

2017 Tier III Plan – Vermont Electric Cooperative November 15, 2016

The Energy Transformation provisions of Act 56, passed by the Vermont Legislature in 2015, set targets for utility-led or utility-partnership projects that will reduce fossil fuel usage and greenhouse gas emission. The legislated target starts at 2 percent of sales (BTU equivalency) in 2017, rising by two-thirds of a percent each year until it reaches 12 percent in 2032.

A utility can satisfy this requirement through additional distributed renewable generation (Tier II), by implementing “energy transformation projects,” or by paying an Alternative Compliance Payment (ACP). In order to be eligible, an energy transformation project (ETP) must have commenced on or after January 1, 2015, must provide delivery of energy goods or services other than electric generation, and must result in a net reduction in fossil fuel consumption by a utility’s customers.

The statute does not mandate any particular product or service and allows for flexibility in how each distribution utility will meet its targets. The statute includes the following project criteria, which will influence our implementation strategy. Projects must:

- Meet the lowest present value life cycle cost, including environmental and economic costs;
- Be evaluated against alternatives that do not increase electricity consumption;
- Cost less per megawatt-hour (MWh) than the ACP (\$.06 per kilowatt-hour or kWh);
- Be implemented in a partnership with others unless exclusive delivery can be shown to be more cost-effective or because no others have the expertise;
- Ensure “an equitable opportunity to participate in, and benefit from, energy transformation projects regardless of rate class, income level, or provider service territory.”

Annual Planning and Evaluation

The PSB has ruled that Tier III annual plans shall include a description of the estimated Tier III compliance obligation for the following year and a description of the overall implementation strategy.

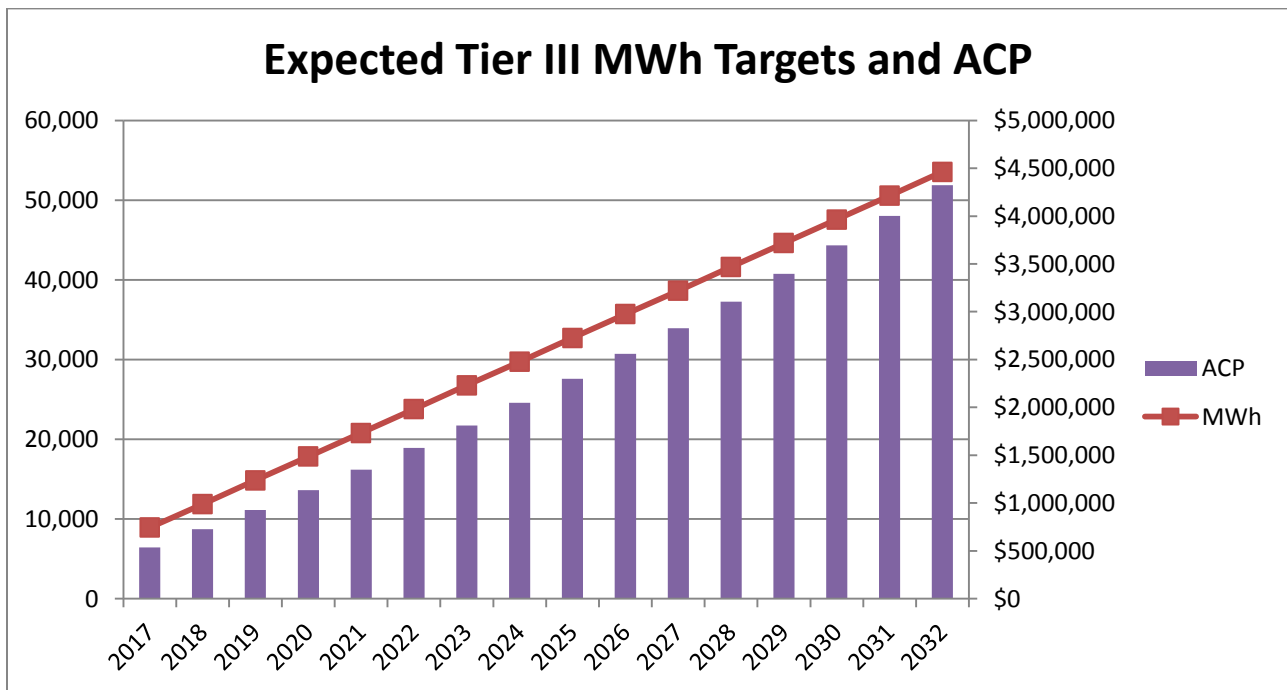
For the energy transformation projects, the submitted plan must describe the project and include:

- Anticipated number of participants
- Any collaborative efforts, or an explanation of why it is more cost-effective for the utility to work alone, or that there is no other entity with the capability to deliver the goods or services;

- Description of how all ratepayers will have an equitable opportunity to participate in and benefit from energy transformation projects regardless of rate class or income level;
- Description of the estimated electric impact of such measures and the demand management best practices that will be incorporated;
- How the technologies are appropriate for Vermont;
- How the installation of the technologies in buildings that meet minimum energy performance standards will be encouraged;
- Least-cost alternatives that do not increase electricity consumption that were analyzed;
- Methodology for allocating project costs and savings if services are shared between partners.

VEC's Tier III Targets

In the first year of program implementation, VEC will need to demonstrate approximately 8,926 MWh of savings for Tier III compliance. In 2018 this is expected to increase to 11,871 MWh. Over time this target will increase with the legislated increase in percentage requirements. The targets set in statute are aggressive, and, by the 2020 program evaluation, more information will be available about whether they are achievable.



VEC Process and Planning to Date

VEC has met with numerous external groups to gather information and explore opportunities for collaboration, including Efficiency Vermont, Champlain Office of Economic Opportunity (weatherization), Northeast Employment and Training Organization (weatherization), UVM Transportation Resource Center (electric transportation), local EV car dealers, NeighborWorks of Western Vermont, Energy Co-op of Vermont, and Vermont Fuel Dealers Association, among others. Based on these informational meetings, VEC initially created an extensive list of potential projects ideas. VEC also developed a financial and carbon evaluation analytic tool that enabled us to evaluate the costs and benefits of various products and services to help guide our final decision-making.

VEC is excited about the opportunity to offer VEC members programs that will help reduce their carbon emissions and have an overall positive economic benefit. VEC's goal is to meet the state requirements for fossil fuel reduction under Tier III in a way that meets the needs of members and does not increase rates.

Components of VEC's 2017 Tier III Program

Clean Air Program (CAP)

| # of projects | Per project MWh savings | Total MWh savings | % of 2017 goal |
|---------------|-------------------------|-------------------|----------------|
| 6 | Varies | 5,800 | 65% * |

** The CAP contribution to the 2017 goal may change depending on the performance of other VEC Tier III initiatives.*

VEC's Clean Air Program (CAP) offers customized opportunities to members with off-grid or underserved homes or businesses to replace fossil fuel usage with electricity. These opportunities may include service upgrades or line extensions, the costs of which will be shared between the utility and the member through customized agreements. Each project is currently being treated as a custom measure with a special contract approved by the PSB.

VEC's service territory includes many maple syrup producers who collect and process their sap off-grid using diesel, oil, or propane generators. Until now, the cost of extending electric service to their seasonal sugaring operations has been prohibitive, and they have continued to run generators and burn thousands of gallons of fossil fuel each season. With these customized cost-sharing agreements, these businesses now will be able to connect to the grid, which saves them time and money, increases sales for VEC, and saves thousands of gallons of fossil fuel each year.

While sugaring operations are currently the primary focus of the CAP, VEC is also exploring opportunities with saw mills, gravel pits, and houses that currently use generators because of a lack of electric service or service that is inadequate to accommodate their full demand.

