

**ASSESSMENT OF THE ERCOT
WHOLESALE MARKET OUTCOMES
ON JUNE 25 AND 26, 2012**

POTOMAC ECONOMICS, LTD.

Independent Market Monitor for the
ERCOT Wholesale Market

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I. INTRODUCTION

Potomac Economics serves as the Independent Market Monitor (“IMM”) for the Public Utility Commission of Texas (“PUCT” or “Commission”). The primary role of the IMM as the Commission’s market monitor is to: (1) detect and prevent market manipulation strategies and market power abuses; and (2) evaluate the operations of the wholesale market and the current market rules and proposed changes to the market rules, and recommend measures to enhance market efficiency.¹

The Electric Reliability Council of Texas (“ERCOT”) region experienced extremely hot and dry weather conditions during the week of June 24, 2012, setting new records for hourly electricity demand for the month of June on two consecutive days. On Monday, June 25, 2012, a new June record for peak electric demand of 65,047 megawatts (“MW”) was set during the 4-5 p.m. hour, exceeding by 3.1 percent the previous record for June of 63,102 MW that occurred on June 17, 2011. On Tuesday, June 26, 2012, the June record was set again, with peak usage reaching 66,583 MW during the 4-5 p.m. hour, or 5.5 percent higher than the peak hour usage on June 17, 2011.

Along with these record electricity demands, market prices averaged higher than normal in both the ERCOT day-ahead and real-time markets on June 25 and 26, particularly during the hottest afternoon hours when electricity demand is at its highest. Prices averaged approximately \$42 per MWh for the day on June 25th, which is about \$15 per MWh higher than average prices prior to the onset of the extremely hot weather. On June 26th, prices averaged approximately \$270 per MWh for the day, with prices reaching the cap of \$3,000 per MWh for 25 minutes from 2:40 to 3:05 p.m. In the several days following June 26th, the IMM received and responded to several informal inquiries from market participants and other interested stakeholders relating to ERCOT market operations and market outcomes, particularly related to the June 26th Operating Day. Such inquiries are commonly received and responded to by the IMM.

Among the inquiries fielded by the IMM related to the market outcomes on June 25 and 26, 2012, one inquiry on June 28, 2012 was followed with a public posting on an

¹ Public Utility Regulatory Act, §39.1515(a); P.U.C. Subst. R. §25.365(c).

online “blog” on June 29, 2012, which generated additional interest and questions from market participants, interested stakeholders, and elected and appointed officials.²

This “blog” post generally asserted and/or questioned: (1) whether ERCOT violated its Protocols related to the operation of the day-ahead market on June 25th for the June 26th Operating Day; and (2) whether market manipulation strategies or market power abuses played a role in the June 25 and 26, 2012 market outcomes.

As explained to the author of the “blog” in a roughly 20 minute conversation on June 28, 2012, the review and analyses performed by the IMM and described in further detail in this report yields the following findings related to the events in the ERCOT wholesale market on June 25 and 26, 2012:

- ERCOT did not meet the target deadline for the publication of day-ahead market results; however, ERCOT did provide proper notice of the delay as required by ERCOT Protocols and therefore did not commit a violation of the ERCOT Protocols.
- Market manipulation strategies or market power abuses did not play a role in the June 25 and 26, 2012 market outcomes.

²

<http://www.texaselectricityratings.com/blog/2012/06/29/ercot-market-manipulated/>. This report addresses several, but not all, items in the “blog.” Not addressing an item from the “blog” in this report does not indicate agreement by the IMM.

