2012 BPA Rate Case
Customer Workshop

Wind Balancing Service
Reserves Forecast Methodology

April 14, 2010

Agenda

1) Discuss overview of process to establish the Wind Balancing Service rate for the Initial Proposal.

2) Focus on the components to develop the reserves forecast.

3) Discuss parking lot issues and priorities specific to the reserves forecast components.

4) Next steps.

Objective

- Our objective today is to discuss the transmission parking lot issues, related to establishing the reserves forecast for the Wind Balancing Service.
- The proposals discussed today do not reflect BPA commitment to adopt any particular proposal or position. The materials are very much a work in progress.
- Today's discussion is preliminary and pre-decisional.
- We look forward to working together to better understand the issues that will help shape the development of the Initial Proposal.

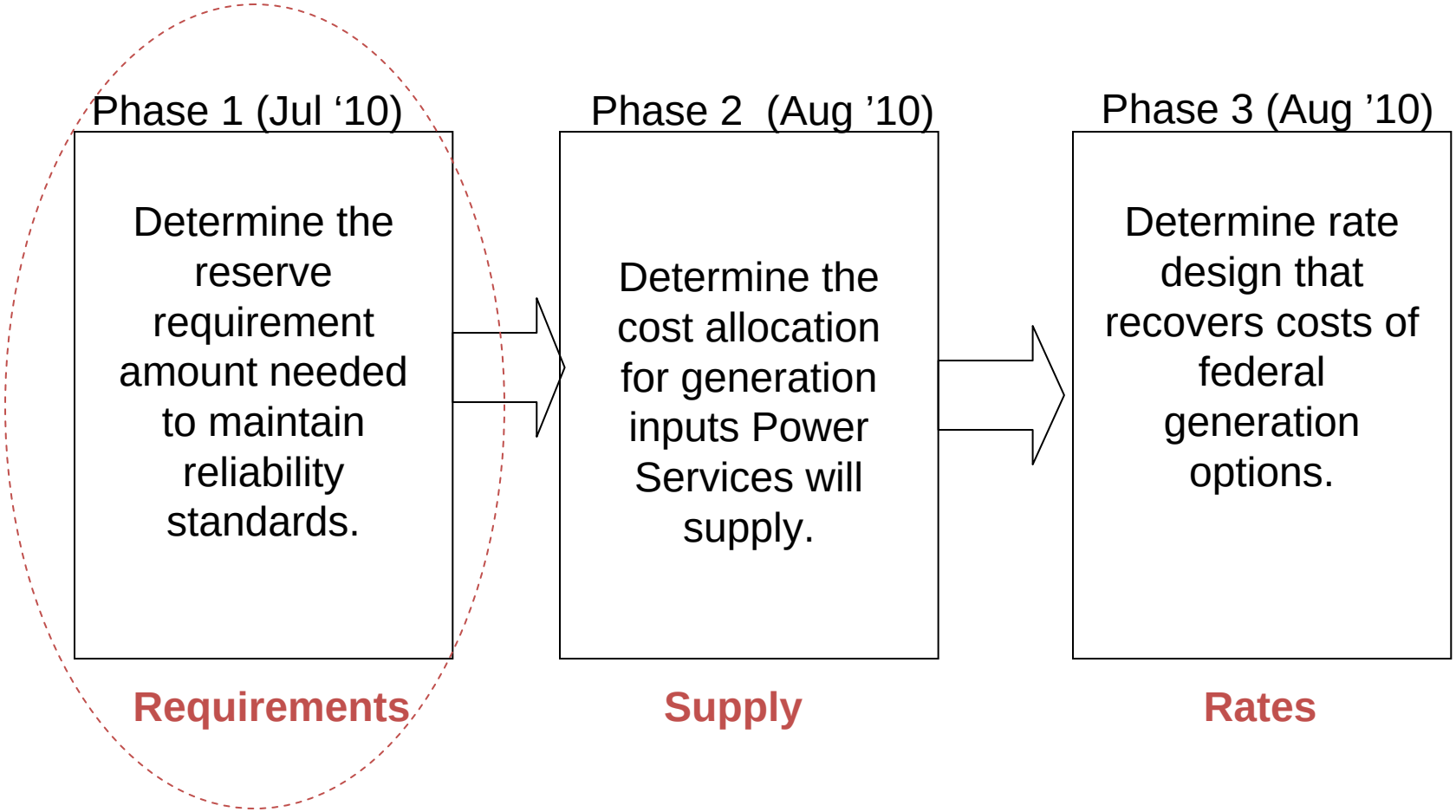
Wind Balancing Service Rate Development Overview

1. Forecast Reserve Requirement Amount for the BPA Balancing Authority (BA) Area. Today's presentation will focus on the components needed to establish the forecasted amount of reserves needed to meet reliability standards.

2. Determine Generation Input cost allocation for the amount of inputs it will supply to meet the Forecasted Reserve Requirement of the BPA Balancing Authority Area.

