

## **Playing with the Big Boys: Energy Efficiency as a Resource in the ISO New England Forward Capacity Market**

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### **ABSTRACT**

ISO New England recently established a Forward Capacity Market (FCM) that will pay suppliers to ensure sufficient capacity is available to meet future peak loads, with the value of such payments determined by auction. This market is unique in that it allows energy efficiency and other demand resources to compete directly with generators. More than 3,400 MW of demand resources qualified in the first auction in February 2008 (nearly 9% of the total qualified capacity), and 2,554 MW (with 655 MW from energy efficiency) cleared the auction, contributing substantially to eliminating the need for new generating capacity in the near term and providing low-cost resources to the regions ratepayers.

Participating in the FCM requires undertaking considerable and complex bid, financial assurance, and claim processes. Meeting new intensive measurement, tracking, and verification requirements will significantly increase 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 could be substantial. Depending on market-clearing prices, installing a single CFL could bring as much as \$1.50. Revenues from the FCM could provide 10% of the current budgets of many efficiency portfolios.

This paper introduces the FCM, examines the experience and trade-offs involved in participating for state-funded efficiency programs, and explores how one state has tackled the policy questions such participation raises.

### **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. 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 measures as resources for meeting peak capacity needs and allowing those resources to compete with traditional power generators in the marketplace. Responding to the concern of generators that the existing market design did not provide enough incentive to build the 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 locational capacity requirements, and provides a long-term (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.

## **Background**

In the past, ISO-NE (and its predecessor NEPOOL, the Northeast Power Pool) imposed an installed capacity requirement on load-serving entities, requiring them to obtain specified amounts of installed capacity (ICAP) based on their peak loads. 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, specifically including the lack of ability to respond to geographical differences in capacity requirements. In 2003, the Federal Energy Regulatory Commission (FERC) directed ISO-NE to design “a mechanism that implements location or deliverability requirements in the ICAP or resource adequacy market ... so that capacity within [designated congestion areas] may be appropriately compensated for reliability.” (FERC 2003). The initial proposals to establish a locational installed capacity mechanism were determined by the Commission to be insufficient to address a number of identified shortcomings, and over the following several years additional filings and hearings occurred with the objective of establishing a process to 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 of 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.

In mid-2006 ISO-NE established working groups to develop the draft rules for FCM implementation, including a Demand Resources Working Group to identify and address the issues particularly distinct to demand resources. This group included representatives of many stakeholders, including the Vermont Energy Investment Corporation (VEIC) as one of the energy efficiency program representatives. Work also proceeded on requirements for assuring measurement and verification (M&V) of demand resources, a significant challenge for resources that are fundamentally different than traditional power generation. Final Market Rules for the conduct of the bulk of the FCM functions were approved in February 2007 (ISO-NE 2007a) and the ISO-NE Measurement and Verification Manual was issued in April 2007 (ISO-NE 2007b). 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 bidding at or under the market clearing price will have a capacity commitment and will get paid for delivering. Additional important features of the FCM design include specification of resource types and entities eligible to participate, the mechanics of the auction process, and the timeline for auctions, project planning, project implementation, and capacity delivery. The Market Rules establishing the FCM also lay out rules for a three-year Transition Period to bridge to the new FCM.

**Eligible resource types.** 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. Demand resources can participate in any of several categories, including real-time demand response, load management, distributed generation, and energy efficiency. The FCM is the first capacity market in the country to allow energy efficiency assets to participate as a resource in a capacity market – capacity reduction is fully equivalent to capacity supply.

Each resource provider chooses the definition of peak to which they wish to apply their capacity offerings, including an option with pre-defined summer and winter peak hours and several definitions more closely tied to real system peak events.

