

Evolutionary Thinking on Reserve Sharing Groups, DCS Reliability Standard and Wind Ramps

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PGE Balancing Authority Area

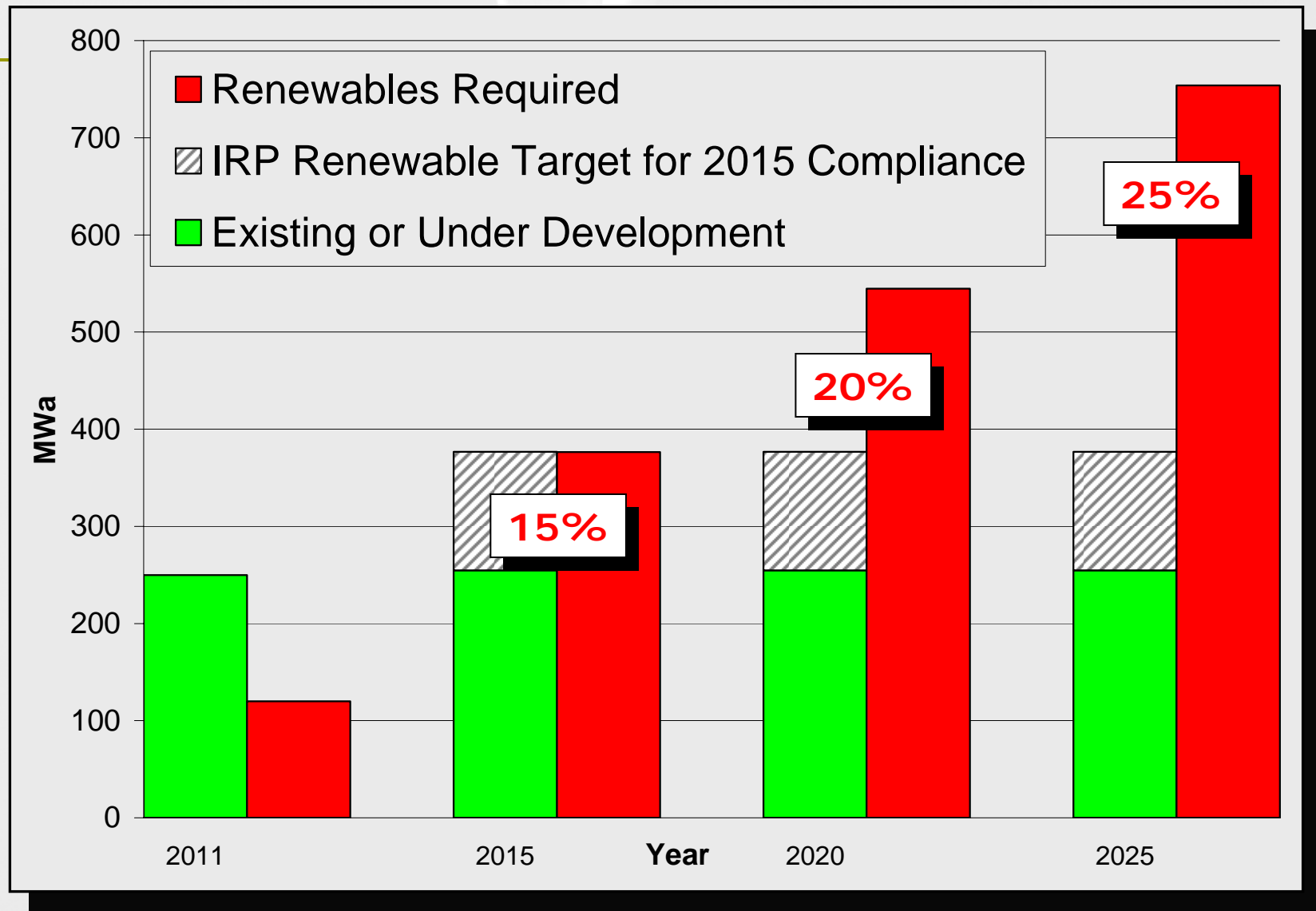
- ❑ 4,000-square-mile operating area
- ❑ 804,000 customers
- ❑ 43% of Oregonians depend on PGE for electricity
- ❑ 52 cities served (Portland and Salem are the largest)



