# Energy efficiency as a resource in the ISO New England forward capacity market

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## Abstract

ISO New England, which oversees New England's bulk electric power system and wholesale electricity markets, recently established a Forward Capacity Market (FCM) that will pay suppliers to ensure sufficient capacity is available to meet future peak loads. Under the FCM, ISO New England projects the needs of the power system three years in advance and then holds an annual auction to purchase the resources necessary to satisfy the future regional requirements. This market is unique in that it allows energy efficiency and other demand resources to compete directly with generators. In the first auction, held in February 2008, demand resources contributed substantially to eliminating the need for new generating capacity in the near term and to providing low-cost resources to the regions ratepayers. A second successful auction was conducted in December 2008.

Participating in the FCM requires a considerable and complex bid, financial assurance, and claim activities. Meeting new intensive measurement, tracking, and verification requirements adds new costs. For efficiency portfolio administrators, participation raises policy questions regarding ownership of capacity credits, appropriate disposition of revenues, increasing emphasis on peak savings, and whether traditionally short-term budget cycles should change to enable the longer-term planning necessary to bid resources several years into the future. On the other hand, revenues from the FCM can provide needed funding for additional efficiency investments.

This paper describes the FCM, examines the experience and trade-offs involved in participating for efficiency programs, and reviews the benefits of such participation for the program and the region, including the positive value from increased exposure of the part that efficiency can play in our energy mix.

## The ISO-NE Forward Capacity Market

ISO New England (ISO-NE) is an independent, not-for-profit corporation created in 1997 to oversee New England's bulk electric power system. ISO-NE serves the electrical needs of a population of 14 million with 6.5 million households and businesses. There are more than 350 generators and 8,000 miles of high-voltage transmission lines with 13 interconnections to the electrical systems in New York State and Canada. The region has over 32 GW of total supply, including 1,500 MW of demand-response capacity, and an all-time peak demand of 28,130 MW, set on August 2, 2006. In comparison, the United Kingdom includes about four times the population, 25% more land area, and 2.5 times more supply capacity (at 80 GW).

Since its inception, ISO-NE has worked collaboratively with stakeholders, including market participants, state regulators, and other public officials, to ensure that New England's electric power system is reliable and meets the needs of the region's electric customers and growing economy. The most recent step toward ensuring this reliability comes through the design and implementation of an innovative and effective market solution for attracting new resources and maintaining necessary existing resources. This Forward Capacity Market (FCM), developed by ISO-NE, participants in the wholesale markets, the six New England states, and industry stakeholders, has the ability to recognize and include, for the first time, energy efficiency

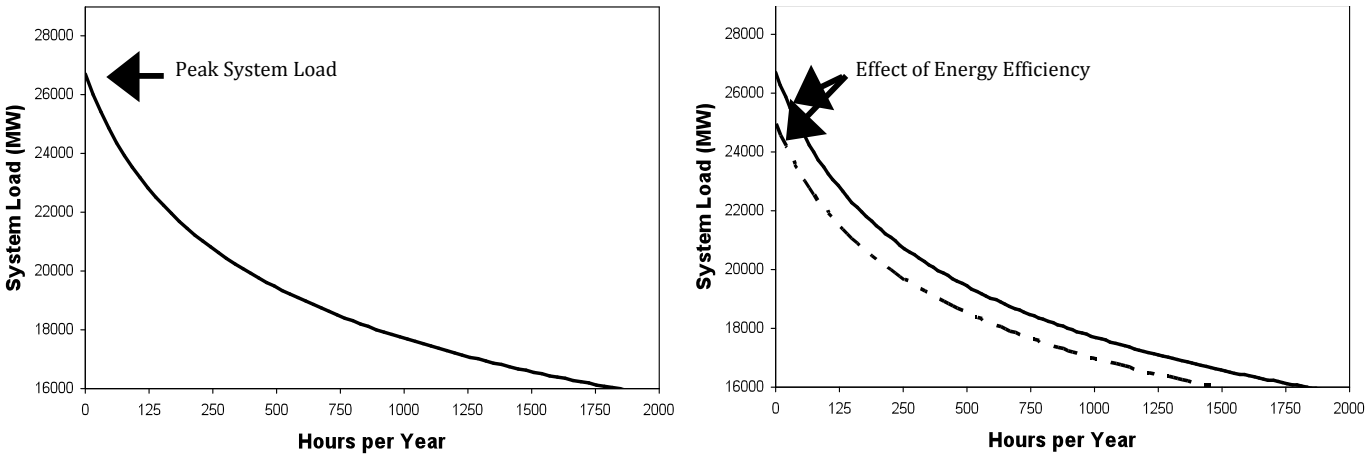


*Figure 1. Load Duration and the Effect of Energy Efficiency. In this example, the system needs an additional 10% capacity for only ~50 hours a year.*

measures as resources for meeting peak capacity needs and allowing those resources to compete on an equal basis with traditional power generators in the marketplace.

