



E.1 INTRODUCTION

This is the Final Report of the Phase 2 Evaluation of Efficiency Vermont's programs to promote the adoption of energy-efficient products and construction practices among business (commercial and industrial) customers and the building professionals and trades who serve them. Efficiency Vermont (EVT) delivers energy efficiency programs to electric customers statewide, with the exception of customers served by the Burlington Electric Department. EVT initiated operation in November 2000, under contract to the Vermont Department of Public Service (DPS). Previous to that, electric and gas utilities delivered energy efficiency services to their customers under the regulatory supervision of DPS. The Phase 1 Evaluation of the Business Programs was completed in 2001.

E.1.1 Program Overview

Technical Assistance and Incentives. EVT delivers two main programs that provide technical assistance and incentives to business customers and actors on the supply side of the market to implement energy efficiency measures.

- **Existing Buildings.** Services to projects in existing buildings focus primarily on providing technical support and incentives for replacement of failed equipment with efficient models and on retrofit of equipment and systems with more energy-efficient technology. EVT uses both prescriptive and custom incentive structures, depending on the size, complexity, and technology addressed by the specific project. For custom measures, incentives typically are negotiated, with a maximum of 80 percent of incremental cost possible. According to staff, this approach is very effective in ensuring customers contribute to the investment and can be useful in leveraging more efficiency measures into projects than might otherwise be considered. Most incentives have been in the range of 20-50% of incremental cost.

In addition to customer incentives, EVT in 2004 began offering incentives of \$25 to suppliers and \$50 to contractors for the sale and installation of qualifying energy-efficient packaged HVAC units.

- **New Construction.** The New Construction program seeks to achieve energy efficiency in new construction, building addition, and major renovation projects. To accomplish this goal, program technical and business development staff seek to identify projects as early as possible in the development process. In most cases they are able to contact and attempt to recruit project principals in the pre-design phase. Once the principals of a construction project are identified, EVT delivers a broad range of technical support to owners and architects to inform them of efficient design and equipment options and to

assess their costs and benefits. EVT then administers a set of prescriptive and custom incentives for approved measures and design approaches.

Marketing and Business Development. EVT has built up a substantial marketing and business development operation to identify potential projects and to encourage program participation by the facility owners and supply side actors who affect decisions concerning the energy efficiency of those projects. Key elements of the marketing effort include monitoring of new construction activity, participation in the Act 250 environmental permitting process, personal outreach to decision makers in key customer organizations, as well as to key players in the design and construction community, and a well-attended annual conference.

E.1.2 Budget and Energy Savings versus Goals

The energy savings goal for all services and initiatives for the 3-year contract period from January 1, 2003 to December 31, 2005 is 119,490 MWh. The Business sector budget is approximately 59 percent of the total budget, resulting in an estimated business sector energy savings goal across the three years of 70,499 MWh. Calculated in this manner, it appears that in less than two years of program activity the business sector is well on its way to achieving its energy savings goals. Indeed, the gross energy savings from program activity extending from January 1, 2003 through December 3, 2004 represents approximately 73 percent of the apportioned business sector goal while the net energy savings represents 78 percent of the apportioned goal. The New Construction program accounts for 42 percent of budgeted spending and 33 percent of targeted energy savings.

E.1.3 Evaluation Objectives

Overarching Framework: Key Research Questions

The RLW/KEMA team developed a set of key research questions based on our understanding of the EVT business model. This model stresses the development of ongoing relationships with building owners in key sectors as well as with the architects, contractors, and vendors who serve them through a series of transactions and less formal contacts over time. These relationships are then used to capture efficiency opportunities as they arise in the course of construction, renovation and equipment replacement. Also, through ongoing contact with the program, customers and vendors should absorb information on both the value and the techniques of increasing energy efficiency. Using this understanding of the EVT business model, we formulated the following key research questions to guide the evaluation.

- 1. To what extent have the EVT Business Programs engaged their targeted markets among end-users and supply-side actors?**
 - What portion of customers in various submarkets have participated in the program? What portion of the volume of total construction and renovation do these customers represent?