When screening CAP projects, VEC is requiring fuel receipts, estimating the additional electric load, and completing cost estimates. The screening criteria include:

- Must provide Tier III credits
- Must pass the “but for” test (i.e. the project would not have been done *but for* VEC’s contribution and outreach)
- No adverse impact to grid (i.e. will not add load in areas where the grid cannot handle it)
- Load profile – annual, monthly, and daily – and demand response potential
- Net present value (NPV) payback period of less than 5 years
- No overall adverse impacts to the current year capital budget or future operations and maintenance budgets

Below is a list of projects that VEC is currently pursuing for the 2017 compliance year. The Devost, Schurman, and Mayotte projects have already received PSB approval (Special Contract No. 1013, 1014, and 1015), the Pion project has been submitted for approval, and the others are being developed with the intent to submit for approval in 2017.

| Project or Member | Fuel Type | Expected kWh Annual Increase | Annual Gallons Saved | Years in Service | MWh Savings Estimate | % of 2017 Goal |
|--|-----------------|------------------------------|----------------------|------------------|----------------------|----------------|
| Devost Generator Conversion- Norton | #2 Fuel Oil | 77,726 | 5,366 | 30 | 1,429.5 | 16.02% |
| Schurman Generator Conversion- Jay | Propane | 72,149 | 7,515 | 30 | 1,479.1 | 16.57% |
| Sweet Tree Seneca Generator Conversion*- Island Pond | #2 Fuel Oil | 1,448,485 | 100,000 | 10 | 8,880.1 | 99.49% |
| J.R. Sloan Vacuum Pump & Heater- Fletcher | Diesel | 9,609 | 714 | 30 | 197.0 | 2.21% |
| Mayotte High-Brix RO- Fletcher | #2 Fuel Oil | 101,394 | 7,000 | 30 | 1,864.8 | 20.89% |
| Pion Generator Conversion- Lowell | Propane/ Diesel | 57,024 | 4,952 | 30 | 1,169.0 | 13.10% |

**Because of the size of this project, VEC will work with the Department of Public Service to agree upon a method of dividing these savings over time. For example, an initial idea was to claim the savings in 10-year increments rather than claiming 30 years upfront. This would limit the potential for overestimating since VEC would update future savings claims based on actual electric usage data.*

CAP project MWh saving assumptions are based on a 30-year project life because these projects provide permanent infrastructure to serve an existing home or business. The project participants are generally paying about 75 percent of the total project cost, a significant investment that demonstrates a commitment to continued use of the electric service. These MWh savings are based on initial fuel usage information, including receipts in most cases, and, when possible, will be updated based on future electric consumption prior to VEC’s compliance filing.

For each CAP project, VEC is working with Efficiency Vermont (EVT) to identify efficiency opportunities through an energy audit. When EVT and VEC incentives have the potential to overlap, for example for a line extension or service upgrade that enables the participant to install a EVT-incentivized reverse osmosis system, VEC will work with EVT to negotiate savings claims to avoid double-counting.

VEC is excited about the CAP opportunities that Tier III has enabled. These projects provide meaningful fossil fuel reductions, offer service to members that had previously found the investment cost-prohibitive, and increase electric sales so that the benefit accrues to all members. CAP projects that are currently being pursued offer a payback of less than five years, while the benefits last for the lifetime of the infrastructure.