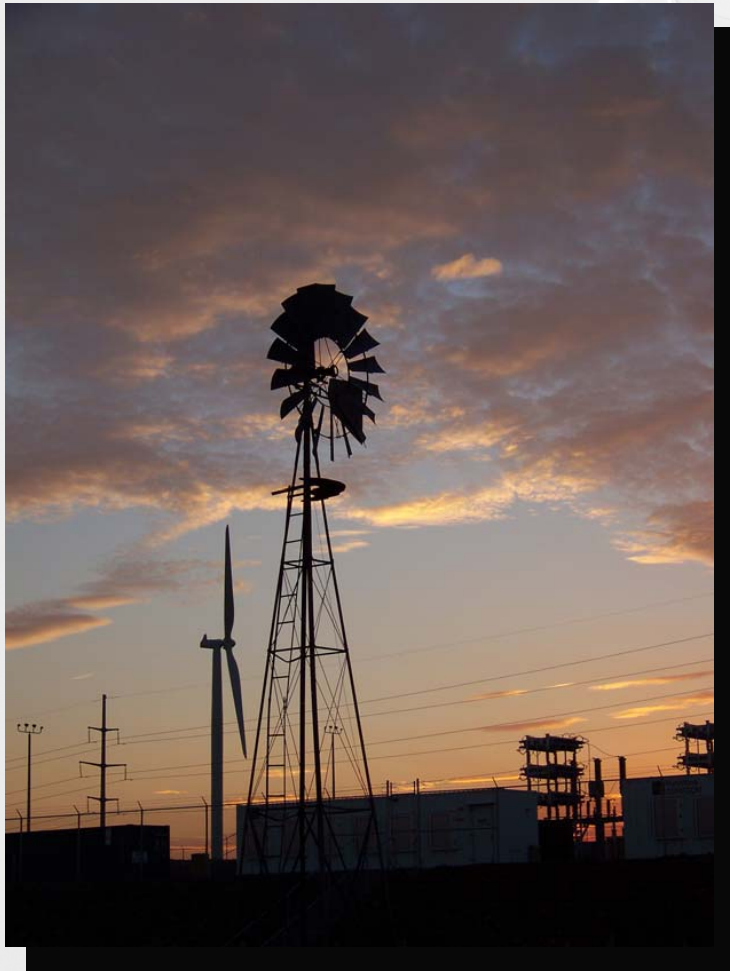


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Oregon Renewable Portfolio Standard (RPS)



Total PGE Wind Power in 2010



- Total 550 MW
- Biglow Canyon
450 MW (w/ Phase III)
- Klondike II – 75 MW
- Vansycle Ridge ~ 25 MW



Evolutionary Thinking

ev – o – lu – tion - ary

–adjective

1. pertaining to evolution or development; developmental: *the evolutionary origin of ~~reserves~~ species.*
2. of, pertaining to, or in accordance with a theory of evolution, esp. in biology.
3. pertaining to or performing evolutions.

Reserve Sharing Group in the Northwest

- ❑ Northwest Power Pool (NWPP)
- ❑ Serves NW U.S., British Columbia and Alberta
- ❑ Originally formed in 1942 by Fed Gov to ensure uninterrupted electricity during wartime operations...
- ❑ Objectives:
 - Reliable operation of grid
 - Coordinate power system planning
 - Assist in transmission planning



Reserve Sharing Process in the Northwest

- Generating BA has option/obligation to call on Contingency Reserves (CR) to cover sudden loss of generation in its BA
- Most Severe Single Contingency (MSSC) = 1500MW
- CR calculated as function of generation
- Hydro = 5% and Thermal = 7%
- In 2003, Wind Energy added to the Hydro category
- Hydro/Wind = 5%

Evolutionary Thinking occurs...

- Generating BA has option/obligation to call on these Reserves to cover sudden loss of generation in its BA
- Most Severe Single Contingency (MSSC) = 1500MW
- Contingency Reserves calculated as function of generation
- Hydro = 5% and Thermal =

pertaining to evolution or development;
developmental: *the evolutionary origin of reserves.*

rev – o – lu – tion - ary

–*adjective*

1. of, pertaining to, characterized by, or of the nature of a revolution, or a sudden, complete, or marked change: *a revolutionary junta (council)*.
2. radically new or innovative; outside or beyond established procedure, principles, etc.: *a revolutionary discovery*.
3. (*initial capital letter*) of or pertaining to the American Revolution or to the period contemporaneous with it in U.S. history: *Revolutionary heroes; Revolutionary weapons*.



