

**2010 BPA Rate Case**  
**Power Services & Transmission Services**  
**Wind Integration Rate**  
Customer Workshop

January 23, 2009



# Workshop Agenda

- Update on reserve requirements for wind integration
- Update on generation input costs
- Update on transmission rate design



# Key Messages

- The material we are sharing today reflects *estimates* of reserve amounts, generation input costs, and transmission rates. Additionally, we have included information on varying wind schedule accuracy.
- These estimates are *close* to what will be reflected in the Initial Proposal for the 2010 BPA Rate Case.
- Please feel free to ask questions as we move through today's workshop materials.



# Key Messages

- As part of the WI-09 Settlement, BPA established a cross agency Wind Integration Team (WIT). The WIT is exploring many potential long-term solutions to meet the challenge of balancing loads and resources while accommodating wind's variability.
- It is premature for BPA to propose whether or not any of the technical solutions developed by the WIT will be completed in time for consideration in this rate proceeding.
- The afternoon WIT working session discussion is outside the scope of this rate case. We ask that any questions for the WIT be directed to the afternoon discussion.



# Reserve Requirement

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# 21-month Study Period Analysis of Reserve Requirement based on Varying Wind Schedule Accuracy

## Average Reserves over 24-month Rate Period

<u>Wind Est. Accuracy</u>	<u>Total</u>		<u>Load</u>		<u>Wind</u>	
	<u>Inc</u>	<u>Dec</u>	<u>Inc</u>	<u>Dec</u>	<u>Inc</u>	<u>Dec</u>
30-min Persistence	1,302.9	-1,614.7	761.8	-946.9	541.1	-667.8
45-min Persistence	1,459.2	-1,818.6	783.9	-943.9	675.3	-874.7
60-min Persistence	1,603.2	-2,033.2	782.6	-929.6	820.6	-1,103.6
2-hour Avg Persistence	1,776.8	-2,340.1	735.2	-860.2	1,041.6	-1,479.8



# Generation Inputs

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# Background on Proposed WECC Standard for Operating Reserves

- WECC is in the process of getting approval from FERC for a new Standard titled BAL-002-WECC-1 Contingency Reserves. This will change the calculation of the requirement and needed amount of generation inputs to be: 3% times BA load *plus* 3% times BA net generation (generation minus station service).
- If adopted, this new standard will replace the existing standard of 5% of the hydro, 5% wind generation and 7% of other on-line generation. This is a reliability based requirement that the Balancing Authority must satisfy at all times.
- The estimated forecast under each scenario is:

	<u>Current</u>	<u>Proposed</u>
– FY2010:	504 MW	375 MW
– FY2011:	522 MW	387 MW
– Rate Period Average:	513 MW	380 MW





