AFFIDAVIT OF ABRAM W. KLEIN

Evidence of ISO-NE Market Performance In Support of Rejecting ISO-NE’s First Level Mitigation Thresholds

Until recently, I was Director, Power Market Analytics for Edison Mission Marketing and Trading, Inc. (EMMT), the marketing and trading arm for Edison Mission Energy, Inc. (EME), an Edison International Company. Currently, I am a Senior Energy Trader at EMMT. EMMT specializes in the marketing and trading of U.S. electricity, associated fuels and emission allowances, tailored long-term power sales and long-term fuel purchases employing forward and option structures, and asset-backed transactions supported by EME’s U.S. merchant generation portfolio. EME merchant capacity now stands at over 13,200 megawatts, including approximately 1,900 megawatts located in the Northeastern United States. EMMT is actively engaged in trading and risk management activities in ISO-NE, and is an ISO-NE market participant.

Prior to joining EMMT, I was a principal at Putnam, Hayes & Bartlett and its successor companies, PHB Hagler Bailly and PA Consulting Group. During seven years as a consultant I worked on electricity restructuring, market rules, asset valuation and price forecasting, and market power issues. I have testified before the New York Siting Board, the Ontario Energy Board and the Federal Energy Regulatory Commission. Before the Commission, I provided affidavits in the NYISO Automatic Mitigation Procedure docket and in the docket addressing NYISO credit policy for virtual bid transactions. I have also given presentations on electricity market issues at numerous industry conferences. I have a Masters in Public Policy from the John F. Kennedy School of Government at Harvard University, where I focused on applied microeconomics, the business-government relationship and regulatory economics. I also have a Bachelor of Arts from Brown University.

Summary of Affidavit

The Commission’s Notice of Proposed Rulemaking on Standard Market Design (SMD NOPR) sets out stringent criteria needed to justify and trigger implementation of market power mitigation that falls within its fourth “voluntary” category applied to mitigation of bids in unconstrained areas. The ISO-NE’s first level mitigation thresholds clearly fall within the Commission’s fourth category of mitigation measures. The trigger contemplated by the Commission requires both a showing that a sustained market power problem exists and that the measures be suspended when the market returns to normal conditions. The SMD NOPR also cautions that market power mitigation must not be used

to inefficiently suppress prices, or mask scarcity prices, providing the wrong economic signals for efficient investment or demand response.

The first level mitigation thresholds proposed by ISO-NE do not meet the Commission’s standards. By any measure, the mitigation measures used by ISO-NE currently, and proposed for the future market, have inefficiently suppressed prices below competitive levels during scarcity. By any measure, ISO-NE markets have been extremely competitive and continue to become more competitive. Rather than having prices above competitive levels for sustained periods, ISO-NE prices have been below the cost of entry despite the clear need for new capacity and occurrences of true scarcity on many peak days.

It is entirely appropriate that the Commission contemplates temporary mechanisms to impose more stringent market mitigation when faced with evidence of market failure due to inadequate competition. But, as the Commission’s SMD NOPR convincingly argues, the institution of such invasive market mitigation regimes depends first on evidence of a problem. In New England the preponderance of evidence shows not market power but rather a concern that spot prices are driven below competitive levels during scarcity. Moreover, the ISO-NE Compliance Filing fails to show evidence of a competitive concern in need of mitigation. The Commission should reject the ISO-NE first level mitigation thresholds.

The Commission Request for Factual Support and Justification in the ISO-NE Filing in the Context of the SMD NOPR

The Commission’s response to the NEPOOL/ISO-NE SMD filing wisely asks for additional factual support and justification of “first level mitigation” in unconstrained areas in the ISO-NE market design, specifically asking why it is necessary to have first level mitigation thresholds in addition to the $1,000/MWh safety net bid cap that is in place market-wide. Among other requests the Commission directed NEPOOL and ISO-NE to provide relevant analyses of market power, and to address “whether there is concern that opportunities for the exercise of market power exist within the $1,000 bid cap even when there are no constraints.”