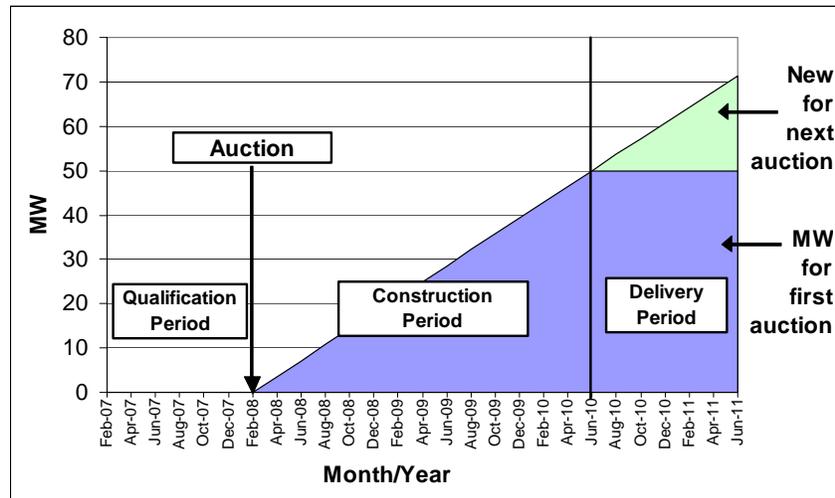
**Eligible participants.** In order to participate in the FCM, entities must be members of NEPOOL. Such membership, which also entitles entities to vote in rule-setting and other NEPOOL business, requires meeting specified eligibility requirements, payment of dues, and providing financial assurance to back commitments. Membership is in different "sectors," with energy efficiency classified as part of a sector labeled "Alternative Resources." Utility administrators of efficiency portfolios are already members of NEPOOL as transmission owners and can bid efficiency resources as such. Merchant providers of energy efficiency resources (e.g., energy service companies) or non-utility administrators of state efficiency portfolios (such as VEIC) are required to become members of NEPOOL to participate in the market. State governments cannot directly participate in the market.

**FCM time line.** 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 1 and discussed in more detail in the sections below.

The first auction, in February 2008, established the price for peak capacity delivery beginning in June 2010. 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.

**Figure 1. ISO-NE Forward Capacity Market Time Line  
Energy Efficiency Resource Example**



**Planning for and qualification of resources.** For the several months before an auction, both project sponsors and ISO-NE undertake forecasting and qualification activities. During this time, 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 includes

- The capacity reduction value, bid price, and bidding strategy to be used in the auction
- Election of a period of commitment to deliver the capacity reduction at the market clearing price (1 – 5 years)
- A plan for customer acquisition to substantiate the project sponsor’s ability to attain the forecast savings
- A funding plan for the project to verify financial feasibility
- A cost analysis to support any proposed bid price below ISO-NE’s threshold for Market Monitor review – required to ensure that low-cost projects are legitimate and are not using low bids to undermine the auction process or to corner the market
- A plan for the measurement and verification (M&V plan) of the project’s capacity reduction value

This package of supporting materials is submitted to ISO-NE and receives substantial review, paid for by the project sponsor, before a project is deemed Qualified Capacity for

participation in the auction. At this stage, sponsors of new projects must also determine a bidding strategy for the auction. This includes determination of the price to bid and election of a delivery period term – from one to five years.

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 assets 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 would provide useful capacity.

**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 capacity growing as measures that make up the project are installed. In order to assess that sufficient progress is being made toward the final commitment, ISO-NE requires that projects submit as a part of their Qualifications Package a schedule of capacity reduction milestones. Values of capacity reduction reached as of these interim dates will be reported and the approved M&V plan will be used to verify performance.

For the first delivery period, beginning in June 2010, ISO-NE allows efficiency measures that will be installed from June 2006 through May 2010 to be included in the portfolio. Auctions for capacity in subsequent commitment years must include resources that have not been committed in prior auctions. This means that in all future auctions efficiency portfolios will generally include savings from measures installed for single years, along with any incremental savings not accounted for in the forecasts used to determine earlier commitments (see Fig. 1).

**Financial assurance.** As a means of guarantee against the consequences of failure of projects to deliver their capacity obligations, ISO-NE requires sponsors of all new resource projects (supply and demand) to provide financial assurance against non-performance. Financial assurance deposits are due at several interim points throughout the construction period, to be released once the project is declared “commercial” and tested or verified for its full capacity rating at the delivery date. If the resource is only capable of delivering less than the amount of its commitment, the project sponsor forfeits the portion of its financial assurance associated with the capacity shortfall.