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| Program | Clean Air Program |
| Objective | Provide discounted line extensions and service upgrades for homes and businesses in VEC service territory that currently use generators to power all or part of their home or business |
| Number of participants | 6, but not limited to only these projects |
| Lifetime MWh credit | Varies |
| Partners | EVT, in cases where incentives overlap and for required energy audits |
| Additional kWh | Varies |
| Incentive | Varies, generally about 23% of the total cost |
| Best practices | Evaluate projects for DR potential, impact on the grid, potential for increased sales, and Tier III savings. EVT will perform an energy audit at the location. |
| Appropriate for VT | Yes |
| Min Building Standards | N/A |
| Equitable opportunity - customer class | Yes |
| Equitable opportunity - low-income | Yes |

Cold Climate Heat Pumps (ccHPs)

| # of units | Per unit MWh Savings | Total MWh savings | % of 2017 goal |
|------------|----------------------|-------------------|----------------|
| 200 | 30* | 1,650** | 18% |

** This is an estimate; ccHP value will depend on its specific characteristics per the TRM.*

*** This figure represents the credit-sharing outlined in the Memorandum of Understanding between VEC and EVT.*

As identified in Vermont's 2016 Comprehensive Energy Plan (CEP), heating is a key contributor to Vermont's carbon emissions. The CEP sets an ambitious goal of installing 35,000 cold-climate heat pumps (ccHPs) statewide by 2025. Because VEC's current electric portfolio is over 90 percent carbon-free (not taking Renewable Energy Certificate sales into consideration), ccHPs offer an attractive solution from a carbon emissions perspective. However, VEC is aware that the economics and efficacy of ccHPs are highly sensitive to fuel prices, appropriate sizing and placement, and user behavior. With these factors in mind, VEC will work to craft messaging on ccHPs that highlights their potential as well as various factors that members should consider when deciding if this technology is right for them.

Because EVT already offers an upstream incentive for ccHPs, VEC and EVT have negotiated a partnership with a shared savings allocation. Under this 2017 pilot program, VEC members still can take advantage of EVT's upstream incentive and will receive an additional \$150 bill credit from VEC. Our combined goal is to have 200 new ccHPs installed in VEC members' homes and businesses in 2017. VEC will claim a share of each of these installations. The expected savings will be roughly equivalent to full credit for 55 ccHPs, which represents the approximate program increase that EVT and VEC expect as a result of their partnership.

Both EVT and VEC will answer general inquiries, with EVT offering more in-depth technical assistance as needed. VEC will supplement EVT's marketing activities, using communications channels such as bill stuffers, email blasts, website features, and VEC's quarterly newsletter Co-op Life. VEC and EVT will coordinate their messaging to avoid customer confusion.

In order to receive the VEC bill credit, members will need to fill out a short form that identifies information required for Tier III compliance, including minimum performance metrics for buildings identified by the Department of Public Service and whether their household income is below 80 percent of area median income. This program will be available to all members regardless of rate class or income level. VEC intends to offer an on-bill financing option to assist members with the initial capital outlay when needed.

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| Program | Cold Climate Heat Pumps |
| Objective | Install 200 ccHPs in VEC homes and businesses to displace fossil fuel heating sources |
| Number of participants | 200 |
| Lifetime MWh credit | 19 - 43, 30 expected on average; VEC will claim 27.5% of each per MOU with EVT |
| Partners | EVT |
| Additional kWh | 2,500 - 7,300 |
| Incentive | \$150 bill credit, in addition to the EVT incentive |
| Best practices | Participants will be informed about VEC's optional TOU rate, weatherization programs, and the opportunity to install controls for optimization. |
| Appropriate for VT | Yes |
| Min Building Standards | This information will be gathered from participants, and they will be given information about weatherization programs. |
| Equitable opportunity - customer class | Yes |
| Equitable opportunity - low-income | Yes, VEC may offer on-bill financing |

Electric Vehicles (EVs) and Plug-in Hybrid Electric Vehicles (PHEVs)

| Vehicle type | # of units | Per unit MWh Savings | Total MWh savings | % of 2017 goal |
|--------------|------------|----------------------|-------------------|----------------|
| EV | 6 | 20 | 80 | 1 % |
| PHEV | 18 | 11 | 198 | 2 % |

Even greater than the energy burden of the heating sector is the energy burden of the transportation sector, which contributes to nearly half of Vermont's greenhouse gas emissions. With rapidly improving technology, Vermonter's appetite for electric vehicles continues to grow. Between April 2014 and April 2016, the number of EVs and PHEVs registered in Vermont almost doubled. However, given the electric range and cold weather performance of current EV and PHEV models, their use presents distinct challenges for widespread deployment in a cold and rural state, and VEC serves some of the coldest and most rural areas.

