

Wind Plant Monitoring and Harmonic Studies

Assessing the Power Quality Performance of Wind Plants

Wind power is the fastest growing form of electric generation in the world. Environmental friendliness, proven turbine technologies, and dramatically declining costs of production are driving unprecedented growth in the industry. Wind generation is even reemerging as an important "hedge" against the uncertainties plaguing energy markets.

As wind plants grow in size and number, questions about their possible impacts on the electrical grid become more complex. Whether it is a large-scale facility supplying bulk power or a distributed generation application providing on site power, these questions must be answered. Relating largely to design and operational issues, they address

- Impacts of the plant on operation of the electrical grid or customers on the grid
- The plant's ability to honor capacity, reserve, and firm power transfer commitments
- Effects from harmonic voltages and currents produced from the wind turbines

Answering these questions requires attention to design and engineering of the plant, as well as monitoring plant output and operation. Electrotek provides an extensive array of power systems engineering services, as well as the ability to remotely monitor wind plants.



Why Monitor?

Electrical system monitoring is a critical component in obtaining a comprehensive picture of a wind plant's performance. Monitoring can be used to identify problems with wind turbine components and wind plant electrical systems and assist in solving and even preventing them. Specific applications include

- Diagnosis of equipment misoperation and failure.
- Identification of grid-side phenomena responsible for turbine faults or failure.

In addition to providing benefits centered around existing wind plants, monitoring can aid in the design and construction of pending and future facilities. Monitoring can also assist in addressing industry-wide concerns about various aspects of wind plant performance, including interaction between the plant and the utility grid, impacts of utility power system operations, and validation of wind turbine/wind plant models and simulations.



