Efforts to improve energy savings in affordable housing and increase the number served

Report to the Vermont House and Senate Natural Resources and Energy Committees

As Called for in Act 89 of 2013, Section 12a

January 20, 2015

Submitted by:

Vermont Public Service Department

Acknowledgements

This report was drafted by a core group of individuals and then vetted with other stakeholder organizations named in the section of Act 89 of 2013. A list of the participants is included below.

Core Participants

Scott Campbell, Vermont Fuel Efficiency Partnership/Capstone Community Action

Paul Dragon, Office of Economic Opportunity

Kelly Launder, Vermont Public Service Department

Craig Peltier, Vermont Housing Conservation Board

Gus Seelig, Vermont Housing Conservation Board

Geoff Wilcox, Office of Economic Opportunity

Additional Participants

Sarah Carpenter, Vermont Housing Finance Agency

Neil Curtis, Efficiency Vermont

Sam Falzone, Vermont Housing Finance Agency

Nancy Owens, Housing Vermont

Jennifer Hollar, Vermont Department of Housing and Community Development

Purpose

This report was called for in Act 89 of 2013, which stated, the following:

> *Sec. 12a. 30 V.S.A. § 2(e) is added to read:*
>
> *(e) The Commissioner of Public Service (the Commissioner) will work with the Director of the Office of Economic Opportunity (the Director), the Commissioner of Housing and Community Development, the Vermont Housing and Conservation Board (VHCB), the Vermont Housing Finance Agency (VHFA), the Vermont Community Action Partnership, and the efficiency entity or entities appointed under subdivision 209(d)(2) of this title and such other affected persons or entities as the Commissioner considers relevant to improve the energy efficiency of both single- and multi-family affordable housing units, including multi-family housing units previously funded by VHCB and VHFA and subject to the Multifamily Energy Design Standards adopted by the VHCB and VHFA. In consultation with the other entities identified in this subsection, the Commissioner and the Director together shall report twice to the House and Senate Committees on Natural Resources and Energy, on or before January 31, 2015 and 2017, respectively, on their joint efforts to improve energy savings of affordable housing units and increase the number of units assisted, including their efforts to:*
>
> *(1) simplify access to funding and other resources for energy efficiency and renewable energy available for single- and multi-family affordable housing. For the purpose of this subsection, "renewable energy" shall have the same meaning as under section 8002 of this title;*
> *(2) ensure the delivery of energy services in a manner that is timely, comprehensive, and cost-effective;*
> *(3) implement the energy efficiency standards applicable to single- and multi-family affordable housing;*
> *(4) measure the outcomes and performance of energy improvements;*
> *(5) develop guidance for the owners and residents of affordable housing to maximize energy savings from improvements; and*
> *(6) determine how to enhance energy efficiency resources for the affordable housing sector in a manner that avoids or reduces the need for assistance under 33 V.S.A. chapter 26 (home heating fuel assistance).*

Progress to Date

This section will report on the progress of each numbered items identified above to be addressed, with next steps noted when possible.

Simplifying access to funding and other resources

Low-income owners of single-family housing historically have accessed the Home Weatherization Assistance Program (HWAP) for assistance with energy efficiency improvements. That program continues to provide the primary resource for this sector. However, the anticipated decline of the HWAP budget in FY 2016 will exacerbate what are already long wait lists for local HWAP agencies – typically one to two years long. HWAP agencies do coordinate with local NeighborWorks programs, through referral for assistance with health-and-safety or repair issues that are outside the scope or ability to

fund of HWAP; however more systematic collaboration is needed and resources are not sufficient to meet the need.

Resources available to owners of multi-family affordable housing have improved since the inception of Vermont Fuel Efficiency Partnership (VFEP) in 2009, but are less than the levels of funding available during the ARRA "stimulus" program and still fall short of overall demand. VFEP is a statewide program, managed out of Capstone Community Action, that partners with HWAP local agencies, Efficiency Vermont (EVT), the Office of Economic Opportunity (OEO), VHCB, VHFA, and statewide and local housing agencies. VFEP provides owners technical support; coordination with HWAP, Efficiency Vermont, and other programs; and cash reimbursements to incentivize higher efficiency measures than would otherwise be done. It is funded primarily by Efficiency Vermont;[1] energy savings are applied toward Thermal Energy and Process Fuel resource acquisition targets. VFEP currently has additional funding through Vermont Low-Income Trust for Electricity (VLITE) and OEO.

