Cost Recovery in a Competitive Installed Capacity Market

NYISO Installed Capacity Working Group

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Market Monitoring & Mitigation in Energy and A/S Markets

In my presentation at the July 6 ICAP WG meeting, I recommended that the ISO expeditiously begin to develop more detailed market monitoring and mitigation procedures for its ICAP markets.

- **In support of this proposal, I described several benefits that would result from it.**
- **One of those benefits is that more detailed market monitoring and mitigation procedures would clarify what behavior constitutes an exercise of market power, and what does not.**

The discussion during my presentation, and during other presentations, made it clear that this benefit requires more emphasis.

Behavior in Competitive Markets

In a competitive market, the price at which ICAP was offered in the ICAP spot market auction (SMA) should only reflect its short-run going-forward costs, which are the *greater* of:

- **The costs that potential ICAP supplier expects to avoid by staying open, but not providing ICAP to anyone.**
- **The costs that potential ICAP supplier expects to avoid by shutting down, net of any margins on energy and ancillary services that it would lose.**
- **The revenues that potential ICAP supplier expects to be able to realize by not selling its ICAP in the SMA (presumably resulting from the selling its ICAP outside than New York).**

Current Short-Run Going-Forward Costs

Currently, short-run going-forward costs may be quite low.

- **As the New York ICAP market is presently constructed, the SMA for a given month is conducted just a few days before the beginning of that month.**
  - ***Consequently, the costs that a potential ICAP supplier would avoid by not being selected to provide ICAP are quite limited, and shutting down so quickly is not an option.***
  - ***In auctions with longer time spans between the time at which the suppliers of ICAP are identified and the time at which those suppliers must begin to provide ICAP, the scope of costs that can be avoided if one is not selected to provide ICAP may be much wider.***
- **Adjoining ICAP markets are still paying relatively low amounts for ICAP (although that will be changing soon).**

So competitive ICAP offers would also be low.

Allegations Regarding Ability to Recover Costs

In response, it was alleged during the meeting that:

- **Offers in the ICAP market that exceed these costs are perfectly legitimate.**
- **If such offers are not permitted, generators will not be able to recover their long-run going-forward costs.**
  - ***These are the costs that can be avoided over the long term if a generator is shut down.***
  - ***They should be significantly larger than short-run going-forward costs, in most instances.***

In competitive markets, both of these assertions are incorrect.

Actual Ability to Recover Costs

The following example will show that even if short-run going-forward costs for existing generators are very low, and existing generators' offers are correspondingly low, revenues from the ICAP market should, in the long-run competitive equilibrium:

- **Permit entry.**
- **Permit existing generators to recover their *long-run* going-forward costs, as long as those costs are less than the net cost of entry.**
  - ***Existing generators whose long-run going-forward costs exceed the net cost of entry would not receive enough revenue to induce them to stay in service—but these are precisely the generators that should shut down!***

Going-Forward Costs

Initially, make the following assumptions regarding going-forward costs for existing generators:

- **At the time of the SMA, generators avoid only $1/kW-mo. in costs if they are not selected to provide ICAP.**
  - ***This is because suppliers of capacity in these auctions are chosen just a few days before the beginning of each month, so most of the costs they incur have already been sunk.***
  - ***These are their short-term going-forward costs.***
- **Over a longer time frame, generators would avoid $5/kW-mo. in costs if they shut down.**
  - ***These are their long-term going-forward costs.***

Competitive Bidding Behavior

In that case, a generator that still has capacity that is available for sale in the SMA (and is not attempting to exercise market power) will maximize its profits if its offer reflects only its short-run going-forward costs, which were $1/kW-mo. in this example.

- **If its offer exceeded $1/kW-mo., it might not be selected to provide ICAP, even though the payment it would receive would exceed the incremental costs it incurs to provide capacity.**

Irrelevance of Unavoidable Costs

"Sunk costs are like spilled milk: They are past and irreversible outflows. Because sunk costs are bygones, … they should be ignored."

– Brealey & Myers, *Principles of Corporate Finance,* 4th Ed.