The Commission’s request for justification must be understood in the context of the Commission’s recently issued Notice of Proposed Rulemaking on Standard Market Design (SMD NOPR), and the SMD NOPR’s principles and objectives with respect to market power mitigation and monitoring. The SMD NOPR makes an important distinction between the need for mitigation in constrained areas where “must run” conditions and/or few competitive suppliers exist, versus the situation of a broader, unconstrained market approaching scarcity or near-scarcity conditions. In the SMD NOPR:

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NOPR, the Commission expresses caution that market power mitigation not be used to drive prices below competitive levels during scarcity conditions:

“The challenge for market power mitigation on the supply side is to assure that it allows long-term competitive prices, which allows the opportunity to recover the fixed costs of the investment as well as the short-term variable costs of producing electricity. If some degree of scarcity pricing is not allowed, and generation only recovers short-term marginal costs, then some generators needed for reliability could fail to recover their full costs and may be retired. Worse yet, prices could be held so low that investors decline to invest in needed generation, transmission and demand-side projects because they do not see a reasonable expectation of recovering their costs.”

The Commission goes on to state:

“…the market power mitigation plan should be calibrated so that it does not inefficiently suppress prices, or mask scarcity prices, providing the wrong economic signals for efficient investment or demand response.”

The first level mitigation thresholds proposed by ISO-NE do not fall within the three mandatory components of the market mitigation plan proposed in the SMD that are specifically tailored to the structural flaws in the wholesale electricity markets. Rather, the first level mitigation thresholds correspond to the “voluntary fourth measure that could apply in unusual market conditions to assure that the high prices are not the result of market power.” The Commission provides an indication of what sort of unusual circumstances might trigger this type of mitigation:

“Exercise of this mitigation could be triggered by predetermined conditions or triggers (such as a sustained period of prices significantly above competitive levels), or by significant infrastructure problems in the market (e.g. sustained tight reserve conditions, as might be due to drought).”

The Commission expands:

“Since this form of market power mitigation is for temporary market conditions, it will be equally important for the market monitor to indicate the criteria to determine when the market has returned to normal competitive conditions and this market power mitigation method will be suspended.”

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3 SMD NOPR at 393.
4 SMD NOPR at 397.
5 SMD NOPR at 398 – emphasis added.
6 SMD NOPR at 402.
7 SMD NOPR at 416.
Because NEPOOL’s first level mitigation thresholds so clearly fall within the fourth category of market power mitigation outlined in the SMD NOPR, it is reasonable to expect that the “additional justification” the Commission has requested address the Commission’s concerns expressed in the SMD NOPR. That is, the compliance filing should 1) demonstrate that the market power mitigation plan is calibrated so that it does not inefficiently suppress prices, or mask scarcity prices, providing the wrong economic signals for efficient investment or demand response, and 2) that the mitigation measures are necessitated by “unusual circumstances” such as a sustained period of prices significantly above competitive levels or infrastructure problems.

**The ISO-NE Compliance Filing Justification of First-Level Mitigation Thresholds**

NEPOOL and ISO-NE argue that the New England market is “generally competitive,” but could have brief periods where it is vulnerable to non-competitive behavior. They base this conclusion on “a theoretical measure and evaluation of incentives for strategic bidding;” what they have dubbed the Residual Supply Index or RSI. The Compliance filing also points out anecdotal evidence from Summer 2002 when unusually high load and unexpected delays in new generation caused periods of “capacity deficiency” which “requires the commitment and dispatch of all available resources.”

They argue that the first level mitigation measures discourage anti-competitive behavior during these capacity deficiencies, “while allowing appropriate scarcity pricing.” Purported evidence for ISO-NE allowing for appropriate scarcity pricing is the fact that prices rose to the $1000 cap in three hours and above $100/MWh in 39 total hours during June, July and August 2002. They also point to prices reaching the $1000 cap in 15 hours during the Summer of 2001, while exceeding $100/Mwh a total of 34 times.

**The ISO-NE Compliance Filing is Deeply Flawed**

The ISO-NE compliance filing is deeply flawed in every respect.

The filing’s main piece of evidence, the hourly RSI measurement, represents a misguided misapplication of anti-trust theory. Rather than being a certain indicator of anti-trust concerns, as ISO-NE suggests, a low RSI in a given hour may be merely a reflection that the market is in or near true scarcity conditions. Because of how the hourly RSI is defined, the index is below 100% in any hour when there is scarcity regardless of the overall market concentration. The RSI denominator is system demand, including reserves. The numerator is system supply less the supply of the largest bidder. Because the system demand exceeds system supply in OP-4 hours, the RSI will be below 100% by definition in these hours, regardless of the dominance of the largest bidder.