#### OBJECTIVE OF A CAPACITY MARKET

Providing mechanisms to motivate power producers to plan for and develop enough capacity to meet the needs of customers during times of peak demand has been a challenge for power planners. The issue at stake is illustrated by the example load duration curve in Figure 1a, which shows the number of hours in a year during which a particular system load is required. For example, the highest 10% of the system's demand may be required for as little as 50 hours a year. While power offered during these hours will be paid high marginal rates for the energy produced, it is simply not needed for enough hours to pay for the incremental cost of building and maintaining the infrastructure to support it. In the past, ISO-NE (and its predecessor NEPOOL, the Northeast Power Pool) sought to address this challenge by imposing an installed capacity requirement on load-serving entities, requiring them to obtain specified amounts of installed capacity based on their peak loads and levying a penalty for non-compliance. This penalty mechanism led to an oversupply of capacity and a move toward a market-based method of assuring peak capacity at a reasonable price for the region's ratepayers.

#### EVOLUTION OF THE NEW ENGLAND CAPACITY MARKET

In 1998, ISO-NE began operating a bid-based market for installed capacity. Experience suggested a number of flaws and opportunities for improvement of this system. The original capacity auction design suffered from several perceived inadequacies, including chronically low clearing prices and lack of a price signal based on geographic needs. As a result, the capacity auctions were suspended in September 2000, and a deficiency charge was reinstituted to penalize participants who did not meet their capacity obligation. Under the direction of the Federal Energy Regulatory Commission (FERC), over the following several years, additional filings and hearings occurred with the objective of establishing a process to better meet the needs of the region and its stakeholders. This activity culminated in 2005 with the appointment of a settlement judge to guide the process of developing an alternative to the current proposals.

In March 2006, a settlement agreement that resolved the significant issues with the previous market design was filed with FERC. This agreement was the end product of over 30 formal settlement conferences occurring over several months, with the active participation of ISO-NE, load serving entities, state regulators, generators, other historical members of NEPOOL, and notably, a number of new members who specifically sought the inclusion of demand-side resources in a new market design. Approved by FERC in June 2006, the settlement agreement laid out the details for a Forward Capacity Market and charged ISO-NE with the development of a Market Rule to outline the terms and requirements of such a market.

A key component of the settlement agreement was the inclusion of demand resources, including energy efficiency, demand response, and distributed generation projects, as resources that could qualify for the new market on a basis fully equivalent to traditional power supply resources. This treatment recognizes that these demand resources can, like the provision of additional supply, help meet the region's peak capacity. Demand response and load management projects reduce the peak capacity need by reducing power requirements during identified peak hours through changes in electric usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time, effectively lowering peak demand only during those few critical hours (the left side of the load duration curve – Figure 1a). In addition, energy efficiency and customer-sited distributed generation projects have the potential to lower the entire load duration curve (Figure 1b), providing relief during peak as well as non-peak hours. As these types of resources were believed to be less costly than new generation, including demand resources was also predicted to lower the overall costs of peak capacity assurance for the region's ratepayers.

Final Market Rules for the conduct of the bulk of the FCM functions were approved by consensus of the participating stakeholders in February 2007 (ISO-NE 2007a) and by FERC in April 2007 (FERC 2007), and the ISO-NE Measurement and Verification Manual, which outlines requirements for assuring measurement and verification (M&V) of demand resources, was issued in April 2007 (ISO-NE 2007b).

Responding to the concern of generators that previous market designs did not provide enough incentive to build the

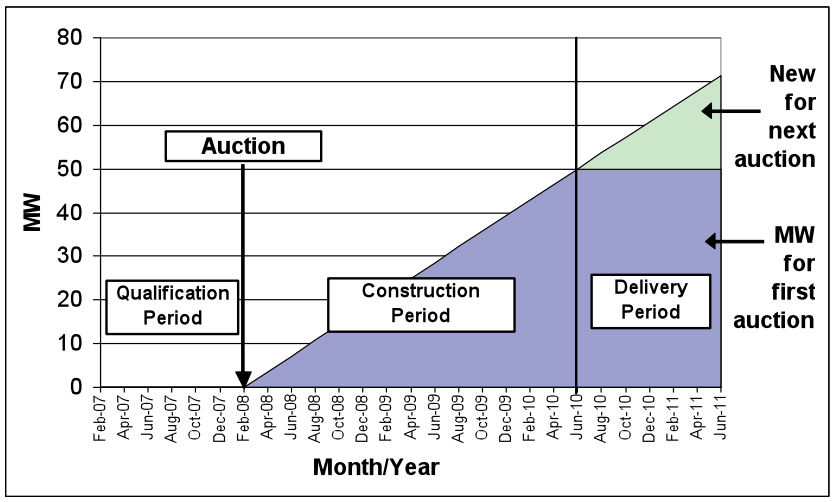


*Figure 2. ISO-NE Forward Capacity Market Time Line: Energy Efficiency Resource Example*

necessary peak capacity, under the FCM, ISO-NE forecasts the peak capacity needs of the power system three years in advance and holds annual auctions to purchase the power resources needed to satisfy these future regional system requirements. The FCM auction allows new capacity to set the market clearing price, accounts for location-specific capacity requirements, and provides a multi-year (up to five-year) commitment to new resources to encourage investment. Resources must clear the auction and be able to demonstrate measured and verified performance during specified peak hours in order to receive capacity payments.