As a means of promoting EVs and PHEVs, VEC will offer a \$250 bill credit for the purchase of new or used EVs and PHEVs. Members who lease an EV or PHEV will be eligible for an upfront bill credit of \$50 for each year of the lease. We will promote the incentive directly to members, as well as through local car dealers, who will integrate the offer into other

incentives and rebates. To obtain the bill credit, members will fill out a simple form and include proof of purchase or lease.

VEC's intends to make savings claims for EVs and PHEVs based on the prescriptive measures determined by the Technical Advisory Group (TAG). Tier III savings claims will be made for the full lifetime of the measure on new, purchased vehicles. However, claims on used vehicles will be prorated based on the age of the car, and claims on leased vehicles will be for the length of the lease. Credits will be tracked based on VIN numbers to ensure that credits are not claimed more than once. However, if VEC claimed a partial credit on a leased vehicle, VEC would consider the additional years still available for incentives and Tier III credit.

In determining the amount of the 2017 bill credit, VEC weighed ratepayer interests against the interests of offering this program to reduce fossil fuel consumption. Given the small Tier III credit for EVs and PHEVs, VEC decided that the initial bill credit should not exceed what could be recuperated through the increased sales from the EV or PHEV within the first two years (assuming 83 percent home charging). For simplicity of marketing this new program, VEC decided to offer the same bill credit for EVs and PHEVs, although their Tier III values are different.

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| Program | Electric Vehicles and Plug-in Hybrid Electric Vehicles |
| Objective | Promote EVs and PHEVs and encourage their deployment in VEC service territory |
| Number of participants | 6 EVs, 18 PHEVs |
| Lifetime MWh credit | 20 for EVs, 11 for PHEVs |
| Partners | Car dealerships, Drive Electric Vermont |
| Additional kWh | 2,500 for EVs, 1,500 for PHEVs |
| Incentive | \$250 for new, prorated for used, \$50/year for leased |
| Best practices | N/A |
| Appropriate for VT | Yes |
| Min Building Standards | N/A |
| Equitable opportunity - customer class | Yes |
| Equitable opportunity - low-income | Leased and used vehicles are included |

Energy Saver Program - Thermal Efficiency and Fuel-Switching

| # of participants | Per unit MWh Savings | Converted MWh savings | % of 2017 goal |
|-------------------|----------------------|-----------------------|----------------|
| TBD | Varies | 1,339 | 15% |

The VEC Energy Saver Program, which will be launched in 2017, has a goal of helping members improve thermal efficiency, reduce carbon, and save money. The program will target (but will not be limited to) low-income/high-usage members and will provide assistance and incentives customized to their individual needs. VEC will coordinate with a variety of partners on promotion, technical assistance, installations, incentives, and financing. Some of the partners we are exploring collaborative opportunities with include Efficiency Vermont, Vermont Fuel Dealers Association, Energy Co-op of Vermont, Champlain Valley Office of Economic Opportunity (CVOEO), NeighborWorks of Western Vermont, Capstone Community Action, and NE Employment and Training (NETO). VEC will serve as the initial point of outreach, identifying potential members to participate in the pilot program.

According to US Census data, VEC serves many of the towns with the highest poverty rates in Vermont. Many VEC members struggle to pay their bills each month, only one of which is the electric bill. VEC sees great value in crafting a program to help members understand their full energy picture in order to find savings, whether through electric efficiency, thermal improvements, or fuel-switching. This program would include projects that VEC could count for Tier III savings but would be larger in scope in order to leverage the full value of Vermont's robust energy services. VEC envisions this as an energy affordability program with a Tier III component.