II. ANALYSIS

A. ERCOT June 25th Day-Ahead Market Operations

Each day, ERCOT executes a day-ahead market (“DAM”) that performs resource unit commitment and co-optimizes ancillary service capacity, certain congestion revenue rights and forward financial energy transactions for the 24 hours of the subsequent operating day. ERCOT begins execution of the day-ahead market at 10:00 a.m. in the day-ahead for the subsequent operating day, with a target completion under the ERCOT Protocols of no later than 1:30 p.m. (ERCOT Protocols Section 4.5.3). Although the “blog” characterizes the DAM as a “dutch auction,” it is actually based on a much more complex, multi-hour mixed integer programming algorithm to maximize bid-based revenues minus the offer-based costs over the operating day, subject to transmission network security, and ERCOT ancillary service requirements. Approximately one hour after the completion of the DAM but no sooner than 2:30 p.m., ERCOT begins execution of its Day-Ahead Reliability Unit Commitment (“DRUC”). Upon completion of the DRUC, ERCOT updates a chart on its public website showing the forecasted load and expected online generating capacity as of 2:30 p.m. for each hour of the following operating day (the “blog” refers to this chart as the “Day Ahead forecasting”).³

Because of the complexity of the DAM algorithm, although the target completion time is 1:30 p.m., Section 4.1.2 specifically recognizes that, at times, ERCOT may deviate from the target completion time of 1:30 p.m., and that it is possible that the DAM may be aborted (the DAM has never been aborted to-date). If completion of the DAM is delayed beyond the 1:30 p.m. target, Section 4.1.2 of the ERCOT Protocols requires that “ERCOT shall immediately issue a Watch and notify all Qualified Scheduling Entities

³ <http://www.ercot.com/content/cdr/html/loadForecastVsActualCurrentDay.html>. In this chart, the “HSL” values represent the sum of the High Sustainable Limits of all generating resources expected to be online for each hour as represented by the Current Operating Plans (“COP”) submitted by all of the Qualified Scheduling Entities in the ERCOT region. The HSL values in the COP are not necessarily representative of the actual generating capacity online in real-time, because these values can change in real-time due to factors such as unit outages, reductions or increases in available capacity from online generating units, changes in wind speeds, and the commitment of generating units that were not expected to be online.

(QSEs)...” On June 25, 2012, completion of the DAM for the June 26, 2012 operating day was delayed past the 1:30 p.m. target and ultimately completed at 5:42 p.m.

Related to the DAM delay on June 25th, the “blog” states:

“One interesting thing did happen on Monday, however. Instead of releasing their Day Ahead forecasting by 2:30 p.m., ERCOT uncharacteristically didn’t release it until roughly 8 p.m. Monday night, and they appear to have offered no explanation whatsoever for the delay. When I asked Dan Jones, the Independent Market Monitor for ERCOT about the delay in releasing the DAMs and if there were any reason for the delay, he couldn’t provide a meaningful response. He simply said “Sometimes that kind of thing happens. And to be clear, “That Kind of Thing” in this instance is actually a violation of ERCOT’s own protocols for procedures when the DAM is going to be late. When the information finally was released, the forecasting for Tuesday June 26th predicted an extremely heavy load.”