Market participants were required to file Qualifications Packages describing the resources they intended to submit to the first auction, including full M&V plans addressing the ISO requirements, by June 15, 2007, and received notification of successful qualification in November in preparation for the first auction in February 2008.

## DESCRIPTION OF THE FORWARD CAPACITY MARKET

The central feature of the FCM is the establishment of an annual forward capacity auction designed to procure 100% of the region's Installed Capacity Requirement for the ISO-NE power year beginning three years later (ISO-NE's power year runs from June-May each year). The price for capacity is established through these open auctions. New investment is encouraged by allowing new capacity to set the market clearing price and providing the option of a long-term (up to five-year) price commitment to these new resources. This process is designed to assure that capacity is available at the lowest possible price, as only those resources bidding at or under the market clearing price will have a capacity commitment and will get paid for delivering.

## ELIGIBLE PROJECTS

Different types of capacity resources are eligible to participate in the FCM on an equal footing, including: traditional power generation; intermittent resources such as wind, solar, and hydro; imports of capacity from outside New England; and demand resources, including real-time demand response, load management, distributed generation, and energy efficiency.

## FCM TIME LINE

The first auction, in February 2008, established the price for peak capacity delivery beginning in June 2010; capacity for delivery starting in June 2011 was procured in the second auction in December 2008. Future auctions are scheduled to take place approximately every 10 months to gradually reach a cycle where auctions regularly occur three years prior to the beginning of each annual capacity delivery period.

The period of time before each auction is used by resource providers ("project sponsors") to forecast and plan projects, by ISO-NE to determine the future capacity needs of the region, and by each to work toward qualification of projects to participate in the market. After successful participation in an auction, project sponsors undertake the implementation of the project, in preparation for the delivery of capacity during the delivery period. These stages of participation are illustrated in Figure 2 and discussed in more detail in the sections below.

## PLANNING FOR AND QUALIFICATION OF RESOURCES

In the months before an auction, sponsors of new projects must determine the level of capacity that can be made available for the next (starting three years out) delivery period and the price the project requires from the auction in order to proceed. For efficiency providers this means that a forecast must be developed of the portfolio of measures to be installed and associated capacity savings that will accumulate by a date three years in the future. This energy efficiency portfolio must be qualified by ISO-NE to participate in the auction through submission and approval of a formal Qualifications Package, which indicates the project's capacity bid and includes plans for customer acquisition, funding and cost analysis, and measurement and verification.

Before each auction, ISO-NE calculates an Installed Capacity Requirement (ICR) for the region for the upcoming delivery period. This value, based on forecast needs and including a system reserve margin, becomes the capacity target for the auction. ISO-NE is also charged during this time with the activities necessary for the determination of qualification of resources to participate in the auction. Projects are assessed individually and collectively to determine the impact on the region's power system and to ensure that each will provide useful capacity.

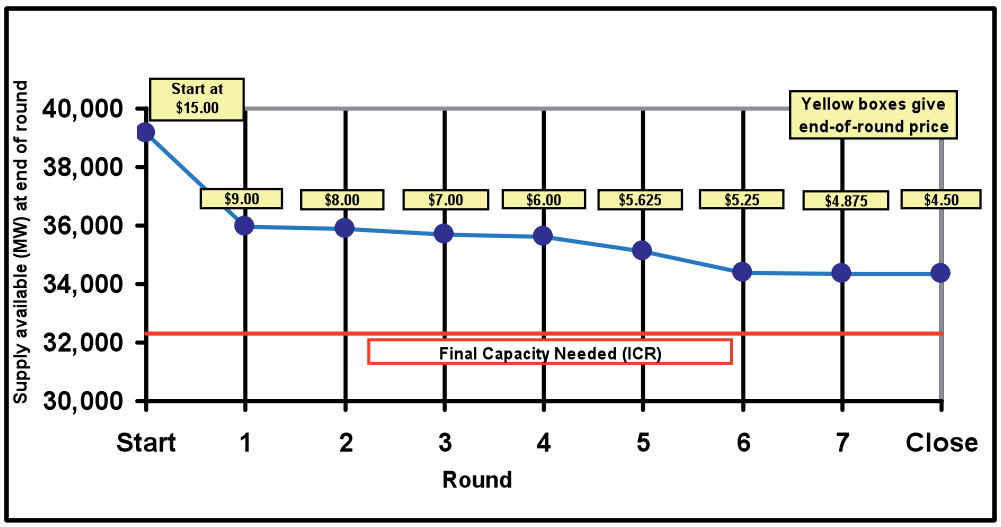


*Figure 3. Final Results of ISO-NE FCM Auction #1. Prices given in $US/kW-month*

### AUCTION MECHANICS

The FCM auctions are live, Internet-based auctions conducted over several days. Prior to each auction, ISO-NE publishes the capacity they seek to procure in the auction (the ICR for the associated delivery period). For the first three auctions, the Market Rules also set a predetermined minimum price (60% of the Cost of New Entry) to provide a predictable lower bound for clearing prices. The bidding begins with all qualified resources in at the starting price, and proceeds in a "descending clock" auction, with resources withdrawing at prices below what they deem acceptable. Prices continue to fall in each subsequent round as long as there is still excess capacity on offer. The auction ends when either there is no longer excess capacity or the price reaches the auction floor price.

