



Evaluation Plan for the Geographically Targeted Energy Efficiency Programs in Vermont

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Introduction

In August of 2006, pursuant to 30 V.S.A. § 248(b)(2), the Public Service Board (PSB, or “Board”) modified the 2006-2008 Efficiency Vermont (EVT) contract to direct a portion of the state’s energy efficiency investments to areas targeted for transmission and distribution (T&D) upgrades to seek alternatives to those investments.¹ Four geographic areas were “geotargeted” for 2007-2008 within the distribution utility service territories of Central Vermont Public Service, Green Mountain Power, and the Vermont Electric Cooperative. Three of the original geographic areas, and one new area, were geotargeted for the 2009-2011 period.² The Board requested that the Department of Public Service “work with Efficiency Vermont and the Vermont electric utilities to develop evaluation measurements that will verify that geographically targeted energy-efficiency can achieve the intended result of deferring transmission and distribution upgrades.” This Evaluation Plan defines the scope and timeframe for an evaluation of geotargeting (GT) process, programs and results.³

The broad goal for this multi-faceted evaluation is to provide a “proof of concept” to understand what intensive energy efficiency efforts can deliver in a targeted area, the speed with which energy efficiency savings can be attained, and the cost to achieve such savings. Impact evaluation will attempt to determine the actual effect of geotargeted efforts, from the perspective of both the program administrator and the affected utility - - both “at the meter” and at the distribution system level. Process evaluation will investigate the selection method for areas to target, administrator program implementation, relationships among involved parties, and opportunities to improve the effectiveness of geotargeting effort. Further research issues may emerge through continued collaborative discussion, and will be accommodated as resources allow.

This evaluation will aid parties in their efforts to determine whether geographic targeting can be an effective option for deferring or avoiding transmission and distribution projects and will provide recommendations concerning methods to identify areas where GT can alleviate system stress. The work contemplated here necessarily includes the input and participation from a number of affected parties. Efficiency Vermont; the affected Distribution Utilities; Vermont Electric Power Company, Inc. (VELCO); and the Vermont System Planning Committee (VSPC) will have significant roles to play in providing data and feedback to evaluation efforts. The Department emphasizes that this

¹ Order at 3, *Order Re Geographic Targeting of EEU Funds*. January 8, 2007. See: publicservice.vermont.gov/energy-efficiency/orderregeographictargetingoriginal.pdf

² The Chittenden County geographically targeted area was expanded for the 2009-2011 timeframe. Public Service Board *Order re Geographic Targeting of Energy Efficiency Utility Funds in 2009-2011*. November 4, 2008.

³ The evaluation plan has been developed in significant collaboration with EVT, with input from distribution utilities, VELCO, and the EEU Contract Administrator. While the Department of Public Service has endeavored to reflect concerns of all parties, it alone is responsible for this document. In development of this document, the Department re-considered all historical filings, including two specifically: an “Assessment Protocol” filed by EVT on February 15, 2007 that posed questions that would evaluate the economic effectiveness of geotargeting, and a letter from the Department of Public Service (DPS) dated April 9, 2007 that outlined a proposal for evaluation activities.

evaluation effort will **not** determine if a particular transmission or distribution constraint was deferred or avoided by implemented and planned efficiency efforts. Ultimately, those are judgments to be made by the distribution utilities and VELCO, and the Public Service Board.

The approach outlined in this plan optimizes use of internal analyses, program planning, and savings verification processes already required for other operational and/or evaluation purposes. Further, it identifies questions that are unique to the GT effort and focuses Department resources on those critical questions. This evaluation is timed to produce results in time to inform the “Demand Resources Plan” proceeding tentatively expected to occur in the late fall of 2010, thus informing policy decisions that may refine, expand, retarget, or terminate GT efforts for the next energy efficiency performance cycle.⁴ In the long term, the Department will incorporate additional and specific evaluation plans related to geotargeting into its three-year evaluation plan.