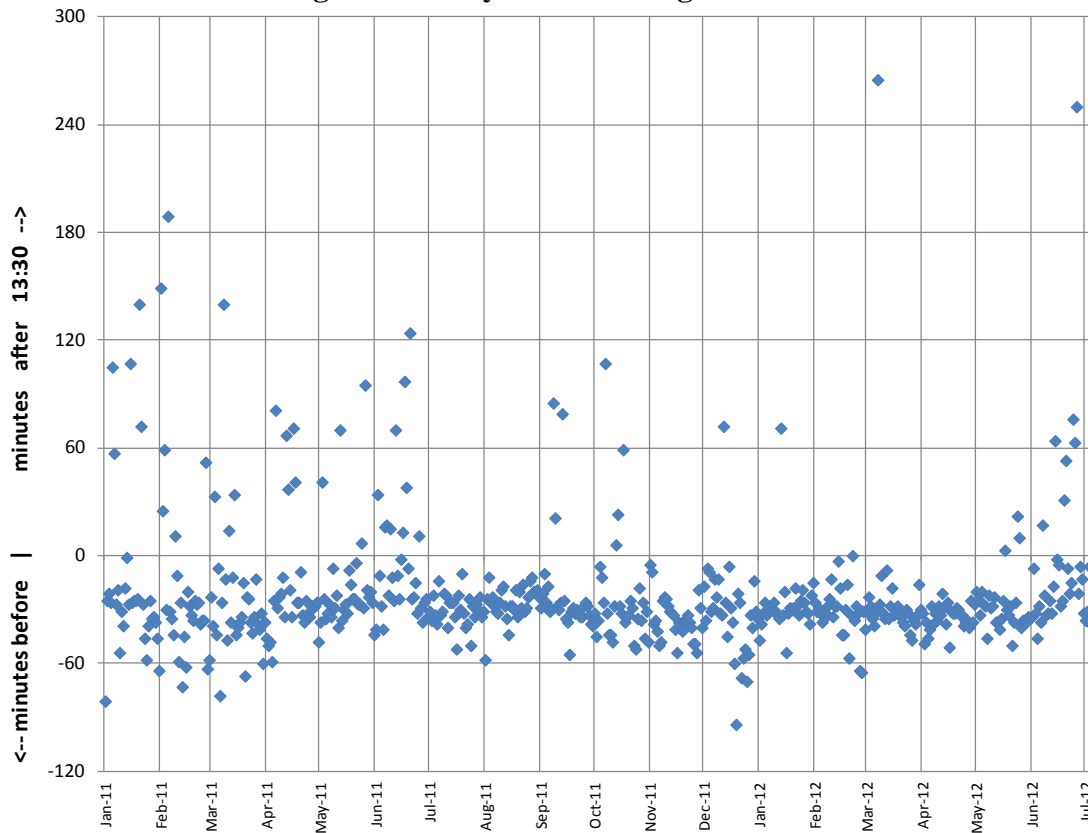
This is not a question; rather, it is a direct allegation of a Protocol violation by ERCOT. Whether directed at ERCOT or market participants, the IMM takes seriously all alleged violations of the Protocols or PUCT rules.

As stated previously, the ERCOT Protocols have a target completion time for the DAM, and a requirement to provide notice to all QSEs if the DAM completion time will be delayed beyond the target. Thus, the fact that the DAM was delayed past the target completion time does not, in of itself, give rise to a protocol violation by ERCOT. Although not typical, it is not an uncommon occurrence for the DAM to be delayed beyond the target completion time. In fact, the two days prior to June 25th also experienced delays beyond the target DAM completion time.

The chart in Figure 1 shows the Daily DAM posting times from January 1, 2011 through July 6, 2012 relative to the target completion time of 1:30 p.m. in the ERCOT Protocols. Of the 553 days in this time period, the DAM was completed after the 1:30 p.m. target completion time in the ERCOT Protocols on 54 days. In regard to a potential violation of the ERCOT Protocols, the question is, when the DAM is delayed beyond the target

completion time as it was on June 25th, did ERCOT comply with the requirement in Protocols Section 4.1.2 to immediately issue a Watch and notify all QSEs?

Figure 1: Daily DAM Posting Times



Review of the ERCOT notice archives show that ERCOT issued the following notice to all QSEs at 13:23:33 on June 25, 2012 regarding the delay of the DAM for the June 26, 2012 operating day:

Table 1: ERCOT QSE Notices on June 25, 2012

Date/Time	Type	Priority	Notice
Jun 25, 2012 13:23:33	Watch	Medium	ERCOT has delayed the deadline for the posting of the DAM solutions for OD June 26, 2012 due to long solution time. ERCOT will post notification when DAM is complete.
Jun 25, 2012 17:52:21	Watch	Medium	As of 17:42 DAM has posted results for OD 06/26/2012

Based upon this review, the IMM finds that ERCOT complied with the procedures set forth in the ERCOT Protocols and that the Protocol violation by ERCOT alleged in the “blog” is without merit.

Finally, although the DAM for the June 26th operating day was completed at 5:42 p.m. on June 25th, the “blog” states that the “Day Ahead forecasting” chart on the ERCOT website was not updated until roughly 8 p.m. According to ERCOT records, the “Day Ahead forecasting” chart should have been posted and available at the usual time around 2:30 p.m., although it is not possible at this time to confirm that posting time or explain why the author of the “blog” did not see an update until around 8:00 p.m. In any event, because of the DAM delay on June 25th, whenever the “Day Ahead forecasting” chart was posted, the expected online generation capacity shown in the chart at that time was inaccurate because it was based on data as of 2:30 p.m. that had not yet been fully updated because of the DAM delay (this is common when there is a relatively long DAM delay such as that occurring on June 25th).

