POTOMAC ECONOMICS

2009 STATE OF THE MARKET REPORT FOR THE ERCOT WHOLESALE ELECTRICITY MARKETS

POTOMAC ECONOMICS, LTD.

Independent Market Monitor for the
ERCOT Wholesale Market

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I. REVIEW OF MARKET OUTCOMES

A. Balancing Energy Market

1. Balancing Energy Prices During 2009

The balancing energy market is the spot market for electricity in ERCOT. As is typical in other wholesale markets, only a small share of the power produced in ERCOT is transacted in the spot market, although at times such transactions can exceed 10 percent of total demand. Although most power is purchased through bilateral forward contracts, outcomes in the balancing energy market are very important because of the expected pricing relationship between spot and forward markets (including bilateral markets).

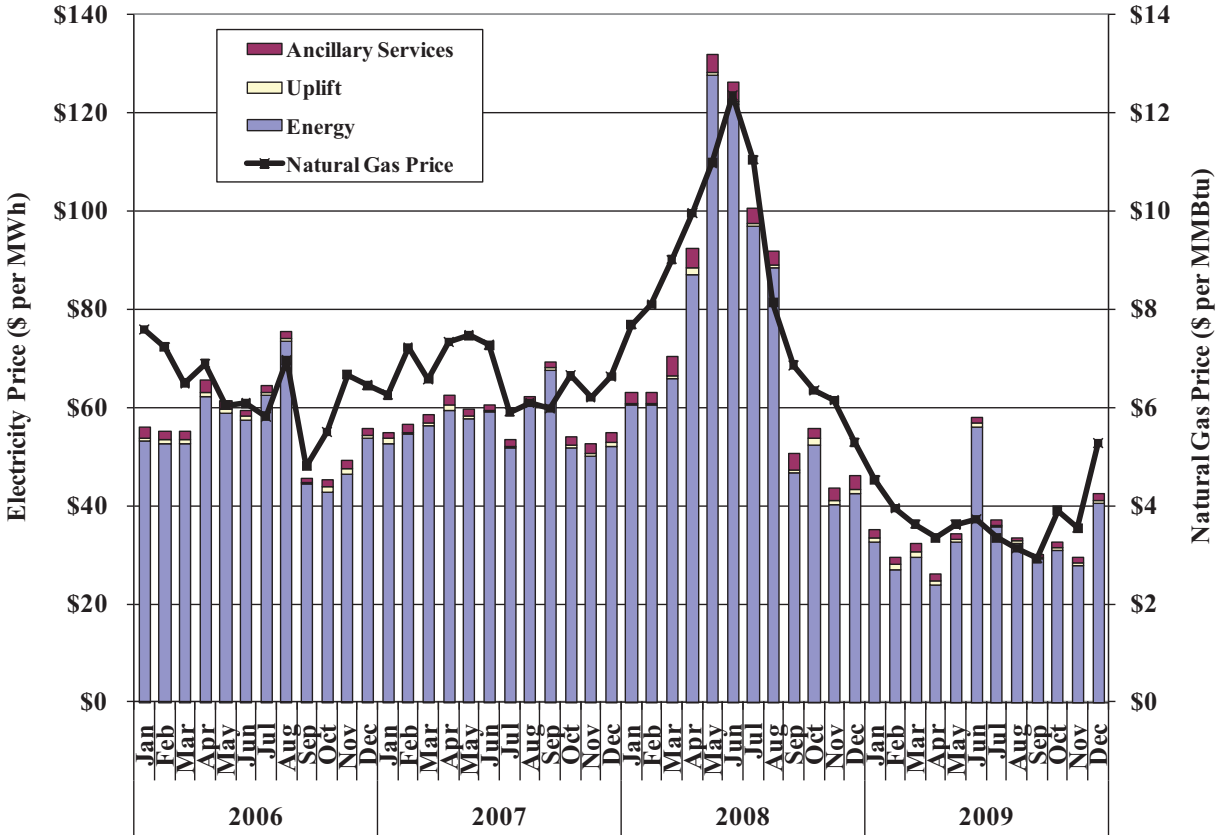
Unless there are barriers preventing arbitrage of the prices between the spot and forward markets, the prices in the forward market should be directly related to the prices in the spot market (*i.e.*, the spot prices and forward prices should converge over the long-run). Hence, artificially low prices in the balancing energy market will translate to artificially-low forward prices. Likewise, price spikes in the balancing energy market will increase prices in the forward markets. This section evaluates and summarizes balancing energy market prices during 2009.

