Bonneville Power Administration

Quadrennial Energy Review

Transmission

July 2014

Portland, Oregon

Background

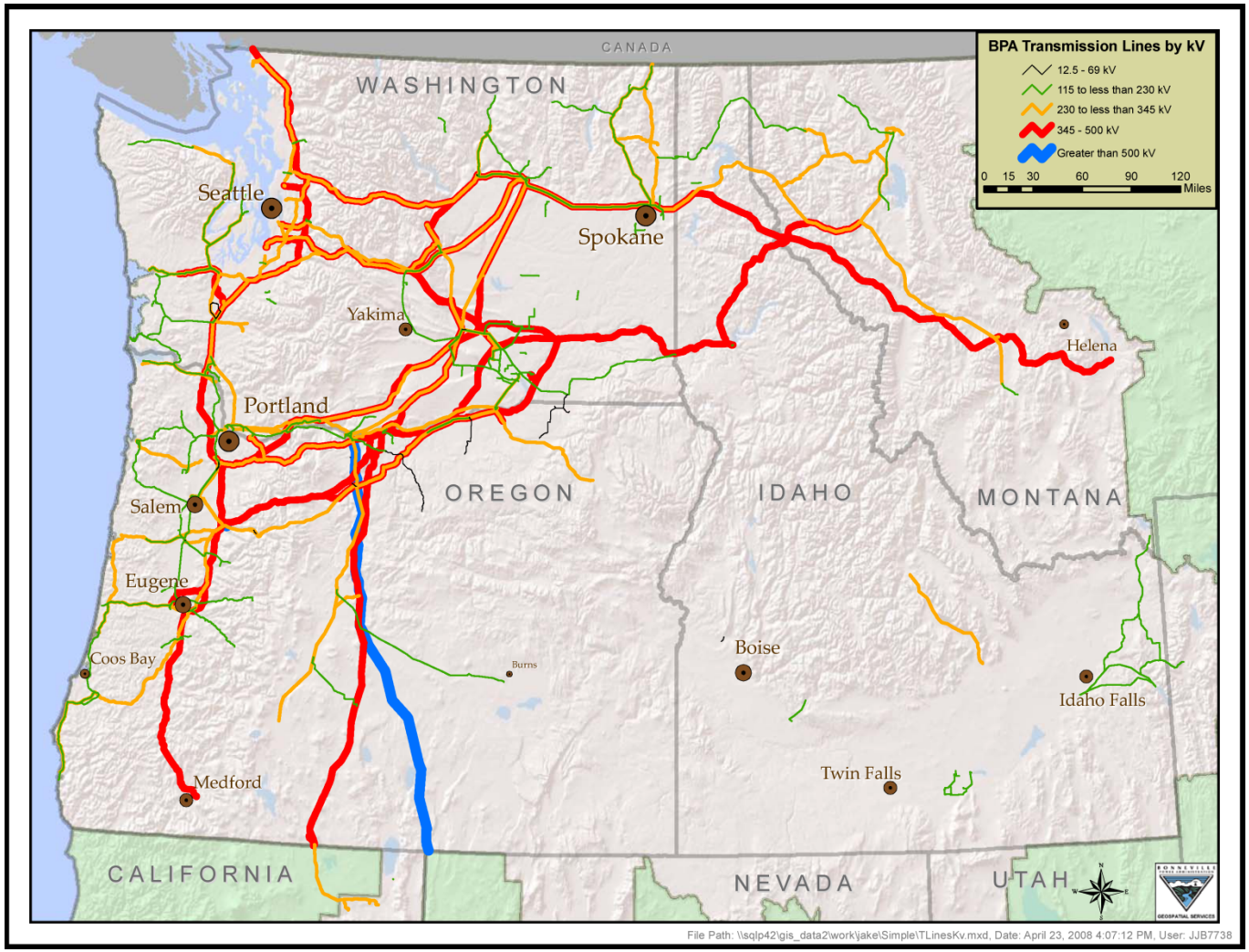
Introduction to BPA

- BPA markets power from 31 Federal dams, the Columbia Generating Station Nuclear Plant, and several small non-Federal power plants
- About 80% of the power BPA sells is hydroelectric.
- BPA accounts for about 30% of the electric power consumed within the region.
- BPA owns and operates 15,000 miles of transmission lines.
- 3,100 Federal FTE employees