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Even if the market were made up entirely of atomistic 25 MW generators, each owned by a separate entity, the RSI would be below 100% during OP-4 hours. In this example, New England could be made up of 1,000 different capacity owners, each with one 25 MW unit. The RSI in this example would still be below 100% in OP-4 hours because of how the RSI is defined, as discussed above. Thus, rather than providing justification of the first-level mitigation thresholds, as the Compliance filing intends, ISO-NE’s enumeration of the 2002 OP-4 hours begs the question of what spot clearing prices were in these hours and whether they meet the Commission’s requirement that the mitigation plan not “inefficiently suppress prices, or mask scarcity prices.” This topic is addressed below.

The use of the RSI demonstrates a basic flaw in ISO-NE and NEPOOL’s thinking about anti-trust issues and intervention in competitive markets. Structural indices of market power are intended to show whether market concentration may drive prices above competitive levels in aggregate over a sustained period, such as a year, not whether prices may be high in any given hour due to scarcity. Yet NEPOOL and ISO-NE offer no evidence from the several years of history of the NEPOOL competitive market to indicate a persistent market power concern. Indeed, it would be reasonable to expect spot market prices to be above (perhaps even significantly above) the cost of entry in a workably competitive market that experienced the number of days of true scarcity that existed in the NEPOOL spot markets during 2001 and 2002. In fact, as demonstrated below, NEPOOL market prices have been persistently and significantly below the cost of entry during this period, despite the many hours of scarcity and near scarcity. This evidence suggests three conclusions: 1) a lack of market power in the ISO-NE market, 2) the fact that ISO-NE’s invasive market mitigation procedures prevented supplier bids from reflecting the true scarcity that existed in the market, given 3) the fact that ISO-NE’s pricing software and protocols prevent prices from reaching competitive levels during scarcity without supplier bids that may appropriately reflect scarcity (such as the very last, emergency segment of a generator’s output).

The filing provides no evidence for their claim to “allow appropriate scarcity prices.” The filing merely notes the fact that prices were high in a few hours in 2002, which is evidence of nothing. Any reasonable analysis of ISO-NE prices during the six days of capacity deficiency in 2002, and other high load days, would be struck by the extent to which prices were clearly prevented from reaching competitive levels during scarcity, as demonstrated below.

The filing provides no evidence that the mitigation is necessitated by unusual circumstances within NEPOOL as the Commission’s guidance in the SMD NOPR demands. Indeed, the very conditions that are identified as the potential for concern are normal and expected conditions that exist in any well-functioning competitive electricity market; weather-driven peak loads and/or unit unavailability may and should create tight supply/demand conditions during a few hours or days of the year. These conditions should lead to high spot prices on these days to clear the market and to send appropriate signals to new entrants and demand-response. Moreover, these few spikes are a relatively small part of consumers’ bills and are appropriately managed through contracts. Indeed,
without the potential for price spikes there is very little incentive for load-serving-entities to hedge.

**RSI Application is Flawed and Does Not Meet the Commission’s Standard for Justification of Mitigation in Unconstrained Areas**

The Commission has set forth clear guidelines regarding its intentions with respect to the application of the fourth voluntary category of mitigation measures in the SMD NOPR. Broad-based mitigation of unconstrained areas needs to apply in “unusual circumstances,” should be “triggered” by real evidence of market failure such as sustained prices above competitive levels or infrastructure problems such as a drought. They need to be “temporary” and should be “suspended” when the market has returned to normal conditions.  

It is appropriate that the Commission have a high standard for the application of a heavy-handed intrusive market mitigation regime as represented by the first-level mitigation thresholds.  