As an example, the activity from the first FCM auction is shown in Figure 3. The auction began with a set starting price of $15.00 ($10.93 Euro) per kW per month and 39,155 MW of resources participating. Price bids between $15.00 and $9.00 were registered during the first round of the auction, and the round closed with 35,974 MW still available at $9.00 per kW per month. The large drop in available resources reflected in the first round indicates that a number of projects decided to participate in the auction even though their costs could not justify continuing to bid at lower levels. Bidding continued in this fashion for a total of eight rounds to the administratively set floor price of $4.50 per kW per month, at which excess capacity remained.

### PROJECT "CONSTRUCTION"

The three-year lead time from auction to delivery period is designed to allow sufficient time for the construction or development of new resources once they receive a price commitment from the auction. For traditional power generation projects, this would be the period of power plant construction. For energy efficiency projects, this is a "ramp-up" period, with capacity reduction growing as measures that make up the project are installed. The capacity bid for the first auction therefore includes savings from measures installed over a 2 ½ year period (see Figure 2). The incremental new capacity available for auctions in subsequent commitment years must include resources that have not been committed in prior auctions. This means that in all future auctions the addition to an efficiency portfolio's capacity offering will generally include savings from measures installed for single years (Figure 2).

### DELIVERY PERIOD

All resources that already exist at the time of the auction receive a one-year commitment to provide capacity and are paid monthly at the clearing price of the auction associated with the delivery period. New resources that successfully clear an auction elect delivery periods of from one to five years as a part of their auction bid. For that delivery period, they receive the guaranteed price determined by the auction clearing price, allowing them to lock in a price regardless of the clearing price in subsequent auctions.

### FINANCIAL IMPLICATIONS

As a means of guarantee against the consequences of failure to deliver their capacity obligations, ISO-NE requires sponsors of all new resource projects (supply and demand) to provide financial assurance during the "construction" period. Financial assurance is released once the project is declared "commercial" and tested or verified for its full capacity rating at the delivery date. The project sponsor forfeits a portion of its financial assurance if there is a capacity shortfall.

Should a project fail to attain its full capacity commitment, additional capacity may be procured through reconfiguration auctions or by bi-lateral contract with another capacity provider. These allow the participant to deliver the full commitment but at a price set by the market at that time.

### TRANSITION PERIOD RULES

Because the delivery period associated with the first FCM auction does not begin until June 2010, the Market Rules define a Transition Period to bridge to the FCM, during which capacity payments are made to all listed and qualified capacity providers. These monthly payments, equal for all asset types, are fixed and set in advance by the Market Rules, increasing each year from $3.05 per kW per month in 2006 to $4.10 per kW per month in 2010.

## Forward Capacity Market Participation and Challenges for a State-Funded Energy Efficiency Program

For the past nine years, the Vermont Energy Investment Corporation (VEIC) has delivered energy efficiency services as Efficiency Vermont to the citizens and businesses of Vermont. The customer market consists of all Vermont residential (289,000) and commercial and industrial (44,000) electricity ratepayers – in total, over 333,000 electric accounts (these electric accounts represent the entire state of Vermont except for the city of Burlington). Created as the nation's first energy efficiency utility by the Vermont Legislature and the Vermont Public Service Board in 2000, Efficiency Vermont's mandate is to promote cost-effective acquisition of energy and demand resources through energy efficiency. An energy efficiency surcharge on each ratepayer's electric bill funds the energy efficiency resource acquisition activities of Efficiency Vermont.

VEIC became a NEPOOL member and an ISO-NE Market Participant in August 2006, allowing us to fully participate in the FCM. We filed our first transition period claims in December 2006 for capacity savings from efficiency measures installed beginning June 16, 2006. To date we have filed 28 monthly claims totalling 33 MW of installed capacity and have received over $1.55 million in payment. These transition period claims and payments will continue through May 2010; we currently estimate that we will receive a total of $3.9 million (NPV) in transition period payments for capacity reduction from measures installed through that period. In June 2010, we will begin to file claims and receive payments for our first FCM delivery period commitment.

In June 2007, VEIC submitted an FCM qualification package for the Vermont Efficiency Portfolio based on the capacity reduction that we project will be available for the 2010 delivery period (June 20102 – May 2011) from efficiency measures installed from June 2006 to April 2010. We participated in the first FCM auction in February 2008, the second in December 2008, and our portfolio successfully cleared both auctions at the clearing price of $4.50 per kW per month for the first auction and $3.60 per kW per month for the second. We now have an obligation to provide approximately 52 MW of monthly peak capacity reduction beginning in June 2010, and are to add an additional 10 MW by June 2011. We are currently preparing qualification materials for an incremental 10 MW to be added for the third FCM auction, which will take place in October 2009.