However, we also note that ERCOT publishes load forecast data accessible from the same page on the ERCOT website as the referenced chart that contains hourly-updated load forecast data beginning seven days prior to the operating day. These data were continuously available on the ERCOT website despite any delay that may have occurred in updating the “Day Ahead forecasting” chart.⁴

B. Market Manipulation and/or Market Power Abuse

The ERCOT region experienced extremely hot and dry weather conditions during the week of June 24, 2012, setting new records for hourly electricity demand for the month of June on two consecutive days. On Monday, June 25, 2012, a new June record for peak electric demand of 65,047 megawatts (“MW”) was set during the 4-5 p.m. hour, exceeding by 3.1 percent the previous record for June of 63,102 MW that occurred on June 17, 2011. On Tuesday, June 26, 2012, the June record was set again, with peak usage reaching 66,583 MW during the 4-5 p.m. hour, or 5.5 percent higher than the peak

⁴ “Seven-Day Load Forecast by Weather Zone” (<http://www.ercot.com/gridinfo>)

hour usage on June 17, 2011. These weather conditions and high load levels were forecast several days in advance of June 25 and 26, 2012.

Additionally, as is typical for such hot summer days, afternoon wind production was forecast to be relatively low at around 1,000 to 2,000 MW. As it turned out, actual wind production on June 25 and 26 was even lower than predicted, averaging 455 MW and 340 MW for hour-ending 4 p.m. on June 25 and 26, respectively.

Figure 2 shows the actual ERCOT load (left axis) and wind production (right axis) for June 25 and 26, 2012. The “blog” states that “...Monday June 25th arrives and the day ends up being one of the hottest June temperatures on record. It’s hot, and the grid taxed, using almost 66,000 megawatts of energy.” However, as indicated in Figure 2, while the actual load on June 25th was indeed high, it just barely exceeded 65,000 MW at the peak, and was not almost 66,000 MW as suggested in the “blog.” In contrast, the ERCOT load on June 26th was well above 66,000 MW, with peak usage reaching 66,583 MW during the 4-5 p.m. hour.