It is highly dubious proposition that any automatic procedure can account for all the elements of cost and risk that go into determining bids, particularly during times of scarcity. In fact, it is exactly at these times that the calculation of operating risk for emergency output, increased O&M costs, allocation of increased risk of outage and potential for major maintenance expenses must necessarily be an exercise in substantial guess-work, with the “right” answer depending on many judgmental factors that change quickly, not on the fuel price indexes proposed by the ISO-NE proposal. The Commission’s high standard for implementation of mitigation in unconstrained areas recognizes that there is significant value in minimizing the extent of intervention in the market; in only intervening to prevent market power from driving prices significantly and persistently above (or below) competitive levels. This latter policy objective recognizes that excessively interventionist regulation is likely both to have unintended costs to society and to be exceedingly difficult to implement effectively.

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10 SMD NOPR at 402 and 416.

11 As stated in the May 29, 2001 affidavit of Dr. Larry Ruff, submitted on behalf of Aquila and Edison Mission in the related Docket Er01-2076-000.

“...It is not a legitimate objective of market power mitigation to try to identify and root out every market behavior or result that deviates even slightly or temporarily from textbook definitions of “perfect” competition. Economists and this Commission have long recognized that pursuit of such an objective is not necessary to maintain workable competition and would require a degree and type of intervention in the market that would be totally inconsistent with normal commercial operations.”

12 Indeed, the major economic rationale of moving from a regulated to competitive market structure is to benefit from the efficiency of allowing market forces, rather than command and control decisions by regulators and utilities, to determine both short-run supply and demand behavior and long-run resource allocation decisions.
It is against this backdrop that we must evaluate the Compliance filing’s use of the RSI. ISO-NE suggests that any RSI below 100% is indicative of market power, and offers an exhibit of RSI calculations during NEPOOL OP-4 hours. The fact that the RSIs are below 100% in each of these hours is offered as evidence for the need for bidding restrictions on suppliers. However, each of the OP-4 hours reflects a situation when the market is in a scarcity condition, by definition. These hours would not be designated as OP-4 otherwise. And, as noted above, because of how the hourly RSI is defined, the index is below 100% in any hour when there is scarcity regardless of the overall market concentration. Even if the market were made up entirely of atomistic 25 MW generators, each owned by a separate entity, the RSI would be below 100% during OP-4 hours.

While the RSI is a reasonable indicator of whether a market is approaching scarcity conditions (although there are certainly more direct measures of this), it is a very poor indicator of whether competitive concerns may exist in these conditions. In addition to the problem noted above about the RSI’s inability to distinguish scarcity from market power concerns, the RSI makes the extremely incorrect assumption that each supplier’s capacity is entirely uncommitted entering the spot market. In fact, most large participants will have committed a substantial portion of their capacity in advance, and may even be net buyers in the spot market. Indeed, it is a major objective of the Commission and a primary purpose of spot prices to facilitate markets for long-term contracting.

Finally, the RSI is flawed because it looks only at a few isolated hours, not whether there is a potential to raise price materially above competitive levels for a sustained period of time. In its SMD NOPR, the Commission clearly requires that any mitigation of the sort at issue here must be “triggered” by a finding that a market failure exists in the sense of prices significantly above competitive levels for sustained periods.

**Evidence from Market Performance: ISO-NE Prices are Kept Below Competitive Levels During Scarcity**

This section provides evidence regarding scarcity pricing in the ISO-NE market. While the ISO-NE Compliance Filing states by way of justification of the first level mitigation thresholds that their market allows “appropriate scarcity prices,” an analysis of the market prices during the OP-4 hours identified in the ISO-NE Compliance filing’s Exhibits C-1 and C-2 conclusively shows that the opposite conclusion is true.

**OP-4 Hour Prices**

Table 1 shows the prices and load levels during the 25 OP-4 hours that the ISO-NE compliance filing presents in Exhibits C-1 and C-2. Of the 25 OP-4 hours during 6 days in 2002:

- 6 hours, or 24%, had prices below $100/MWh with a minimum price of $60 during capacity deficiency.
- 17 hours (68%, more than 2/3 of the hours), had prices below $150/MWh.
• 8 hours (32%) had prices above $150/MWh. All of these prices occurred on 2 of
  the 6 days with OP-4 hours.
• Thus, on 4 out of the 6 days with capacity deficiency in NEPOOL, the price never
  exceeded $150/MWh and was frequently below $100/MWh.

Pricing on each of the days is discussed below.

