

Four Years Experience of the Nation's First Energy Efficiency Utility: Balancing Resource Acquisition & Market Transformation under a Performance Contract

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ABSTRACT

Competing priorities and bottom line objectives require innovation and flexibility in any business model. The same holds true in the field of energy efficiency administration and management. Since March 2000, Efficiency Vermont, a system-benefits-funded statewide “energy efficiency utility,” has been the sole provider of statewide efficiency programs that have delivered verified, highly cost-effective energy resources, now providing approximately 3% of Vermont’s electric energy requirements. At the same time, nation-leading market shares have been achieved for a number of efficient products and significant efforts have been applied to attain market transformation and distributional equity objectives. One of the key factors responsible for the broad success of Efficiency Vermont is the administrative structure of the negotiated performance contract between Efficiency Vermont and the Vermont Public Service Board. With the structure, scope and flexibility of this administrative arrangement, Efficiency Vermont has adaptively managed efficiency investments to obtain results that balance many conflicting objectives.

Introduction

In 1999, Vermont made a bold move, creating the nation’s first Energy Efficiency Utility (EEU) to administer virtually all system-wide, electric-ratepayer funded energy efficiency at a statewide level. In doing so, it chose a single non-utility administrator/implementer, operating under a competitively-awarded, performance-based contract. While other jurisdictions have created statewide non-utility administrators to implement efficiency efforts funded by system benefit charges, none have had as broad a scope of responsibility and accountability. None has been as independent, nor have they generally been subject to as rigorous accountability for measurable results (Harrington, 2003; Kushler, York and Witte, 2004). Similarly, while systems of performance indicators and incentives have increasingly been used in a number of jurisdictions where utilities are acting as administrators or implementers of system benefit funded efficiency programs, their impact in Vermont appears to have been particularly important in achieving not only specified on-time results, but also in achieving balance among policy objectives. Now, Vermont’s experiment has had four years of field testing, feedback, refinement and evolution. Much has been learned by both the regulators and the implementers which should be of interest in other jurisdictions.

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Background

Roots

The EEU concept was initially considered as part of Vermont's electric restructuring deliberations in 1996-1997. While Vermont did not proceed with retail electric competition, it was concluded that a statewide, non-utility alternative approach to energy efficiency would: (1) increase statewide availability and uniformity of services; (2) reduce regulatory contentiousness and cost; (3) reverse a downward trend in utility program spending since 1993; and (4) allow greater administrative and delivery efficiency (Vermont Department of Public Service, 1997).

In 1999, the Vermont Legislature confirmed the authority of the PSB to create an EEU, set an annual funding cap for it of \$17.5 million, and notably did not include a "sunset" of the authorization. The state's Public Service Board (PSB) ordered the creation of an EEU, adopting a negotiated settlement among the state's regulated utilities, the DPS, and business, consumer and environmental groups. Under the PSB order, energy efficiency continues to be treated as an "essential component of utility service," but a service that is now provided on behalf of Vermont electric distribution utilities by the EEU. The order also established the administrative structure, defined a set of initial "core" programs to be implemented statewide, and set initial five-year budgets (Vermont Public Service Board, 1999). Funding is provided by an energy efficiency charge that is phased in over five years. In 2000, the charge averaged 1.5 mills/kWh, rising to an average of 2.9 mills in 2003.