- What portion of designers, distributors, and installers in the supply chains for various products and services have participated in the program? What portion of the market do they represent?
- 2. What is the depth of contact the program has had with members of the targeted markets?**
- What is the distribution of participating customers by the number of projects they undertook, number of measures they installed, and estimated savings?,
 - What is the distribution of participating supply side actors by numbers of projects in which they were involved?
- 3. What effect has the project had on participants' construction and purchase decisions in regard to energy efficiency?**

Customers

- What were the customers' baseline energy efficiency practices in regard to design, equipment selection, and ongoing facility maintenance and operation?
- What effect did the program have on participants' decisions to implement measures in projects directly supported through the program?
- What specific services were most important in affecting these decisions?
- To what extent have participating customers carried over design and purchasing approaches they were exposed to into other projects and purchases?

Supply Side Actors

- What were the supply side actors' baseline energy efficiency practices in regard to design, equipment specification, and marketing of their overall services to customers?
- To what extent did supply side actors first learn about efficient products, services, and design approaches through the program?
- To what extent have they incorporated these approaches into the general technical, marketing, and business practices?

Research and Analysis Efforts

Figure E-1 summarizes the research and analysis efforts undertaken to support the evaluation. Overall we undertook seventeen different research and analysis efforts. On the customer side, we conducted surveys of population-based samples of commercial and industrial customers to ascertain patterns of construction activity and measure adoption. We also interviewed a population sample of commercial and industrial customers who received life safety permits for new construction and renovation projects in order to focus in on the population of customers with significant recent construction. The RLW/KEMA team conducted in-depth interviews with

smaller samples of customers, principally program participants of various kinds, to generate detailed information on their responses to the programs and their perceived influences on behavior. We conducted in-depth interviews with samples of key groups of supply-side actors: architects, engineers, lighting and HVAC installation contractors, and equipment suppliers. This entire effort was guided by close analysis of data from EVT's KITT program tracking database.

Figure E-1
Summary of Research Undertaken for This Evaluation

Data Collection & Analysis Task	Survey Approach			Analytic Application		
	n =	Sample Frame/ Approach	Mode	Breadth/ Depth	Base- line	Program Effect
Customers: Population-Based						
Analysis Dept of Labor and Industry Life Safety Permit Database	n/a			X		
Survey of Commercial Customers	100	D&B/Stratified on size	CATI	X	X	X
Survey of Industrial Customers	48	D&B/Stratified on size	CATI	X	X	X
Survey of Customers with DLI Permits 2003 - 2004	140	DLI Database/R	CATI	X	X	X
Inspections of new facilities and renovations	54	Subsample of above	On-Site		X	
Survey of Market-Rate MF Housing Developers	10	DLI Database/R	Phone In-depth		X	X
Inspections of new developments	9	Subsample of above	On-Site		X	
Customers: Participants						
Analysis of KITT Database: EVT Program Tracking System						
Lighting participants	30	KITT/Random	CATI		X	X
HVAC participants	20	KITT/Random	CATI		X	X
New Construction participants	22	KITT/Random	Phone In-depth		X	X
Industrial participants	21	KITT/Random	Phone interview		X	X
Supply Chain						
Architects	35	Directories/Random	Phone In-depth	X	X	X
Mechanical Engineers	20	Directories/Random	Phone In-depth	X	X	X
Lighting Contractors	15	Directories/Random	CATI	X	X	X
HVAC Contractors	10	Directories/Random	Phone In-depth	X	X	X
Suppliers	19	Directories/Random	Phone In-depth	X	X	X

CATI = Computer Aided Telephone Interviewing

E.2 KEY FINDINGS

E.2.1 Customer Participation in Market Context

EVT has done a very good job of recruiting customers in the targeted markets into the Business Programs. EVT has also made visible and significant strides on the customer side towards executing its business model. Specifically EVT has been able to engage a significant number of larger customers in multiple projects. The following findings support these conclusions.