### FORECASTING AND MARKET UNCERTAINTY

Participation in the FCM requires estimates of future efficiency portfolio performance and future capacity market behavior, both of which are inherently uncertain. In terms of portfolio performance, we have to be able to predict what efficiency measures we will install over the next three years and then forecast expected capacity savings from those measures for up to eight years in the future – three years until the delivery period begins, and, if we decide to lock in that auction price for the future, up to an additional five years. This latter decision is based on expectations about the future capacity needs of the region and the behavior of other participants over that time frame, factors that determine what the clearing price for future auction is likely to be. Dealing with these types of uncertainty adds risks that are fundamentally different than those faced in the design and delivery of efficiency programs in the past.

The risks present in long-term project performance estimation come from budget assumptions, program and performance projections, and uncertainties in the rapidly changing efficiency environment. Our current three-year contract cycle leads to short budget and program planning horizons, and even in this context we have seen large adjustments year to year in response to rapid changes in technology, market conditions, and the regulatory and political environment. Because we do not currently have detailed program plans in place for as far in the future as FCM forecasts require, forecasts for periods beyond our current contract are of necessity based on fairly high-level assumptions. For the bids and filings made to date, we forecast capacity reduction by assuming annual budget amounts and projecting savings based on historical performance. We then considered whether conservative adjustments should be made to take into account changes to the efficiency environment in the future that would lead to changes in programs and savings.

The potential effects of these uncertainties can be visualized in the context of the efficiency measure makeup of our forecast savings portfolio. As illustrated in Figure 4, savings from residential and commercial and industrial lighting measures make up the largest portion of our portfolio. Uncertainties related to the evolution in lighting technology, and the corresponding savings per budget dollar that will accompany it, mean that forecasting our portfolio performance very far into the future is challenging.

These risks have real financial implications. For example, failure to deliver our full capacity commitment at the beginning of the delivery period would result in loss of the posted financial assurance applicable to the shortfall amount. The amount of financial assurance at risk varies according to the Cost of New Entry for each delivery period For example, for every MW of shortfall in the capacity we have committed to deliver in the first period, we would lose $22,500 of our financial assurance deposit; that same MW if delivered will earn $4,500 per month.

In addition, decisions concerning bidding strategies and commitment choices are affected by predictions about the behavior of the capacity market. Future regional needs and capacity available from others and its associated cost determine the clearing capacity and price for auctions in the future. There is risk that a substantial part of the market offers will its capacity as a price taker, which would drop the price of capacity and erode the value of future participation. And, there is risk that the structure of the market itself will change fundamentally, which has happened three times over the past decade in New England due to ongoing regulatory proceedings. Predictions concerning these future values have implications for decisions we must make as to the delivery period chosen, the bid we submit, and for projections of future revenue from FCM participation.

### MEASUREMENT AND VERIFICATION ISSUES

For the purposes of the FCM, a project's measurement and verification (M&V) plan describes what the project sponsor will do and how they will meet or exceed the minimum requirements

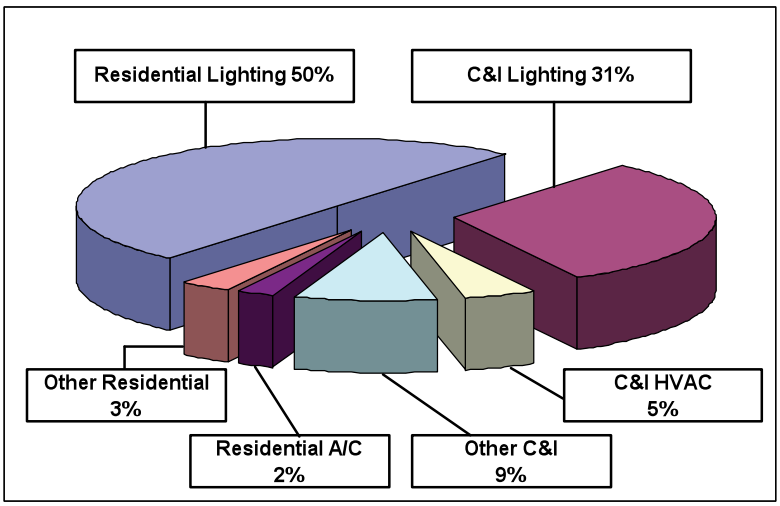


*Figure 4. Savings Breakdown of Efficiency Vermont Savings Portfolio*

of the ISO M&V Standards Manual (ISO-NE 2007b). It is used to qualify the project sponsor's demand resource project and its offer for the auction, and is used to verify project performance during the ramp-up period to verify the project is on schedule. The project sponsor is expected to comply with its approved M&V plan during the delivery period to determine the capacity reduction values that will be reported to ISO-NE.

The procedures necessary to meet the ISO-NE M&V requirements are extensive and different than those that may be required by state utility regulators. They represent two fundamental needs: to assure ISO-NE and other stakeholders, who have historically worked with more-straightforward supply generation projects, that they can rely on the capacity reduction promised by efficiency resource providers, and to measure and verify capacity savings from very specific peak hours. These procedures will increase our ongoing M&V costs and therefore affect the net revenues from FCM participation.