To summarize the price levels during the past four years, Figure 1 shows the monthly load-weighted average balancing energy market prices in each of the ERCOT zones during 2008 and 2009, with annual summary data for 2006 and 2007.[9]

[9] The load-weighted average prices are calculated by weighting the balancing energy price for each interval and each zone by the total zonal load in that interval. For this evaluation, balancing energy prices are load-weighted since this is the most representative of what loads are likely to pay (assuming that balancing energy prices are generally consistent with bilateral contract prices).

The next analysis evaluates the total cost of serving load in the ERCOT wholesale market. In addition to the costs of energy, loads incur costs associated with ancillary services and "uplift".[10] We have calculated an average all-in price of electricity for ERCOT that is intended to reflect wholesale energy costs as well as these additional costs. Figure 2 shows the monthly average all-in price for all of ERCOT from 2006 to 2009 and the associated natural gas price.

Figure 2: Average All-in Price for Electricity in ERCOT



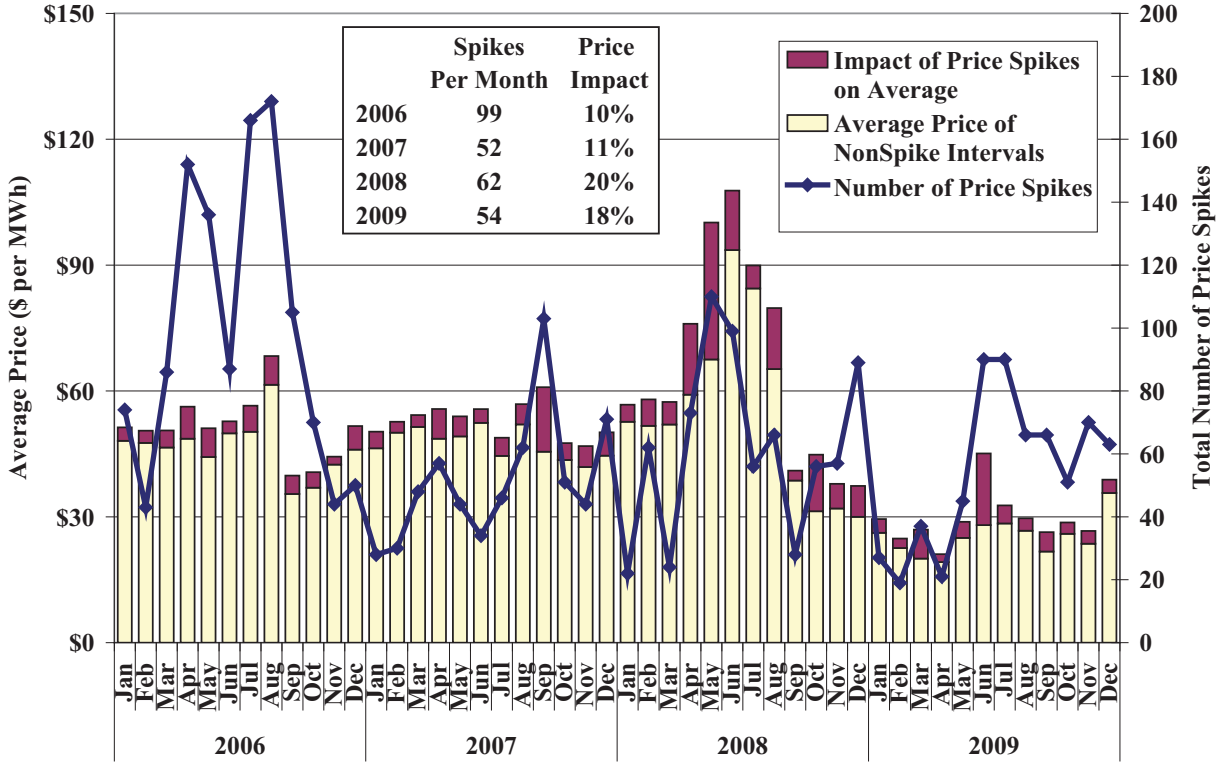
The components of the all-in price of electricity include:

- Energy costs: Balancing energy market prices are used to estimate energy costs, under the assumption that the price of bilateral energy purchases converges with balancing energy market prices over the long-term, as discussed above.
- Ancillary services costs: These are estimated based on the demand and prices in the ERCOT markets for regulation, responsive reserves, and non-spinning reserves.

[10] As discussed in more detail in Section III, uplift costs are costs that are allocated to load that pay for out-of-merit dispatch, out-of-merit commitment, and Reliability Must Run contracts.

(a level that should exceed the marginal costs of virtually all of the on-line generators in ERCOT).

Figure 6: Average Balancing Energy Prices and Number of Price Spikes



The number of price spike intervals was 62 per month during 2008. The number decreased in 2009 to 54 per month. The highest frequency of price spikes occurred in June and July during 2008, caused by significant transmission congestion that ERCOT was inefficiently attempting to resolve by using zonal congestion management techniques.[11] The high number of price spikes during June 2009 was also the result of zonal congestion management actions, although for reasons different than in 2008, as discussed in Section III. Other months with a higher frequency of price spikes in 2009 – particularly in the months after May 2009 – can be attributed to the more frequent deployment of off-line, quick start gas turbines in the balancing energy market as a result of the implementation of PRR 776 in May 2009, as discussed in Section II. Off-line, quick start gas turbines typically have a marginal cost that is greater than the 18 MMBtu per MWh threshold used in Figure 6.

[11] *See* 2008 ERCOT SOM Report, at 81-87.

deployment of higher-cost offers from other QSEs. Ramp rate constraints can also be limiting when resources are instructed to ramp down quickly, although this is less common.

In many cases, the lack of ramp capable resources offered to the balancing energy market results in inefficient price spikes.[15] The efficiency implications associated with these issues continued in 2009 and will likely continue until the current zonal market design is replaced. However, ERCOT implemented 14 minute ramp rates in late October 2009 that are expected to help make more balancing energy ramping capability available, which in turn is expected to reduce the frequency and magnitude of price spikes associated with large schedule changes.[16]

B. Ancillary Services Market

The primary ancillary services are up regulation, down regulation, and responsive reserves. Market participants may self-schedule ancillary services or purchase their required ancillary services through the ERCOT markets. Historically, ERCOT has also procured non-spinning reserves as needed during periods of increased supply and demand uncertainty. However, beginning in November 2008, ERCOT began procuring non-spinning reserves across all hours based on its assessment of "net load" error, where "net load" is equal to demand minus wind production. This section reviews the results of the ancillary services markets in 2009.

In general, the purpose of responsive and non-spinning reserves is to protect the system against unforeseen contingencies (*e.g.*, unplanned generator outages, load forecast error, wind forecast error), rather than for meeting normal load fluctuations. ERCOT procures at least 2,300 MW of responsive reserves to ensure adequate protection against the loss of the two largest units. Non-spinning reserves are procured as a means for ERCOT to implement supplemental generator commitments to increase the supply of energy in the balancing energy market if needed. The balancing energy market deployments that occur in the 15-minute timeframe and regulation deployments that occur in the 4-second timeframe are the primary means for meeting load fluctuations across and within each 15-minute interval.

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15 2005 SOM Report at 68-76.

16 There are insufficient data to perform an assessment of the effects of the 14-minute ramp implementation in 2009.