June 26

There were 4 OP-4 hours on June 26, hours 14-17. The prices during these 4
hours were $102/MWh, $147/MWh, $125/MWh and $61/MWh respectively. The
on-peak average price for the day was only $64/MWh, despite the 4 hours of
capacity deficiency.

July 23

There were 2 OP-4 hours on July 23, hours 14-15. The prices during these 2 hours
were $348/MWh, and $336/MWh, respectively, which were the 5th and 6th highest
prices during the Summer. The on-peak average price for the day was $94/MWh,
with an on-peak average dropping to $58/MWh in non-OP-4 hours. An hour after
the lifting of OP-4, the price had dropped to $36/MWh in hour 17, despite
continued heavy load in that hour of over 22,400 MW.

August 5

There were 5 OP-4 hours on August 5, hours 15-19. The prices during these 5
hours were $137/MWh, $82/MWh, $61/MWh, $60/MWh and $71/MWh,
respectively. The on-peak average price for the day was $76/MWh. During
similar periods of the Summer, defined hear as hours 13-19 for the 9-week period
from June 24th to August 23rd 2002, there were 28% of hours with prices higher
than those during the capacity deficiency of hours 17 and 18. Over the year, there
were a total of 202 hours with higher prices than $60.

August 13

There were 3 OP-4 hours on August 13, hours 16-18. The prices during these 3
hours were $113/MWh, $147/MWh and $130/MWh, respectively. The on-peak
average price for the day was $75/MWh.

August 14

There were 6 OP-4 hours on August 14, hours 13-18. The prices during these 5
hours were $221/MWh, $738/MWh, $1000MWh, $1000MWh, $1000MWh and
$261/MWh, respectively. These hours were the highest prices in ISO-NE in 2002,
and along with the 2 hours on July 23, were the only hours that prices exceeded
$150. The on-peak average price for the day was $306/MWh. Prices did reach the $1000 proxy for scarcity on this day.

August 19

During August 19, there were 5 OP-4 hours. Clearing prices ranged from $86/MWh to $119/MWh during OP-4. According to ISO-NE’s exhibit C-1, hours 15 and 16 were the 4th and 5th most scarce hours of the 25 OP-4 hours provided by ISO-NE as demonstrating the need for first-level mitigation measures. These two hours had prices of $119/MWh and $111/MWh respectively. The on-peak average price for the day was only $78.81/MWh, despite the 5 hours of scarcity.

The highest price during the day actually occurred in hour 12, a non-OP-4 hour. This price was $159/MWh, and was followed in hour 13 by a price of $55/MWh despite load continuing to increase. OP-4 began at hour 14 with the $86/MWh price, and one may speculate that had the price not been allowed to collapse in hour 13 and appropriate price signals been sent, power may have been available to ISO-NE from outside that would have avoided the capacity deficiency.

OP-4 Prices are Below Competitive Levels

The Commission states that its market power mitigation measures are intended to deal with structural defects in electricity markets “by approximating the outcomes that a competitive market would produce.”\textsuperscript{13} Are the prices – ranging from range from $60/MWh to $147/MWh during 4 of the 6 capacity deficiency days shown in Table 1 – those that a competitive market would produce?

It is impossible to know precisely what prices a truly competitive market would have produced. Indeed, a perfectly competitive market with price responsive load may have produced prices well above $1000/MWh during the summer of 2002.\textsuperscript{14} Nevertheless, it is obvious from mere inspection that the prices during 2/3 of the capacity deficient hours, those with prices below $150/MWh, are below what would have been produced by a perfectly competitive market. This is obvious for numerous reasons.

First, during OP-4 conditions, all available generation is called into operation. Most peaking units (and many intermediate units) in New England have costs that exceed $60/MWh and some probably exceed $150/MWh.\textsuperscript{15} These units were required to be operating to meet demand during OP-4.

\textsuperscript{13} SMD NOPR at 392.

\textsuperscript{14} A $1000 demand response reflects a price only 7 times higher than the average New Engander’s bill and would only come into effect during a few infrequent hours of the year. Moreover, estimates of the value of lost load and bid caps in other competitive markets around the world significantly exceed $1000/MWh.