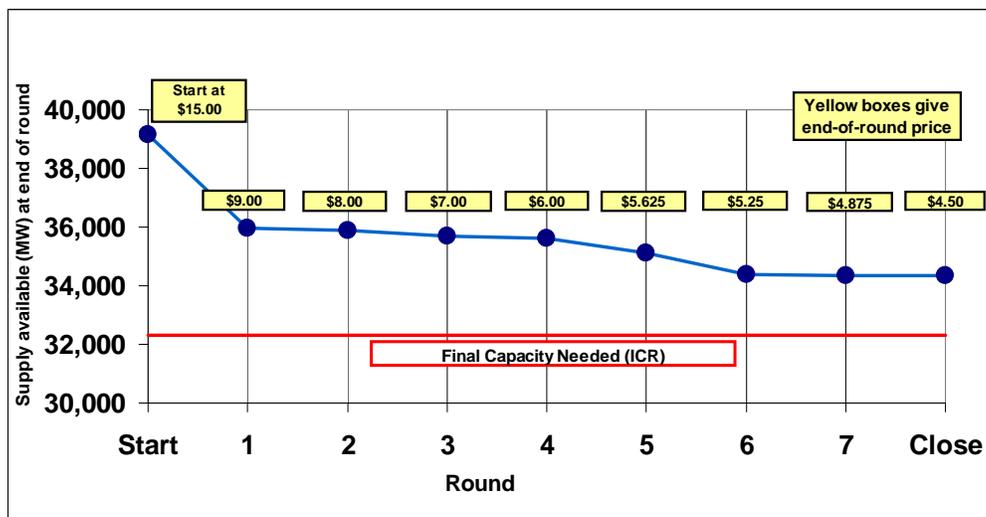
**Delivery period.** Monthly reports of delivered capacity are required during the delivery period, and payments are received based on the delivered capacity and the auction clearing price for that delivery period. Shortfalls in available capacity result in loss of payment, as sponsors are only paid for capacity delivered. Annual certification of compliance with the approved M&V plan is also required, along with participation in any audits and reviews deemed necessary by ISO-NE.

All existing resources receive a one-year commitment to provide capacity, paid at the clearing price of the auction associated with the delivery period. New resources have elected delivery periods of from one to five years, in annual increments, as a part of their auction bid. For that delivery period, they will 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.

**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) and, for the first three auctions, administratively determined maximum (starting) and minimum (floor) 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 results of the first FCM auction are shown in the following figure. The auction began with a set starting price of \$15.00 and continued for eight rounds to the administratively set floor price of \$4.50, at which excess capacity remained.

**Figure 2. Final Results of ISO-NE FCM Auction #1**



**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, begun in December 2006 and running through May 2010, include payments to new energy efficiency assets submitted by market participants that qualify and register in the market. Fixed payment levels, equal for all asset types, were set in advance by the Market Rules and increase each year from \$3.05 per kW-month in 2006 to \$4.10 per kW-month in 2010.

Energy efficiency and other demand resource installations, undertaken as part of merchant, utility, or state-sponsored programs and totaling for any project at least 100 kW of peak capacity reduction aggregated within a single Load Zone, are considered qualified capacity for the transition period, subject to ISO-NE review of their measurement and verification processes. Project sponsors are required to submit M&V plans that meet the requirements of the Market Rule. For efficiency programs, review and approval by the appropriate state regulatory agency with jurisdiction over the utility or state-sponsored program is considered an adequate independent review process for transition period capacity.

**Other features.** There are a number of other characteristics of the FCM that help define its structure and have relevance for project sponsors.

- The FCM addresses its locational resource needs through requiring that all projects be within a single NEPOOL load zone and establishing auction constraints when necessary within each capacity zone and interface.
- Reconfiguration auctions are provided for under the Market Rule – these short-term auctions allow rebalancing of supply and demand within a delivery period.
- While resources are likely to deliver different peak capacity in summer and winter, the FCM requires capacity commitment on an annual basis, meaning that a resource must either provide the same capacity for both peak periods or only offer the lower of the two values.
- Bi-lateral agreements are allowed between separate parties, for example to equalize winter and summer peak offerings or to make up shortfalls in capacity.

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

The past two years have been fast paced and eventful as the FCM has progressed from the beginning of settlement discussions designed to develop the concept, through drafting and finalizing Market Rules, and culminating in the completion of the first successful auction in February 2008. This extremely quick pace has proved a challenge to ISO-NE as well as all market participants as we struggled together to understand the operational and policy implications resulting from this new market process.