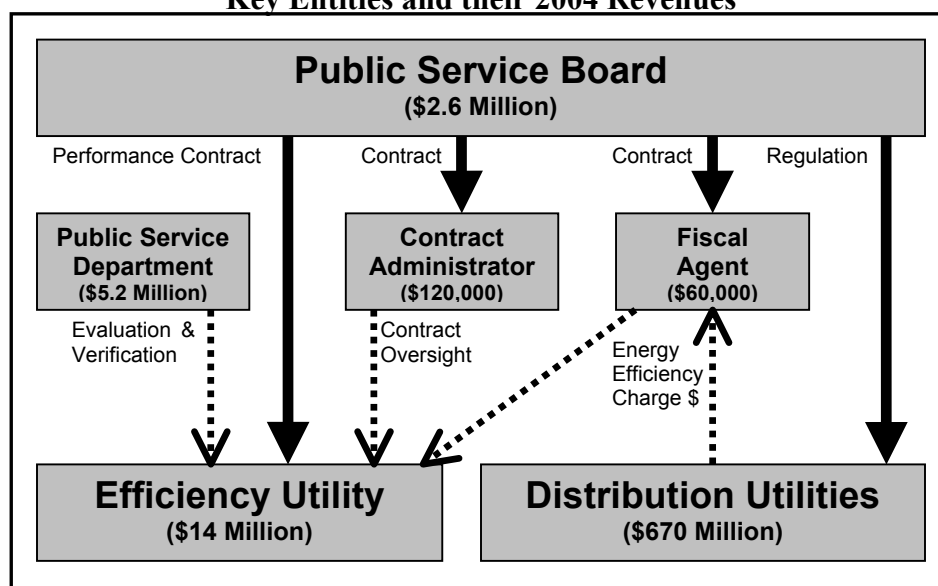
Structure

The structure for Vermont's efficiency utility is illustrated in Figure 1. The model uses a "Contract Administrator" who handles any day-to-day contract administration responsibilities on behalf of the PSB. It also includes a "fiscal agent" who receives Energy Efficiency Charge collections from the utilities and disburses funds against bills submitted by the EEU upon approval by the Contract Administrator. Both are competitively-solicited, independent contractors. In this structure, the funds collected never become "funds of the State," and are therefore less exposed to redirection, as well as less restricted by State procurement limitations.

The responsibility for the design, marketing and implementation of public-benefits energy efficiency in Vermont sits entirely with the PSB's competitively-selected EEU contractor, operating under the name Efficiency Vermont.

The Department of Public Service (DPS) has responsibility for review of the savings claims made by the Efficiency Vermont contractor each year. The DPS engages with Efficiency Vermont in an ongoing process of review and update of prescriptive savings algorithms, and conducts an annual verification process of all savings claims. The DPS is also responsible for assessing and reporting on market potential, setting efficiency baselines, program evaluation, and making recommendations to the PSB on directions and priorities for the future of Efficiency Vermont. Further information and discussion of the formation and structure can be found in a prior ACEEE paper (Hamilton and Plunkett, 2002).

**Figure 1. Structure and Relationships Surrounding Vermont's Efficiency Utility:
Key Entities and their 2004 Revenues**



The Performance Contract Mechanism

The Efficiency Vermont contract contains carefully-chosen and tightly-specified indicators of performance designed to reflect and weight the multiple policy, resource acquisition and market transformation objectives of the State, as represented by the PSB. How well Efficiency Vermont performs against these targets determines how much it earns of a “holdback” performance award set aside as an incentive for superior performance, payable at the end of the contract period (performance would also have a major impact on potential contract renewal). The definitions of performance indicators, their targets and their individual award values are all set through negotiations involving the PSB, the Contract Administrator, the DPS, and the Efficiency Vermont team.

Results

Three types of results from Efficiency Vermont’s first four years are summarized below, (1) resource acquisition, (2) participation/equity and (3) market impacts. Achieving greater results in any one of these three areas generally requires a trade-off against the others – a balancing act which is discussed in the Lessons Learned section of this paper.

Resource Acquisition Impacts

The PSB’s contract for the EEU focuses heavily, but not exclusively, on short-term resource acquisition as an objective. Table 1 presents the annualized energy savings (first-year MWh) for each of the past four years, together with summer and winter coincident peak kW reductions. The average measure life for these annual savings is 14 years.

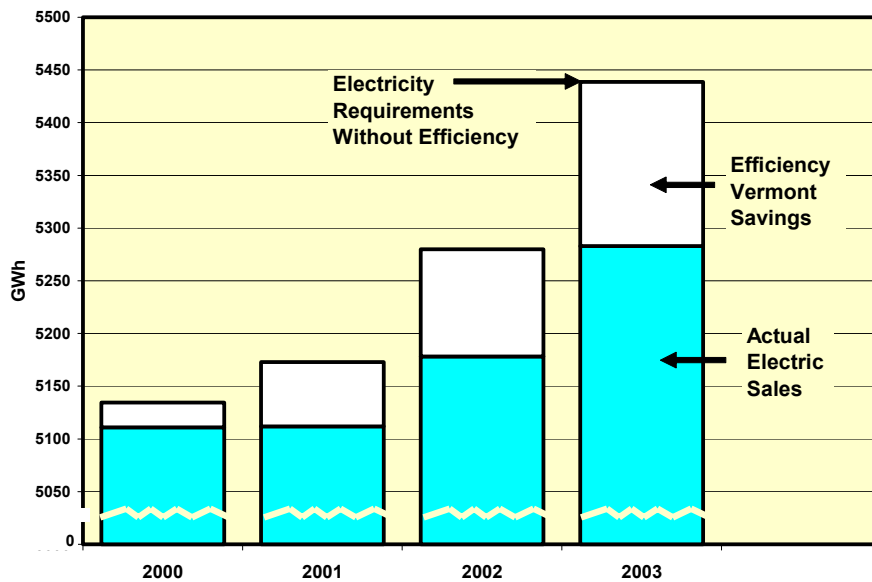
Table 1. Efficiency Vermont's Annualized Savings

