

Department of Energy

Bonneville Power Administration
P.O. Box 491
Vancouver, WA 98666-0491

TRANSMISSION SERVICES

February 25, 2011

In reply refer to: TS-DITT-2

To BPA Customers and Interested Parties:

The Bonneville Power Administration (BPA) supports the development of Pacific Northwest wind generation resources and is working intensively to facilitate that development. Included in these efforts is the BPA Wind Integration Team's ("WIT") Wind Generation Forecasting Initiative. The success of this Initiative is dependent on BPA receiving additional operational and meteorological data from wind generators. After discussing these data needs at the March 11, 2010 Joint Operating Committee and through individual meetings with wind generators, BPA has finalized its wind plant data requirements to support the WIT's Wind Generation Forecasting Initiative. This letter explains the WIT's Wind Generation Forecasting System Initiative and provides information on the next steps for BPA's new data requirements.

BPA Wind Generation Forecasting Initiative

BPA is implementing wind speed and wind generation forecasting systems to facilitate informed decision-making and improved situational awareness of BPA's system operators. Access to this information will support transmission grid reliability and enhance hydroelectric generation reliability as more wind generation is integrated into the BPA System. The wind generation forecasting will provide real-time situational awareness for BPA Hydro Duty Scheduling and Transmission Dispatch, making it easier for BPA to meet its non-power Federal Columbia River Power System ("FCRPS") objectives, including flood control, Clean Water Act, and fisheries programs among others.

Background of the Project

Integrating large amounts of wind to the Transmission System includes many challenges and opportunities, and as reliability issues come to the forefront, BPA has a greater need for visibility into actual wind generation, submitted schedules and forecasted generation. Superior forecasting accuracy relies on superior data granularity, frequency of delivery, number of measurement variables and diversity of data sources.

Accordingly, in 2009, BPA included Wind Generation Forecasting as one of the original six WIT Initiatives of WIT 1.0. This work is now continuing into WIT 2.0, and BPA expects this Initiative to produce the following benefits:

- More accurate forecasts of wind generation serving BPA Load;

- Better planning of the hydro system leading to greater flexibility, better efficiencies and improved ability to address non-power requirements and constraints on the FCRPS;
- Better planning for future wind energy storage and balancing energy consumption;
- Predictions of within-hour ramp events;
- Better preparation for extreme swings in wind generation;
- Better management of transmission congestion;
- Support Smart Grid demonstration projects.

As part of the Wind Generation Forecasting Initiative, BPA has taken several steps to increase its awareness of meteorological and operational changes that have the potential to impact system operations and reliability. These steps include:

- Installation of 14 new meteorological sites to support real-time weather observation and share the data with the public.
- Development of an in-house, wind generation forecasting system.
- Purchase of two commercial wind generation forecasting subscription services.
- Creation of new displays and situational awareness tools for operators that track atmospheric changes and their effect on wind generation and the transmission systems.

In addition to these efforts, BPA expects to make the following system enhancements in the near future:

- Upgrade the communication links to BPA's 6 older met sites, bringing the BPA met tower network up to 20 sites.
- Post (publically) the BPA aggregated fleet level wind generation forecast.

New Data Requirements

In accordance with sections 2(a) and 8(a) of the WI-09 Wind Integration Rate Case Settlement Agreement, BPA has added the new operational and meteorological data requirements (outlined in Attachment 1 and 2 of this document) to the "BPA Technical Requirements for Interconnection to the BPA Transmission Grid."¹

Privacy and Security

BPA realizes that your company may have concerns about the treatment, vulnerability, or unauthorized access to or use of the data being requested. BPA adheres to strict national cyber security standards and will maintain the data on internal systems unavailable for public use. All data transfers will be through secure means and transfer from your wind project to BPA. While the data itself will be considered and treated as business sensitive to the extent required by law, its applications may become publicly available. For example, the data will be used to create an aggregated fleet-level wind generation forecast for wind generators in the BPA Balancing Authority Area, which will be publically available. Please direct any

¹ The BPA Technical Requirements for Interconnection to the BPA Transmission Grid is available at: http://transmission.bpa.gov/business/generation_interconnection.

questions about data confidentiality and business sensitivity to your Transmission Account Executive.

Next Steps

Your Transmission Account Executive and Customer Service Engineer will contact you to set up a meeting to discuss BPA's new data requirements. These discussions will include specifics about the historical data transfer file format, real-time data format, and communication system requirements.

If you should have any questions about BPA's new data requirements, please feel free to contact your Transmission Account Executive.

BPA is optimistic that support provided on these activities will improve grid reliability, facilitate wind integration and mitigate intermittent resource issues, enhance the region's green resource portfolio, and aid the national policy of reducing reliance on imports and fossil fuels. BPA looks forward to your company contributing to a joint and regional success.

Sincerely,

A handwritten signature in blue ink that reads "Cathy Ehli".