- **Participation by commercial customers.** 464 commercial customers participated in the EVT Business Programs in 2003 – 2004, completing 811 projects. This is seven percent of all commercial establishments with more than 5 employees, yielding an annual participation rate of 3.5 percent. To the extent that this result can be compared to the participation statistics for other well-established programs, it ranks at the high end of participation rates.¹ Using estimates of total market construction volume generated from a number of sources we estimate that EVT supported 26 percent of significant construction projects undertaken by commercial customers.
- **Participation by manufacturing customers.** 77 manufacturing customers participated in the EVT Business Programs in 2003 – 2004, completing 124 projects. This is six percent of all manufacturing establishments with more than 10 employees, yielding an annual participation rate of 3.0 percent. Again, this participation rate ranks high among states with established programs. We estimate that EVT supported 21 percent of significant construction projects undertaken by manufacturing customers.
- **Engagement of large customers.** In the years 2003 – 2004, 44 of the largest 100 organizations in terms of volume of permitted construction participated in EVT's Business Programs. Twenty-five of the largest 100 projects in terms of estimated value participated in the program. Capturing the participation of owners with large and/or multiple facilities is extremely important because of the concentration of annual construction activity. The 15 top owners (organizations) ranked by value of permitted construction in 2003 – 2004 accounted for 45 percent of total permitted construction in the state.
- **Measures of depth of participation.** Twenty-six percent of all participants during the period 2003 – 2004 implemented two or more projects through the program. Thirty percent addressed two or more end-uses through the program, and 48 percent installed more than one type of energy efficiency measure.

¹Kushler, Martin, Dan York and Patti Witte. April, 2004. *Five Years In: An Examination of the First Half-Decade of Public Benefits Energy Efficiency Policies*. Washington, D. C.: American Council for an Energy-Efficient Economy

E.2.2 Supply-side Actor Participation in Market Context

Interviews with customers conducted for this evaluation, as well as many other studies, find that that supply-side actors – architects, engineers, installation contractors, and equipment suppliers – all play an important role in design and equipment selection decisions that affect the energy efficiency of buildings and building systems. The nature and extent of this influence varies with the size, complexity, and end-use technologies encompassed by a particular project, as does the particular party that exercises most influence. Thus, it is clear that the success of the EVT Business Programs depends greatly on the extent to which supply-side actors can be brought on board.

EVT has done a very good job of recruiting supply-side actors into the program and of encouraging them to participate on an ongoing basis. Table E-1 shows the number of supply-side firms that participated in projects supported by EVT Business Programs in the period 2003 – 2004, as well as their distribution by the number of projects with which they were associated in the tracking database system.² To provide a sense of program participation in the context of market size, the far right hand column shows the estimated number of firms in the respective categories that provide a significant level of service to business customers.

Table E-1
Distribution of Supply-Side Participants in EVT Business Programs: 2003 – 2004
By Type of Firm and Number of Projects

Type	Number of Projects Recorded in KITT				Total	Pop-ulation ¹
	1	2	3 – 4	5 +		
Architect	22	7	6	5	40	~130
Contractor, Electrical	51	24	3	7	85	118
Contractor: HVAC	25	3	5	2	35	<66
Supplier	46	12	14	13	85	84
Builder/General Contractor	20	2	3	1	26	n/a
Total	164	48	31	28	271	

¹ KEMA estimate

- **Architects.** Forty out of the 130 architectural firms with at least five employees that are active in Vermont were recorded in project records. Among these participating firms, 18 or 45 percent worked on more than one project, with five firms working on five or more projects. The maximum number of EVT projects for any one architecture firm was seven. For architects, EVT appears to be doing a good job in executing its stated business strategy.

² It is possible that other building professionals, suppliers, and trades persons participated in these projects as well, but were not recorded in the tracking system because they did not have direct contact with EVT.

- **Electrical Contractors.** Eighty-five electrical contractors – 72 percent of the number listed in Dun & Bradstreet – participated in EVT projects in 2003 – 2004. Of those, 40 percent recorded multiple projects. However, the high concentration of electrical contractors with only one or two projects suggests that, for the most part, this group did not play a major role marketing the program to customers.
- **HVAC Contractors.** Thirty-five HVAC contractors out of approximately 65 that are active in the C&I markets participated in the program. Ten worked on multiple EVT projects. The maximum number of EVT projects for a single contractor was 7.
- **Equipment Suppliers.** The numbers in Table E-1 suggest that a very large portion of the state’s electrical and mechanical equipment suppliers participated in EVT Business Programs. Two-thirds of the participating suppliers provided materials to only one or two projects. However, one ambitious firm was recorded on 83 separate projects.