	2000	2001	2002	2003*	Four-Year Cumulative
Annualized MWh Savings	23,540	37,489	40,557	54,356	155,942
Summer Peak kW Savings	2,161	4,279	4,996	7,343	18,778
Winter Peak kW Savings	5,447	6,489	7,467	14,560	33,963

*2003 savings have not yet been verified by the Vermont Department of Public Service.

Figure 2 presents the impact of Efficiency Vermont's energy savings on Vermont energy consumption for 2000-2003. Overall, without Efficiency Vermont savings, Vermont energy consumption would have grown by 195 GWh over this period, an average rate of 1.5%. Due to Efficiency Vermont savings, actual consumption increased by only 140 GWh, 53% of what otherwise would have occurred and a growth rate of only 0.7%.

Figure 2. Efficiency Vermont's Contribution Vermont Electric Energy Requirements



While annualized MWh and peak kW resource acquisition goals drive a focus on near-term savings, Total Resource Benefits serves as an index of broader, long-term benefits. In Vermont, Total Resource Benefits is defined as the present value of the net lifetime electric, fossil fuel and water savings from installed efficiency measures. Efficiency Vermont has achieved approximately \$143 Million in Total Resource Benefits in the first four years of operation (all \$ values are in \$2003). As shown in Table 2, this was achieved with an investment of \$62 million, yielding a net direct economic value to the State's economy of \$81 Million.

Table 2. Economic Value of Efficiency Vermont Investments

Net Lifetime Economic Value for 2000 -2003		
Benefits	\$143 Million	Lifetime Economic Value of Efficiency Investments (Total Resource Benefits)
Minus Costs	\$38 Million	Costs paid for by investments through Efficiency Vermont
	\$24 Million	Costs paid for by participants and third party investments
	\$62 Million	Total Costs
= Net	\$81 Million	Net Lifetime Economic Value to Vermont

Based on Efficiency Vermont expenditure of ratepayer dollars collected through the system benefits charge, the levelized cost of these savings is \$.026 per kWh³. Given New England's high regional electric supply costs, particularly for long-term commitments, this compares very favorably against all other marginal supply resource options.

Participation and Equity

Vermont statute requires that all Vermonters have the opportunity to make use of Efficiency Vermont services. The regulatory order establishing Vermont's EEU established a number of objectives regarding reasonable levels of equity in the distribution of savings and economic benefits by sector, by certain markets and by geographic region of the State.

Table 3 presents the distribution of savings and benefits by sector, which closely matches the relative contribution to funding of these efforts by the business (56%) and residential (44%) sectors.

Table 3. Distribution of Benefits by Sector

Cumulative Benefits Achieved in 2000 - 2003			
	Business	Residential	Total
Annual kWh Savings	90,094,000 (58%)	65,848,000 (42%)	155,942,000
Lifetime Economic Benefit	\$85,986,000 (60%)	\$57,273,000 (40%)	\$143,259,000

Participation by Vermont ratepayers has steadily increased each year. By the end of 2003, well over one in four Vermont electric ratepayers had installed measures with savings attributed to their electric accounts. Table 4 presents the growth in participation over the past four years (repeat participants are not counted).