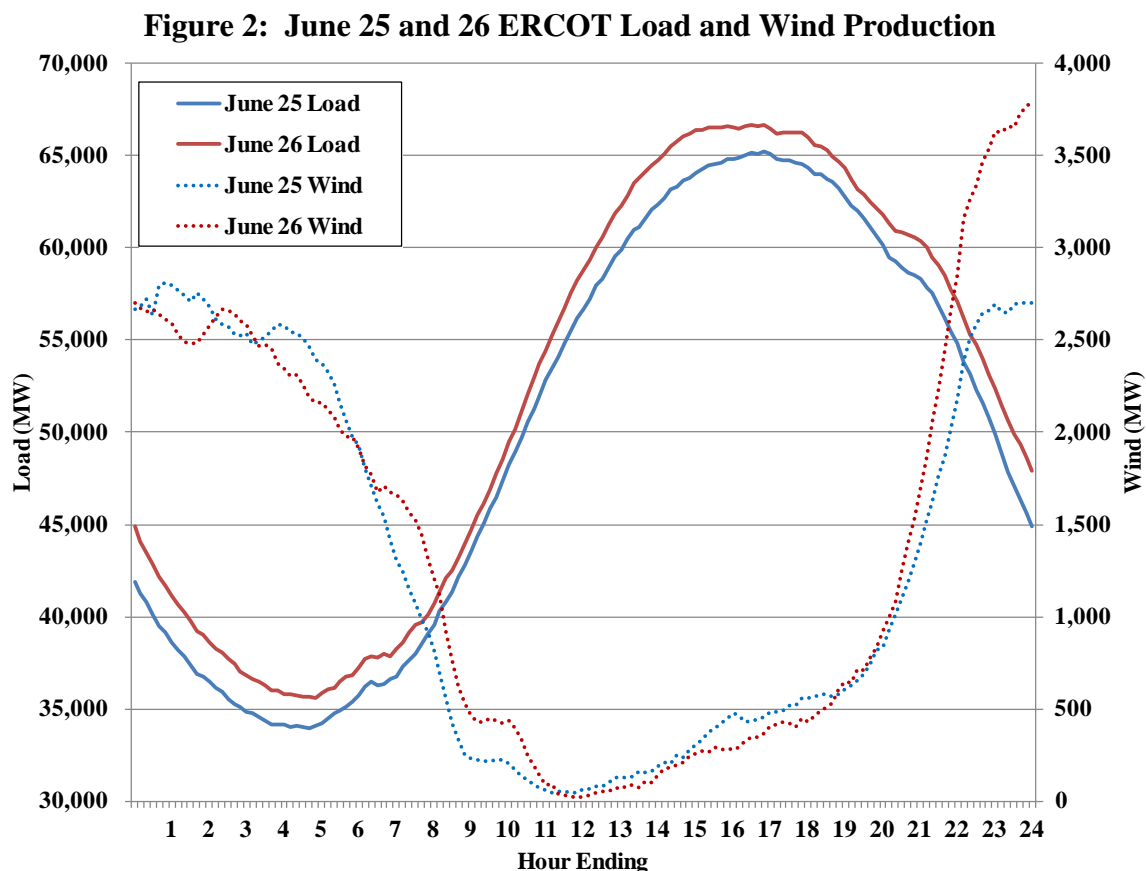
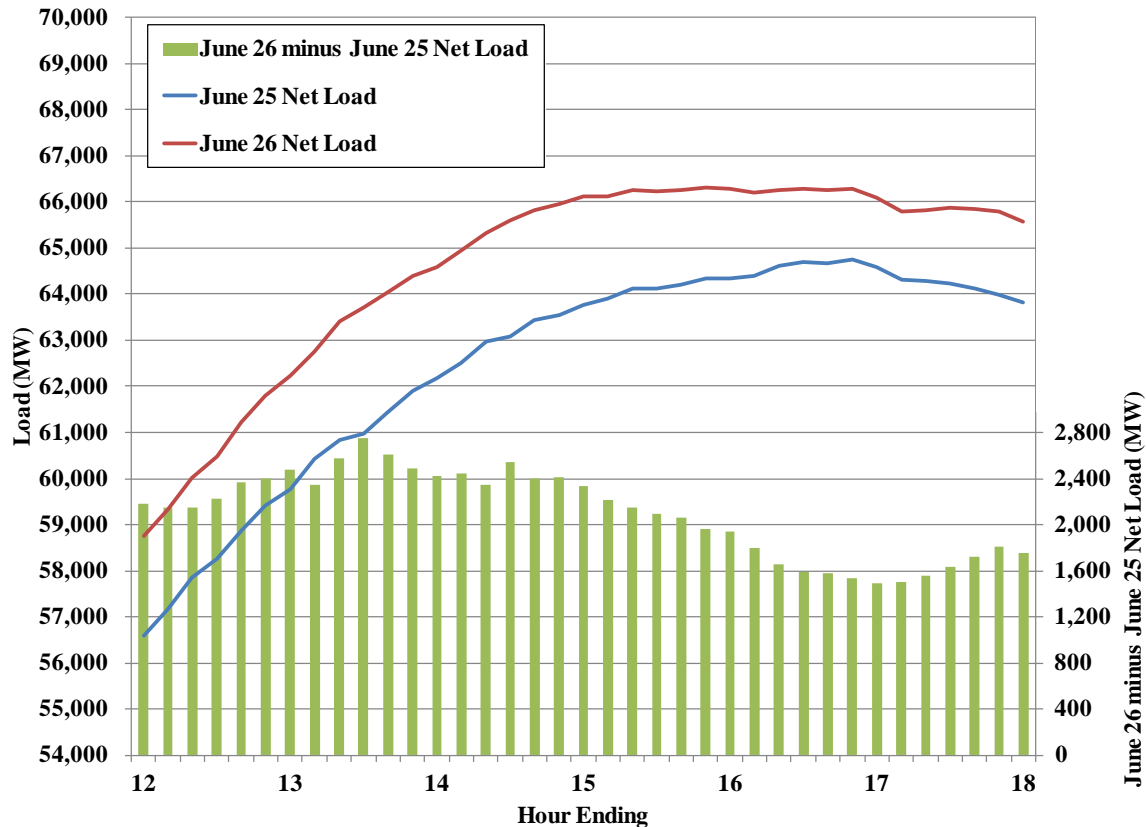