Efficiency Vermont is working with VFEP to streamline multifamily energy efficiency program and project implementation. In 2015 Efficiency Vermont will train and support VFEP to expand beyond pure thermal funding and savings to include direct responsibility for electrical measures in low-income multifamily retrofits. For example, Efficiency Vermont and VFEP collaborated in 2014 to provide consistent technical service and incentives to Cathedral Square's Richmond Terrace project, displacing propane heating with cold-climate heat pumps and implementing significant thermal shell upgrades which reduced the subsequent electricity consumption for heating and cooling.

VFEP convened 30 housing and energy services leaders in January 2013 to review Thermal Efficiency Task Force recommendations, and discuss how to simplify access to funding and improve coordination and effectiveness of multi-family energy efficiency and renewable energy services. Resulting from that meeting, a working group met throughout 2013, and identified misalignments and improvements in several areas. A Statement of Principles was signed by VHCB, VHFA, EVT, OEO, Department of Housing & Community Development (DHCD), and Vermont Community Action Partnership (VCAP) in December 2013. A companion Operational Agreement achieved nearly 100% consensus among 25 requested signatories. The process itself resulted in much progress, and created a structure for continuing improvements in service coordination, consisting of two newly formed groups: the VFEP Advisory Group of all interested stakeholders – anchored by VHCB, Housing Vermont, EVT, and HWAP – and VFEP Governance Group composed of funding agencies and Capstone Community Action.

In the HWAP program, OEO rolled out new statewide database tracking and single-family energy audit software (Hancock Energy Systems). They have begun work on completely revised and updated policy and procedures manual for HWAP, to improve and standardize service delivery among all agencies. The single-family technical portion is already in place; administrative and multi-family portions are in process.

As part of policy review for the new manual, OEO is simplifying procedures wherever possible. A system has been set up for VHFA to verify tenant-income covenants on affordable housing projects which obviates the need for a separate income-verification process to determine eligibility for HWAP services. OEO has committed to review federal Department of Energy WAP multi-family rules, and make specific

[1] Revenues supporting this and other thermal efficiency programs come from the Regional Greenhouse Gas Initiative and Forward Capacity Market.

exceptions for state-funded projects when deemed appropriate and beneficial for improved operational performance. OEO is institutionalizing ongoing policy review with a reinvigorated WAP Policy Advisory Committee, which includes stakeholders from state agencies, and housing and HWAP local agencies, and offers policy advice for administration of HWAP.

Efficiency Vermont continues to improve its collaboration with HWAP. Efficiency Vermont has increased training and support for HWAP staff to identify and retrofit electrical efficiency measures. This has led to a 30% increase in electrical savings per household served. Through this collaboration, Efficiency Vermont provides ~$1 million in funding support to HWAP local agencies. Measures include refrigerators, freezers, clothes washing machines, lighting, cold climate heat pumps and heat pump hot water heaters. Additionally, Efficiency Vermont has made these electrical services available to low-income households who may not be eligible for HWAP service, or are on a HWAP waiting list longer than 6 months.

OEO has provided a separate grant to VFEP, as mentioned above, both for enhanced VFEP services to the multi-family affordable housing market, and to assist its efforts to improve service delivery within the HWAP network. VFEP will assist with technical review of projects, energy audit tool training, and presentation of training sessions by guest speakers on various technical topics.

Efficiency Vermont's Multifamily New Construction and Major Rehabilitation program provides customized project-based technical assistance to developers, owners, funders, designers and contractors of affordable multifamily housing. Efficiency Vermont is increasing the per apartment cash rebate for "Efficiency Vermont Certified" apartments by 3½ times from $500 to $1,750 in 2015.