Five Piece Evaluation Framework

The GT evaluation framework proposed here brings together a number of interrelated pieces. Each piece will provide information that will be made available as completed. A series of questions is provided under each section below in order to guide Parties during the evaluation process. The DPS will issue a Request for Proposals (RFP) for contractor support in areas where additional resources are necessary.⁵ Additional research activities may be identified in consultation with the DPS contractor, or by other parties throughout the collaborative process.

Process Evaluation – Target area selection and collaboration efforts

Geographic targeting was identified by the Board in 2006 a potential least cost solution to transmission and distribution system constraints. Distribution Utilities were asked to propose transmission and distribution constrained areas for consideration as geotargeted areas. Utilities were asked to move quickly; time was not sufficient to perform load flow or other detailed analyses for specific areas. Areas of immediate need were identified; the Board then directed EVT to design and implement targeted efficiency to address those utility constraints. GT efficiency services were henceforth launched in July 2007. In 2008, in the Order establishing the EEU budgets for 2009-2011,⁶ the Board determined that geotargeting should continue. Utilities again recommended geographic areas for targeted efficiency services. The Board held a workshop, and after comments determined the 2009-2011 geotargeted areas.⁷

⁴ The details of the “Demand Resources Plan” proceeding are currently under discussion in Phase Two of Docket 7466. Broadly, the Demand Resource Plan is expected to be a Board proceeding where budgets and savings goals for 20 year periods are developed and approved.

⁵ The Department reserves the right to prioritize certain areas of this evaluation plan, depending on contractor response and resources needed to complete a robust evaluation in each area. The Department will notify the Board of any such changes to the scope outlined herein.

⁶ Public Service Board *Order Re: Energy Efficiency Utility Budget for Calendar Years 2009, 2010, and 2011*. August 20, 2008.

⁷ Public Service Board *Order re Geographic Targeting of Energy Efficiency Utility Funds in 2009-2011*. November 4, 2008.

The target area selection process will be assessed for its effectiveness, with an objective to provide parties with a high level of confidence that areas selected for any future GT investment will have undergone robust review of all pertinent information. The process evaluation will examine the manner in which particular areas are identified, initial proposals, collaboration efforts, the flow of data and information, and the administrative process to ensure that all parties are working efficiently toward the common goal. Changes already made to processes will be considered and evaluated as well. The affected utilities, implementation contractors, and other parties may be queried for input on research planning and/or be asked to participate in surveys or interviews (as a group or individually). Questions to be addressed may include, but are not limited to:

1. How were decisions made to determine what constrained areas are best suited for geotargeted efficiency resources (both initially and for 2009-2011 period)?
 - a. What criteria were used to determine constraints that made an area a potential candidate for geotargeted efficiency?
 - b. What information was available at the time decisions had to be made?
 - c. What were the obstacles encountered in the decision-making process?
 - d. Have any changes to the decision-making process been made? If so, how have they improved/worsened the ability to determine candidates for geotargeted efficiency efforts?
2. How could the decision-making process have been improved?
 - a. What information that was not available at the time would be useful for parties in decision making?
 - b. What is a reasonable timeframe to gather necessary information and make a decision concerning a targeted area?
3. What methods of communication are being employed?
 - a. What are the perspectives of key parties, including staff, regarding program development and implementation and how collaboration happens?
 - b. Where can communication and collaborative processes be improved? How?

Process Evaluation – Program implementation

2007-2008 was a development and implementation period for the GT program; initial assumptions were tested and several promising approaches were put in place. By ramping up demand reductions over such a short timeframe, the state embarked on an aggressive and somewhat unprecedented initiative.⁸ As such, there was limited real-world implementation experience to inform the approach and overall practicality of EVT's strategy for delivering GT programs. Based upon the experience of the first 18 months, some service delivery changes were made to improve the program in both the original and the newly targeted areas.

⁸ GMP ran a successful geotargeting program in the Mad River Valley in the mid-90's and California ran a pilot program known as the Delta project in the early 90's.