Figure 3 shows the “net load” (left axis) for June 25 and 26, 2012 and the June 26 minus the June 25 “net load” (right axis) for the afternoon peak hours from 12:00 to 6:00 p.m. “Net load” is the ERCOT load minus the ERCOT wind generation, and is representative of the demand that must be met by all non-wind generation resources.

Figure 3: June 25 and 26 ERCOT Net Load (Peak Hours)



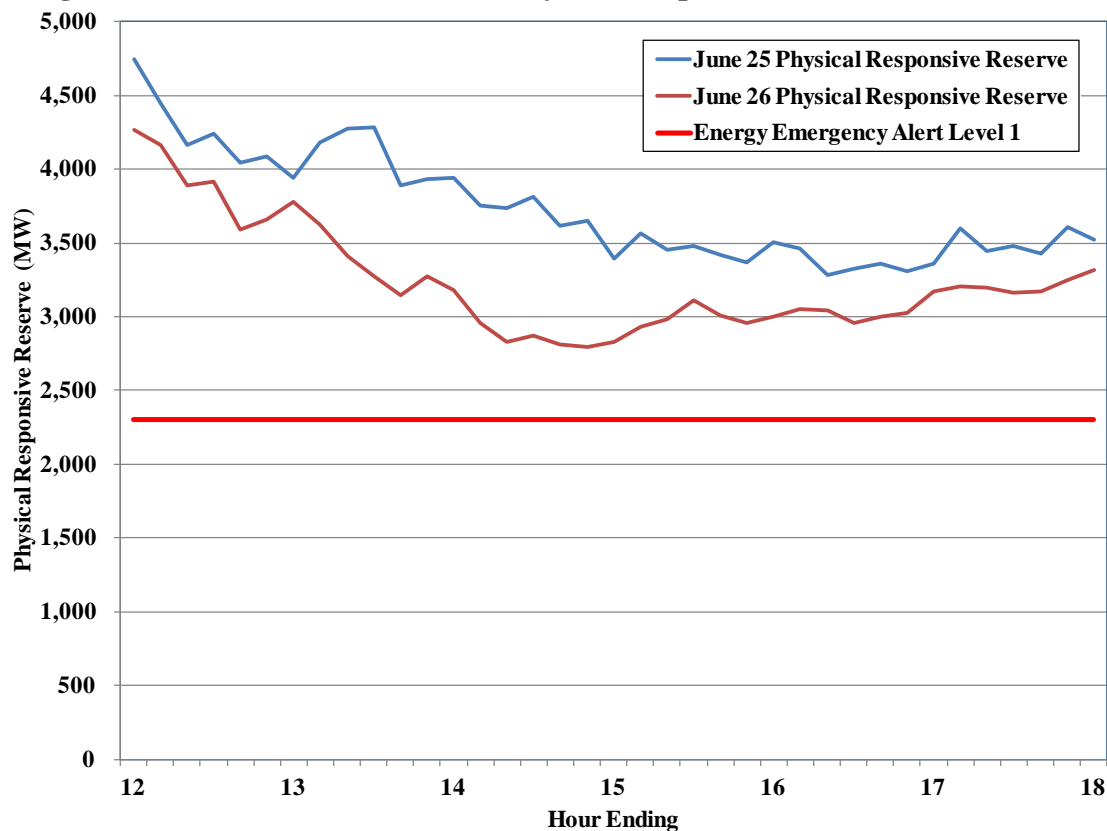
In regard to the June 26th electricity demands, the “blog” states “...let’s not forget that Monday June 25th was ALSO a very heavy load demand day, using approximately 66,000 megawatts of energy, so it isn’t as if the expected amount of generation resources just snuck up on anyone, because Monday, Tuesday, and Wednesday were all actually very similar days in terms of total usage.”