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Reserve Sharing Groups

Using Contingency Reserves for Wind

- Contingency Reserves: Covers loss of wind generation due to:
 - Mechanical or electrical failure
 - High Speed Cut-out
- 2009 Proposal (Original):
 - Call on CR to cover loss of wind generation during sudden loss of wind
 - Would change responsible party from Generating BA to the Load BA
- Proposal (Modified)
 - Agreed to allow CR to cover loss of wind generation during sudden loss of wind
 - Responsible party remains the Generating BA

A detailed illustration of an unrolled scroll. The scroll is made of aged, yellowish parchment with visible texture and some small cracks. It is held open by four wooden rollers, one at each corner. The scroll is set against a dark blue background. The text "NERC Glossary" is written in a large, bold, black sans-serif font in the center of the scroll. The entire scroll is framed by a thin black border. The background of the slide is light gray with a vertical olive green bar on the left and horizontal olive green lines intersecting the scroll.

NERC Glossary

Handy-Dandy NERC Glossary...

- Contingency Reserves:

The provision of capacity deployed by the **Balancing Authority** to meet the **Disturbance Control Standard (DCS)** and other NERC and Regional Reliability Organization contingency requirements.

- Disturbance Control Standard:

The reliability standard that sets the time limit following a **Disturbance** within which a **Balancing Authority** must return its **Area Control Error** to within a specified range.

Handy-Dandy NERC Glossary...

□ Area Control Error:

The instantaneous difference between a **Balancing Authority's** net actual and scheduled interchange, taking into account the effects of Frequency Bias and correction for meter error.

□ Disturbance:

1. An unplanned event that produces an abnormal system condition.
2. Any perturbation to the electric system.
3. The unexpected change in ACE that is caused by the sudden failure of generation or interruption of load.

Therefore...

A loss of wind generation (due to the loss of wind) is a “sudden failure of generation” which causes a “**Disturbance**” that affects the “**Area Control Error**” of the Generating BA. This motivates the Generating BA to remain compliant with NERC’s “**Disturbance Control Standard**”, which triggers the obligation to call upon “**Contingency Reserves**”.



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Disturbance Control Standard

Reliability Standards

BAL-002-WECC-1

- ❑ CR required for the reliable operation of the interconnected power system.
- ❑ Adequate generating capacity must be available at all times
- ❑ Maintain scheduled frequency, and avoid loss of firm load following transmission or generation contingencies.
- ❑ Necessary to replace generating capacity and energy lost due to forced outages of generation or transmission equipment.

Contingency Reserves Levels

- The greater of the following:
 - An amount of reserve equal to the loss of the most severe single contingency; or
 - An amount of reserve equal to the sum of **three percent of the load** (generation minus station service minus Net Actual Interchange) and **three percent of net generation** (generation minus station service).

Following the Proposal

- ❑ Drafting Team sends to WECC Operating Committee for approval **March 2008**
- ❑ WECC OC approves and sends to WECC Board for approval **April 2008**
- ❑ WECC Board approves and send to NERC for approval **May 2008**
- ❑ NERC approves. WECC Board sends to FERC for approval **June 2008**
- ❑ FERC remands BAL-002-WECC-1 **March 2010**

FERC Docket No. RM09-15-000

- ❑ Could harm reliability
- ❑ Fails to support requirements that are less-stringent than the current regional standard
- ❑ Less stringent than the NERC-wide reliability standard on contingency reserves
- ❑ WECC relied on only eight hours of operating data to support its proposal
- ❑ Additional data and analysis to support the reformulated plan



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Wind Ramps

Current Status in Northwest

- ❑ Tariffs have been modified to allow for sub-hourly (30 minute) schedule changes
- ❑ BPA Tariff is currently the lowest common denominator
- ❑ Restricted to wind schedules only
- ❑ Must be exported from BPA BA
- ❑ Only valid for increase in wind schedule
- ❑ Other BA's Tariffs less restrictive
- ❑ BPA says Tariff modifications imminent

Intra-Hour Scheduling Efforts

- Joint Initiative
 - Intra-Hour Transaction Accelerator Platform (I-TAP) Dec 2010
 - Dynamic Scheduling System (DSS) Sept 2010
- WSPP Schedule D – Reserve Services
 - D-1 Non-Spinning Reserve
 - D-2 Spinning Reserve
 - D-3 Regulation
 - D-4 Operating Reserve – Spinning
 - D-5 Operating Reserve - Supplemental



Thank you

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