Continual internal reflection is important in order to enhance program design and implementation practice; external consideration of the delivery process can ensure continual improvement. This evaluation will result in a report on the implementation process including, for example, experience with ramp up, barriers encountered, and lessons learned. This report is intended to help inform decisions about whether individual programs should be continued, revised, expanded, or cut back. It will inform policy decisions that will be made in the context of the Demand Resource Plan concerning future GT programs. Questions to be addressed may include but are not limited to:

1. What are the substantive differences between services offered in Geotargeted areas versus statewide efficiency programs?
 - a. How were programs developed and how did they ramp up? What programs were identified for possible future development?
 - b. What barriers to implementation were encountered? What lessons were learned? Identify ways in which strategies or programs might be improved.
 - c. How were contract goals set? How did these targets affect program design and implementation? Identify ways in which goal setting might be improved.
 - d. Did a reorientation of focus from market-driven opportunities to the rapid acquisition of efficiency resources through retrofit markets affect the overall delivery of efficiency resources statewide? If so, how?

2. To what extent did EVT accomplish its specific 2007-2008 objectives for geographically targeted areas? These objectives include:
 - a. Peak demand savings in the targeted areas
 - b. Higher percentage of first-time energy efficiency program participants
 - c. Greater percentage of business customers who deepen their savings by completing second and/or third efficiency or business expansion projects
 - d. More savings from initiatives that involve upstream business partners, that is, partners such as distributors

3. What is the remaining potential for cost-effectively achievable energy efficiency savings in each area?⁹ Related questions include:
 - a. How much more savings could be realized from participants already reached by GT efforts?
 - b. How much more savings could be achieved by reaching additional participants in efficiency markets previously addressed by GT efforts?
 - c. How much savings could be achieved by additional energy efficiency strategies not attempted in this initial 18 month period?

⁹ While a comprehensive analysis of efficiency potential is beyond the research scope presented here, it would be useful to develop rough estimations of the quantity of energy and demand savings that can be achieved from participants already treated by GT efforts, as well as the savings possible from reaching markets *not* yet addressed. An independent potential study conducted by the Department is **not** anticipated as part of this evaluation plan. However, issues related to GT remaining potential should be addressed in more detail in the next statewide potential study, which is planned to be conducted in parallel to this study in the summer of 2010. Past market assessments have specifically identified some baselines for geotargeted efficiency.

4. What is the timeframe necessary for GT to be effective?
 - a. How soon does a potential GT area need to be indentified prior to the need date of a T&D upgrade
 - b. Does this timeframe vary based on the magnitude of the project?
 - c. What is a reasonable timeframe to mobilize GT in a new area
 - d. What is the best method to determine if GT has been effective? How much time is needed?
 - e. What is the timeframe when a T&D upgrade is so immediate that GT should not be considered as a practical alternative?

5. What future opportunities, if any, are there for EVT to improve the effectiveness or efficiency of its geotargeting? Related questions include:
 - a. What are the reactions and/or suggestions of customers and trade allies to the GT strategies and programs?
 - b. How could EVT change the design of geotargeting strategies to increase customer acceptance rates of efficiency technologies, and/or penetration of efficiency services in targeted areas?
 - c. What implementation process improvements could improve effectiveness and/or reduce costs?
 - d. Should other measures such as solar heating, geothermal AC, or distributed generation, e.g. roof-top solar, micro hydro, micro CHP and small wind be considered? If so, by whom (the distribution utility, EVT, or other entities?)
 - e. How can the targeted distribution utilities best support the geotargeting effort?

6. Do GT interventions create lost opportunities, where quickly achieved efficiency might prevent future, more robust efficiency measures and/or generation additions from being cost-effective?

Impact Evaluation – Savings results

The DPS will conduct an impact evaluation to determine verified savings for each GT area. This evaluation will leverage the annual DPS verification of statewide savings claims and the monitoring and verification conducted for the Forward Capacity Market. In keeping with standard procedures, data analyses pertinent to GT that are not part of routine savings verification or Forward Capacity Market evaluation efforts should be conducted by EVT and then verified by the Department. All data will be provided in a separate report for GT areas. This effort will occur following the verification process for the 2009 savings claim, in order to leverage that process. Questions to be answered by impact evaluation include, but are not limited to:

1. What were the verified energy, demand, and TRB savings in each of the targeted areas over the initial 18 month implementation period? In 2009? What was the overall and winter and summer levelized cost per kW in each area? Per kWh?