3. Determine a rate design that fully recovers costs.

Wind Balancing Service
High Level Process for Initial Proposal



Balancing Reserve Forecast Components

1) Installed Wind Capacity for the BPA BAA
2) Scaling Methodology
3) Generation Resource Types
4) Scheduling Assumptions
5) Allocation between Resources and Load
6) Base Forecast of Balancing Reserve Amounts

Forecast of Installed Wind Capacity

- Develop monthly Forecasts of installed wind capacity
  - Plant Level Information required
- Include estimates of projects that might leave the BA
  - Which plants, amounts, and when
- Include reserve estimates of the Self Supply of Generation Imbalance Pilot
  - Which plants, amounts, and when

Scaling Methodology

- Evaluate the BPA-10 Scaling Methodology Analysis
  - Test Plan: Calculate the generation reserves over one full calendar year for an installed capacity with a group of wind plants modeled as either their actual generation (base case) or their virtual generation (test case).
- Parameters and assumptions set the same as the BPA-10 Rate Case, including:
  - The scaling process used to create the virtual wind plants
  - The 30 min persistence wind forecasting metric
  - The allocation of reserves between load and wind
- Use a test period of the calendar year 2009
- Simulations for analysis run at 2,254 MW of installed capacity with:
  - 773 MW modeled using only actual output (online prior to 2007)
  - 583 MW modeled using only virtual output (online in 2009)
  - 898 MW modeled using actual (base case) and virtual (test case) outputs (online in 2007 and 2008)

Scaling Methodology – Preliminary Draft Analysis

- The Total Reserves are within a 3.5% error difference between the Test Case and the Base Case using the BPA-10 Rate Case Scaling Methodology.

MW ERROR (TEST CASE - BASE CASE)					
TEST CASE with BPA-10 RATE CASE VIRTUAL WIND PLANTS					
		Regulation	Load Following	Generation Imbalance	Total Reserves
TOTAL	INC	-2.6 MW	-9.8 MW	2.8 MW	-9.6 MW (-1.5%)
	DEC	-4 MW	-10.8 MW	2.5 MW	-12.3 MW (-1.6%)
LOAD	INC	2.4 MW	4.7 MW	-2.3 MW	4.8 MW (2.2%)
	DEC	1.4 MW	4.8 MW	-1.7 MW	4.4 MW (1.8%)
WIND	INC	-5 MW	-14.5 MW	5.1 MW	-14.4 MW (-3.5%)
	DEC	-5.4 MW	-15.5 MW	4.2 MW	-16.7 MW (-3.3%)

Positive quantity indicates test case predicted more than base case.
Negative quantity indicates test case predicted less than base case.
% error = MW error / base case amount

- The existing scaling methodology is doing a good job of forecasting wind generation.

Moving Forward with the Scaling Methodology

- Enhance the BPA-10 Scaling Methodology
  - Refine correlation factors
  - Increase resolution of time offsets
- In spirit of operational excellence, explore new Scaling Methods
  - Polynomial methodology
    - For every minute in the test period, create a polynomial surface of the wind plants based on their normalized actual output and coordinates (longitude and latitude)
    - Calculate virtual plants from the polynomial surfaces using coordinates and nameplate capacity
- The results of the evaluation of the BPA-10 scaling method indicate that the methodology is accurate and produces acceptable results for ratemaking purposes, but BPA is not foreclosing enhancements that would result in meaningful improvements in the accuracy.

Generation Resource Types

- Generation Resource Types
  - Additional resource types, including Thermal and Non-AGC Controlled Hydro, factored into the amount and allocation of balancing reserves forecasted for the rate period.
  - We expect that the amount will be small relative to the overall reserve requirement.

Scheduling Accuracy

- Review assumptions for scheduling load and wind.
  - Assess the performance of wind scheduling accuracy
- Determine metric for scheduling of other non-Automatic Generation Control (AGC) controlled generation in the BA
  - Thermal and Non-AGC Controlled Hydro
- Accumulated imbalances are not part of today's discussion but will be addressed at a later date under the heading of "Persistent Deviation"

Allocation between Resources and Load

- Allocation between Resources and Load
  - Decide allocation of the Reserve Requirement between load and generation resource types including Thermal and Non-AGC Controlled Hydro
  - The current allocation method can easily account for these additional generation types

Calculate Base Reserves Forecasted Amount for Initial Proposal

- Calculate the Wind Balancing Service forecasted amount of reserves for the Initial Proposal.
  - The base forecast may include a with and without self-supply reserves forecast amount.
- After development of the base reserves forecast in July 2010, we will continue to study the impacts of the Wind Integration Team initiatives to determine whether adjustments in the base reserve forecast amount can be made. Examples of these initiatives include:
  a) DSO 216 Performance
  b) Self-Supply Generation Imbalance Pilot
  c) Intra-Hour Scheduling Pilot
- Given the preliminary nature of the pilot efforts and the late timing of such wind initiatives, we plan to address assumptions about the uncertainty of the reserve forecast in our initial proposal testimony and encourage rate case participants to respond accordingly in their direct case.

Wrap Up

- BPA would like to continue to hear your feedback regarding the Wind Balancing Service – Forecast Methodology we discussed today.

  Share your view today or feel free to submit a written response to techforum@bpa.gov. Please state "2012 Rate Case" in the subject line.

- Our intent is to understand customer interest and the priority of specific components of the reserves forecast methodology to capture in the parking lot. This information will help inform the topics to focus on for developing the workshop schedule.

- We look forward to working together on these complex issues.