In fact, as shown in Figure 3, although the ERCOT loads on Monday and Tuesday were both quite high for June, the ERCOT load on Tuesday was significantly higher than the ERCOT load on Monday, with “net load” averaging 2,100 MW higher on Tuesday than on Monday for the afternoon peak hours from 12:00 to 6:00 p.m. To put this difference in perspective, according to a metric from ERCOT, one MW is enough to power about

200 homes during peak demand periods.⁵ Thus, the increase in the ERCOT load and relative decrease in wind production during the afternoon hours on June 26th compared to June 25th was comparable to the amount of electricity required to power 420,000 homes.

Figure 4 shows the ERCOT Physical Responsive Reserve (“PRC”) for the afternoon peak hours from 12:00 to 6:00 p.m. on June 25 and 26, 2012. PRC is ERCOT’s primary measure of overall operating reserves, and ERCOT will initiate Energy Emergency Alert Level 1 (“EEA1”) when PRC drops below 2,300 MW. The data in Figure 4 show that PRC was lower across the peak hours on June 26th compared to June 25th, with the minimum PRC value of 3,236 MW occurring at 4:16 p.m. on June 25th, and the minimum PRC value of 2,754 MW occurring at 3:00 p.m. on June 26th.

Figure 4: June 25 and 26 ERCOT Physical Responsive Reserve (Peak Hours)



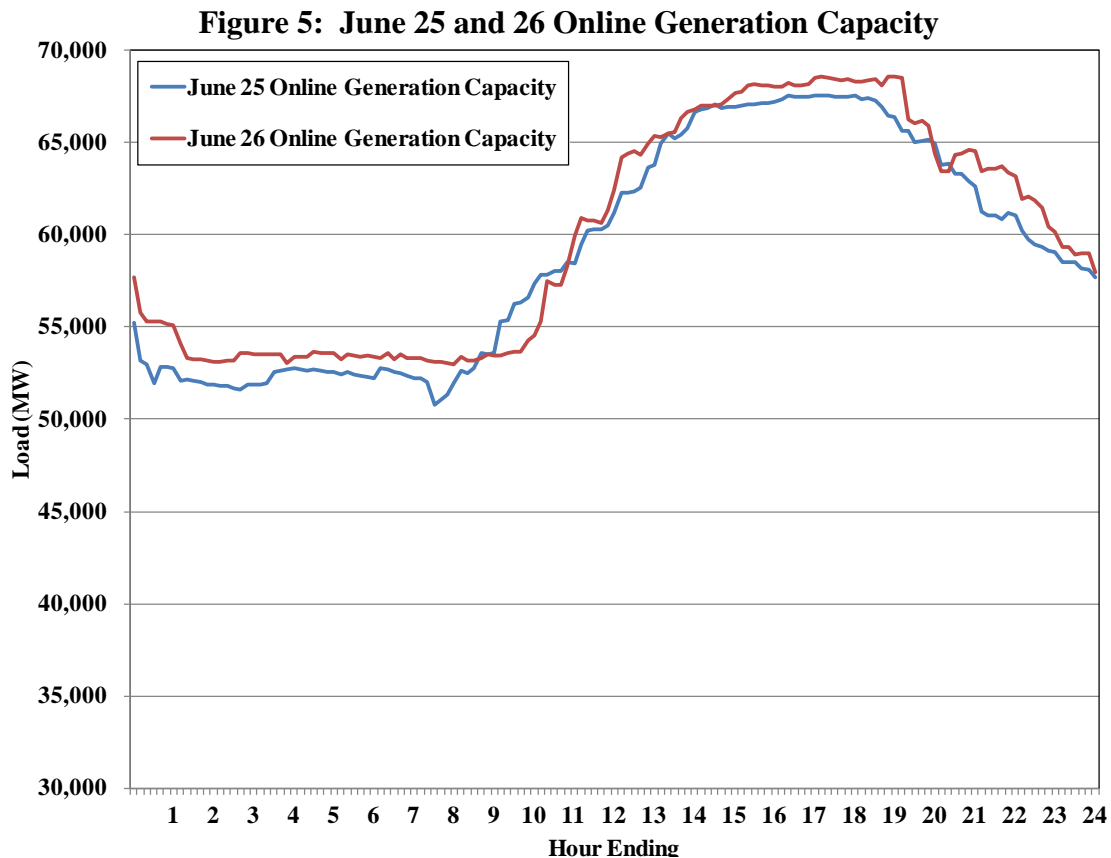
Although the precise quantity will vary somewhat, given current operating reserve requirements, market prices will generally rise to the system-wide offer cap (currently \$3,000 per MWh) as PRC drops below 3,000 MW to reflect the degradation in reliability