2. What were the peak demand reductions, *incremental* to statewide savings that would have been achieved absent GT policy, by GT area monthly, annually, and over the initial 18 month implementation period?
3. How do savings impacts compare in both magnitude and cost with savings achieved contemporaneously in non-GT areas?
4. What do results suggest about how cost-effective are the GT electricity savings achieved in each of the GT areas? Related questions include:
 - a. How much did it cost to achieve the electricity savings in each area?
 - b. What are the estimated benefits of the actual GT electricity savings in each area?
 - c. Were there any significant differences across the four areas? Why?
5. Beyond overall impacts, what can be determined about the relative impacts and cost-effectiveness of the various specific GT strategies, programs and measures? What do these results suggest about future GT efforts?
6. What do the results suggest about whether geotargeted energy efficiency interventions are a “no-regrets” strategy? (I.e., is it a cost-effective and beneficial investment even if it turns out not to be a least-cost T&D alternative or unable to defer or eliminate a particular T&D upgrade?)

Impact Evaluation – At the system level

Geotargeted efficiency investments ultimately have the goal of deferring or avoiding an otherwise necessary transmission or distribution infrastructure project. In order for utilities and policymakers to have confidence that savings were achieved that address the specific constraint, analysis of substation data should be completed in order to determine the actual load levels on particular circuits. These should be compared with continually updated, utility-developed circuit load forecasts in order to determine, to the extent possible, how verified savings in a particular geotargeted area correlate with each particular circuit. This analysis, to be further developed with DPS contractor support, will allow parties to explore the results on a particular circuit. This effort necessarily includes significant coordination between the DPS and affected utilities. These results will be compared with the savings estimates developed through the savings verification process, above. Due to budget limitations, it will likely be necessary to attempt this analysis on a small number of circuits, and consider the value of expanding analysis based on those results. Questions to be answered in this analysis include, but are not limited to:

1. What are the trends shown by analysis of hourly substation data?
 - a. How does hourly substation data compare before, during, and after implementation of GT services?
 - b. How does this compare to utility forecasted load growth?
2. Is it possible to detect GT program impacts at the utility system level?

- a. Can you differentiate between the impacts of GT programs and that of weather and economic activity?
3. How do verified achieved savings correlate with the observed substation data?
 - a. Were there any outside influences that affected the circuits either positively or negatively, such as a large customer either powering onto or off of the system?
 - b. How would a large customer sited in the constrained area affect results?
4. What conclusions can we draw about the relative effectiveness of each of the programs/strategies (in terms of affecting system level load) in the GT areas?
 - a. To what extent were achieved reductions coincident with constrained area system peaks?

Continuing evaluation facilitating utility and VSPC decisions

Finally, it is important to restate that it is not the intent of this evaluation plan to determine whether a specific investment in transmission and distribution infrastructure has been deferred or avoided. As discussed above, the distribution utilities and VELCO should be making these ultimate decisions. Continuing evaluation in order to inform these decisions will likely be necessary. This piece of the evaluation is intended to provide information and ideas that will enhance long-term decision making and inform future evaluation efforts. It permeates all other pieces of the evaluation, but is necessarily longer term in nature. Some questions that might be answered under these auspices include:

1. To what extent do electricity savings achieved to date with GT meet original and current utility estimates of load relief required to defer the “critical-need date” for planned T&D investment in each GT area?
2. What is the correlation between estimated savings at the ISO summer and winter peaks and the electricity savings realized during peak demand periods on the geotargeted distribution system and subtransmission elements, and during VELCO’s system peak periods?
3. Should specialized load shapes or specific avoided costs be developed for use in screening efficiency measures in geotargeted areas?
4. How do we verify current transmission capacity assumptions and track deferral decisions for T&D development in each targeted area?
5. What additional information is needed in order to help assess the extent to which GT programs can effectively defer or avoid T&D system investment?
6. When analyzing the impact of GT how should the effects of weather and level of economic activity be incorporated into the analysis to ensure that the true impact of GT is determined.
7. What is the timeframe needed to access trends in load to determine if GT is in fact having the necessary impact to defer a T&D project.