POWER GENERATION

Wind Turbine Ramp-up

Data Sources

- Process Data Historian: OSIsoft, PI, MySQL
- Asset Structure: OSIsoft, Asset Framework

Data Cleansing

- Filtering of curtailment conditions less than a specified amount of time
- Filtering of turbine performance when a unit is offline

Calculations and Capsules

Power generation potential is calculated from wind speed and direction using modeling. Seeq allows multiple conditions to be created to analyze the total power generation potential lost during wind turbine ramp-up period and are then totaled and displayed. • A condition is created for periods of generation curtailment using capsules.

- A ramp-up condition is created that determines the time from the end of a curtailment period to the time the turbine reaches its generation capability.

Challenge

When managing a power grid, there are times when wind turbine generator is not required, and generation from the wind turbines is reduced. As power needs rise, grid management requires the wind generation to ramp-up, but this cannot occur immediately. The wind turbine operator has the opportunity to charge for lost generation during this ramp-up period resulting in the need to calculate this amount.

Solution

Using Seeq's analysis solutions, the wind generation potential is calculated based on wind strength and direction. Operations teams can also calculate the actual power generated. Once the demand rises from the grid, the generation curtailment period stops. The exact time curtailment stops are used to calculate generation losses during the ramp-up period until the full generation capability is met.

Benefits

Seeq's software enables easy calculation of commercial losses in wind turbine ramp-up after a power curtailment period allowing the generator to increase charges to the grid operator. Calculations for a single turbine can also be applied to the entire fleet.

Summarizing Results

Prior to using Seeq, the calculation of potential losses sustained during wind turbine ramp-up time could not be performed and was unable to be systematically quantified and passed along to the grid operators.

Now, the wind turbine operator can easily calculate power generation losses during ramp up after a curtailment period allowing increased revenue