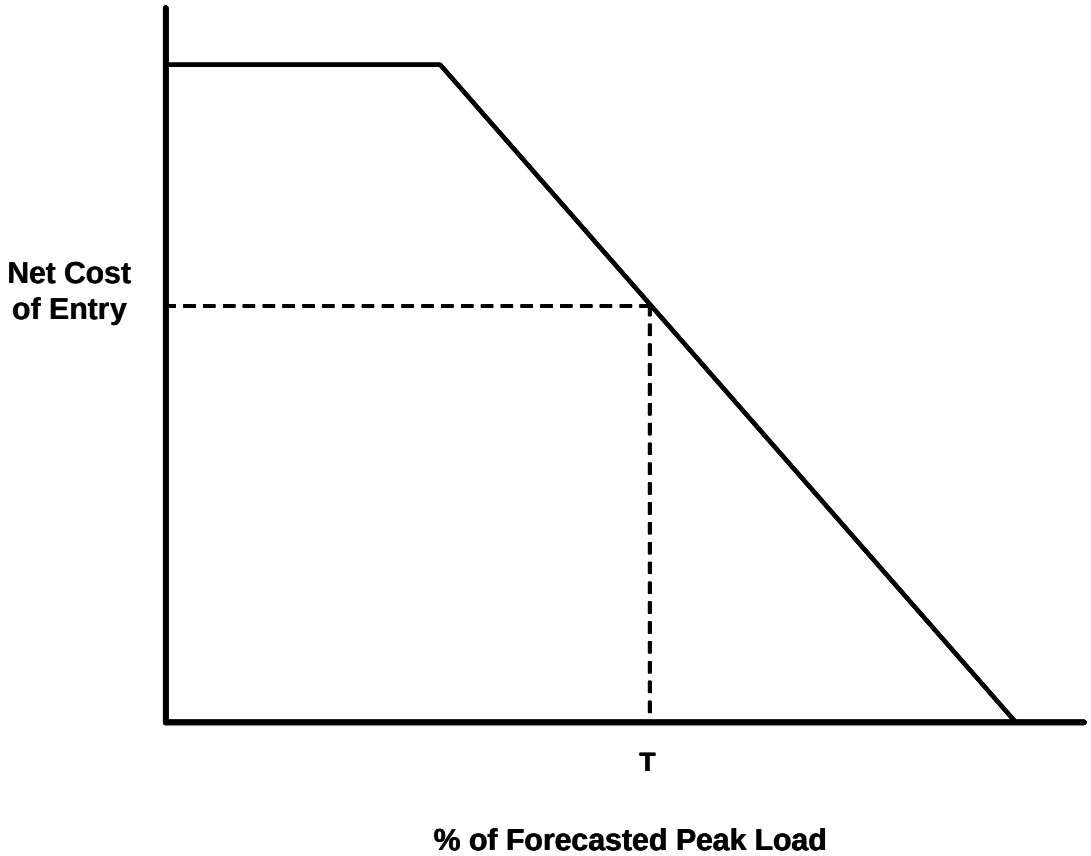
Therefore, unavoidable costs would not be included in offers in competitive markets. The ISO's other markets reflect this approach. For example:

- **The ISO's market monitoring procedures state, "The reference level for a Generator's Energy Bid is intended to reflect the Generator's marginal costs."**
  - ***The costs the ISO may use to calculate reference levels when appropriate offer data are not available include fuel costs, emissions costs, and variable O&M costs—each a cost that can be avoided by not generating energy.***
- **Under SMD2, market participants may not submit operating reserve availability offers in the real-time market, because no costs associated with providing OR can be avoided by that time.**

Minimum ICAP Requirement

Suppose that New York has a single minimum ICAP requirement, equal to *T* percent of forecasted peak load.

- **The ICAP demand curve would then pass through a point with:**
  - ***An x-coordinate equal to T percent of forecasted peak load, and***
  - ***A y-coordinate equal to the net cost of entry.***



Effect of Unpredictable Load Growth

The ICAP demand curve is drawn with the intent of ensuring that sufficient resources are developed to meet the minimum ICAP requirement. Nevertheless, the amount of capacity available will not always be equal to *T* percent, due to unpredictable load growth and construction schedules.