VEIC became a NEPOOL member and market participant in August of 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 16 monthly claims totaling 17.7 MW of installed capacity and have received over \$345,000 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, 2007, VEIC submitted a qualification package for the Vermont Efficiency Portfolio based on the capacity reduction that we project to be available for the 2010 delivery period from efficiency measures installed from May 2007 to April 2010. We participated in the first FCM auction the first week in February, 2008, and our portfolio successfully cleared the market. We now have an obligation to provide approximately 50 MW of monthly peak capacity reduction for five years beginning in June 2010, and are on the way to participation in the second auction in December 2008.

The learning curve to date has been significant. We discuss some of the challenges and our solutions below.

### **Policy and Program Implications**

It is likely that the biggest questions concerning participation in the FCM in the minds of utility-administered energy efficiency programs pertain to potential costs and benefits. In Vermont, because of our unique efficiency utility program delivery model, we began with some fundamental questions as to the appropriate participating entity. The State of Vermont

established its rate-payer funded efficiency utility, Efficiency Vermont, in 2000 to administer statewide energy efficiency resource acquisition. This is implemented through a contract between the Vermont Public Service Board (PSB) and the implementing entity, the Vermont Energy Investment Corporation (VEIC). Identifying the most appropriate party to participate in FCM activities is not immediately clear from this structure. In addition, the current three-year contract model imposes significant constraints on the necessary long-term planning, financing, and bidding considerations for both the State and VEIC as the efficiency contractor.

In December 2006, after soliciting and considering input from stakeholders, the PSB issued an order directing VEIC as the Efficiency Vermont contractor to participate in the transition period on behalf of Vermont as the logical entity to bid capacity acquired from the efficiency measures it puts into place. VEIC was also authorized by the PSB to become a NEPOOL member, to participate in negotiations of final rules for the FCM, to support Vermont's efforts to secure resource parity for demand resources in the FCM, and to develop the necessary information for participating in the first FCM auction. We received approval to submit a qualifications package for the first auction in May 2007. While there is an element of risk in doing so, VEIC undertook a commitment for delivery of capacity reduction based on projections of installations of efficiency measures for several years beyond our current contract with the PSB, which runs only through the end of 2008. This commitment has performance and financial implications, as VEIC is the FCM Market Participant for the Efficiency Vermont resource and as such has the obligation to post financial assurance toward our capacity obligations.

In addition, the current three-year contract structure of Vermont's efficiency utility model hinders the long-term – up to eight-year – forecasting needed for predicting capacity offerings for the FCM, as it is necessary to make assumptions of the amount that will be available to invest in efficiency resources to estimate the level of demand reductions that can be provided. At this time the State has not established a budget for efficiency programs beyond 2008. These issues have provided some of the impetus for a process begun in 2007 to consider structural changes to the efficiency utility model (Hamilton 2008).

A first step toward offering resources from Efficiency Vermont activities in the FCM was to clearly establish ownership of capacity credits. The establishment of a financial market for efficiency resources makes clarity on this point essential, as customers or other entities might claim their own right to submit these resources to the FCM. To ensure clarity on this matter, the PSB, after notice and opportunity for comment, ordered Efficiency Vermont to clearly state in any service contracts that ownership of any resultant savings for submission in the regional capacity market, or other markets that may emerge for environmental credits, would be retained by Efficiency Vermont to be used for the benefit of Vermont ratepayers. Such language is now included in all Efficiency Vermont incentive agreements, contracts, rebate forms, and coupons.

The PSB also initiated a public input process to help them determine the appropriate disposition of the revenues from the FCM. Ideas have included returning proceeds to the ratepayers in the form of lowered rates and use of the funds for either further electric efficiency or broader efficiency services. Though an exact accounting of the amount of income that can be expected from FCM activities is strongly affected by the uncertainties discussed below, the Vermont State Legislature recently targeted the proceeds from the FCM as a source of funding for new plans for “all-fuel” efficiency activities outlined in newly passed legislation.