Delivering energy services in a timely, comprehensive, and cost-effective manner

Single-family comprehensive energy services for low-income households continue to be primarily through HWAP. Act 89 (2013) raised the allowable 'job cost average' for state-funded jobs from $6,000 to $8,000 (33 VSA § 2502), which allows for more comprehensive improvement of homes, but obviously means fewer homes are served with the same amount of funding. HWAP is also required to prioritize fuel assistance households and those with the highest energy intensity. The higher energy intensity homes often require more funds per unit, leaving fewer funds to serve other low-income households. These factors along with the amount of total funding available have led to lengthy wait lists and prioritization metrics that favor lower-income[2] households make timely service of the entire eligible population challenging.

OEO has adjusted cost-effectiveness screening procedures to allow for more comprehensive treatment, while still ensuring measures are cost-effective. First, beginning July 1, 2014, the costs to be included in cost-effectiveness calculations was changed to include only "on-site", or construction, costs. Second, as part of OEO's commitment to increase both participation and per unit funding on multi-family projects,

[2] Act 89 raised HWAP income-eligibility threshold on state-funded projects from 60% to 80% of Area Median Income (AMI), where it aligns with typical multi-family housing program requirements and is effectively streamlining service delivery. In the single-family sector, the 60%-80% AMI group is lower on the priority list than <60% group, but it does receive services such as 'energy coaching' and Efficiency Vermont electrical measures.

it is actively implementing a "threshold-screening" protocol[3] that was first authorized in April, 2010 (Weatherization Letter Series 2010-3); increased funding per unit is allowed when it meets both the cost-effective criteria and the mission of HWAP to save energy and money for low-income clients. Third, on January 1, 2015, the minimum cost-effectiveness threshold for all measures will be lowered.[4] The effect of all these adjustments is to allow more comprehensive measures to screen and realize deeper savings.

OEO's new HWAP policy and procedures manual will standardize services among the local agencies, and ultimately improve effectiveness and comprehensiveness of efficiency services for both single-family and multi-family homes.

Multi-family energy services have greatly improved with the advent of a dedicated retrofit program, VFEP. VFEP has provided a bridge to link HWAP, housing developers and programs, and Efficiency Vermont. Better coordination and collaboration has improved the timeliness of services. However, key to realizing deeper energy savings consistent with long-term project goals are the projected per-unit contribution increases in incentives to multi-family retrofits from EVT and HWAP which will be a vital component to continued program advancement in 2015 and beyond. VFEP's separate funding stream, layered on top of HWAP, EVT, and renewable energy incentives, allows higher investment in more comprehensive efficiency improvements. VFEP staff provides enhanced technical support and oversight, to help ensure proper measures are specified and installed, and to better guarantee cost-effective results.

Efficiency Vermont's Multifamily New Construction and Major Rehabilitation program has delivered comprehensive and customized technical support to developers and owners of affordable multifamily housing since 1998. Services continue to adapt to the increasing standards and performance of Vermont's multi-family market, and include:

- Support property owners and design teams to articulate project energy goals;
- Design team support to identify and specify energy efficient measures (including participation in design team meetings);
- Plan review to confirm measures have been included that meet project energy goals. Recommend adjustments as appropriate;
- Contractor support to identify critical energy efficiency aspects of design and set expectations for project implementation, inspection process and dates;
- Construction inspections, providing direct feedback to owner, design team, and contractor;
- Final inspections, and certifications as applicable;

[3] Typical screening methodology compares estimated savings from an efficiency improvement measure against *all* costs associated with that measure. But some measures with quantifiable savings would not screen strictly as an efficiency improvement – and would not be done – if all their costs had to be included in the calculation. *(cont'd) (cont'd)* Threshold-screening allows capturing the savings from such measures, and allows program investment up to the amount justified by that savings. Example: Adding foam-board insulation to exterior of a building requires removing existing siding and installing new siding. If the total cost of the measure is $20,000, but the expected savings only justifies an investment of $5,000, then a program can invest up to $5,000 using threshold-screening. The owner would bear the other $15,000, justified from their viewpoint as a maintenance/repair expense.

[4] The HWAP cost-effectiveness calculation is the Savings-to-Investment Ratio (SIR), which compares a measure's cost against lifetime savings using current fuel costs, and against a discount rate for that investment. Other calculations include Net Present Value, which includes both discount and fuel-price inflation rates, and simple payback, which simply compares today's costs to fuel cost savings at today's prices.