We tried to address the balance between satisfying ISO-NE's needs and proposing too much and too costly an effort by leveraging procedures and processes already in place. Efficiency Vermont had a head-start with its well-supported Technical Reference Manual, which outlines the savings algorithms and evaluation support for our prescriptive measures (those installed in large quantities for which standardized approaches are appropriate). Use of this as support for FCM savings requires some new studies and assumption updating. We also proposed an enhanced review of custom measure savings, which represent nearly 50% of our peak demand savings and are almost entirely business sector projects, that builds on our existing sampling approach for savings verification. This approach will sample projects on a real-time basis to enable metering that can then be used in verification. There are also requirements for statistical precision, building simulation model calibration, and justification of studies or support that is more than five years old. Annual third-party verification of peak savings and certification of continued compliance with all M&V processes is required.

It is a reasonable expectation that the costs for this M&V work are commensurate with the benefits. The ISO-NE rules treat all measures the same, though some are much more important than others in a portfolio. Increased rigor in savings review will certainly provide benefits other than meeting ISO requirements; more feedback on measure performance is always valuable to implementers. But meeting some of the requirements, for some types of measures, is not likely to yield non-FCM value relative to their cost. We may find at some point that it is just not cost effective to bid our full portfolio into the market.

## OTHER ISSUES AND CHALLENGES

Participation in the FCM has raised a number of other challenges beyond our normal operations as efficiency service providers.

- Vermont's unique efficiency utility program delivery model required a Board order to authorize VEIC to participate in the FCM on behalf of the state's ratepayers.
- The current three-year contract model for Efficiency Vermont imposes significant constraints on the necessary long-term planning, financing, and bidding considerations. VEIC undertook a commitment for delivery of capacity reduction based on projections of installations of efficiency measures for several years beyond the contract then in place with the PSB.
- Clear credit for ownership of capacity savings needed to be established.
- Determination of the appropriate disposition of the FCM revenues required a public input process and Board and legislative consideration.
- Future program planning now requires appropriate prioritization of emphasis in efficiency program design and delivery between traditional electric saving and peak capacity reduction.
- Values for capacity reduction under FCM rules may be calculated by slightly different methods than are used for our normal program reporting – different assumptions may be used for eligible measures, measure life, M&V procedures, and treatment of free riders and spillover.

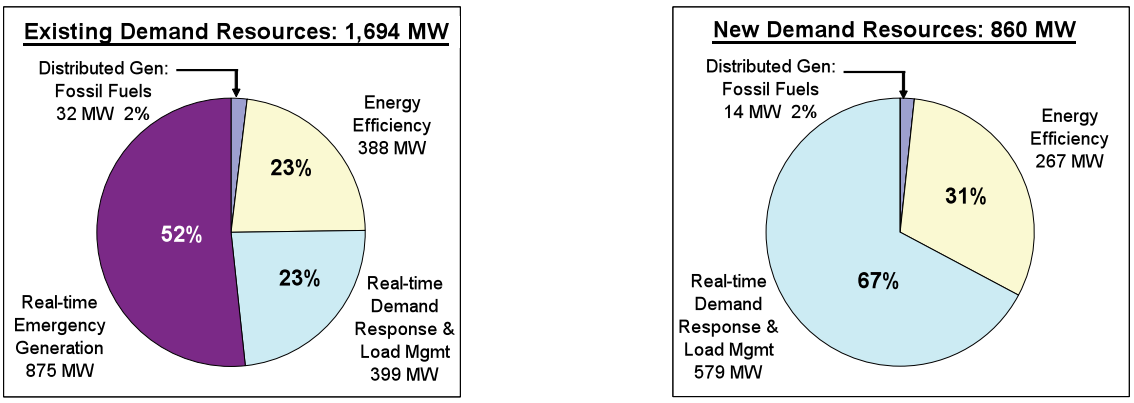


*Figure 5. Demand Resources Awarded in FCM Auction #1. All Real-time Emergency Generation is treated as existing resources in the auction. Only 168 kW of existing Distributed Generation: Renewable cleared the auction, and there are no new resources in this category. (ISO-NE 2008b)*

- There is a critical need for tracking precise measure installation and savings decay over time as measures reach the end of their savings life. In future years it will be necessary to allocate some savings from new measures to make up for the capacity that drops off from old measures.

## FCM Results to Date

### FORWARD CAPACITY AUCTION RESULTS

Of the over 12,000 MW of new demand- and supply-side resources that submitted applications, 6,102 MW survived the rigorous qualification process to participate in the first FCM auction, held in February 2008. Approximately 41% – 2,483 MW – of these new qualified projects were demand resources, with energy efficiency projects making up over 590 MW (9.7%) of the total.

The first auction began with ISO-NE's installed capacity requirement (ICR) of 32,305 MW and a total offered supply of 39,142 MW. After eight rounds of bidding, the auction ended successfully at the floor price of $4.50 per kW per month with an excess of 2,047 MW above the ICR clearing the market (see Figure 3 and ISO-NE 2008a). Demand resources made up 2,554 MW of the cleared capacity (1,694 MW were existing demand resources and 860 MW were new projects – Figure 5 gives a breakdown by type of project), indicating that, had they not been allowed to participate, the ICR would have been reached above the floor price.