E.2.3 Customer Baseline Practices: Changes Since the 2002 Phase 1 Study

One of the major objectives of the evaluation was to assess current baseline³ practices among customers in regard to adoption of energy efficiency measures and practices and among supply-side actors in regard to promotion and delivery. The Phase 1 Evaluation had developed a battery of quantitative indicators of the adoption of such behaviors. In this study, we estimated current values of those indicators, using the same sampling and calculation techniques to the extent possible. This work enables us to assess changes in baseline practices over the three years since the Phase 1 Evaluation. It also allows us to compare baseline practices between participants and nonparticipants.

Customer Baseline Practices

The prevalence of well-established energy efficiency measures grew at a modest rate in the three-year period between research for the Phase 1 and Phase 2 studies. The most direct indicators of customer baseline practices involve the rate at which energy efficiency measures are used in construction and renovation projects.

Table E-2 displays the relevant results for lighting and HVAC technologies from various customer phone surveys conducted for the Phase 2 and Phase 1 evaluations. The columns show the percentage of respondents who installed the efficiency measures in the left-hand column, using as a denominator the number who reported that they installed or changed their lighting systems as part of the project. We used this approach to the data both because it provides an appropriate indicator of market penetration and it facilitates comparison to reported results of the Phase 1 evaluation. In assessing changes in market share 2002 and 2005, it is most appropriate to compare the permit holder surveys from the two years to each other. The two surveys used the same sampling approach and skip patterns leading up to the measure adoption questions.

³ The term baseline here refers to most prevalent *current* practice.

- ***Changes in lighting measures from 2002 to 2005.*** Where direct comparisons can be made between the permit holder surveys, the reported market share of the most common lighting efficiency technologies rose modestly between 2002 and 2005. For example, the percentage of sample permit holders reporting that they had used T-8 lamps in their projects increased to 44 percent in 2005 from 38 percent in 2002. Similar rates of increase can be seen for CFL fixtures and bulbs, LED exit lights, and occupancy sensors. Only the change in the reported prevalence of occupancy sensors is statistically significant at the 90 percent confidence level. The reported use of daylighting controls increased substantially. However, it is not entirely clear that customer understand the nature of daylighting controls.
- ***Adoption of new lighting technologies.*** Small but measurable portions of respondents to both the omnibus and permit holder surveys reported that they had used newer lighting efficiency technologies – super T-8 fluorescent lamps; T-5 fluorescent technology; and fluorescent high bay fixtures. These technologies were not tracked in the Phase 1 study.
- ***Changes in HVAC measures from 2002 to 2005.*** The increase in the in the reported use of high efficiency boilers and energy management systems is significant at the 90 percent confidence levels, as is the apparent decline in the installation of economizers. The reported use of set-back thermostats did not change between 2002 and 2005.

Table E-2 summarizes these changes.

Table E-2
Use of Lighting and HVAC Efficiency Measures in Construction Projects

Energy Efficiency Measure	Percent of Customers that Report Using Measure in Construction Project							
	Omnibus Commercial (Weighted)			Omnibus Manufacturing (Weighted)			2005 Permit Holders	2002 Permit Holders
	2005 SMALL <50 employees	2005 LARGE 50+ employees	2005 ALL	2005 SMALL <50 employees	2005 LARGE 50+ employees	2005 ALL		
Lighting Measures	n=8	n=16	n=24	n=3	n=9	n=12	n=117	
T-8 fluorescent lamps	8%	55%	14%	33%	78%	45%	44%	38%
Compact Fluorescent Fixtures or Bulbs	65%	58%	64%	n/a	n/a	n/a	50%	45%
LED Exit Lights	54%	39%	52%	0%	33%	9%	56%	49%
Occupancy controls in offices	28%	11%	26%	0%	33%	9%	28%	19%
Daylighting controls	13%	20%	14%	0%	22%	6%	35%	9%
HVAC Measures	n=3	n=16	N=19	n=2	n=5	n=7	n=7	
Enthalpy economizers	0%	33%	11%	0%	40%	9%	15%	25%
High efficiency boilers	68%	58%	65%	n/a	n/a	n/a	37%	23%
Energy management systems	0%	82%	27%	0%	40%	9%	27%	18%
Set back thermostats	54%	100%	69%	0%	40%	9%	52%	52%

Supplier Baseline Practices

Among architects, indicators of energy-efficient practice advanced strongly between the 2002 and 2005 studies. For engineers, use of commissioning increased sharply. Among equipment suppliers, sales of less well-established efficiency technologies began to take off.