\textsuperscript{15} Section 2 of the ISO New England, Inc. Annual Markets Report, issued on September 12, 2002 presents data on supply curves with a number of bids above $150.
Second, one of the OP-4 actions is to call on the “emergency” capacity of existing generators. Running at emergency capacity levels imposes significant additional costs on generators that would increase the cost of some marginal generators significantly above $150. As described by ISO-NE’s market advisor, Dr. Patton in the related docket on New York’s mitigation plan:

“For example, the reference prices for emergency output ranges that can only be achieved at very high marginal costs (reflecting incremental increases in O&M, reduction in the unit’s efficiency, and increases in the forced outage probability) will reflect those high marginal costs. Consequently, there are substantial quantities of resources in the New York markets that have reference prices close to or at the $1000 bid cap.”\(^{16}\)

The precise cost of emergency segments on New England generators is not public. However, if there are “substantial quantities” of such capacity in neighboring New York with close to $1000/MWh bids, surely there are some units with similar costs in New England.

Third, OP-4 requires calling on interruptible loads and demand respond. While New England does not have much demand response, it is dubious that the prices seen during scarcity would be sufficient to illicit demand response. It makes no sense that such resources would be available at market prices of only $150/MWh, or 15 cents/kWh. Indeed, it is likely that the lack of “appropriate scarcity pricing” is one of the major impediments to the development of demand response that the Commission so desires. Indeed, the Commission’s $1000/MWh bid cap is expressly designed to address the lack of price responsive demand.\(^{17}\) By preventing bids from reaching the $1000 bid cap, the first level mitigation makes the bid cap irrelevant and prevents the ISO’s pricing software from having any bids that may act as proxies for the lack of price-responsive demand.

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\(^{17}\) SMD NOPR at 400.
Evidence from Market Performance: Long-run Price Signals

The purpose of spot electricity prices is not just efficiently clearing the market in the short term. An even more important goal is sending appropriate price signals for long-term contracting, price-responsive demand and competitive entry. Justification of the first level mitigation thresholds requires an assessment of actual performance of the ISO-NE market in aggregate. Indeed, as noted above, such an assessment of market performance is contemplated by the Commission in the SMD NOPR as a pre-requisite for triggering the SMD’s voluntary fourth category of mitigation such as the first level mitigation thresholds.

The ISO-NE Compliance filing provides no evidence of “a sustained period of prices significantly above competitive levels”\(^{18}\) in New England to trigger the Commission forth category of mitigation. They offer no assessment of market performance at all. Such an assessment is critical: one would in fact expect that a workably competitive market that was both in need of new capacity and experienced the degree of scarcity experienced in ISO-NE during the Summers of 2000, 2001 and 2002 would have market prices above, perhaps significantly above, the cost of entry. Likewise, a market in need of new capacity that has prices below the cost of entry cannot be infected with market power, almost as a matter of definition.

Strikingly, rather than being infected with market power, ISO-NE prices have been significantly below the cost of entry. Table 2 shows the annual margins for an entrant combined cycle (CC) unit under the assumption that the unit is dispatched with perfect foresight of market prices and has no impact on the prices that it sees. Both assumptions are unrealistic and actual margins for the hypothetical CC would certainly be less. The annual margins are shown for four cases:

- Year 2000 prices and gas costs
- Year 2001 prices and gas costs
- Year 2002 prices and gas costs with the price in all OP-4 hours set to the $1000/MWh bid cap.

From Table 2,\(^{19}\) returns on the entrant CC would be: $75/kw-yr in 2000, $83/kw-yr in 2001, $72/kw-yr in 2002 and $89/kw-yr in 2002 if all 25 OP-4 hours are adjusted to have $1000/MWh energy prices.\(^{20}\)

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18 SMD NOPR at 402.

19 Capacity market revenues have not been included in the estimate of entrant CC revenues. These revenues have fallen far short of making up the shortfall in revenues for new entrants relative to the high cost of entry.