- Programmatic flexibility to accommodate projects attain success when technical and logistical attributes of a specific project may not support complete compliance with program design;
- Provide developers/owners a per-unit rebate for completed measures.

In addition, Vermont Energy Investment Corporation (VEIC, the operating contractor of the designated statewide Energy Efficiency Utility, Efficiency Vermont) has launched Commons Energy, a "public-purpose energy service company," whose goal is to finance comprehensive energy efficiency measures as a cash-flow-positive loan to public assets such as multi-family housing, education, health care, and community and municipal facilities. While just beginning, Commons Energy promises to be an important additional source of funds for – and incentive towards – comprehensive efficiency work.

Implementing energy efficiency standards

Single-family energy efficiency standards reference the Residential Building Energy Standards (RBES), which apply to new construction and renovations.

Multi-family standards reference both Residential and Commercial Building Energy Standards (CBES), as applicable, and the more-comprehensive VHCB/VHFA Multi-family Energy Design Standards, developed in collaboration with Efficiency Vermont. Concurrent with the modified screening and/or incentive funding goals of HWAP, EVT and VFEP, VHCB and VHFA will work with housing developers to maximize their combined incentives in support of projects pursuant to the Multi-family Energy Design Standards. VFEP established its own standards soon after beginning work, based on the best available building science consensus. They are similar to, and in some cases slightly more comprehensive than, the VHCB/VFHA Design Standards. VFEP provides incentives to implement the higher standards wherever possible, given the overall scope of work.

Measuring outcomes and performance of energy improvements

OEO is currently conducting a study on HWAP impacts, and the results of those impacts on the Low-Income Heating Energy Assistance Program (LIHEAP). Hancock, the new database OEO just implemented for HWAP, will facilitate closer evaluation of data and outcomes, agency-by-agency, to identify areas for improvement.

Additionally OEO's contract with VFEP includes analyzing actual post-retrofit fuel usage. VFEP has already developed methodology for such an analysis in an internal study of actual savings in summer and fall 2013 (report released April 2014; available from VFEP, Scott Campbell, scampbell@capstonevt.org).

In 2015 Efficiency Vermont expects to support affordable multi-family housing owners to begin comprehensive benchmarking of multi-family properties. Benchmarking will allow owners to track outcomes and performance of energy improvements, as well as to analyze many hundreds of housing units and identify poor performers.

Developing guidance for affordable housing to maximize energy savings

OEO funded a pilot program to develop "efficiency coaches" for single-family households in 2011, and has since implemented it as a regular part of HWAP. Plans are in place to extend the concept to multi-family households in 2015. OEO may collaborate with EVT, VHCB, VHFA and others to maximize the impact of this effort.

Members of the WAP network, Efficiency Vermont, and VFEP, participated in efforts to develop an energy labeling system for single- and multi-family housing, available to both affordable and market-rate housing. The single-family residential label prototype has been developed. The multi-family system is still in process; a separate report on its development was delivered to the legislature in December 2014. Labels provide feedback on the state of a building's efficiency, as a snapshot in time; a related process, called "benchmarking," provides ongoing information about a building's performance, in comparison to similar buildings and occupancies. Some housing agencies are already using benchmarking services, and others are considering participation. As mentioned above, Efficiency Vermont expects to support affordable housing owners to begin comprehensive benchmarking in 2015.

Efficiency Vermont has budgeted $125,000 in 2015 for Multi-family New Construction and Major Rehabilitation Special Use Funds. The funds support low-income multi-family developers to research and implement new and innovative measures that exceed program minimum requirements. As an example, in 2014, Efficiency Vermont supported $20,000 of engineering costs for engineering services at Red Clover Commons (Brattleboro) to design and analyze a ground source heat pump system with near-frictionless chiller. The system had not been used in residential applications; energy costs are expected to be ~25% of a conventional fuel system.

Efficiency Vermont is also collaborating with low-income multi-family housing owners to install NEST "smart" thermostats in 500 apartments. Energy consumption in the buildings served will be compared to a pre-selected control group of similarly designed buildings to assess energy saving potential from this technology.