A variety of services are already available through the network of organizations that work on thermal and electric efficiency. However, many Vermonters who need these services the most aren't aware of what's available to them. VEC's member service representatives and meter technicians interact with these members daily, on the phone and in person. The Energy Saver Program would be offered to members as a proactive tool to help them take control of their energy bills. VEC would develop a quick evaluation form that could include income level, heating sources, age of home, and a list of appliances in the home in order to identify what opportunities might be available to the member. VEC would then work to connect the member with relevant services. VEC may also develop criteria for providing bill credit incentives for implementation of projects that will help reduce carbon and help VEC meet Tier III goals.

The Energy Saver Program would be custom and targeted at members struggling to pay their bills or struggling to make energy improvements. However, it would not be limited by

income level or rate class. The difference would be in the types of solutions available. For example, an income-qualified member could be connected with the Weatherization Assistance Program that provides free energy audits, weatherization, and electrical efficiency services, while a non-income-qualified member could be connected to a market rate program coupled with EVT’s existing weatherization incentives.

The program will be finalized before the start of 2017 but will likely contain the following components:

1. Marketing of existing opportunities to all VEC members with particular emphasis on opportunities for income-qualified members.
2. Targeting of 25 members who have high usage or regular difficulty paying their bills for customized support and assistance. This support would include direct contact from a VEC representative to introduce the relevant opportunities for assistance and cost-savings and periodic check-ins with the member to provide assistance as needed.
3. Financial incentives, which may include up to \$500 in VEC bill credit for implementation of projects that will reduce carbon.

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| Program | Energy Saver |
| Objective | Offer customized options to members based on their needs. Target high-usage and/or low-income. Connect members with existing weatherization, electrical efficiency, and fuel-switching services. May provide incentives in some cases |
| Number of participants | TBD |
| Lifetime MWh credit | TBD |
| Partners | EVT, VT Fuel Dealers Association, Energy Co-op of Vermont, CVOEO, NW of Western VT, Capstone Community Action, NE Employment of Training, among others |
| Additional kWh | N/A |
| Incentive | TBD |
| Best practices | This will depend on the measures being undertaken by the member. In general, the goal is to connect members with the services that will provide the most benefit to them financially and in the sense of electrical and thermal efficiency as well as carbon emissions. |
| Appropriate for VT | Yes |
| Min Building Standards | Yes, weatherization will be a major focus of the program |
| Equitable opportunity - customer class | Yes, the target will be residential but businesses could participate |
| Equitable opportunity - low-income | Yes |

Tier III Program Summary

| Program | # of Participants | MWh Savings | % of 2017 Goal |
|--------------|-------------------|-------------|----------------|
| CAP | 6 | 5,800 | >65% |
| ccHP | 200 | 1,650 | 18.5% |
| EV | 6 | 80 | 0.9% |
| PHEV | 18 | 198 | 2.2% |
| Energy Saver | TBD* | 1,339 | 15.0% |
| 2017 Total | | 9,067 | 101.6% |

**The number of participants in the Energy Saver Program is to be determined. The 15 percent share of 2017 credit is meant to reflect a commitment to developing this program in a way that is meaningful to members and Tier III.*

Complementary Systems and Services

Time of Use (TOU) Rates

TOU rates can be an effective tool for shifting load and providing members incentives to shift to electric products from products that produce carbon. VEC has developed pilot TOU rates and submitted them to the PSB in September for approval. These pilot rates will be optional, but strongly encouraged and offered to members who partake in any of the Tier III programs. TOU rates have the potential to give members more control of their usage and monthly electric bill.

On Bill Payment Services

VEC now has the capability to set up on bill payments for members who finance their Co-op Community Solar sponsorship with NeighborWorks Vermont. For Tier III program members, VEC has the opportunity to use this existing system. VEC will continue to explore the value and feasibility of this system for Tier III. For service such as weatherization and, potentially, other products, very low interest rates may be available to low-income members.