20 This latter case shows that prices would be below the cost of entry even with prices at the cap during OP-4 hours. The analysis here only addressed whether prices were at competitive levels during the 25 OP-4 hours. To the extent that prices are suppressed below competitive levels during other high demand hours as well, it is not surprising that prices are still below competitive levels after adjusting the OP-4 prices. This finding may also indicate that $1000/MWh is too low a proxy for the price of at least some dispatchable demand.
From Table 3, we see that the cost of entry is approximately $115/kw-yr in New England for an entrant combined cycle. This is the amount the entrant CC would need to earn each year for 30 years. This estimate is consistent with the recent work sponsored by ISO-NE and used to determine the UCAP deficiency rate in SMD-1, which calculated the levelized entry cost of a simple cycle CT at $74/kw-yr. The combined cycle is more complex and thus higher cost than the CT.

We can see then that the entrant CC would not break even with ISO-NE spot prices. This is not to argue that market prices should always be at the cost of entry. Going forward, the prices that a competitive market would yield may well be appropriately below the cost of entry given the oversupply shown in the Compliance Filing’s Exhibit B – with reserve margins above 35% from 2003-2006. However, this oversupply did not exist in 2000-2002; ISO-NE had both multiple days of true scarcity as evidenced by OP-4 actions and tight reserve margins – just above 15% in 2000 and just below 10% in 2001 based on Exhibit B of the Compliance filing, and the 6 days of scarcity in 2002 discussed above.

Two conclusions are obvious from this analysis of market performance. First, ISO-NE’s justification of the first level mitigation measures based on the current market “allowing appropriate scarcity prices” is unfounded. In fact, ISO-NE market prices have both been below any reasonable measure of scarcity pricing during the scarcity hours, and, as a result, significantly below competitive levels in an annual aggregate sense. This latter finding derives from the fact that the ISO-NE market in 2000-2002 required entry and yet has had spot prices significantly below the cost of entry despite extreme weather and poor unit availabilities discussed in the Compliance Filing.

Second, the first level mitigation measures do not even come close to meeting the Commission’s standards for implementation of mitigation in unconstrained areas as set forth in the SMD NOPR.

**SMD-1 and Efficient Scarcity Pricing**

Why do prices not rise in New England during scarcity? There are many technical reasons, some of which were identified in the ISO-NE market advisor’s detailed report

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22 The Compliance filing indicates that high load and construction delays prevented the forecasted 30 percent reserve margins for 2002 in Exhibit B from being realized.

23 Some of the ways that the current and proposed pricing rules keep prices below competitive levels during scarcity include:

- Demand response and interruptible load do not set price, they are dispatched as must run.
- Bids from external resources will be effectively barred from setting the real-time ex-post price when their bid is higher than the dispatch rate which sets the ex-ante price. Interestingly, under the current market rules, only emergency imports are able to set prices at the $1000 bid cap. This sometimes leads to a perverse sequence of events where the imports get cut (say by an external region entering a generation emergency), the shortage/scarcity gets more severe as a result and ISO-NE’s prices collapse.
in November 2001 peak energy prices during summer, 2001. Yet despite reforms put in place for Summer 2002, prices have continued to be below competitive levels during scarcity. Most importantly, the ISO-NE’s SMD-1 proposal, while an improvement over the current market, does not have adequate assurances that prices will rise sufficiently during scarcity. SMD-1 does not have price-responsive demand allowed to set prices, and does not adequately increase prices during reserve shortages to reflect scarcity. There are no mechanisms in place to ensure that prices reflect the cost of units committed out-of-merit for local or pool-wide reliability or other reasons. ISO-NE prices during scarcity will continue to be below competitive levels under SMD-1 until these and other factors are corrected.

**Conclusion**

The ISO-NE Compliance filing fails to justify application of its first level mitigation thresholds in unconstrained areas. Such intrusive measures are only appropriate when triggered by evidence of a significant competitive concern, as required in the SMD NOPR. There is no evidence that such competitive concern exists in the New England market. Rather, the preponderance of evidence leads to the conclusion that market rules suppress prices below competitive levels during scarcity, and will continue to do so under SMD-1. The Commission should deny the ISO-NE request for first level mitigation thresholds in unconstrained areas and should require that adequate scarcity pricing mechanisms be put in place in the SMD-1 market. At a minimum, given the importance of appropriate scarcity pricing to the functioning of the electricity markets, as recognized by the Commission in the SMD NOPR, the Commission should at least deny approval of invasive market mitigation policies in unconstrained areas until it first receives appropriate assurances that the market design allows for adequate scarcity pricing.