Table 4. Cumulative Unique Participation

Year	2000	2001	2002	2003
Cumulative Participation	5.6%	14.1%	21.6%	29.5%

Efficiency Vermont serves the customers of 21 different electric distribution utilities in Vermont. While statewide savings benefit all ratepayers in the State, each of these utilities has some level of interest in seeing that Efficiency Vermont's efforts benefit its own ratepayers, generally in proportion to the utility ratepayers' financial contribution to the statewide effort. Similarly, Efficiency Vermont addresses equitable geographic distribution of benefits around the

³ For comparison with utility avoided costs, dollars paid through rates are used. Total costs (Efficiency Vermont investments plus participant costs) are appropriately compared to Total Resource Benefits.

state's fifteen counties. While it required conscious targeting of efforts, the level of benefits provided to each county and utility corresponded well to the distribution of charges paid over the first four years (Efficiency Vermont, 2004).

Market Results

Given the accomplishments of Efficiency Vermont in resource acquisition while addressing multiple equity objectives, it is notable that nation-leading market impacts have also been achieved⁴. To name just a few:

- In 2002, Vermont had the highest market share of any state for Energy Star room air conditioner sales (61%), and in 2003 the highest statewide market share for Energy Star clothes washers, with a remarkable third-quarter market share of 62%.
- In 2002, Vermont had the highest statewide market share in the lower 48 states for Energy Star residential new construction (25%).
- All of the 74 retail appliance dealers with showroom floor space in Vermont have partnership agreements with Efficiency Vermont, promoting the sale of Energy Star appliances and offering Efficiency Vermont rebates.
- Efficiency Vermont has approximately 155 retail partners who partner to promote Energy Star lighting products and accept Efficiency Vermont's instant discount coupons. This is estimated to represent well over 90% of hardware stores, lighting specialty stores, home improvement stores, and electrical supply houses who sell to Vermont consumers⁵.
- Almost all new construction or substantial rehabilitation projects for multifamily affordable housing in the State now routinely partner with Efficiency Vermont to address energy efficiency (approximately 500-800 units/year). In partnership with Efficiency Vermont, both the State's Housing Finance Agency and Housing and Conservation Trust Board adopted standards in 2004 that set the efficiency level for all new affordable housing construction they support at a minimum of the Energy Star level.
- For the larger (over 25,000 square feet) new construction market, it is estimated that over 90% of all construction now engages with Efficiency Vermont and receives technical assistance and financial incentives to optimize energy efficiency. Overall, of a statewide estimated total of 500 annual permitted commercial new construction projects, Efficiency Vermont completed 142 (28%) commercial new construction projects in 2003.
- All of the architects, 80% of the engineers and 75% of the contractors surveyed as part of the State's evaluation of Efficiency Vermont in 2003 indicated that they "knew and recognized" Efficiency Vermont. Ninety percent of the engineers spontaneously identified Efficiency Vermont as the name of an organization that provides energy efficiency services in Vermont. Eighty percent of the engineers, half the designers and one third of the contractors reported using one or more services from Efficiency Vermont (Vermont Department of Public Service, 2003).

⁴ All market share impacts are from EPA Energy Star state-level reports and are subject to sampling limitations of the survey methods used.

⁵ Penetration of the grocery and convenience store market remains low.

Lessons Learned

Based on the past four years experience, some “lessons learned” should greatly interest those concerned with the administrative structure, scope and objectives of efficiency efforts funded by system benefit charges. These lessons fall into the following five areas and are discussed below, both from the perspective of the implementing contractor and the regulatory body overseeing the contractor.

1. Achieving Balance Among Multiple Objectives
2. Flexibility/Freedom in Design/Implementation
3. Moving from “Programs” to a Market-Based Approach
4. Addressing All Sectors
5. Use of a Performance Contract

Achieving Balance Among Multiple Objectives

Sound energy resource portfolios inherently involve trade-offs to achieve both near and long term objectives. As a part of these portfolios, energy efficiency efforts also have multiple, potentially conflicting goals (resource acquisition vs. market transformation, most bang-for-the-buck vs. equity, etc.). Vermont’s experience suggests that the use of carefully-crafted performance indicators in the context of a performance-based contract for delivery of measurable results can be a highly effective vehicle for seeing that multiple resource acquisition and policy goals are appropriately balanced in implementation as well as in design.

In the context of a performance-based contract, balancing is not just a theoretical discussion or set of objectives, but instead becomes a practical, applied activity of the contractor with consequences for time-sensitive results. Efficiency Vermont plans and budgets carefully for a mix of efforts to achieve multiple objectives, but then tracks actual experience and modifies efforts as needed. Table 5 illustrates how investment in different market segments yields a wide range of resource savings per dollar invested. With three-year cumulative performance goals for annualized MWh and Total Resource Benefits, managers track all these indicators on a monthly basis and course-correcting actions are taken in a timely manner. For example, marketing efforts may be shifted from one market sector to another, or incentive levels ramped up or down.