BPA's high-voltage transmission system

- BPA owns and operates 75% of the Pacific Northwest's high voltage electrical transmission system.
- BPA's system includes more than 15,000 miles of transmission line and 285 substations.
- The Federal Columbia River Transmission System spans 300,000 square miles in Oregon, Washington, Idaho, Montana and sections of Wyoming, Nevada, Utah and California.
- The system enables a peak loading of about 30,000 megawatts and generates more than $700 million a year in revenues from transmission services.
- BPA's Transmission Business Line operates as a non-jurisdictional entity with an Open Access Transmission Tariff based on FERC's pro-forma tariff.

BPA's Transmission System

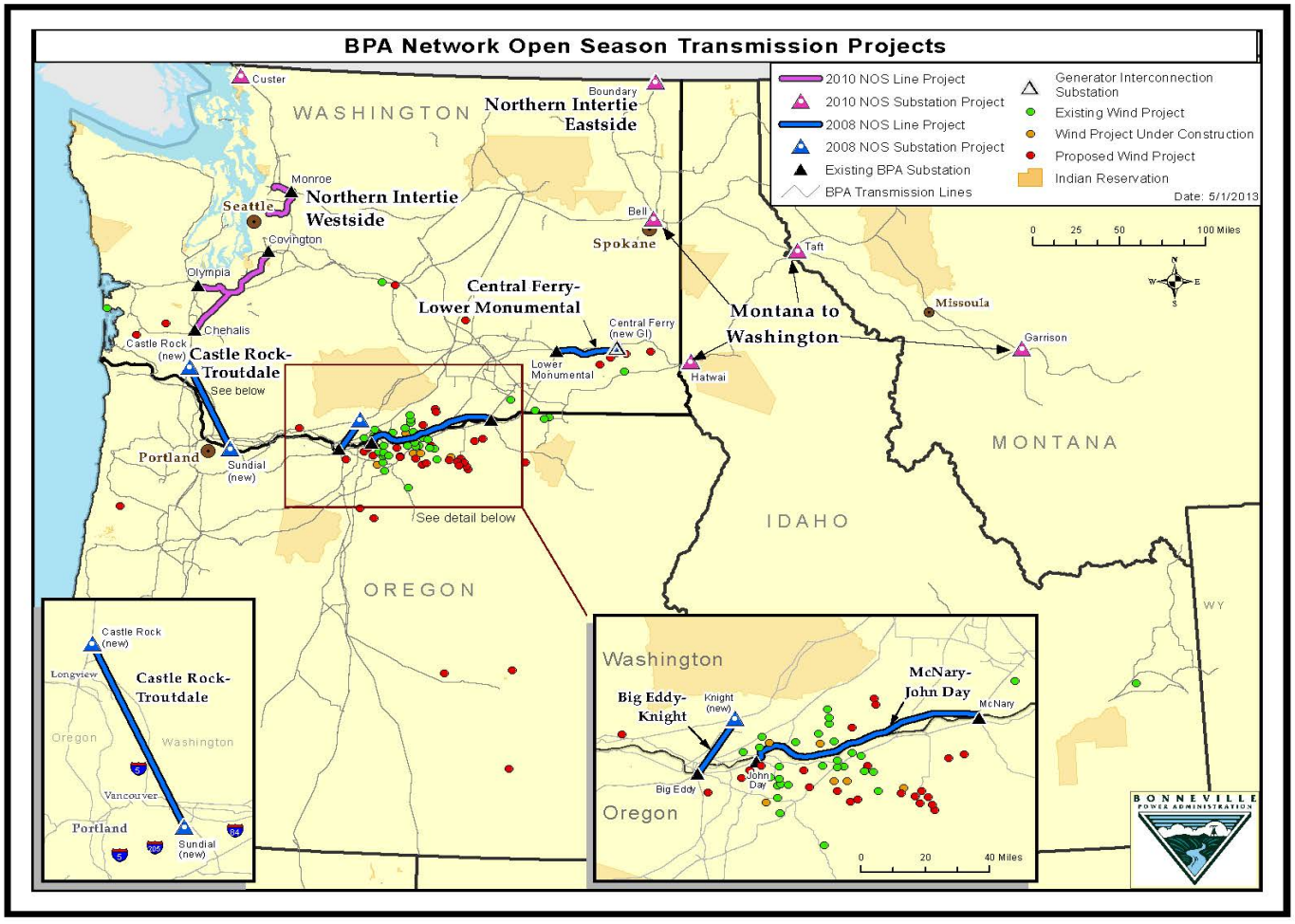


Transmission System

Operating voltage	Circuit miles
1,000 kV	264*
500 kV	4,735
345 kV	570
287 kV	229
230 kV	5,324
161 kV	119
138 kV	50
115 kV	3,556
below 115 kV	368
Total	15,215

*BPA's portion of the PNW/PSW direct-current intertie. The total length of this line from The Dalles, OR to Los Angeles, CA is 846 miles.