Architects. Table E-3 presents the estimated 2002 and 2005 values for market indicators related to architects' practice. If the difference between the values was significant at the 90 percent confidence level, we signified it with a + or – trend sign, as appropriate. Otherwise, we characterized the difference as “no change”.

Table E-3
Changes in Selected Market Indicators: Architects, 2002 - 2005

Market Indicator	2002 Value	2005 Value	+/- Trend*
Awareness of 2001 VT Guidelines for Energy Efficient Commercial Construction	< 5%	23%	+
Use of any EVT Services	47%	94%	+
Specify photo dimming to enhance daylighting: at least 5% of projects a year	30%	34%	no change
Specify photo dimming to enhance daylighting: at least 50% of projects a year	27%	6%	-
Use of daylighting strategy in design practice: at least 5% of projects	35%	34%	no change
Use of daylighting strategy in design practice: at least 50% of projects	30%	11%	-
Know SHGF rating generally specified for glazing	10%	26%	+
Use of 3rd party agent for commissioning: at least one project a year	23%	57%	+
Use of lighting model: at least once in past year	43%	37%	no change
Use of lighting modeling: at least 75% of projects	23%	23%	no change

* Difference between 2002 and 2005 values marked + or – only if it is significant at the 90 percent confidence level.

A number of the indicators of architects' energy efficiency behavior gained significantly between the two phases of the study: awareness of the Vermont Energy Efficient Commercial Construction Guidelines, participation in EVT, and use of commissioning. Reported use of specific daylighting strategies decreased sharply. This result is somewhat at odds with customer reports and may simply result from the relatively small samples available for this project and the nature of projects on which the sample architects worked.

Engineers. Engineers reported similar increases in awareness of the Commercial Construction Guidelines and use of commissioning on their projects.

Suppliers. Among lighting suppliers, indicators of sales of newer efficiency technologies increased significantly. Specifically, the portion of suppliers who reported selling Super T-8 and T-5 technologies increased, as did their share of total sales.

E.2.4 Assessment of Program Effects: Customers

Effects of Equipment Rebates

According to EVT records, roughly 65 percent of total net program savings are attributable to projects supported by equipment rebates in retrofit and replacement situations. Lighting measures account for 31 percent of total Business Program savings; HVAC measures for 8 percent. We conducted interviews with 50 rebate recipients to assess the effects of rebate programs on participants' lighting and HVAC equipment selection. The key findings from this analysis are as follows.

- ***EVT played a key role in introducing efficiency measures to a small but significant percentage of participants.*** Participants in the lighting program had no prior knowledge of 29 percent of the measures they installed; 37 percent if CFLs are not included in the count. The corresponding figure for HVAC measures is 21 percent. Lighting program participants report that they first heard of 18 percent of the measures they implemented from EVT; 21 percent for HVAC measures.
- ***EVT played a decisive role in the decision to implement measures in 55 percent of the lighting measure adoption decisions and 48 percent of the HVAC measure adoption decisions.*** That is, participants reported that they were likely or very likely to have installed the measures 45 percent of the lighting measures covered by the participant sample and 52 percent of the HVAC measures in the absence of the program. Customers who reported that they had first learned about measures through contact with EVT were significantly less likely to have implemented the program in the absence of the program than those who had previous experience with the measures.
- ***Spillover.*** One-third of the lighting participants and all of the HVAC participants reported implementing the same kinds of measures for which they received EVT support in other facilities during the two years covered by the survey. In most cases, these installations were supported by EVT programs. Generally, the responses to this line of questioning bring out the high level of repeat participation in the program. However, reported levels of program influence on use of program-supported measures in projects undertaken "outside" the program are low. However, experience in the program did appear to encourage participants to adopt new lighting measures.
- ***The reported influence of EVT participation on measure implementation was similar to that of similar programs in other jurisdictions.*** For cases in which program structure

and evaluation methods were comparable, indicators of participant-reported influence on measure selection were very similar.