Table 5. Savings Indices per Dollar Invested⁶ by Market Segment from 2000-2003.

Market Segment	\$ Invested per Annual MWh Saved	\$ Invested per \$ of Total Resource Benefit
Business New Construction	\$277	\$0.19
Business Equipment Replacement	\$161	\$0.10
Business Retrofit	\$206	\$0.33
Efficient Products	\$166	\$0.21
Low-Income	\$400	\$0.51
Residential New Construction	\$2,120	\$0.62
Residential Retrofit	\$411	\$0.38

⁶ In this table, the dollars invested represent fully allocated Efficiency Vermont expenditures from 2000-2003 to these cost centers, not just the direct expenses.

In order for the PSB to achieve the State's resource acquisition and policy goals, the choice of performance indicators and the values set for them has been extremely important. In the first Efficiency Vermont contract term (2000-2002), a total of 35 performance indicators were negotiated and included in the contract. They had completion dates spread over the course of the contract and included some "activity milestones" to assure rapid ramp-up (Hamilton and Plunkett, 2002). Based on experience, a much smaller and purposeful set of indicators was negotiated for the next contract period (2003-2005). To begin with, there is a minimum requirement that the final verified present value of lifetime electric benefits must be greater than contract costs or the contractor forfeits the right to any performance incentive. Further minimum requirements include that a minimum of 15% of all spending must be for low-income single and multifamily services and that 40% of total non-residential participants with savings will be accounts with annual electric use of 40,000 kWh/yr or less. If the contractor fails to meet either of these minimums, they forfeit 25% of the total available incentive. Three resource acquisition indicators were selected for the 2003-2005 contract:

- Annual incremental net MWh savings, to capture immediate resource savings
- Total Resource Benefits (present worth of lifetime electric, fossil, and water savings) to encourage long-term measures and leveraging of non-electric savings
- Cumulative, summer peak demand savings, recognizing the increasing importance and growth of summer peak in Vermont

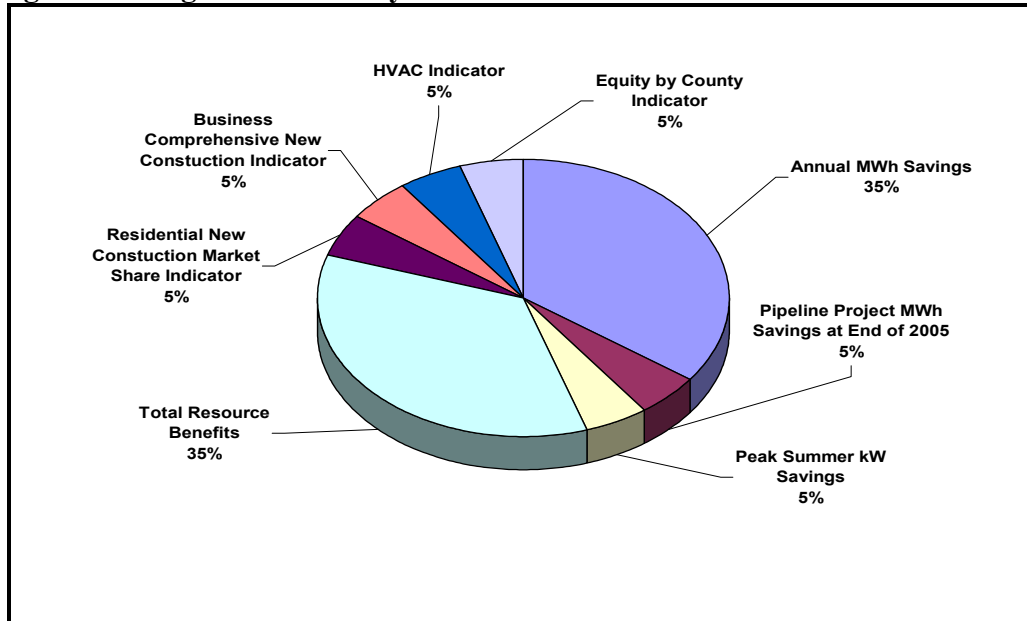
While deciding on the three resource acquisition indicators was relatively easy, choosing indicators for market impacts was quite difficult. While it may be tempting to specify indicators for each market or key objective, the experience of the first three years suggested that too many indicators was problematic and did not necessarily yield commensurate benefits. The focus instead was to come up with a short list of market impact indicators that would induce the contractor to pursue and pay attention to broad types of action and focus that they might not otherwise pursue. These indicators would be somewhat "orthogonal" to each other and pull back the contractor from pursuing any one indicator at the expense of others. For example, specifying a market share goal in the residential new construction market (which has very low MWh/\$ benefits in Vermont) creates a tension with going after the customer opportunities with the greatest MWh/\$. The mix of these market impact indicators for 2003-2005 is:

- Doubling of market share (relative to 2001) of residential units in new buildings with 5-star Energy Ratings, including single and multifamily units.
- Increasing the number of business new construction, addition, and renovation projects that participate at a comprehensive (rather than prescriptive) level, to reach 11% of such projects receiving building permits in 2004.
- Achieving a 20% increase in eligible HVAC measures for existing business facilities compared to the initial three-year contract period.
- Achieving a minimum ratio of 1.7 to 1 for each county in Vermont when three-year cumulative total resource benefits are compared to system benefit charges paid by ratepayers from that county.

The total value and relative weight put on each of the performance indicators is also critical. For the 2003-2005 contract period, the total value that the contractor could earn was set

at 2.9% of the contract value, similar to the value from the initial contract period. This level appeared to have been effective in the first contract period, and was notably less than the level common for administration in other states by utility administrators. The numerical targets for each indicator were negotiated, with the understanding that these are all intended to be “stretch” indicators of “superlative” performance, not just getting the job done. The impact results from the first three years provided a valuable basis for negotiating these stretch levels, with the PSB generally pushing for increased performance compared to historical efforts. The relative weight of the indicators, according to their potential value to the contractor, is presented in Figure 3.

Figure 3. Weight of Efficiency Vermont Performance Indicators for 2003-2005



Flexibility/Freedom in Design/Implementation

In Vermont, moving away from the almost universal pattern of pre-designed and pre-approved efficiency programs seen in other jurisdictions is proving to have unforeseen, significant and far-reaching benefits.

When the PSB issued the RFP for an EEU contractor in 1999, the RFP included a set of relatively highly-defined “core” programs that the contractor was expected to deliver, along with individual budgets and expected savings for each program. This guidance was certainly reasonable at the time and highly typical of implementation elsewhere. However, Vermont has moved further and further away from this approach over the past four years, based on the conscious decision of both the contractor and the PSB.

The contractual/regulatory context that has evolved allows an unprecedented flexibility in how the contractor achieves goals. Where the initial approach specified annual and multi-year budgets for each of seven programs, with regulatory approval required for fund-shifting among programs of more than 15%, the current contract specifies only a three-year cumulative breakdown in spending between the business and residential sectors. More importantly, the PSB and the contractor have reached a mutual understanding that while the Board wants to understand and monitor the activities of Efficiency Vermont, its highest interest is in results. The PSB requires an Annual Plan from Efficiency Vermont each year that fully describes anticipated

offerings and directions for the coming year, holds a workshop on the Plan for public input, and maintains a high awareness of ongoing activities, but this Plan and the PSB's ongoing oversight anticipate and provide wide latitude for the contractor to modify plans as necessary to better achieve contract objectives.

The benefits of this approach have been quite significant as it has allowed: (1) increased flexibility to respond to changing markets in real time; (2) quick response to time-sensitive opportunities (e.g., tie-in to manufacturer rebate promotion, new technology opportunities, unforeseen customer or vendor-initiated opportunities); (3) reduced administrative cost associated with deliberation and formal approval processes over program changes; and more timely response to feedback mechanisms, including both evaluation findings and the contractor's implementation experience. While this feedback process to improve program design is an objective of most energy efficiency efforts, the structure they operate under creates many barriers to adopting (or sometimes even paying attention to) changes, typically defaulting to annual reviews. Perhaps most important, it has encouraged an attitude and culture of ongoing flexibility and innovation at all levels of Efficiency Vermont.