In 2014, Efficiency Vermont provided a $20,000 research and development grant to Housing Vermont to implement a remote building monitoring system. The system includes sensors monitoring the status and runtimes of mechanical equipment; provides remote access to actual building conditions, and will provide alerts of equipment malfunction or needing adjustment to reduce energy waste. These kinds of systems – making use of falling sensor and computing costs, increasing data standardization, and improved connectivity – promise real-time trouble alerts and far more consistent operating efficiency than has been possible in the past.

Enhancing energy efficiency resources to reduce the need for home heating fuel assistance

In single-family housing, HWAP's increased comprehensiveness through mechanisms cited above will ultimately result in higher average efficiencies in retrofitted homes. Whether that result justifies reducing home heating fuel assistance, and by how much – given that fuel assistance currently covers less than half a typical low-income household's heating costs, and that such reduction could result in reduced take-up and effectiveness of HWAP services – is a matter for legislative determination.

Multi-family housing divides into two categories: those with centralized heating, and those with individually metered heating. Individually metered heating, with the tenant paying the bill, has obvious benefits in terms of directly incentivizing more efficient behaviors on the part of the resident. Tenants in these buildings benefit from fuel assistance just as if they were in a single-family home. In centrally heated buildings, where heat is included in the rent, households that are eligible for heating assistance may receive a nominal cash benefit (last winter the average benefit was $195)[5]. Therefore, converting individually metered apartments to centralized heating would by itself reduce the need for fuel assistance funding in the future – though of course it would not reduce the need for or cost of *fuel* in these apartment buildings unless comprehensive energy efficiency retrofits were also performed.

Nonprofit housing agencies have realized in recent years that centralized heating systems are also more cost-efficient than individually metered apartment units. While an individual household's incentive to conserve costs is reduced, the savings to the owner in maintenance and repair, cutoffs and re-connects, and bulk purchasing more than offset that effect. This sort of calculation has been less apparent to for-profit owners. VFEP is making a concerted effort to engage for-profit owners of affordable apartment housing, where two-thirds of low-income tenants live, with a newly created Outreach and Communications position. In addition to the obvious benefits for the owners, VFEP will help some realize the benefit of centralized heating, ultimately reducing the need for fuel assistance in these apartments.

The Agency of Human Services recently completed a legislative report on how HWAP and fuel assistance programs can complement each other most beneficially.[6]

All the efforts cited elsewhere in the report – including: increased job cost average in HWAP; better coordination among programs; lowered cost-effectiveness thresholds; measurement of outcomes; and coaching building owners and operators for ongoing effectiveness of energy efficiency improvements – will help reduce the gap between heating costs and income for low-income households in the future.

Conclusion

Over the past two years the groundwork has been set for improved operational implementation of energy efficiency services into both single family and multifamily housing. Moving forward into 2015 and 2016 the reconstitution of the OEO Weatherization Policy Advisory Committee together with the

[5] "Plan To Advance Coordination Of Fuel Assistance With Weatherization", Report to the Vermont Legislature, Vermont Agency of Human Services, January 15, 2015, page 13.

[6] The Vermont State Legislature, through H.885 E. 324.3(b), directed that a plan be developed to advance coordination of Vermont's Home Heating Fuel Assistance Program with the Home Weatherization Assistance Program. This plan includes assessing "programmatic and fiscal impacts" and to "maximize coordination" in pursuit of four objectives:

1) Reduce both energy consumption and the financial burden due to energy use (energy burden) for low-income households;
2) Adjust Seasonal Fuel Assistance benefits to reflect the effects of receiving Weatherization services;
3) Identify the incentives to participate in Weatherization even when Fuel Assistance benefits are adjusted as a result; and
4) Appropriately reduce Fuel Assistance benefits to households residing in "energy efficient" homes to the extent such information is available.

newly formed Vermont Fuel Efficiency Advisory Group will both serve to facilitate continued stakeholder input into further operational advancements and refinements in support of the goals of Sec. 12a. V.S.A. 2(e). A key focus of this effort will continue to be open communication between stakeholders and maximizing organizational flexibility and cooperation in support of program goals.