



## WHY THE TEXAS RELIABILITY EVENT ON FEBRUARY 26, 2008 RAISES NO CONCERNS ABOUT MUCH HIGHER WIND PENETRATION

On February 26, 2008, a drop in frequency on Texas's transmission grid caused the Electric Reliability Council of Texas (ERCOT) to put in place an Emergency Electric Curtailment Plan. The event was reported in some media outlets as having been caused by a sudden drop in output from wind projects. In fact, as the information below makes clear, other factors had a greater impact in this particular incident. Over the 40-minute period preceding the start of load curtailment, wind generation declined by 80 MW relative to its schedule, non-wind generation decreased by 350 MW relative to its schedule, and load rapidly increased to a level that was 1,185 MW more than forecast. More generally, disturbances of this type routinely involve conventional power plants. The incident in reality shows that the key to successful electric system management lies in a diverse power supply, of which wind can reliably be a large part. AWEA (the American Wind Energy Association) has pulled together the following background information and highlights from the report issued by ERCOT on the event. This provides both perspective on the event and insights into the issues going forward.

ERCOT's full report is available at:

[http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/27706\\_114\\_577769.PDF](http://interchange.puc.state.tx.us/WebApp/Interchange/Documents/27706_114_577769.PDF)

Complex electric systems are comprised of many dynamic parts, including power plants, fuel supplies, power delivery infrastructure, and aggregate levels of consumption. Maintaining the reliability of an electric system requires robust operating procedures to handle contingencies, including multiple simultaneous events. As this report establishes, ERCOT has such procedures in place and they work. Yet, particularly as regional fuel sources and power options are diversified, there are improvements to grid operating procedures that can and should be made. As an action item in response to this event, ERCOT has determined to incorporate wind forecasting into short term planning to better inform its capacity procurement needs. The wind industry supports and applauds that conclusion, as it will enable continued diversification of power supplies while maintaining the robustness and reliability of the grid. As a GE study commissioned by ERCOT recently reported, with the use of wind forecasting wind energy deployment in Texas can be more than tripled to at least 15,000 MW without negative consequences for system reliability.

GE's study is available at:

[http://www.ercot.com/meetings/ros/keydocs/2007/1022/Variability\\_and\\_Predictability\\_draft\\_dlvd\\_2a.zip](http://www.ercot.com/meetings/ros/keydocs/2007/1022/Variability_and_Predictability_draft_dlvd_2a.zip)

Some observations regarding the February 26, 2008 ERCOT event:

**1. The drop in frequency was successfully managed and no customers involuntarily lost power. The event was the result of several factors including sudden output shortfalls from conventional generators and a much slower decline in wind output.**

To the extent that changes in wind were a contributing factor during the passage of the February 26 cold front, that can be resolved by integrating the use of wind forecasting into electric system management, as ERCOT is planning to do.

**2. Wind is not dispatchable, but it is generally predictable, and therefore can be successfully and reliably integrated into electric system management.** Wind forecasting accurately predicted ERCOT's February 26 decrease in wind generation. This event illustrates that wind forecasting is an important tool for the successful management of large amounts of wind generation on a grid. ERCOT's wind forecasting system is under development and they plan to accelerate its implementation. When it is in place, such changes in wind output would not be expected to contribute to any system problems.

**3. Unlike other sources of generation that can go offline in 1/60th of a second, wind's declining output tends to be gradual over a matter of hours, giving system operators more time to respond to changes.** Fossil and nuclear power plants can and frequently do trip offline *instantaneously*, as the power outage on February 26 in Florida demonstrated. In ERCOT, 13 conventional generating plants instantaneously tripped offline during the week following February 26th. In the largest of these incidents, 420 MW, 500 MW, 540 MW, 582 MW, and 650 MW were instantaneously lost because a conventional generating unit tripped offline. The February 26th incident was preceded by the loss of a 150 MW non-wind generating unit that tripped offline at 5:44 PM. In comparison, wind generation decreased steadily on February 26 by about 8 MW/minute, during a 3-hour interval.

**4. The event was caused by a combination of factors, one of which was non-wind generators falling short of their scheduled output.** The activation of responsive reserves and interruptible load reserves at 6:49 PM on February 26 immediately followed a 40-minute period during which conventional generation dropped by 350 MW relative to its schedule. Although wind was consistently below its scheduled output during this time period, from 6:27 to 6:50 wind output gradually increased by 40 MW relative to its schedule.

**5. Another factor that contributed to the event was the rapid rate of load increase that evening.** The load increase on the evening of February 26th was 3,150 MW larger than the previous evening's load increase. As a result, ERCOT's short-term load forecast underestimated the actual load at 6:45 PM by 1,185 MW.

**6. To sum up, over the 40-minute period preceding the start of load curtailment, wind generation declined by 80 MW relative to its schedule, non-wind generation decreased by 350 MW relative to its schedule, and load rapidly increased to a level that was 1,185 MW more than forecast.**

**7. The use of “demand response” is not unusual and is a proven tool in cost-effectively maintaining grid reliability.** ERCOT is a leader in the use of paid voluntary interruptible loads (demand response) to accommodate significant variations in load, the sudden loss of conventional generation plants, and to avoid subjecting customers to involuntary power outages. For example, on December 12, 2007, three conventional generation plants totaling 1,022 MW tripped offline. Frequency on the ERCOT grid dropped from 60 to 59.787 Hz, significantly worse than the drop from 60 to 59.85 Hz that was registered on February 26. According to ERCOT, this qualified as a potential NERC Disturbance Control Standard event, while the February 26th event did not. In the December 12th incident, ERCOT was able to prevent an involuntary power outage by deploying all of the interruptible load reserves that were available.