Effects of the New Construction Program

- ***EVT played a strong role in overall design for the projects in which they were involved.*** According to in-depth interviews of participants in the new construction program, EVT participated actively in design decisions in nearly all new construction projects they supported. The parties mentioned most frequently as having most influence on design decisions were the architect (6), the owner (5), and EVT (4). Eleven other parties were mentioned, with only one receiving more than 2 mentions.
- ***EVT exercised a high level of influence on the majority of sample shell and lighting installations.*** The program influenced a smaller percentage of HVAC installations. Table E-4 summarizes the responses from the in-depth interviews to open-ended questions concerning their likely courses of action in the absence of the program.

Table E-4
Participant Characterization of EVT Effect on System Design & Specification

Assessment of EVT Effect on Project	Shell Features	Lighting	HVAC
<i>Interviewees with Positive Responses</i>	8	13	7
Increased Efficiency/Added Expense	7	5	5
Increased Efficiency/Reduced Expense		2	
Focused Efficiency Efforts on Effective Measures	2	11	3
<i>Interviewees Claiming No Effect</i>	1	5	8
n =	9	18	15

Source: In-depth interviews with new construction participants. Multiple responses accepted for kinds of influence.

- ***There was strong evidence of spillover from new construction programs.*** Among the 14 customers with additional construction projects, 11 reported installing lighting measures similar to those they used in their EVT projects. For lighting measures, the program's spillover influence was strong. Nine of these customers reported that their experience with the new construction program was an important factor in their decision to implement lighting efficiency measures in other projects. Among the 14 customers with additional construction projects, 8 reported installing HVAC measures similar to those they used in their EVT projects. Half of those customers reported that their experience with the new construction program was an important factor in their decision to implement lighting efficiency measures in other projects.

E.2.5 Assessment of Program Effects: Supply-Side Market Actors

Architects and Engineers

Large portions of engineers and architects reported increasing their use of energy efficiency measures over the two years prior to the evaluation. Among the sample architects who participated in EVT programs, 45 percent reported that their use of energy efficiency measures had increased over the past two years. For the remainder the use of energy efficiency measures had remained the same. Sixty-five percent of the participating engineers reported that their use of energy efficiency measures had increased over the past two years.

A majority of architects and engineers who reported increased use of energy efficiency measures indicated that EVT played a role in that change. We asked the sample architects and engineers who claimed that they had increased the inclusion of energy efficiency measures in their work to rate how important their experience with EVT was in that change. Two-thirds of both groups characterized EVT as a “partial factor” in the change – the mid-range point offered in the question. Three of the architects – one-fifth of those who reported increasing the energy efficiency of their work – identified EVT as the “main factor” in that change. Only one of the 15 architects who answered this question claimed that EVT was no factor in their change of practice.

Electrical Contractors

The key findings from the interviews with 10 electrical contractors in regard to effects of are as follows.

- **Half of the sample contractors sought technical advice from EVT.** Five of the contractors had taken the initiative to seek EVT design support or financial incentives for projects on which they were working.
- **In many instances, contractors attributed high importance to EVT in regard to promoting new energy efficiency measures.** We asked contractors whether they had used specific lighting efficiency measures such as Super T-8 lamps in their projects over the past two years. For each measure they had used, we asked them to rate the importance of their EVT experiences on their recommendations to customers to use that particular measure. The 10 sample contractors rated a total of 49 measures. In 18 or 40 percent of those cases, the contractors rated the importance of EVT in their decision to recommend the measure in question at “4” or “5” out of a possible five. Given the independent cast of mind of many in the building trades, this appears to be a remarkably high number.
- **Contractors ascribe only modest importance to energy efficiency as a business strategy.** Only 2 of the 10 contractors rated the importance of energy efficiency to maintaining their firm’s competitive position at “4” or “5” on a five-point scale.

- **Contractors believe EVT is doing a good job in promoting high efficiency technologies.** Six of the ten contractors rated EVT’s effectiveness in promoting energy-efficient lighting technologies among commercial and industrial customers at “4” or “5” on a five point scale.

Equipment Suppliers

- **Suppliers believed that the availability of EVT rebates greatly facilitated sales of high-efficiency equipment.** Suppliers felt that rebates had a positive effect both on sales through the contractor channels and on direct sales to facility owners.
- **Many suppliers changed practices in regard to recommending efficient equipment due to the availability of rebates.** Four of 5 HVAC suppliers and 4 out of 9 lighting suppliers who answered questions about the effect of EVT participation on recommendations to customers reported that the availability of incentives influenced their assessment of whether to recommend energy-efficient products to customers.