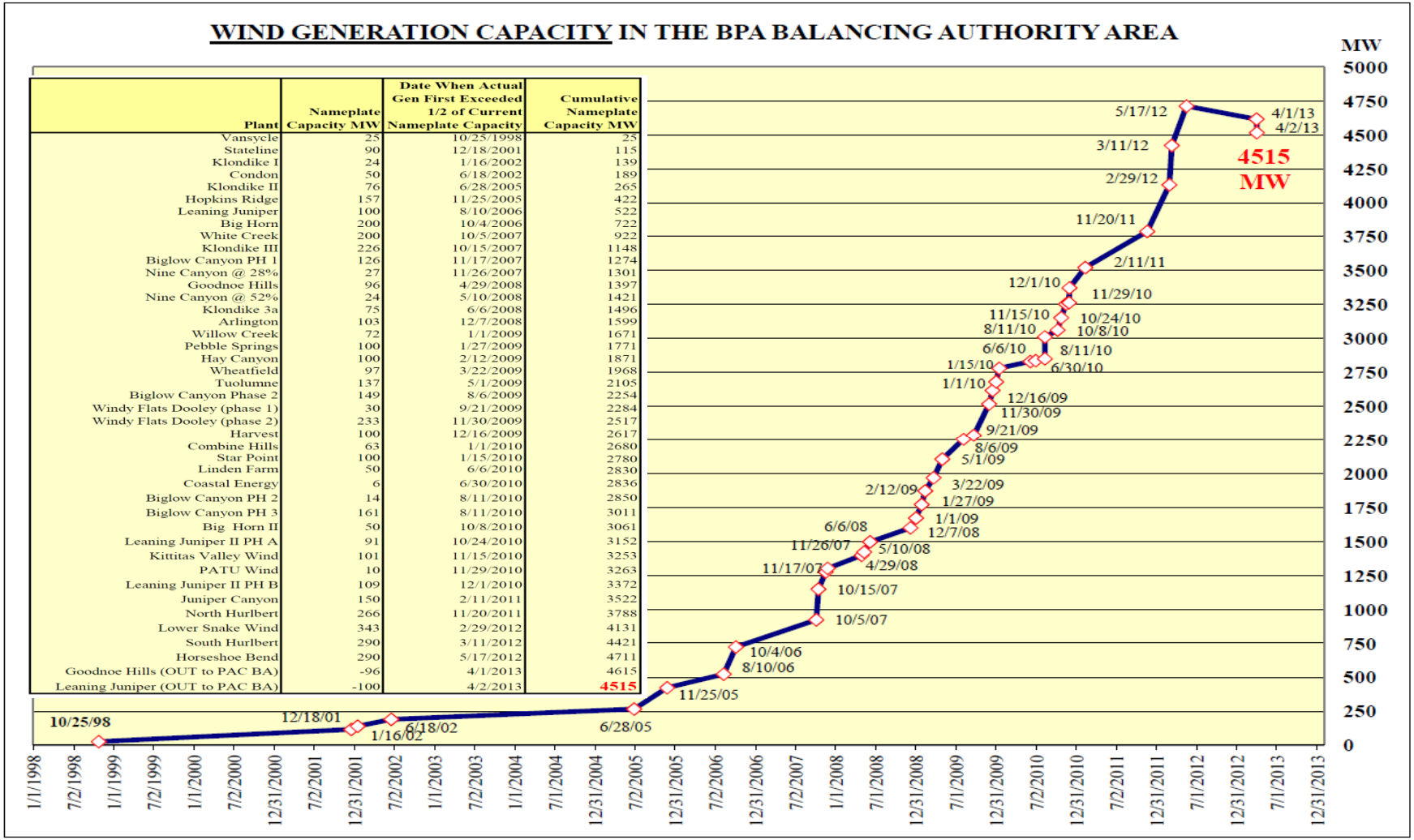
Transmission Infrastructure Projects



Wind Generation Capacity in the BPA Balancing Authority

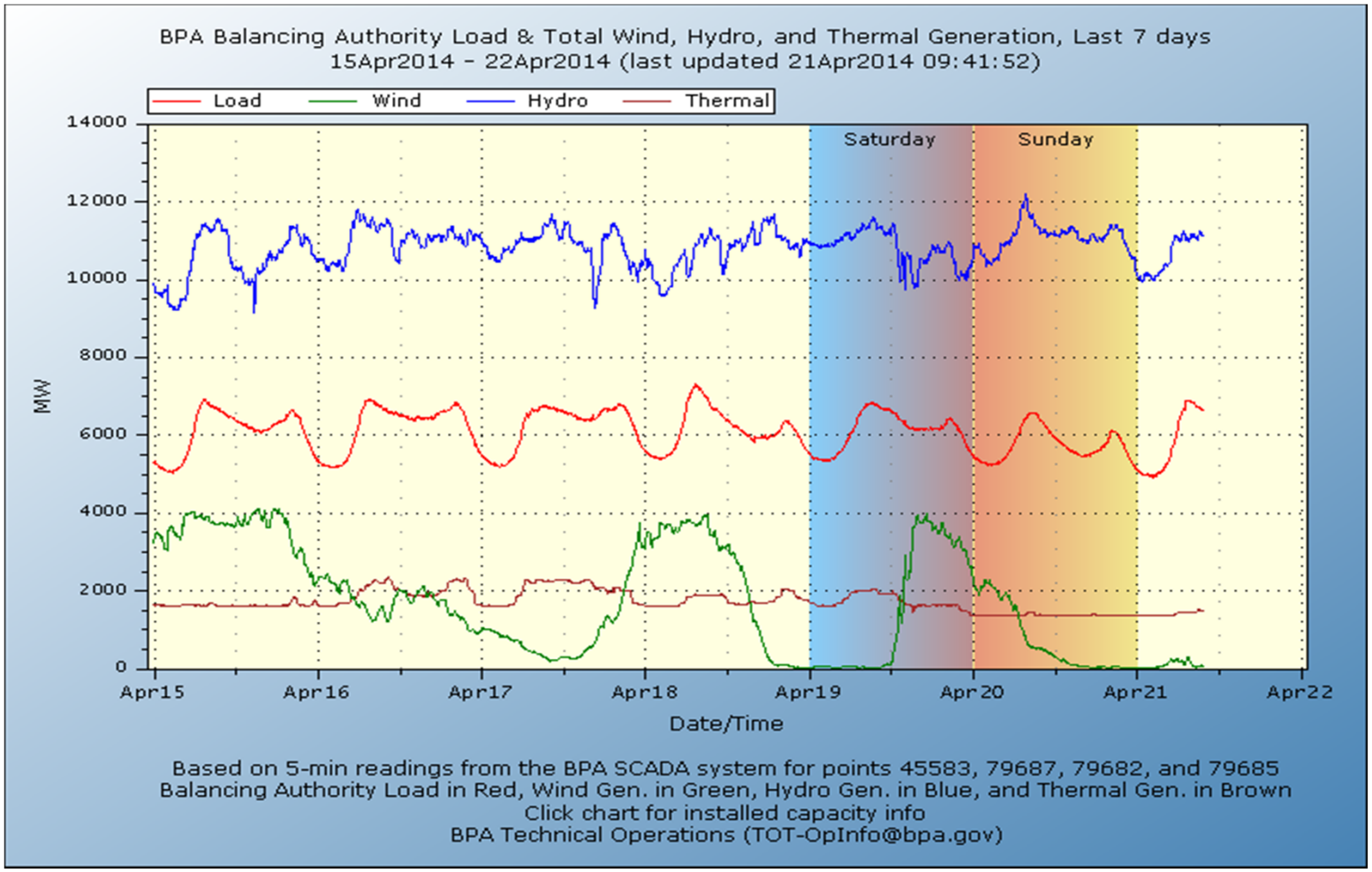
WIND GENERATION CAPACITY IN THE BPA BALANCING AUTHORITY AREA

Plant	Nameplate Capacity MW	Date When Actual Gen First Exceeded 1/2 of Current Nameplate Capacity	Cumulative Nameplate Capacity MW
Vansycle	25	10/25/1998	25
Stateline	90	12/18/2001	115
Klondike I	24	1/16/2002	139
Condon	50	6/18/2002	189
Klondike II	76	6/28/2005	265
Hopkins Ridge	157	11/25/2005	422
Leaning Juniper	100	8/10/2006	522
Big Horn	200	10/4/2006	722
White Creek	200	10/5/2007	922
Klondike III	226	10/15/2007	1148
Biglow Canyon PH 1	126	11/17/2007	1274
Nine Canyon @ 28%	27	11/26/2007	1301
Goodnoe Hills	96	4/29/2008	1397
Nine Canyon @ 52%	24	5/10/2008	1421