- Use of reserves for energy during scarcity. Of course, curtailing reserves rather than energy during a capacity shortage is exactly the right thing to do. However, the pricing rules are not designed to reflect scarcity when this happens. Rather, as units that are held for reserves get released from their reserve obligation they may add lower cost supply to the energy stack and result in prices going down as scarcity increases.
- High-cost units may be committed and scheduled for reliability criteria, such as replacement reserves, while the dispatch software that calculates prices sees these units as out of merit.
- High-cost units may be called for local reliability and are not allowed to set price even if they are in merit.

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Table 2

<table>
<thead>
<tr>
<th>Year</th>
<th>All-hours Average Price ($/MWh)</th>
<th>Average Revenue ($/MWh)</th>
<th>Average Cost ($/MWh)</th>
<th>Average Energy Margin ($/MWh)</th>
<th>Average Energy Margin ($/kw·yr)</th>
<th>Capacity Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>43.23</td>
<td>48.04</td>
<td>34.85</td>
<td>13.19</td>
<td>74.8</td>
<td>65%</td>
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<td>2001</td>
<td>40.16</td>
<td>42.29</td>
<td>28.87</td>
<td>13.41</td>
<td>82.6</td>
<td>70%</td>
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<tr>
<td>2002</td>
<td>32.17</td>
<td>34.34</td>
<td>23.85</td>
<td>10.49</td>
<td>71.9</td>
<td>78%</td>
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<tr>
<td>2002 (1000 prices in OP-4)</td>
<td>34.27</td>
<td>36.85</td>
<td>23.85</td>
<td>13.00</td>
<td>89.1</td>
<td>78%</td>
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</table>

Prices and ISO-NE clearing prices

Cost assumptions for the hypothetical CC are as follows:
- Gas prices as quoted daily by Gas Daily for the Tennessee Zone 6.
- Full load average heat rate of 7100 btu/kw.
- 10% unit derating during Summer months.
- $60/MW per start up cost reflecting the both fuel cost and allocation of major maintenance.
- $1/MWh of VOM
- 5% forced outage rate.
- No fixed maintenance schedule (adding this would lower energy margins)

These cost assumptions represent a reasonably conservative estimate based on typical assumptions used in the industry.

Table 3

<table>
<thead>
<tr>
<th>Economic Assumptions</th>
<th>Notes:</th>
<th>Levelized Cost ($2000/kW)</th>
<th>FCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation Rate</td>
<td>2.50%</td>
<td>115.4</td>
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</tr>
</tbody>
</table>

Project Assumptions
- Project Life: 30 years Must be 30 years or less
- Project Size: 520 MW Annualized Capacity - does not affect Levelized Cost per kW
- Capital Costs (installed - $2000): 700 $ / kW Exclusive of IDC
- Fixed O&M A&G Costs ($2000): 10.5 $ / kW-year
- Project Construction (beginning of year): 2001
- Construction Duration: 2 years Must be 1, 2, or 3 years
- In-Service Date (beginning of year): 2003

Tax Assumptions
- Property Tax Rate: 2.00% Percent of capital cost (including IDC) paid in taxes per annum.
- Federal Tax: 35%
- State Tax: 6%
- Blended Rate: 38.90%
- Tax Depreciaiton Yrs: 20 years Must be 15 or 20 years

Financing Assumptions
- Perc. Financed with Debt: 50%
- Perc. Financed with Equity: 50%
- Return on Debt: 9.10%
- Return on Equity: 13.00%
- Debt Payback Period: 20 years In addition to construction period
- Debt Payment Inflator: 1.5% Debt payments increase annually at this rate.

Technological Assumptions
- Heat Rate Decline per year: 0.0%
- Real Capital Cost Decline per year: 1.0%
- Unit Type: CC Must be CC or CT
- Heat Rate Decline Multiplier: 1.75 Effect of a 1% change in heat rate on energy margin
- Real Energy Margin Decline: 1.0% Rate at which a unit's real Energy Margin will decline over time due to lower capital costs and heat rates of newer units
- Nominal Energy Margin Escalation Rate: 1.5% Energy Margin increases annually at this rate