One certain goal of all parties is to establish an appropriate prioritization of emphasis in efficiency program design and delivery between traditional electric saving and peak capacity reduction. While we want to avoid having “the tail wagging the dog” – traditional resource

acquisition and market transformation will continue to lead our list of objectives – the potential for substantial income from the FCM, along with increasing focus on capacity from other sources, requires a strategy for weighing what may be sometimes conflicting priorities.

## **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. We have to be able to forecast expected capacity savings from installed measures for up to eight years in the future and base bidding strategies on expectations about the future capacity needs of the region and the behavior of other participants over that time frame. 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, these forecasts are of necessity based on fairly high-level assumptions. For the bids and filings made to date – for the first two delivery periods – 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 – particularly related to the evolution in lighting technology, other baseline changes, and regulation.

The need for a longer-term efficiency resource planning and forecasting has been recognized by many parties in Vermont, not only for the needs of the FCM but for better utility resource acquisition and capital planning. A recent regulatory decision requires Efficiency Vermont to produce, for the first time, a 20-year estimate of demand impacts from statewide efficiency resource acquisition to inform the development of 20-year transmission plans that must be prepared by the State's transmission and distribution utilities. In addition, as mentioned above, the State is exploring re-structuring the efficiency utility model, in part to support longer-term planning and commitments.

ISO-NE requires bidders to bear considerable risk for the uncertainty of future resource performance by requiring that sponsors of new resource projects post financial assurance as to their successful completion. This financial risk can be mitigated by choosing to bid conservatively to account for uncertainties in performance. We considered the implications of such conservatism by a risk-reward analysis. The downside to bidding our best estimate of performance and not reaching the goal includes lost financial assurance for the amount of the shortfall and lower capacity payments until the full commitment amount is reached. On the other hand, bidding our best estimate rather than a conservative fraction has a high payoff if the higher value is reached. With review and approval by the PSB, we chose to offer our true best estimate of future performance. ISO-NE has designed other procedures to aid in making sure that commitments can be reached, through allowing bilateral agreements between parties and regular

reconfiguration auctions during the delivery period, which we can take advantage of should the need arise.

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. 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. For example, we have based our bidding strategy on a prediction that the market will clear at the established floor price in first three auctions and stay low in following years. This prediction is based on our perception of what we hear from ISO and other participants, in this case that additional capacity needs are small for the near future, and on the level of excess capacity currently present. We have similarly concluded that there will be plenty of demand resources participating in the market as they are generally less costly to produce than generation and should help keep prices low. While we cannot accurately predict future price spikes, the revenue lost if the market price increases in out years is not huge... and we would have to predict perfectly to avoid all risks.

## **Operational Challenges**

Many of the operational challenges to participating in the FCM relate to the very short time frame from the development and approval of the Market Rule to the filing deadlines for the first auction. We were involved in helping to define procedures, establish definitions and M&V requirements, and identify issues unique to efficiency resources while at the same time developing the information needed to qualify our portfolio. Because ISO-NE had not historically worked with efficiency resources, questions that we and others raised concerning the details of accounting for or documenting details of our portfolios often effectively introduced new concepts to ISO and required informally communicated decisions. Throughout this time ISO-NE staff was invested in understanding our systems and processes as they worked to learn and communicate fully with participants. They offered many training sessions, fielded questions, and made visits to providers to learn how we operated and understand how we track data. Many of these procedural difficulties and uncertainties have been addressed, and participation in future auctions will certainly be a clearer process for all.

One ongoing challenge is the need to keep track of values for capacity reduction 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. Many providers are already dealing with different state requirements for their multi-state programs; different ISO requirements add further to administrative complexity. Tracking will be another big issue from both the provider and ISO-NE perspective. There is a critical need for tracking precise measure installation and savings decay over time. Resources are bid into specific auctions for specific periods of commitment, and it is conceivable that savings from measures installed in the same year may be committed to several different delivery years with differing FCM prices and reporting needs. In future years we will also need to allocate some savings from new measures to make up for measure decay, an additional tracking challenge.

## **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 of the ISO M&V Standards Manual (ISO-NE 2007). 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, which has 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. They will increase costs and will be a challenge to implement in a timely manner.