- **Suppose that it takes three years to develop generation, and load grows more quickly over those three years than had been expected.**
  - ***In the long-run equilibrium, market participants would respond by providing capacity equal to T percent of the peak load that was forecasted three years in advance.***
  - ***But this will be less than T percent of the peak load forecasted a few months in advance, since the load forecast has increased due to the unanticipated load growth.***
  - ***If load had grown more slowly than expected, the amount of capacity provided would have been more than T percent of the peak load forecasted a few months in advance.***

Effect of Unpredictable Construction Schedules

- **Alternatively, suppose that load growth matches expectations, but generation is developed more slowly than was anticipated.**
  - ***Again, in the long-run equilibrium, market participants would respond by attempting to develop capacity as necessary so that the total amount of capacity provided was equal to T percent of the peak load that was forecasted three years in advance.***
  - ***But the amount of capacity actually provided will be less than T percent of the peak load forecasted a few months in advance, due to the unanticipated delays in construction schedules.***
  - ***If construction had progressed more quickly than anticipated, the amount of capacity provided would have been more than T percent of the peak load forecasted a few months in advance.***

Consistency with Long-Run Objective

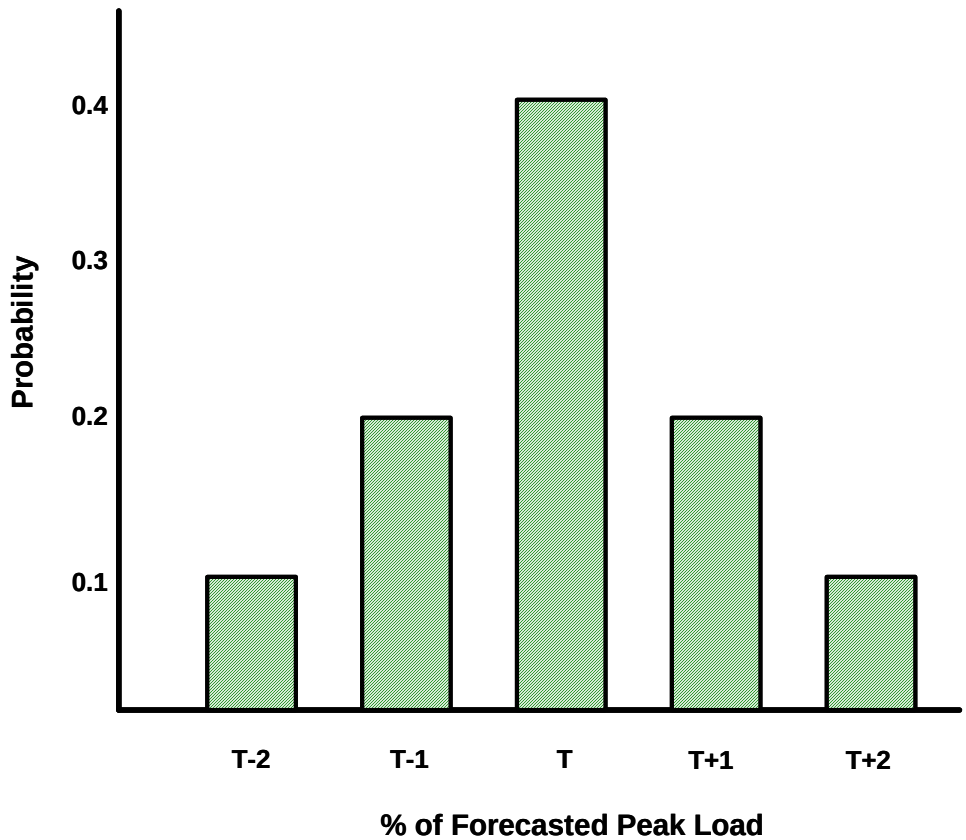
These short-run fluctuations around the minimum ICAP requirement are fully consistent with the long-run result that the ICAP demand curve is intended to produce.

- **In each case, the amount of capacity that is expected to be in service is equal to the level of the installed reserve requirement that is expected at the time development of that capacity must begin.**
- **There is little or nothing that can be done about things that happen after that deadline, since that deadline was, by assumption, the date by which development of new facilities had to begin.**

Possible Outcomes

Consistent with this, for the purposes of this example, suppose that five outcomes are possible in this market:

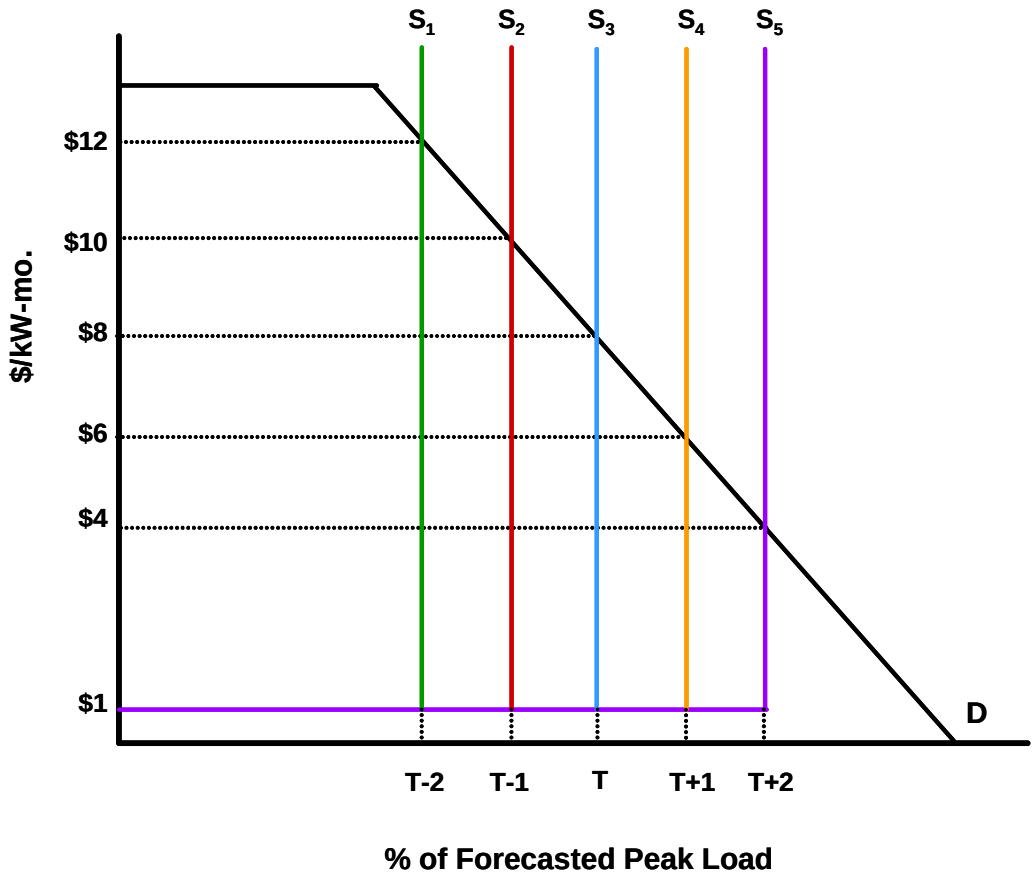
- **There is a 40% chance that the amount of capacity that is qualified to provide ICAP is exactly equal to *T* percent of forecasted peak load.**
- **There is a 20% chance that capacity equal to either *T* + 1 percent or *T* – 1 percent of forecasted peak load is qualified to provide ICAP.**
- **There is a 10% chance that capacity equal to either *T* + 2 percent or *T* – 2 percent of forecasted peak load is qualified to provide ICAP.**



Prices in Each Possible Outcome

Also, for simplicity, assume that the net cost of entry has been estimated as $8/kW-mo., and that the prices that correspond to each of these possible outcomes, if suppliers submit offers that only reflect their short-run avoidable costs of $1/kW-mo., are as follows:

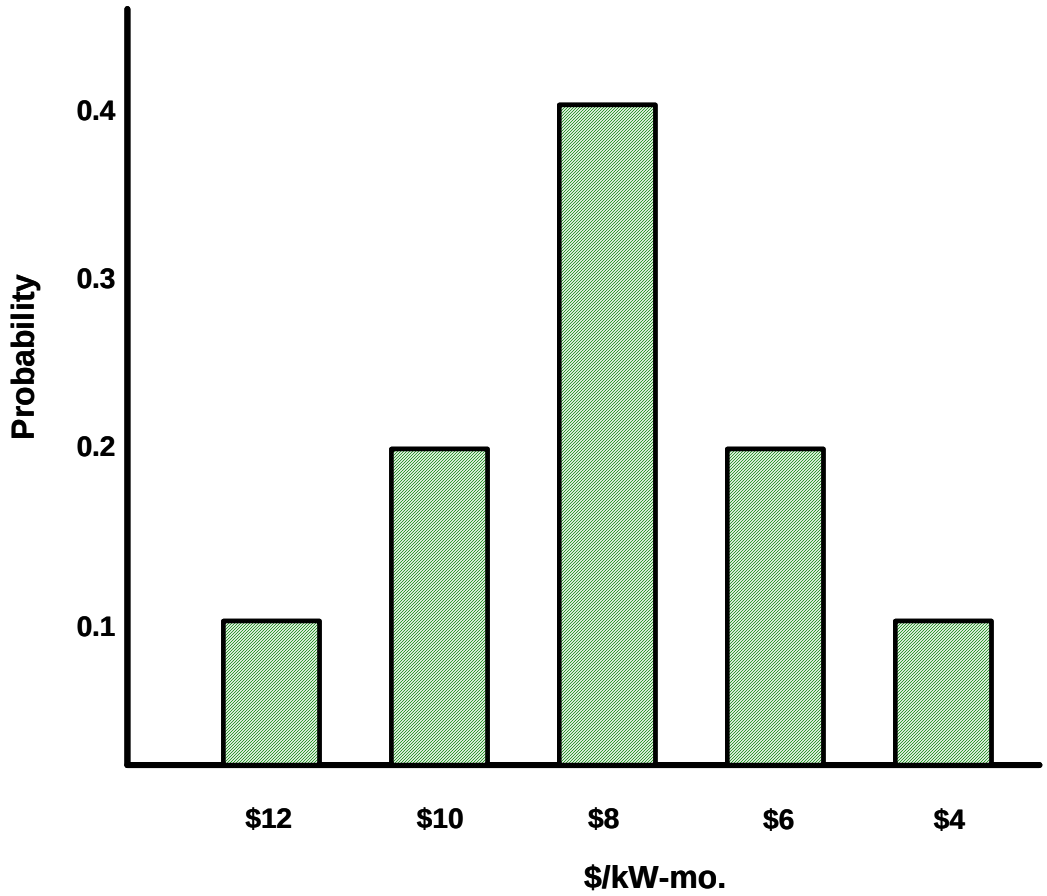
- **Price at *T* – 2 percent: $12/kW-mo.**
- **Price at *T* – 1 percent: $10/kW-mo.**
- **Price at *T* percent: $8/kW-mo.**
- **Price at *T* + 1 percent: $6/kW-mo.**
- **Price at *T* + 2 percent: $4/kW-mo.**



Cost Recovery When Suppliers Bid Competitively

It is not necessary for suppliers to exercise market power to ensure cost recovery. In this example:

- **The average payment to a new generator is (10% x $12) + (20% x $10) + (40% x $8) + (20% x $6) + (10% x $4) = $8/kW-mo., exactly covering the cost of entry.**
- **Therefore, average revenues are sufficient to induce the development of new capacity.**
- **Similarly, average revenues are more than sufficient to cover the $5/kW-mo. long-term going-forward costs of existing capacity.**