Bonneville Power Administration

**Estimated Changes to Operating Reserve Cost for Various Scenarios**

	A	B	C	D	E	F	G	H	I
A	Wind Scheduling Accuracy Assumption	2 Hour	60 Minutes	45 Minutes	30 Minutes	2 Hour	60 Minutes	45 Minutes	30 Minutes
B	Load Following Assumption	2 Hour	60 Minutes	45 Minutes	30 Minutes	2 Hour	60 Minutes	45 Minutes	30 Minutes
C	Forecasted Installed Wind Capacity (MW)	3743	3743	3743	3743	3743	3743	3743	3743
D	Wind Balancing Reserve Forecast (MW) Inc	1045	820	675	541	1045	820	675	541
E	Wind Balancing Reserve Forecast (MW) Dec	(1479)	(1103)	(874)	(667)	(1479)	(1103)	(874)	(667)
F	Load Following Reserve Assumption (MW) Inc	733	782	784	762	733	782	784	762
G	Load Following Reserve Assumption (MW) Dec	(858)	(930)	(944)	(947)	(858)	(930)	(944)	(947)
H	Operating Reserve Assumption (MW)	513	513	513	513	380	380	380	380
	<b>Embedded Cost Portion of Operating Reserve</b>	Annual Average of FY2010-FY2011 MW	Annual Average of FY2010-FY2011 MW	Annual Average of FY2010-FY2011 MW	Annual Average of FY2010-FY2011 MW	Annual Average of FY2010-FY2011 MW	Annual Average of FY2010-FY2011 MW	Annual Average of FY2010-FY2011 MW	Annual Average of FY2010-FY2011 MW
	<b>Reserve Assumptions</b>								
1	Regulated + Independent Hydro Projects Capacity	8,363	8,363	8,363	8,363	8,363	8,363	8,363	8,363
2	Regulating Reserves	105	105	105	105	105	105	105	105
3	Operating Reserves	513	513	513	513	380	380	380	380
4	Load Following Reserves	628	677	679	657	628	677	679	657
5	Wind Integration Reserves	1,045	820	675	541	1,045	820	675	541
	<b>Forecast of Hydro Capacity System Uses</b>								
6	Regulated + Independent Hydro Projects Capacity	8,363	8,363	8,363	8,363	8,363	8,363	8,363	8,363
7	Total Power Services Reserve Obligation (Line 2+3+4+5)	2,291	2,115	1,972	1,816	2,158	1,982	1,839	1,683
8	Regulated + Independent Hydro Projects Capacity System Uses (Line 6+7)	10,654	10,478	10,335	10,179	10,521	10,345	10,202	10,046
	<b>Adjusted Revenue Requirement</b>								
9	Power Services' Revenue Requirement for Regulated + Independent Hydro Projects	\$ 921,058,000	\$ 921,058,000	\$ 921,058,000	\$ 921,058,000	\$ 921,058,000	\$ 921,058,000	\$ 921,058,000	\$ 921,058,000
10	Regulated + Independent Hydro Projects Capacity System Uses (Line 8)	10,654	10,478	10,335	10,179	10,521	10,345	10,202	10,046
11	Total kW/month Hydro Project Capacity (Line 10 * 12MO * 1000kW/MW)	127,848,000	125,736,000	124,020,000	122,148,000	126,252,000	124,140,000	122,424,000	120,552,000
12	<b>Per Unit Allocation \$/kW/month (Line 9 / Line 11)</b>	\$ 7.20	\$ 7.33	\$ 7.43	\$ 7.54	\$ 7.30	\$ 7.42	\$ 7.52	\$ 7.64
	<b>Revenue Forecast by Product</b>								
13	Operating Reserves	\$ 44,323,200	\$ 45,123,480	\$ 45,739,080	\$ 46,416,240	\$ 33,288,000	\$ 33,835,200	\$ 34,291,200	\$ 34,838,400
14	<b>Change in Operating Reserve Embedded Cost Portion from Initial Proposal Forecast</b>		\$ 800,280	\$ 1,415,880	\$ 2,093,040	\$ (11,035,200)	\$ (10,488,000)	\$ (10,032,000)	\$ (9,484,800)

15	Variable Cost per unit cost assumption (\$/kW/month)	\$ 0.95	\$ 0.95	\$ 0.95	\$ 0.95	\$ 0.95	\$ 0.95	\$ 0.95	\$ 0.95
16	Operating Reserve - Spinning (Embedded + Variable) (\$/kW/month)	\$ 8.15	\$ 8.28	\$ 8.38	\$ 8.49	\$ 8.25	\$ 8.37	\$ 8.47	\$ 8.59
17	Operating Reserve - Supplemental (Embedded Only) (\$/kW/month)	\$ 7.20	\$ 7.33	\$ 7.43	\$ 7.54	\$ 7.30	\$ 7.42	\$ 7.52	\$ 7.64
18	Operating Reserves - Spinning billing factor (MW average)	265.5	265.5	265.5	265.5	190.0	190.0	190.0	190.0
19	Operating Reserves - Supplemental billing factor (MW average)	265.5	265.5	265.5	265.5	190.0	190.0	190.0	190.0
20	Transmission Service Rate for Operating Reserve - Spinning (Mills/kWh)	11.16	11.34	11.48	11.63	11.30	11.47	11.60	11.77
21	Transmission Service Rate for Operating Reserve - Supplemental (Mills/kWh)	9.86	10.04	10.18	10.33	10.00	10.16	10.30	10.47