Klondike 3a	75	6/6/2008	1496
Arlington	103	12/7/2008	1599
Willow Creek	72	1/1/2009	1671
Pebble Springs	100	1/27/2009	1771
Hay Canyon	100	2/12/2009	1871
Wheatfield	97	3/22/2009	1968
Tuolumne	137	5/1/2009	2105
Biglow Canyon Phase 2	149	8/6/2009	2254
Windy Flats Dooley (phase 1)	30	9/21/2009	2284
Windy Flats Dooley (phase 2)	233	11/30/2009	2517
Harvest	100	12/16/2009	2617
Combine Hills	63	1/1/2010	2680
Star Point	100	1/15/2010	2780
Linden Farm	50	6/6/2010	2830
Coastal Energy	6	6/30/2010	2836
Biglow Canyon PH 2	14	8/11/2010	2850
Biglow Canyon PH 3	161	8/11/2010	3011
Big Horn II	50	10/8/2010	3061
Leaning Juniper II PH A	91	10/24/2010	3152
Kittitas Valley Wind	101	11/15/2010	3253
PATU Wind	10	11/29/2010	3263
Leaning Juniper II PH B	109	12/1/2010	3372
Juniper Canyon	150	2/11/2011	3522
North Hurlbert	266	11/20/2011	3788
Lower Snake Wind	343	2/29/2012	4131
South Hurlbert	290	3/11/2012	4421
Horseshoe Bend	290	5/17/2012	4711
Goodnoe Hills (OUT to PAC BA)	-96	4/1/2013	4615
Leaning Juniper (OUT to PAC BA)	-100	4/2/2013	4515



WIND_InstalledCapacity_current.xls 4/10/2013

Wind Generation and Load Variability



The 5-year Pacific Northwest Smart Grid Demonstration Project

- Largest Smart Grid Demonstration Project in the United States
- Involves 11 utilities, two universities, and five infrastructure partners
- $178 million budget ($89 million private funds/$89 funded by 2009 American Reinvestment Recovery Act
- Projects include (but not limited to): Home energy systems, distributed generation, batteries, smart appliances, voltage optimization tools, as well as exploring ways to integrate solar and wind resources