In the new FCM, development of M&V plans was difficult for most efficiency resource providers, as the time line was very tight and the work challenging. ISO-NE's manual was not issued until mid-April 2007, and M&V plans were due as part of qualification packages by June 15. New processes led to new questions not previously considered or addressed by the rules. While ISO-NE is guided by a desire to see best practices in place, their unfamiliarity with the field led to some lack of clarity and what appears, in some cases, to be excessive complexity – the 17 specific requirements for metering equipment, for example, obliquely refer users to dozens of standards from as many as 11 standard-setting organizations. Meeting such requirements for portfolios of hundreds of different efficiency measures required us to find a balance between satisfying ISO-NE's needs and proposing too much and too costly an effort.

We tried to address this balance by leveraging procedures and processes already in place. Efficiency Vermont had a head-start with its well-supported Technical Reference Manual, which outlines savings algorithms and evaluation support for our prescriptive measures. 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.

Similar concerns with M&V across all participating efficiency providers in the region created an impetus for regional collaboration on evaluation. Progress toward the development of consistent policies and evaluation and M&V protocols across the region's energy efficiency

programs was promoted through the creation of a State Programs Working Group, facilitated by the Northeast Energy Efficiency Partnerships (NEEP). This group encourages greater regionalization of evaluation through identification of issues of interest and cost sharing on regional studies. It has also provided a useful forum for exchange of information on interactions with and questions to ISO-NE and on solutions to common challenges from FCM participation regarding M&V. The lower costs of participating in key expensive studies on a regional basis has been particularly important for a small state like Vermont. Greater consistency in M&V plans and assumptions has likely led to greater trust and confidence in savings from ISO-NE as well.

## **Results to Date**

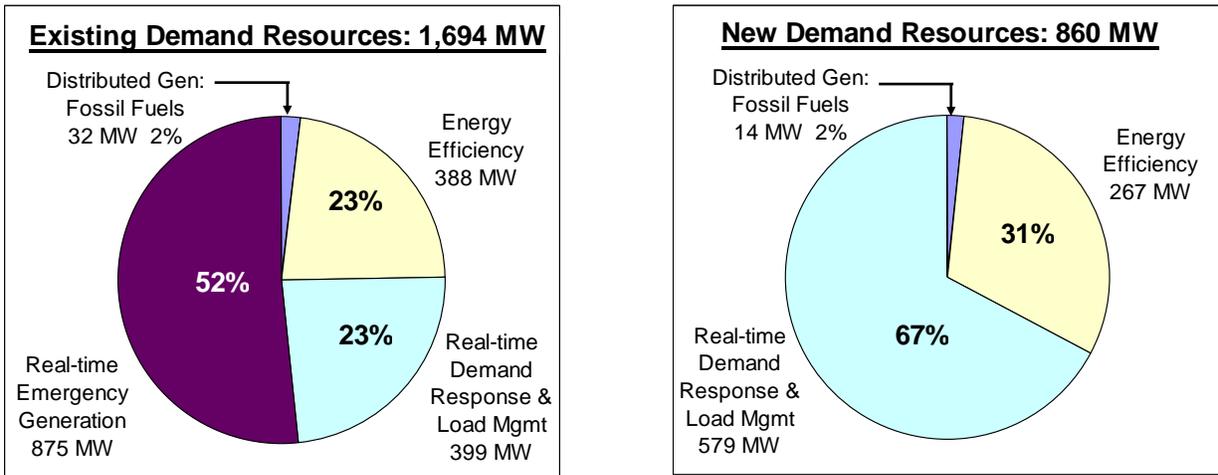
Of the over 12,000 MW of new demand- and supply-side resources that submitted applications, 6,102 MW survived the rigorous qualification process to participate in the first FCM auction, held in February 2008. Approximately 41% – 2,483 MW – of these new qualified projects were demand resources, with energy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

The auction began with ISO-NE's installed capacity requirement (ICR) of 32,305 MW and a total offered supply of 39,142 MW, 33,042 of which were already existing resources. After eight rounds of bidding, the auction ended successfully at the floor price of \$4.50 per kW-month with an excess of 2,047 MW above the ICR clearing the market (see Fig. 2 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 3 gives a breakdown by type of project), indicating that, had they not been allowed to participate, the ICR would have been reached at some price above the floor. As the designers of the FCM envisioned, demand resources can be credited with making the clearing price lower than it would have been otherwise, making the acquisition of required capacity for the region less expensive for the ratepayers. 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.

