

## **NERC Report Confirms Wind Energy's Reliability**

The Integrating Variable Generation Task Force (IVGTF) report, released today by the North American Electric Reliability Corporation (NERC), highlights a number of important conclusions about wind energy and reliability that have been gathered from extensive studies and real-world grid operating experience:

### **Wind plants are important contributors to grid reliability today**

**“It is now possible to design variable generators with the full range of performance capability which is comparable, and in some cases superior, to conventional synchronous generators.”** (p. 18)

**“Unlike a typical thermal power plant whose output ramps downward rather slowly, wind plants can react quickly to a dispatch instruction taking seconds, rather than minutes.”** (p. 19)

The report describes a number of ways in which modern wind plants can match or exceed conventional power plants in helping power system operators maintain grid reliability, such as: voltage and frequency regulation, reactive power output, the ability to stay online through voltage and frequency disturbances, and output curtailment.

### **New transmission is critical for bringing large amounts of new wind online**

**“High levels of variable generation will require significant transmission additions and reinforcements to move wind, solar, and ocean power from their source points to demand centers and provide other needed reliability services, such as greater access to ramping and ancillary services. Policy makers and government entities are encouraged to work together to remove obstacles to transmission development, accelerate siting, and approve needed permits.”** (Executive Summary p. ii)

For more information on why the lack of transmission infrastructure is the largest obstacle to full utilization of our country's immense renewable energy resources, visit <http://www.awea.org/GreenPowerSuperhighways.pdf>

### **Accommodating wind's variability is nothing new for system operators**

**“Power system planners and operators are already familiar with designing a system which can be operated reliably while containing a certain amount of variability and uncertainty, particularly as it relates to system demand and, to a lesser extent, to conventional generation.”** (p. 4)

**“The aggregate energy output from wind plants spread over a reasonably large area tends to remain relatively constant on a minute-to-minute time frame, with changes in output tending to occur gradually over an hour or more.”** (p. 15)

Electricity demand and supply can change suddenly and unpredictably as large power plants experience outages and millions of consumers turn air conditioning and other appliances on and off. Grid operators use the same tools to accommodate any variability that wind plants add to the already constantly fluctuating level of supply and demand on the power grid.

### Coordinated regional grid operations provide significant benefits

**“Transmission expansion, including greater connectivity between balancing areas, and coordination on a broader regional basis, is a tool which can aggregate variable generators leading to the reduction of overall variability. Sufficient transmission capacity serves to blend and smooth the output of individual variable and conventional generation plants across a broader geographical region. Large balancing areas or participation in wider-area balancing management may be needed to enable high levels of variable resources. As long as existing transmission pathways are not congested, transmission expansion may not be required to achieve the benefits of larger balancing areas...”** (p. 43)

**“With sufficient bulk power transmission, larger Balancing Areas or participating in wide-area arrangements, can offer reliability and economic benefits when integrating large amounts of variable generation.”** (p. 60)

The U.S. grid is currently balkanized into around 125 separate grid operating areas. Greater coordination between these areas can greatly improve the efficiency of the grid, with or without renewable energy on the grid.

### More and better use of wind energy forecasting is critical

**“Forecasting is one of the key tools needed to increase the operator’s awareness of wind plant output uncertainty and assist the operator in managing this uncertainty.”** (p. 55)

**“Forecasting techniques must be incorporated into real-time operating practices as well as day-to-day operational planning.”** (Ex. Sum. p. iii)

As the report notes, wind energy forecasting techniques are now quite advanced, capable of predicting changes in wind energy output up to several days in advance with a very high degree of accuracy.

### Grid operations and resources need to become more flexible

The report identifies a number of steps that can be taken to make the grid more flexible, and thus significantly reduce the cost of integrating wind:

**“Additional sources of system flexibility include the operation of structured markets, shorter scheduling intervals, demand-side management, reservoir hydro systems, gas storage and energy storage.”** (p. 48)

In particular, scheduling power plants to operate for 5- or 10-minute intervals instead of more common hourly intervals can make the grid much more flexible, allowing variability to be accommodated at much lower cost:

**“More frequent and shorter scheduling intervals for energy transactions may assist in the large-scale integration of variable generation.”** (p. 61)

### Reliability standards must be fair

**“Industry standards and criteria must be fair, transparent and performance-based.”** (p. 3)

As discussed above, modern wind plants are capable of meeting or exceeding the reliability capabilities of conventional power plants.