Net Revenues Collected by Existing Suppliers

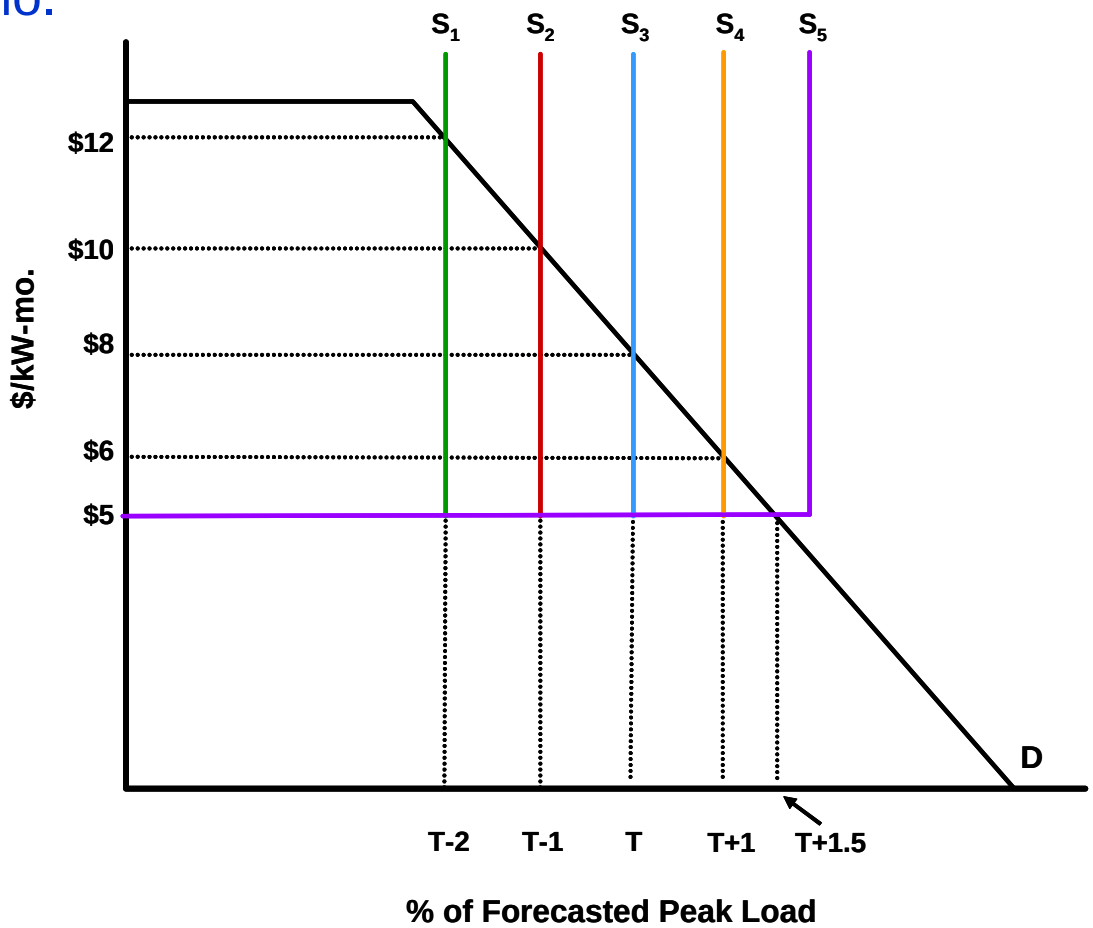
In fact, average revenues exceed the long-term going-forward costs of existing capacity by $3/kW-mo. This is exactly what one would expect:

- **The payment required to induce entry is $8/kW-mo.**
- **The payment that existing capacity requires over the long term to induce it not to shut down is $5/kW-mo.**
- **Therefore, in a market in which it is necessary to induce entry, and market-clearing prices must reflect that need, owners of existing capacity should be able to clear $3/kW-mo., since that is the measure of their cost advantage relative to their competition.**

Higher Short-Term Going-Forward Costs

Now change the assumptions for the example. Suppose that existing generators' short-term going-forward costs are equal to their long-term going-forward costs, $5/kW-mo.