Estimated Changes to Wind Balancing Reserve Embedded Cost for Various Scenarios									
	A	B	C	D	E	F	G	H	I
A	Wind Scheduling Accuracy Assumption	2 Hour	60 Minutes	45 Minutes	30 Minutes	2 Hour	60 Minutes	45 Minutes	30 Minutes
B	Load Following Assumption	2 Hour	60 Minutes	45 Minutes	30 Minutes	2 Hour	60 Minutes	45 Minutes	30 Minutes
C	Forecasted Installed Wind Capacity (MW)	3743	3743	3743	3743	3743	3743	3743	3743
D	Wind Balancing Reserve Forecast (MW) Inc	1045	820	675	541	1045	820	675	541
E	Wind Balancing Reserve Forecast (MW) Dec	(1479)	(1103)	(874)	(667)	(1479)	(1103)	(874)	(667)
F	Load Following Reserve Assumption (MW) Inc	733	782	784	762	733	782	784	762
G	Load Following Reserve Assumption (MW) Dec	(858)	(930)	(944)	(947)	(858)	(930)	(944)	(947)
H	Operating Reserve Assumption (MW)	513	513	513	513	380	380	380	380
	<b>Embedded Cost of Regulating Reserve and Wind Balancing Reserve</b>	Annual Average of FY2010-FY2011 (MW)	Annual Average of FY2010-FY2011 (MW)	Annual Average of FY2010-FY2011 (MW)	Annual Average of FY2010-FY2011 (MW)	Annual Average of FY2010-FY2011 (MW)	Annual Average of FY2010-FY2011 (MW)	Annual Average of FY2010-FY2011 (MW)	Annual Average of FY2010-FY2011 (MW)
	<b>Reserve Assumptions</b>								
1	Regulated + Independent Hydro	8,363	8,363	8,363	8,363	8,363	8,363	8,363	8,363
2	Regulating Reserves	105	105	105	105	105	105	105	105
3	Operating Reserves less Op Res on rest of System	490	490	490	490	363	363	363	363
4	Load Following Capacity	628	677	679	656	628	677	679	656
5	Wind Integration	1,045	820	675	541	1,045	820	675	541
	<b>Forecast of Hydro Capacity System Uses</b>								
	Big 10 is 91% of Total								
6	Hydro Projects Capacity (Line 1 * 91%)	7,610	7,610	7,610	7,610	7,610	7,610	7,610	7,610
7	Total PS Reserve Obligation (Line 2+3+4+5)	2,268	2,092	1,949	1,792	2,141	1,965	1,822	1,665
8	Hydro Project Capacity System Uses (Line 6+7)	9,878	9,702	9,559	9,402	9,751	9,575	9,432	9,275
	<b>Adjusted Revenue Requirement</b>								
9	Power Revenue Requirement for Hydro Projects	\$ 833,231,000	\$ 833,231,000	\$ 833,231,000	\$ 833,231,000	\$ 833,231,000	\$ 833,231,000	\$ 833,231,000	\$ 833,231,000
10	Hydro Project Capacity System Uses (Line 9)	9,878	9,702	9,559	9,402	9,751	9,575	9,432	9,275
11	Total kW/month Hydro Project Capacity (Line 10 * 12MO * 1000kW/MW)	118,539,960	116,427,960	114,711,960	112,827,960	117,014,760	114,902,760	113,186,760	111,302,760
12	Per Unit Allocation \$/kW/month (Line 9 / Line 11)	\$ 7.03	\$ 7.16	\$ 7.26	\$ 7.38	\$ 7.12	\$ 7.25	\$ 7.36	\$ 7.49
	<b>Revenue Forecast by Product</b>								
13	Load Regulation (Line 2 * 12mo * 1000kW/mo * line 12)	\$ 8,857,800	\$ 9,021,600	\$ 9,147,600	\$ 9,298,800	\$ 8,971,200	\$ 9,135,000	\$ 9,273,600	\$ 9,437,400
14	Wind Integration	\$ 88,156,200	\$ 70,454,400	\$ 58,806,000	\$ 47,910,960	\$ 89,284,800	\$ 71,340,000	\$ 59,616,000	\$ 48,625,080
	<b>Change in Wind Integration Balancing Reserve Embedded Cost Portion from Initial Proposal Forecast</b>		\$ (17,701,800)	\$ (29,350,200)	\$ (40,245,240)	\$ 1,128,600	\$ (16,816,200)	\$ (28,540,200)	\$ (39,531,120)