Show of Interest filings have been submitted for the second FCM auction, which will take place in December 2008 for capacity commitments to begin in June 2011. Interest from demand resources continues to be strong – 40 new projects propose to offer a total of 319 MW, and expansions of 53 previously participating projects have offered an additional total of 536 MW.

Other ISOs and RTOs are monitoring the performance and results from ISO-NE's market experiment and are considering implementing similar market activities. 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. PJM will include energy efficiency as a capacity resource in its capacity construct – the Reliability Pricing Model – in early 2009 and is currently working on the relevant details in their stakeholder process.

**Figure 3. Demand Resources Awarded in FCM Auction #1**



Note: 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)

### Going Forward – Next Steps and Prognosis for the Future

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 \$1.50. Revenues from the FCM could provide as much as 10% of the current budgets of many efficiency portfolios. Participation in this capacity market is helping project sponsors to realize the full value of energy efficiency.

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, in the future we will have greater confidence in our savings claims. 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 and are investigating potential synergies that might result from collaboration or coordination.

We have also seen a remarkable emergence of regional cooperation among efficiency program administrators and other regional demand resource providers. The State Programs Working Group 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. Areas of regional collaboration to

date have included studies on coincidence factors, lighting persistence, and ISO-NE metering requirements. Members have shared in-house evaluation results and drafts of their own FCM submittals. While there have been challenges to this regional collaboration, particularly around timely responses in the face of short deadlines for FCM-related activities and lingering concerns about confidentiality and ownership of information, the advantages of sharing costs and developing consensus have proven resilient. The group continues to meet to address regional issues, and we expect the process to expand to include other types of demand resource providers and a broader range of coordinated activities.

An additional benefit is that instead of being integrated into the ISO-NE load forecast, energy efficiency activity is now listed prominently in every FCM report and announcement, making it clear that energy efficiency is a resource that can provide capacity to New England and creating awareness of a clean, low-cost capacity investment.

The FCM auction process has proved to be a viable one. Proposed market rules are currently being crafted for FCM functions that have not yet been completed, such as the details for reconfiguration auctions, bilateral contracting, seasonal resources, settlements, and other processes. Market rules will undoubtedly change as all parties strive to make the market function effectively and efficiently. All these processes will continue to benefit from the participation of a wide group of stakeholders, including energy efficiency.

## **References**

- [FERC] Federal Energy Regulatory Commission. 2003. *Devon Power LLC*, 103 FERC ¶ 61,082.
- Hamilton, Blair. 2008. "Taking the Efficiency Utility Model to the Next Level" In *Proceedings of the ACEEE 2008 Summer Session on Energy Efficiency in Buildings*, Washington, D.C.: American Council for an Energy-Efficient Economy.
- [ISO-NE] ISO New England. 2007a. *FERC Electric Tariff No. 3, Section III – Market Rule 1 – Standard Market Design: Section III.13 – Forward Capacity Market*. ISO New England Inc.
- [ISO-NE] ISO New England. 2007b. *Manual for Measurement and Verification of Demand Reduction Value from Demand Resources*. Manual M-MVDR. ISO New England Inc.
- [ISO-NE] ISO New England 2008a. *Forward Capacity Auction Results Filing (to FERC)*. [http://www.iso-ne.com/regulatory/ferc/filings/2008/mar/er08-633-000\\_03-03-08\\_fca\\_results\\_filing.pdf](http://www.iso-ne.com/regulatory/ferc/filings/2008/mar/er08-633-000_03-03-08_fca_results_filing.pdf) ISO New England Inc.
- [ISO-NE] ISO New England 2008b. *Demand Resources Cleared in FCA1 by Measure Type*. [http://www.iso-ne.com/committees/comm\\_wkgrps/mrkt comm/dr\\_wkgrp/mtrls/2008/apr22008/fca-1\\_results\\_measure\\_type\\_040708.ppt](http://www.iso-ne.com/committees/comm_wkgrps/mrkt comm/dr_wkgrp/mtrls/2008/apr22008/fca-1_results_measure_type_040708.ppt) ISO New England Inc.