Cathy Ehli
Vice President, Transmission Marketing and Sales

2 Enclosures:

Attachment 1: Data Requirements

Attachment 2: Web Service Requirements

bcc:

M. Chong -Tim LT-7

S. Oliver - PG-5

K. Beale - PGST-5

S. Winner - PGST-5

E. Pytlak - PGPW-5

E. King - SR-7

R. Thomas - TO/DITT-2

K. Prickett - TOK/DITT-2

B. McManus - TOT/DITT-2

H. Juj - TP/DITT-2

S. Enyeart - TPC/TPP-4

A. DeClerck - TSE/TPP-2

E. Taylor – TSE/TPP-2

Customer File – TSE/TPP-2 (TM-11)

Official File – TSE/TPP-2 (TM-11)

(W:\TM_WG\ACCTEXEC\Taylor\Customers\WindForecastingLtr 022011.doc)

ATTACHMENT 1: DATA REQUIREMENTS

BPA has modified its Technical Requirements for Interconnection to the BPA Transmission Grid to include new data requirements for Wind Generators located in the BPA Balancing Authority Area. Below is a summary of these data requirements.

Plant Operational Data Requirements

Static Data

- Number of turbines, total rated MW
- For each turbine:
 - model/type, nameplate capacity
 - turbine identification number (string/collector line if available)
 - individual turbine coordinates (Latitude/Longitude)

Plant Telemetry Data via BPA SCADA/ICCP, every 2 sec

- Plant output (MW)
- Available capacity (MW, updated within 10 minutes of any change)
- High wind cutout (MW total)
- Plant control limit (MW, when output of plant is limited)

Plant Planning Data

- Planned outages via email to Gen Dispatcher desk with dates, capacity limitations and duration.

Plant Meteorological Data via web service, every minute

Data from the wind plant's weather anemometers needs to be submitted to BPA via web service as outlined in Attachment 2 and posted or refreshed every minute. Although one minute averages would be preferred, instantaneous readings every minute will also be accepted.

- Anemometer coordinates (Latitude/Longitude/height)
- Wind speed (mph, integer)
- Wind direction (degrees of north, integer)
- Temperature (degrees F, integer)
- Humidity (relative %, integer)
- Pressure (inches of Mercury, inHg, three significant figures, xx.xxx)

Nacelle Cluster Meteorological Data via web service, every ten minutes

Weather model grid resolution will become finer (12km down to 1-4km) as BPA improves the forecasting system. For larger wind projects, it will be necessary to model the project as a number of clusters. The selection of designated turbines representative of the clusters

within a wind project site will result from a collaborative process between BPA and the wind project. The typical cluster will be a five blade diameter square with a center turbine designated to provide met data. The data needs to be submitted to BPA via web service as outlined in attachment 2 and posted or refreshed every ten (10) minutes. Although ten (10) minute averages are preferred, instantaneous reading every 10 minute will also be accepted.

- Select turbine number and coordinates (Latitude/Longitude)
- Wind speed (mph, integer)
- Wind direction (degrees of north, integer)
- Temperature (degrees F, integer)
- Humidity (relative %, integer)
- Pressure (inches of Mercury, inHg, three significant figures, xx.xxx)

Historical data, last 2 years or as available, if less than 2 years in service

- Available Capacity (hourly average)
- Plant meteorological data (10 minute average. Although ten (10) minute averages is preferred, instantaneous reading every 10 minute will also be accepted.)
 - Anemometer coordinates (Latitude/Longitude/height)
 - Wind speed (mph, integer)
 - Wind direction (degrees of north, integer)
 - Temperature (degrees F, integer)
 - Humidity (relative %, integer)
 - Pressure (inches of Mercury, in Hg, three significant figures, xx.xxx)
- Data to be emailed to BPA in excel or mutually acceptable format

ATTACHMENT 2: WEB SERVICE REQUIREMENTS

1.1 Web Services

The web service must be built and configured to BPA standards of supportability, reliability, and security.

1.1.1 Methodology

Tool Selection

The wind generator's underlying web service tool must be a Business Intelligence tool such as Microsoft Web Services, Windows Communication Foundation, BizTalk or an equivalent tool for Enterprise-level data transfer.

The tool cannot be FTP-based.

Web Service Description Language

The wind generator must provide a Web Services Description Language (WSDL) to BPA that defines the following:

- The XML schema used to send the data
- Methods that will be used
- Variables/arguments that will be passed in those methods

Note that acceptable methods will include a BPA Pull or Push (*i.e.*, the wind generator will post data for BPA to pull or will receive data that BPA pushes). The wind generator will not push data to BPA.

1.1.2 Security

All wind generators must be vetted through the BPA Cyber Security approval process. Additional BPA requirements for secure communication include:

- The wind generator's web service must have a digital SSL certificate signed by an external 3rd party per industry best practices (*i.e.*, Verisign, GeoTrust, etc.).
- A password-based or similar means of credential authentication must be employed.
- The service should only allow specific IP addresses on the remote end to pull or push data.