Moving from “Programs” to a Market-Based Approach

While starting out in 2000 with a set of six programs focused on different customer markets, Efficiency Vermont has now evolved to a radically-different approach where services, structure and organization are no longer defined as “programs.” In fact, the use of the word “program” is vanishing. As Efficiency Vermont gained experience, it was recognized that the internal barriers and external service gaps created by programmatic definitions often impeded efforts to consistently affect the market. Programs boundaries defined by analysts and administrators to logically break down markets were increasingly recognized to be at odds with how customers, trade allies and strategic partners viewed their efficiency opportunities. Starting in 2003, Efficiency Vermont stopped offering “programs” and adopted a more market based approach. Service offerings, marketing, business development and all other implementation is now organized by broad and target markets that are based on customer perspectives, and often cross over traditional program (new construction vs. existing) or sector (residential vs. commercial) divisions. More detailed information on this approach and its results can be found in Chiodo and Hamilton (2004).

Addressing All Sectors

Having the responsibility for statewide energy efficiency resource allocation and results in all sectors vested in a single administrator has been far more powerful than expected. It has allowed unprecedented recognition of opportunities and implementation of efficiency efforts that cut across traditional sector definitions (residential/commercial/industrial, new vs. existing, etc.), which can both better respond to markets and be more effective in delivering results.

As discussed above, customers, trade ally, vendor, and design professionals don't neatly fit into discrete sector definitions. A lighting showroom typically sells products (and sometimes the same products) for both residential and business applications, to homeowners and contractors, and for both new construction and retrofit applications. Having them deal with multiple programs, each with a different program representative and perhaps different contractor or administrator, is inefficient, tends to result in customer confusion and can even result in

competing program offers. Another example from Vermont is ski areas, whose efficiency opportunities range from industrial processes (e.g., snowmaking, lift drives) to base lodge and hotel facilities, to residential condominium development. Efficiency Vermont's experience has been that addressing these customers comprehensively, across traditional program and sector definitions has been critical to securing partnerships that have yielded high levels of investment and savings in comprehensive projects.

While coordination among parallel efforts in different sectors (typically different contractors for different sectors and/or programs) is the alternative most typically pursued to address this situation, it faces considerable costs and barriers to cross-sector integration of market analysis, opportunity identification, customer relations and implementation. These coordination costs and barriers can evaporate when there is a single administrator or contractor able to address these markets.

Vermont has the advantage of a relatively small size in being able to consider a single contractor and vehicle to deliver across all sectors. This option is typically dismissed by others who can't see how a single, cross-sector contractor could be applicable in a larger jurisdiction, for reasons ranging from risk to capacity to politics. The Vermont experience suggests, however, that the benefits are quite compelling and that further consideration of this option may be warranted.

Use of a Performance Contract

The use of a competitively-bid, performance-based contract with consequential impacts for delivering measurable results on a firm schedule has proven to be highly effective.

The performance contract establishes the context that makes all the other innovations discussed above possible. While other states have set up non-utility administration of some or all programs, none of them have anything like this level of accountability for results. The performance contract operates at two levels. First, it establishes that the contractor's term for acting as the State's energy efficiency utility is finite. If the contractor doesn't do a good job, the job will likely be given to someone else at the end of the current contract period. This alone has proven to be highly compelling to the contractor, and a motivator to perform beyond the requirements and performance indicators of the contract (e.g., excellent customer service, public recognition, achieving other performance success). Second, the financial consequences to the contractor of the performance contract, and the indicators by which exemplary performance is measured, create an effective incentive for the contractor to make continuing efforts to balance the multiple goals established by the State. These now permeate down to individual Efficiency Vermont project managers who, in developing an individual project with a customer, are considering it in the context of cost/MWh, cost/kW, cost/TRB and its contribution to three-year performance indicators.

The overall result: At the end of 2003, the first year of the current three-year contract term, Efficiency Vermont was significantly ahead of annual goals required to meet all of the three-year performance indicators.

Conclusions

Four years of experience show that Efficiency Vermont, a system benefits-funded statewide “Energy Efficiency Utility,” has been a highly effective model for providing energy resources, meeting approximating 3% of Vermont’s energy needs while also achieving significant progress toward market transformation and distributional equity goals. A performance-based contract with substantial direct financial incentives keyed to verifiable, carefully selected performance goals has been key to this success.

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