The second FCM auction took place in December 2008 for capacity commitments to begin in June 2011. A total of 42,777 MW, including 4,153 MW of demand resources, competed to provide the 32,52 MW forecasted ICR (ISO-NE 2008c). This auction also ended successfully at its floor price, $3.60 per kW per month, after eight rounds of bidding. The excess capacity remaining, 4,487 MW above the ICR, indicates continued strong interest from the market. Demand resources made up 2,937 MW of the cleared capacity in this auction, a smaller proportion than in the first. These results imply that new generation projects may have played a much larger role in the second auction than in the first, even in light of the smaller prices set in this auction.

### RESULTS FOR VERMONT'S EFFICIENCY PROGRAM

Resources associated with the Efficiency Vermont portfolio successfully cleared both the first and second auctions, giving us a commitment to provide 52 MW of capacity beginning in June 2010 and increasing to 62 MW in June 2011. The largest cleared capacity commitment in Vermont comes from the Vermont Yankee nuclear generating plant, which will provide 620 MW to the ISO-NE region. The Efficiency Vermont commitment ranks second in the state, with the City of Burlington's McNeil wood-fired generator a close third at 51 MW, followed by other smaller generation facilities (Figure 6). All other demand resources in the state together will provide a total of 41 MW of capacity reduction, making them in aggregate the fourth-largest resource.

The current estimate of the gross revenue that will be available from the Efficiency Vermont FCM participation is nearly $3 million per year for the first five years of the market, and can be compared to the program budget from the state of approximately $37 million per year that supports these electric energy efficiency projects. The Vermont State Legislature recently targeted the net proceeds from the FCM as a source of funding for plans for fossil-fuel efficiency activities outlined in newly passed legislation.

## Conclusions

### INCLUDING DEMAND RESOURCES IN CAPACITY MARKETS CAN PROVIDE A REDUCTION IN THE COST OF CAPACITY TO RATEPAYERS

As the designers of the FCM envisioned, it appears that demand resources can be credited with making the clearing price lower than it would have been otherwise, at least in the first FCM auction, making the acquisition of required capacity for the region less expensive for the ratepayers. The first auction closed with an excess cleared capacity of 2,047 MW. The total cleared capacity from demand resources was 2,554 MW, indicating that, had these resources not been available, there would have been no excess at that price and in fact that the ICR would have been reached in an earlier round at a higher price. Analysis of the intra-round details (illustrated in Figure 3) shows that without these demand resources and all else being the same, the

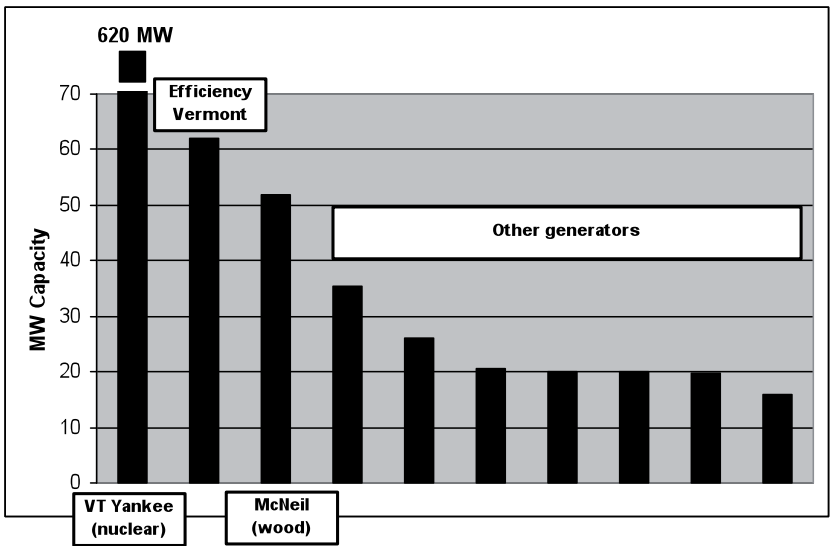


*Figure 6. Top Ten Capacity Obligations in Vermont (2012)*

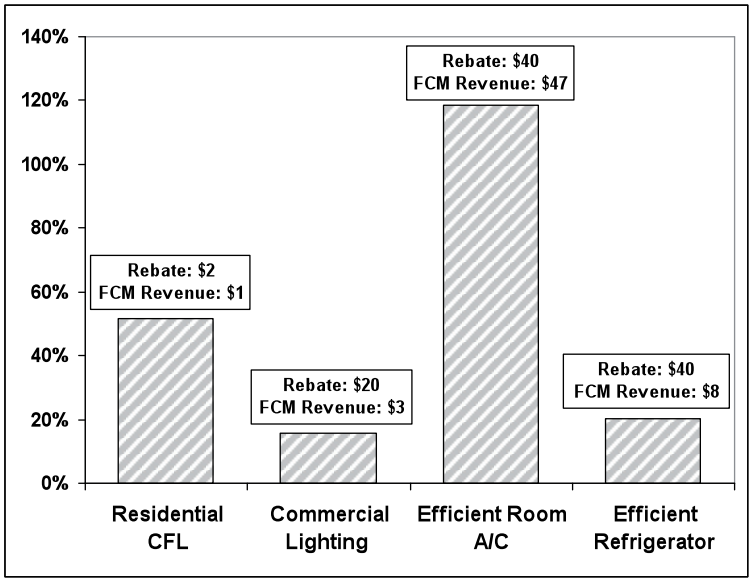


*Figure 7. Illustrative Potential Returns for Common Efficiency Measures. Calculations use only Summer Peak coincidence factors and assume the measure is included in a diversified portfolio that allows full realization of annual returns.*