## Estimated Changes to Wind Balancing Reserve Combined Embedded and Variable Costs for Various Scenarios

	A	B	C	D	E
A	Wind Scheduling Accuracy Assumption	2 Hour	60 Minutes	45 Minutes	30 Minutes
B	Load Following Assumption	2 Hour	60 Minutes	45 Minutes	30 Minutes
C	Forecasted Installed Wind Capacity (MW)	3743	3743	3743	3743
D	Wind Balancing Reserve Forecast (MW) Inc	1045	820	675	541
E	Wind Balancing Reserve Forecast (MW) Dec	(1479)	(1103)	(874)	(667)
F	Load Following Reserve Assumption (MW) Inc	733	782	784	762
G	Load Following Reserve Assumption (MW) Dec	(858)	(930)	(944)	(947)
H	Operating Reserve Assumption (MW)	513	513	513	513
1	<b>Embedded Cost Portion of Wind Balancing Reserve</b>	\$ 88,156,200	\$ 70,454,400	\$ 58,806,000	\$ 47,910,960
2	<b>Variable Cost Portion of Wind Balancing Reserve</b>	\$ 34,247,511	\$ 25,379,843	\$ 18,889,810	\$ 13,825,452
3	<b>Total Cost of Wind Balancing Reserve</b>	\$ 122,403,711	\$ 95,834,243	\$ 77,695,810	\$ 61,736,412
4	<b>Per Unit Allocation of Wind Balancing Reserve (\$/kW/month) Total Cost / (Wind Integration (line D) * 12 months * 1000)</b>	\$ 9.76	\$ 9.74	\$ 9.59	\$ 9.51
5	<b>Transmission Services Wind Integration - Within-hour Balancing Service Rate on Installed Wind Capacity (\$/kW/month)</b>	\$ 2.73	\$ 2.13	\$ 1.73	\$ 1.37

## Total Estimated Embedded Cost Changes from the Initial Proposal for Various Scenarios

	A	B	C	D	E
	Wind Scheduling Accuracy Assumption	2 Hour	60 Minutes	45 Minutes	30 Minutes
	Operating Reserve Assumption (MW)	380	380	380	380
1	<b>Operating Reserves</b>	\$ (11,035,200)	\$ (10,488,000)	\$ (10,032,000)	\$ (9,484,800)
2	<b>Wind Balancing Reserves</b>	\$ 1,128,600	\$ (16,816,200)	\$ (28,540,200)	\$ (39,531,120)
3	<b>PS Transmission Savings Due to change in Operating Reserves Methodology</b>	\$ 2,969,500	\$ 2,969,500	\$ 2,969,500	\$ 2,969,500
4	<b>Total</b>	\$ (6,937,100)	\$ (24,334,700)	\$ (35,602,700)	\$ (46,046,420)

# Transmission Rate Design

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# Transmission Wind Integration Rate Design for the Initial Proposal

- For the 2010 BPA Rate Case initial proposal, the transmission wind integration rate design proposal reflects generation input costs that are passed through to transmission contract holders based on *estimated* installed wind capacity.
- Transmission is proposing developing a rate based on installed wind capacity as the billing factor, similar to the existing rate; only the required reserve amounts now include impacts to generation imbalance capacity.
- The proposed monthly rate is determined by:  $P / (Bf * 12 \text{ months})$

*Where:*

- P = Power Services annual average generation input cost (\$) established in WP-10 rate case for the total reserves required.
- Bf = Monthly billing factor (kW) is the average forecasted installed wind generation capacity for the twenty four months of the rate period.



# Transmission Rate Design for the Initial Proposal

- Transmission is considering proposing to clarify what we mean by intentional deviations and how they are applied under the Generation Imbalance (GI) and Energy Imbalance (EI) rate schedules. We are also considering modifying the penalty for positive deviations to fully recover our incremental costs.
- Additionally, Transmission is considering proposing to modify the GI and EI rate schedules to recognize negative index prices that will apply to spill conditions and intentional deviation conditions.
- After release of the initial proposal, Transmission is open to exploring other rate design alternatives.



# Incremental Cost Rate Design for the Initial Proposal

- Transmission is proposing to adopt a formula for incremental cost rates and to propose the structure and elements of a public process for determining and allocating costs of some facilities in the Network Open Season plan-of-service that do not meet the criteria to move forward at embedded cost rates.
- We believe this approach is the most efficient way to establish incremental costs rates and keep transmission development in the region moving forward.





# Next Steps

- The formal rate proceeding begins with the publication of the Federal Register Notice (FRN). A prehearing conference will follow.
- Ex parte will begin with the publication of the FRN. Once ex parte begins, BPA cannot discuss rate case issues with any party, except in noticed public meetings.
- The final proposal must be submitted to FERC for approval 60 days prior to the effective date, Oct. 1, 2009.

