POTOMAC ECONOMICS

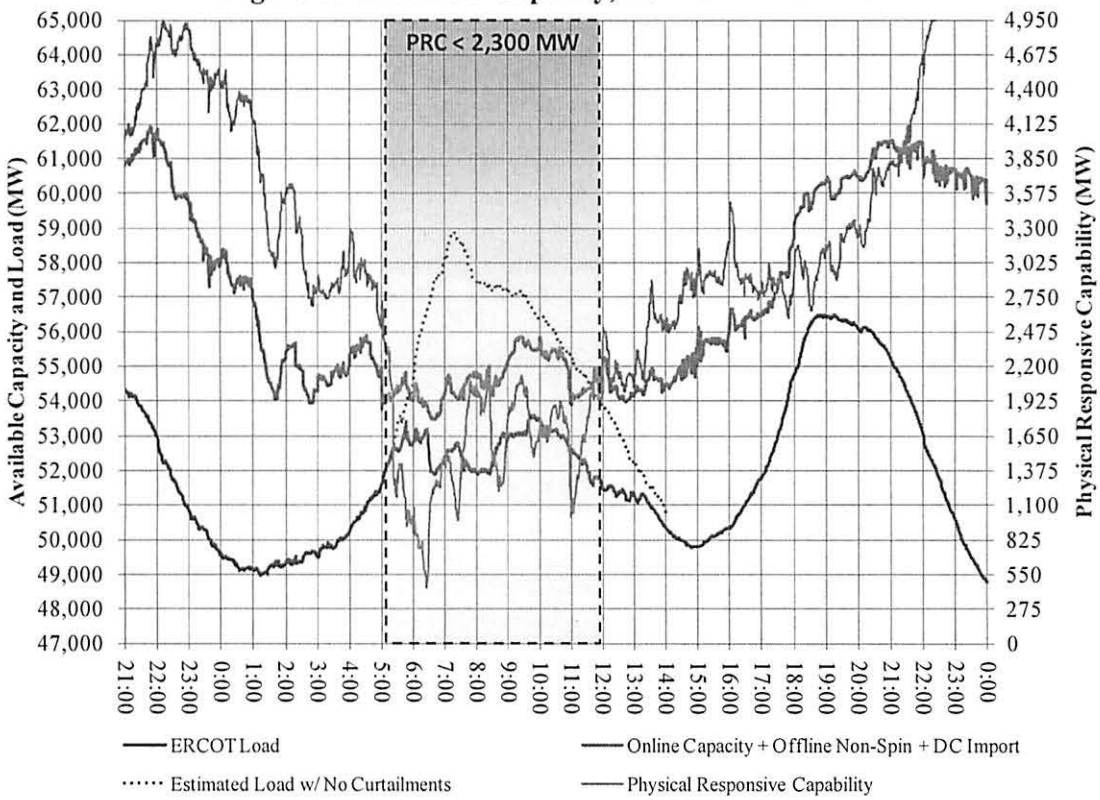
INVESTIGATION OF THE ERCOT ENERGY EMERGENCY ALERT LEVEL 3 ON FEBRUARY 2, 2011

POTOMAC ECONOMICS, LTD.

Independent Market Monitor for the
ERCOT Wholesale Market

April 21, 2011

Figure 3: Available Capacity, Load and Reserves



To ensure reliable recovery from the loss of the two largest generators under normal conditions, ERCOT's minimum acceptable level of PRC is 2,300 MW. If PRC drops below 2,300 MW, ERCOT will initiate Energy Emergency Alert Level 1. As shown in Figure 3, PRC (on the right y-axis) was less than the ERCOT minimum level of 2,300 MW from just after 5 a.m. until approximately 12:00 p.m. on February 2nd, dropping as low as 445 MW at approximately 6:25 a.m.

To provide additional perspective on the capacity limitations experienced on February 2nd, Figure 4 shows the available capacity (online capacity plus offline non-spinning reserves) and the ERCOT load for the seven days from January 31 through February 6, 2011.

are a critical component of the energy-only market design, and an energy-only market design without efficient shortage pricing is not sustainable over the long-term.

B. ERCOT Wholesale Market Outcomes on February 2-3, 2011

As a general principle, competitive and efficient market prices should be consistent with the marginal cost of the marginal action taken to satisfy the market's demand. In the vast majority of hours, the marginal cost of the marginal action is that associated with the dispatch of the last generator required to meet demand. It is appropriate and efficient in these hours for this generator to "set the price." However, this is not true under shortage conditions. When the system is in shortage, the demand for energy and operating reserves cannot be satisfied with the available resources, which will cause the system operator to take one or more of the following actions:

- Sacrifice a portion of the operating reserves by dispatching them for energy;
- Voluntarily curtail load through emergency demand response programs;
- Curtail exports or make emergency imports; or
- Involuntarily curtail load.

A market design that adheres to the pricing principles stated above will set prices that reflect each of these actions. When the market is in shortage, the marginal action taken by the system operator is generally to not satisfy operating reserves requirements (*i.e.*, dispatching reserves for energy). Diminished operating reserves results in diminished reliability, which has a real cost to electricity consumers. In this case, the value of the foregone reserves – which is much higher than the marginal cost of the most expensive online generator – should be reflected in energy prices to achieve efficient economic signals governing investment in generation, demand response and transmission.

During the morning of February 2, 2011, ERCOT operating reserve levels were reduced to perilously low levels for a sustained period of time. ERCOT's primary measure of overall operating reserves is Physical Responsive Reserve ("PRC"), and ERCOT will remain in various levels of EEA once PRC drops below 2,300 MW. Figure 7 shows the wholesale market prices and PRC from 21:00 on February 1 through 24:00 on February 2, 2011.