ICR would have been reached in Round 6, at a price somewhere between $5.63 and $5.25 per kW per month. If that had indeed been the case, a conservative estimate indicates that ISO-NE would have paid $0.75 per kW per month more for its capacity resources, resulting over $24 million a month in extra charges to the region's ratepayers. Results from the second auction are less clear, as there was a larger representation of new generation projects that cleared the auction at its low clearing price, but it remains likely that the inclusion of demand resources will continue to contribute to lower overall capacity prices for the region.

### FCM PARTICIPATION CAN PROVIDE DIRECT BENEFITS TO EFFICIENCY PROGRAMS

Participation in the FCM holds the potential for providing an additional source of significant revenue for efficiency resource providers. Depending on market-clearing prices, installing a single CFL could bring as much as $1.00 over the life of the bulb. Potential revenues provided by other sample measures, shown as a percentage of common efficiency program rebate levels, are shown in Figure 7. Depending on the measure mix, revenues from the FCM could provide as much as 10% of the current budgets of many efficiency portfolios. Participation in this capacity market is thus helping project sponsors to realize the full value of energy efficiency. In addition, this market may provide funding for investment in projects that would otherwise not be undertaken, leading to broader participation from Energy Service companies and other retail providers of efficiency services.

Along with this monetary potential, a number of other benefits have risen from participation in the ISO-NE FCM. Through activities undertaken to fulfill FCM M&V requirements, we will have greater confidence in our savings claims in the future. While such progress might not have been worthwhile without a capacity market to help bear the cost of development, it will prove an advantage that benefits all stakeholders. We will also

find we have learned lessons and procedures that will have relevance for other imminent market developments – including the emerging New England Regional Greenhouse Gas Initiative and other emissions-based markets.

Participation in the FCM has opened doors for potential for coordination with other resource providers and partnerships with other new entities. Cooperation between providers of different kinds of demand resources is particularly exciting. As energy efficiency resource providers, we find ourselves receiving inquiries from demand response providers like Comverge, EnerNOC, and others Energy Service Companies about jointly marketing demand side programs and the potential to combine winter peaking with summer peaking resources to offer additional capacity to the FCM. We have also seen a remarkable emergence of regional cooperation among efficiency program administrators and other regional demand resource providers. Working with these other interested parties has proved valuable both in providing a coordinated point of interaction with ISO-NE and through taking advantage of those efficiencies that can be realized through joint undertaking of evaluation studies and protocol development.

### PARTICIPATION IN WHOLESALE MARKETS PROVIDES IMPORTANT EXPOSURE FOR ENERGY EFFICIENCY

One of the most important steps in the development of effective energy policy is the adoption of the mindset that "energy efficiency is a resource to be acquired on a basis equivalent to that of supply side resources at all levels within the electric system: generation, transmission, and distribution" (RAP 2006). The design of the ISO-NE FCM has resulted in a highly visible platform for the advancement of this policy perspective. Because of its eligibility as a resource in the ISO-NE FCM, energy efficiency activity is now listed separately and prominently in every FCM report and announcement. Instead of being undifferentiated through integration into the ISO-NE load forecast, participation in the FCM makes it clear that energy efficiency is a resource that can provide capacity to New England and creates additional awareness of a clean, low-cost capacity investment. In addition, having specific examples such as the extraordinary showing of efficiency's contribution in states like Vermont (Figure 6) can focus the attention of not only policy makers but the general public. Having such information on the impact of demand resources made clearer through this very public process will make it easier to assess and judge their contribution to the market.

### THE FUTURE OF ENERGY EFFICIENCY IN OTHER WHOLESALE CAPACITY MARKETS

Other ISOs and regional transmission operators (RTOs) are monitoring the performance and results from ISO-NE's market experiment and are considering implementing similar market activities. PJM, the RTO for much of the mid-Atlantic and northern Midwest, has developed a Reliability Pricing Model that functions in a similar fashion to the FCM and allows demand response projects to participate. While the PJM states do not yet have extensive energy efficiency programs in place, they are currently looking for information on programs and their potential benefits and including effects on system capacity in their planning. In response to strong encouragement from FERC, PJM has just filed rules to allow energy efficiency to participate as a capacity resource in this capacity market beginning in 2009. An extensive stakeholder process used to design these rules relied heavily on the experience of the ISO-NE FCM, both for the requirements for participation and for measurement and verification of efficiency resources (PJM 2008). Unlike the FCM, however, savings from efficiency resources will be limited to receiving compensation from the PJM market only for the first four years, rather than for the full measure life. This compromise allows for efficiency project participation but may result in lower participation and therefore smaller potential benefits to the system.

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