E.2.6 Process Evaluation

Customer Assessment of EVT Services

- **Customers’ assessment of the quality, timeliness, and professionalism of EVT services was almost universally excellent.** These assessments came from participants in both the Existing Building and New Construction components.
- **Customers valued technical services most highly.** Both the Industrial program and New Construction program participants identified the technical support and analysis they received as the most useful service they received from EVT. It was the service mentioned “top of mind” twice as frequently as financial incentives.
- **Customer suggestions for program improvements were relatively few and focused on increased communication.** The most frequent unprompted suggestion for improved service was the request for a bulletin or newsletter updating the descriptions of program services and incentives available.

Supply-Side Actor Assessment of EVT Services

- **Supply-side actor comments on the usefulness of EVT services were generally quite good.** Typical comments included the following

“I enjoy working with those folks and think they bring something to the project - ideas and expertise and their incentives.”

“On the commercial project the managers were helpful [and brought] suggestions from a different point of view. On the residential side and the Build Greener program they are very collaborative.”

“A valuable third party resource with the right price.”

- *A significant number of supply-side actors, principally architects and engineers, reported having some misgivings about the technical quality of EVT’s work and the technical qualifications of personnel.* It is our impression that EVT generally provides a higher level of technical and project management support for customers and vendors than is typical in public benefits programs. This level of involvement may occasionally place EVT in a delicate situation in regard to customer expectations regarding the nature and extent of technical support available to them. It may also lead to perceptions among designers and contractors that EVT is inappropriately interfering in their customer relationships. These tensions came out in comments from a small but vocal set of survey respondents primarily on the supply side concerning the quality of technical services they received from EVT. Negative comments addressed the following:
 - Perceived mismatch of EVT specifications and recommendations to project needs.
 - Perceived tendency to recommend untested technologies.
 - Delays in project completion. (Note: only two of the customers interviewed for the entire evaluation mentioned project delays associated with involvement in EVT programs)
 - Inadequate EVT staff qualifications.
 - Perception of EVT as competition.

The situation captured above is fraught with cross-cutting and in some cases contradictory demands. Above all else, the technical services EVT provides are a key element in achieving high levels of participation and implementation. However, they create expectations that are difficult to meet consistently. The issues of staff qualifications and the quality of technical services needs to be framed in context of the services EVT purports to provide. Our understanding is that EVT essentially qualifies projects for funding, it does not tell customers or their vendors what to do in a specific situation. In regard to vendors, it is not always possible to anticipate what kinds of activities designers or contractors will regard as inappropriate interference in the client relationship. Based on the comments received, it may range from setting equipment specifications for prescriptive rebates to providing comment and feedback on plans for more customized types of measures.

In any case, we believe the issues discussed above have more to do with some mismatches between participant expectations – whether or not those expectations are appropriate – and perceptions of EVT’s service delivery. We believe EVT can take steps to clarify for participating customers and vendors what their expectations should be and to manage service delivery to meet those expectations.

E.3 CONCLUSIONS AND RECOMMENDATIONS

E.3.1 Conclusions

The RLW/KEMA team draws the following high-level conclusions from the above findings.

