

The AURORA Dispatch Model

PSE uses the AURORA model to estimate the cost of its resource portfolio used in serving its core customer load. The model is described below: first in general terms to explain how the model operates; followed by discussion of the inputs which are significant to the fundamentals based program.

Overview

AURORA is a fundamentals based program meaning that it relies on factors such as supply, demand and transportation which drive the electric energy market. Unlike many models which use historic data to predict the future, AURORA uses forward looking information in a dynamic process to simulate changes in the market. AURORA uses hourly demand and individual resource-operating characteristics in a transmission-constrained, chronological dispatch algorithm.

AURORA uses information to build an economic dispatch of generating resources for the market. Units are dispatched according to variable cost, subject to non-cycling and minimum run constraints until hourly demand is met in each area. Transmission constraints, losses, wheeling costs and unit start-up costs are reflected in the dispatch. The market-clearing price is then determined by observing the cost of meeting an incremental increase in demand in each area. All operating units in an area receive the hourly market-clearing price for the power they generate.

AURORA also has the capability to simulate the addition of new-generation resources and the economic retirement of existing units. New units are chosen from a set of available supply alternatives with technology and cost characteristics that can be specified through time. New resources are built only when the combination of hourly prices and frequency of operation for a resource generate enough revenue to make construction profitable; that is, when investors can recover fixed and variable costs with an acceptable return on investment. AURORA uses an iterative technique in these long-term planning studies to solve the interdependencies between prices and changes in resource schedules.

Existing units that cannot generate enough revenue to cover their variable and fixed operating costs over time are identified and become candidates for economic retirement. To reflect the timing of transition to competition across all areas, the rate at which existing units can be retired for economic reasons is constrained in these studies for a number of years.