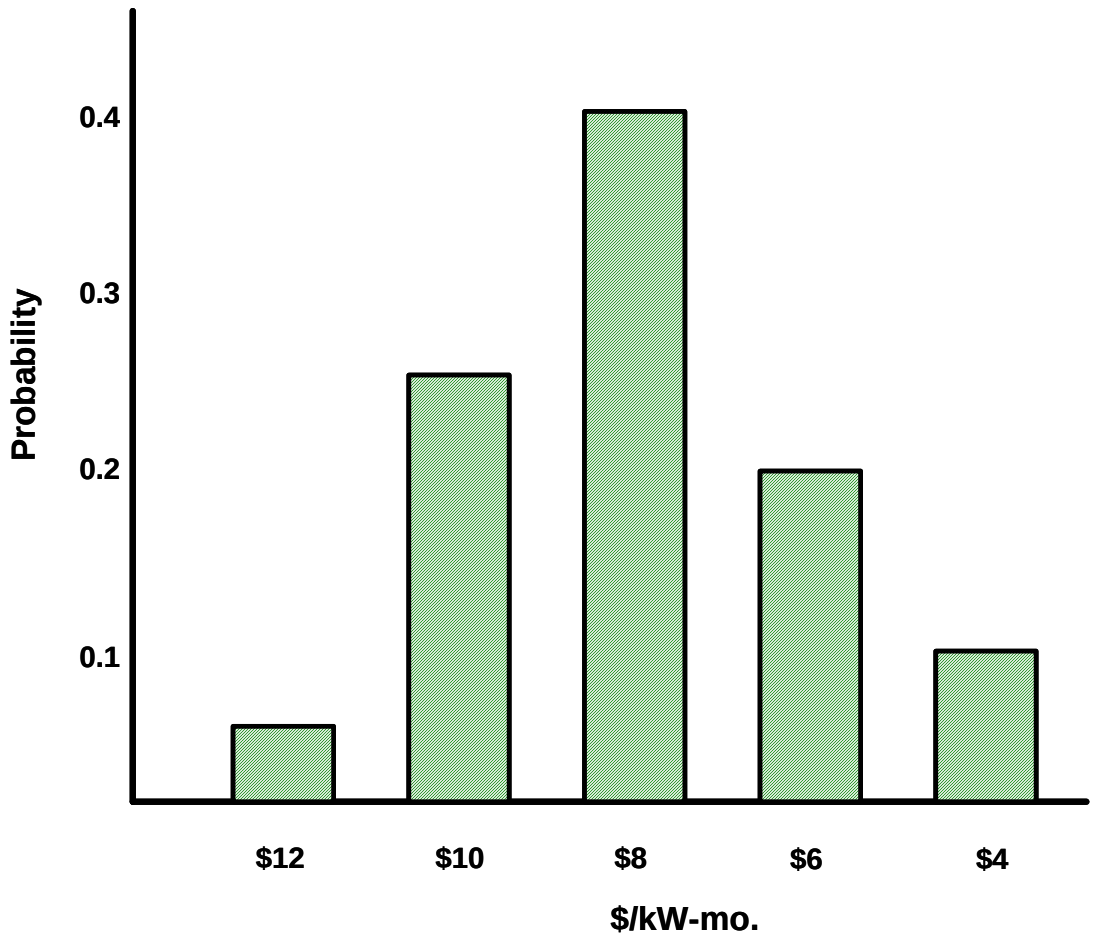
- **In that case, the price of ICAP will never reach $4/kW-mo., even if all generators' offers reflect their short-term going-forward costs. Instead, it will never go below $5/kW-mo.**
- **The amount of ICAP supplied will therefore never go below *T* + 1.5 percent.**



Cost Recovery

This change will slightly affect the relative probabilities of the possible outcomes.

- **Suppose that the probability that we will have *T* + 2 percent decreases to 5%, and the probability of *T* + 1 percent increases to 25%.**
- **Then the average price of capacity will once again be equal to the net cost of entry:**
  - ***(5% x $12) + (25% x $10) + (40% x $8) + (20% x $6) + (10% x $5) = $8/kW-mo.***



Net Revenue for Existing Generators

Again, the average payment to a new generator exactly covers the cost of entry.

And again, average payments to existing generators exceed the long-term going-forward costs of existing capacity by $3/kW-mo., just as they should.

Cost Recovery when Long-Term Avoidable Costs Are High

Next, assume that the short-term avoidable costs for an existing generator are $5/kW-mo., but its long-term avoidable costs are $9/kW-mo.—above the cost of entry for new generation.

- **Again, the average amount this generator is paid would exceed its short-term avoidable costs, so it would make sense for it to supply ICAP next month.**
- **But the payments to this generator do not cover its long-term avoidable costs, so it should stop incurring those costs.**
- **Therefore, it should continue to provide ICAP for as long as it can do so without incurring those long-term avoidable costs, and then retire.**
- **Once more, this provides the proper incentives (for retirement of uneconomic capacity, in this instance).**

Cost Recovery When Both Short- and Long-Term Avoidable Costs Are High

Finally, assume that both the short-term and long-term avoidable costs for an existing generator are $9/kW-mo., above the cost of entry for new generation.

- **It should offer its capacity into the SMA at $9/kW-mo., its short-term avoidable cost.**
- **If the market-clearing price exceeds $9/kW-mo. (there is a 30% chance it will), it should provide capacity that month.**
- **If not, it should retire.**

Basis for Expectations of Behavior in Competitive Markets

My last presentation focused on the need to develop more detailed market monitoring and mitigation procedures for New York's ICAP markets, without specifying just what those measures should be.

- **However, in order to assess whether market power is being exercised, it is necessary to state what behavior the market monitor should expect to see in a market in which market power is not being exercised.**
  - ***The reference levels that are used for mitigation in the energy and ancillary services markets reflect what the ISO expects generators would offer in a competitive market.***
- **The market monitoring and mitigation procedures defined for the SMA should be based on the notion that, in a competitive market, suppliers would offer their short-run avoidable costs, since that is just what they would do.**