- ***Efficiency Vermont’s business model has proven to be appropriate for the markets the Business Programs serve, helping to program to achieve broad and deep participation.*** Given the relatively small size of the markets (numbers of establishments and geography) and their concentration in terms of construction and naturally-occurring energy efficiency opportunities, EVT’s strategy of strong personal representation in marketing has yielded high rates of participation. Moreover, indicators of depth of participation – multiple projects and measures – are very strong.
- ***Customers value EVT’s technical services and report that those services are responsible for much of the overall program effect on measure implementation.*** Customers identified technical support (as opposed to financial incentives) most frequently as the service they valued most from EVT. Those customers that identified EVT as a strong influence in measure adoption frequently reported learning about efficiency measures first from EVT.
- ***Net effects of EVT’s equipment rebate programs appear to be consistent with those of similar programs in other jurisdictions.*** Customers report that participation in the program is a decisive factor for use of efficient equipment in roughly half of the measure installations supported by the program. Equipment replacement and retrofit programs account for roughly 60 percent of total gross electric savings for the Business Programs.
 - ***Among supply-side actors, installation contractors and equipment suppliers exercise the greatest influence on equipment specification in replacement and retrofit situations.*** EVT has engaged a large percentage of these market actors in the Business Programs, and they are generally very pleased with EVT’s approach and performance.
 - ***Contractors and suppliers both report that EVT has influenced them to increase the frequency with which they recommend, specify, and sell energy-efficient equipment.***
- ***EVT’s New Construction program appears to play a more important role in participants’ design and equipment selection decisions than the equipment rebate programs.*** A higher percentage of sample new construction participants report program influence on building systems specification than is the case for equipment rebates. They also report a higher level of spillover activities. New Construction projects account for 40 percent of total Business Program savings.
- ***Architects rely on EVT for technical support and generally appreciate the help they get. However, some architects have felt uncomfortable with EVT technical services.*** Their misgivings generally differences over the appropriateness of equipment recommendations, perceptions that EVT staff are not qualified to provide certain kinds of design advice, and interjection of EVT staff into the professional relationship with their clients.
 - ***Architects are named most frequently as the party with greatest influence in design and equipment selection decisions for new construction and major renovation***

projects. It is therefore important that EVT maintain good working relationships with participating architects.

E.3.2 Recommendations

Given our conclusions, we do not believe that recommendations in regard to the design of the EVT Business Programs are warranted. The business model EVT has chosen to pursue fits the target market and EVT has done a good job in executing the model. Our recommendations focus on strengthening existing administrative systems to address the quite manageable areas for improvement that our interviews of customers and supply-side actors surfaced.

The following are program process recommendations we have identified for EVT to pursue. These are characterized as “primary” or “secondary”. Our team did not perform a comprehensive assessment of internal management practices at EVT, so these recommendations are given with the assumption that these practices may be underway or planned for already.

Primary

Develop and build managerial tools for monitoring and fine tuning service delivery performances. These would be steps to monitor for potential service errors, to respond to correct these in a timely manner, and to ensure that any errors that can occur are minimal and isolated. EVT regularly works with a number of market actors along the value chain, and some simple feedback loops that can be implemented would be of great use. These could be such things as random sampled phone calls from business development staff; simple quality check follow up phone calls after a project is completed; random sampled simple phone surveys by a third party at interim periods between formal evaluation periods.

Define a model for working with design professionals, communicate it to all program and business development staff, and monitor performance to ensure it is implemented. EVT has done a good job in communicating its mission and brand characteristics to all employees. This is a particularly important step in ensuring consistent and high-quality delivery in a service-oriented operation where the overall effect is an accumulation of many small contacts and transactions between the organization and its market. The only negative feed back we received was in the area of the model for working with design professionals. To address this problem, it may be useful to:

- Convene a set of interviews with design professionals to explore how best to structure project interactions and to communicate more clearly the nature of EVT’s mission and the constraints under which it operates.
- Develop a set of draft guidelines for interactions with design professionals (and their clients) on new construction and renovation projects.
- Review these draft guidelines with the design professionals initially consulted, or perhaps with a wider group.

- Publish the guidelines internally for all business development and program staff, and conduct one or more training sessions on their practical application.

Secondary

Conduct demonstration projects and produce case studies for more cutting-edge technologies and design approaches. As pointed out to us from a few HVAC suppliers, there is EVT support for some HVAC systems and components that have yet to be well documented on their applicability, or upon a reliable assurance of energy savings. It would be useful for EVT staff to hear out and consider HVAC supplier concerns (or for that matter, from mechanical engineers or architects as well) on where those concerns lie. If a demonstration project might allay those concerns, it can be useful to EVT to provide a high level of funding towards demonstration projects where participants can be given a chance to install and use these new systems with acceptable economic risks. In return, EVT would monitor the operation, reliability, and actual savings performance, and subsequently promote these projects. It would be our opinion that the market actors involved in such a demonstration – supplier, customer, and vendor – would be interested if they are assured of proper credit in these promotions, and EVT is demonstrated to have served primarily as a facilitator and sponsor.