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http://www.ercot.com/news/press_releases/show/26237

that occurs as operating reserves are consumed to meet system demands, and therefore unavailable to provide insurance against system contingencies (such as the loss of one or more large generating units) that could result in widespread blackouts. Thus, as PRC drops to levels approaching the declaration of EEA1 by ERCOT and operating reserve deficiencies begin to occur, the shortage pricing mechanisms provide an efficient price signal for supply resources to take extraordinary, higher-risk actions to the extent possible (*e.g.*, operating at emergency output levels), as well as the economic incentive for demand-side resources to reduce consumption to help replenish or stall the continued depletion of critical operating reserves.

Figure 5 shows the online generation capacity on June 25 and 26, 2012. Over the peak hours in the afternoon, the online generation capacity averaged approximately 600 MW higher on June 26th than on June 25th.



In regard to the available generation capacity on June 26th, the “blog” states that “...around 5.p.m. on the evening of June 26th and extra 700-1000 megawatts of energy

came on the grid and drove prices back down to normal levels.” The “blog” goes on to state “[w]hen I spoke with Dan Jones about this, he responded with the following:”

“I can’t talk about specific units, but I did share with some other people who had questions that there were some units that had trouble in the afternoon but were able to resolve those issues right around the 5 p.m. time frame.”

The “blog” further states “[w]hat is strange is that ERCOT’s own press conference the following morning referenced no major outages and plenty of reserves being ready had usage gone higher. So why not have that power deployed sooner and prevent a price spike? Jones’s position that plants were down and ERCOT’s rosy take the following morning are in direct contradiction to one another.”

In the press conference conducted by ERCOT on the afternoon of June 26th, Kent Saathoff with ERCOT stated that “there are always some plants that have forced outages, we’ve got over 400 of them and the odds of all 400 not having a problem is pretty low. We don’t have any abnormal amount of outages today.”⁶ The IMM concurs with this assessment by ERCOT, and the observation by the IMM that there were some generation unit issues is in no way contradictory to ERCOT’s observation that the overall level of generating unit outages was not abnormally high.

As indicated in Figure 5, there was a slight increase of approximately 600 MW in the available generation capacity around 5 p.m. on June 26th. As explained to the author of the “blog” on June 28th based on review that had already been conducted by the IMM, this increase was associated with some units that experienced operational issues earlier in the day and that were able to later either return to service or increase their available capacity. Review by the IMM of the data relating to each of these outages indicates that the outages were experienced by multiple generation owners and were related to operational issues that are not uncommon in the day-to-day operation of power plants. There is no indication that the outages were related to manipulative conduct.

⁶ <https://ercot.webex.com/ercot/lsr.php?AT=pb&SP=MC&rID=66253722&rKey=53cf3cdb4b7fca47>

III. CONCLUSIONS

The review and analyses performed by the IMM and described in Section II of this report yields the following findings related to the events in the ERCOT wholesale market on June 25 and 26, 2012:

- ERCOT did not meet the target deadline for the publication of day-ahead market results; however, ERCOT did provide proper notice of the delay as required by ERCOT Protocols and therefore did not commit a violation of the ERCOT Protocols.
- Market manipulation strategies or market power abuses did not play a role in the June 25 and 26, 2012 market outcomes.