

Summary

Wind Data / PMU Requirements

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Wind Power Plant Operational Data Needs and Model Validation

In Summary, BPA needs data for:

- Operations dispatch visibility (real-time)
- System simulation studies
- Improving WECC base case models
- System event diagnostics
- PMU's to be installed to provide dynamic model data and for event analysis.

The PMU's are also part of the WECC Synchro-Phasor program (Smart Grid) that Vickie will discuss in a moment.



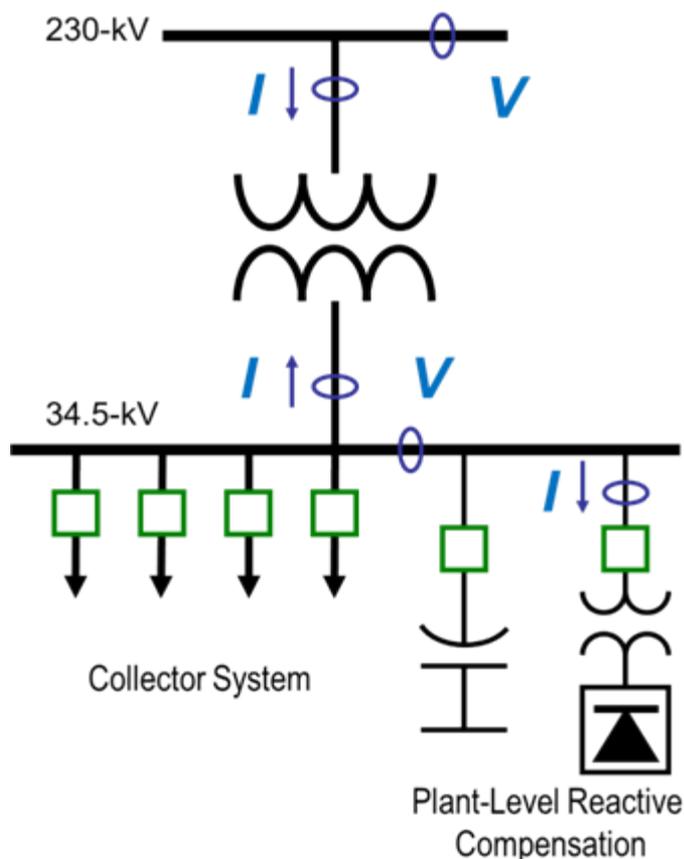
BPA Synchro-Phasor / PMU Program

- BPA is installing 2 types of PMU's
 - Control PMU's (C-PMU) are being added to several (50-60) BPA Substations:
 - Provide real-time data
 - Validate System modeling and system performance
 - Provide Operational Awareness and near real-time system evaluation
 - Provide post event analysis, system limitations
 - Eventual Smart Grid controls
 - Data PMU program will be required at large (230 kV POI) Wind projects:
 - Validate generator modeling
 - Provide Operational Awareness
 - Will be requirement for all new large wind projects



Wind Project D-PMU Monitoring

- Wind Power Plant PMU's will only measure:



High and low side Voltage
High and low side Current
Each Dynamic reactive element
Status of a all switched reactive elements



Summary Plant Data via SCADA / ICCP

- Wind Project Data - Analog quantities via SCADA or ICCP:
 - Plant Generation (MW via BPA Meters at Point of Metering)
 - Plant Reactive Power (MVAR via BPA Meters at POM)
 - Plant Reactive Power (MVAR) – *each switched reactive element* and
 - Each Generation Breaker (MVAR - 34.5 kV typically)
 - *Needed to analyze MVAR consumption of collector system*
 - Each Dynamic VAr device (MVAR) – (STATCOM typically)
 - Bus voltages (High and Low side bus)
 - Plant Reactive Power Reserve
 - Wind Plant Limit / DSO216 Confirmation
 - Plant Generation Availability (MW)
- BPA in process of contacting all wind project to update data



Annual Generation BPA/WECC Data

- Plant Data is required for all interconnections studies, resubmitted as built.
- Annual Data reporting updates required by WECC / NERC.
- Generation and Interconnection Facility Data is to be provided via the generation data sheets provided by BPA, including:
 - Collector system equivalent, configuration and equipment specifications
 - Generation to BPA POI system one-line including collector configuration and reactive elements
 - Total rated MW and MVA_r Capability
 - Model/Type, generation specifications of each turbine type
 - Number of each type of turbine (list per collector on one-line)
 - Size and specifications of each reactive device (include configuration on one-line)
- Many did not respond to the data request last year, and are being contacted again now. It is a NERC compliance requirement

From March 2011 Wind JOC Meeting



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