or greater than the 18 month threshold.

   - *Recommendation: The evaluation team recommends retaining the 18 month payback requirement in the ESA program design at this time. The 18 month payback criterion is not perceived as a barrier to participation by larger, more sophisticated firms/facilities that would be most suited to take advantage of the ESA. The ESA projects to date are less cost effective than the comparable programs implemented by Efficiency Vermont and reducing the payback criteria would further reduce the comparative cost effectiveness of the ESA savings.*

3. Finding: EVT provides a higher level of support and assistance to ESA participants than is typical for this type of program. Enabling ESA participants to maximize their incentives by choosing between custom analysis and prescriptive incentive programs with deemed

savings could reduce the cost efficiency that is intended to result from a self-direct type program and introduce more complexity in program administration. For instance, one lighting project that received significant incentives under the ESA would have received significantly lower incentives under a prescriptive option and another did not qualify for any incentives due to a quick payback. Introducing a prescriptive option would result in the need to choose which option applies for each project, increasing costs and the likelihood of disagreement between the participant and the program administrator.

- *Recommendation: Maintain the ESA as a custom self-direct program with no access to prescriptive incentives. Enabling ESA participants to participate in prescriptive incentive programs blurs the lines of participation - The ESA is intended to be a self-direct program in which the participants identify and implement cost effective efficiency measures that meet the program criteria.*

4. Finding: customers are not encouraged and may not undertake engineering studies to help identify opportunities for savings due to the lack of reimbursement under the ESA.

    - *Recommendation: For engineering studies, provide a percentage of funds up-front and a percentage of funds for reimbursement after measures are implemented, similar to the reimbursement strategy for non-ESA programs. The up-front funding would help to reduce the funding risk for projects that do not screen or are not undertaken for other reasons and may help to increase project development and participation.*

5. Finding: Customers in Vermont are small relative to those in other states and may not have the internal capacity to manage ESA funds effectively.

    - *Recommendation: Consider developing a mechanism to fund a position such as an energy manager within a customer facility using ESA funds. This would support job growth as well as energy efficiency and potentially enable some of Vermont's largest customers to take a more proactive role in energy efficiency investments.*

6. Finding: Restrictions regarding participation in the ESA for projects that may have received prior funding from the EEU are unclear. Specifically the following requirement: "Customer projects that have received incentive payments from an EEU prior to the initiation of a customer's ESA shall not be projects that are eligible for reimbursement as a qualified expense." It is unclear whether this pertains to projects that received EEU funding for an engineering study, new buildings that received EEU incentives and then wish to participate in the ESA, etc.

    - *Recommendation: Clarify or modify this criteria to ensure that participants in the new construction program and those with multi-year, multi-phase projects that have received past support from the EEU can participate in the ESA Program.*

7. Finding: Active participants receive significant support from EVT, but are challenged in using their available ESA funds in efficiency investments.

- *Recommendation: Consider raising the threshold for minimum firm size, which is currently defined as customers that have made payments to the EEC of at least $5,000 per year. Small firms have much fewer funding resources to apply toward projects and face a greater difficulty in utilizing ESA funds. A higher, minimum firm size may help to improve the overall success rate of the program and enable customers to engage independently in implementing efficiency as is typically the protocol for self-direct programs.*

- *Recommendation: Investigate setting-aside forfeited funds for competitive bidding between participants. This could help to motivate more participation and put more funds to productive use within the ESA program.*

C. Evaluation

1. Finding: The lack of ESA goals and reporting results in qualitative program evaluation against subjective criteria.

    - *Recommendations: Develop/define program goals for ESA program. This will provide a basis against which to assess program performance and will help guide future enhancements to the program design. Currently, the stated objectives of the ESA program are generic to all incentive programs, which is to encourage participation in energy efficiency programs and provide access to cost effective incentives. The only discernable objective that is unique to the ESA program is the leverage the knowledge and expertise of customers.*

        - *One potential goal is to increase customer awareness of the ESA program. Progress toward this goal could be measured via a brief EEU-administered survey as part of regular communications with clients.*

        - *Another possible goal from the best practice research is a program savings goal. Establishing savings goals requirements for participants could be useful for both participants and the EEU.*

2. Finding: Efficiency Vermont claims savings for projects that did not receive incentives under the ESA. This evaluation did not perform in depth investigation of the basis for the EEU's claiming these savings; however the research did indicate a significant level of engagement with the customer that could likely justify the savings claim.

    - *Recommendation: Future evaluation scope should include research into the appropriateness of the EEUs claiming savings under the ESA for measures that do not receive incentives under the Program. This should include requiring the EEU to identify such projects up front and providing supporting documentation regarding the practice. The evaluator should verify the EEU's reported engagement and influence on the measures with the participants.*

    -

IX. Conclusion

This process evaluation has revealed opportunities for improving the success of the ESA program. The recommendations of this report highlight opportunities that should be considered by the PSD/PSB. It is anticipated that the development and refinement of these recommendations, and other findings, into ESA program design elements may warrant additional study.

