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January 8, 2013

MEMORANDUM

TO: Council Members

FROM: John Fazio, Senior Systems Analyst

SUBJECT: Briefing on Resource Adequacy after Coal Plant Retirements

At the November Council meeting, during the discussion of power supply adequacy, staff was asked to assess the adequacy of the regional supply after the expected retirements of Boardman and Centralia Unit 1 coal plants in 2020. The combined generating capacity of those two plants is about 1,330 megawatts.

In 2021, assuming anticipated load growth, 6th Plan energy efficiency savings, and sited and licensed new resources, the loss of load probability (LOLP) is 15.3 percent without Boardman and Centralia 1 and 8.3 percent with those plants remaining in service. The Council's adequacy standard limits the LOLP to a maximum of 5 percent - meaning that in both cases, the 2021 supply would be inadequate without additional actions.

For the coal retirement case, it would take about 2,000 megawatts of additional dispatchable resource capacity to bring the 15.3 percent LOLP down to the 5 percent limit. This amount is approximately 1,300 megawatts more than would be required if the coal units are not retired.

For comparison, recall that the recent adequacy assessment for 2017 indicated that the LOLP for that year is expected to be 6.6 percent and that it would take about 350 megawatts of additional capacity to make the system adequate.

While these results are the most likely, it should be noted that they are subject to change, either up or down, depending on how the future unfolds.

Staff has identified over 3,000 megawatts of planned resources that were not counted in the analysis but could be developed by 2021 if the need arises. These planned resources were not counted because they have not yet been sited and licensed.

Announced Coal Unit Retirements: Effect on Regional Resource Adequacy



Boardman

Centralia



Council Meeting
January 16, 2013
Portland, Oregon



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Assignment

At the October Council meeting, Member Rockefeller asked:

'How will the announced closure of coal units at Boardman and Centralia in 2020 affect regional resource adequacy?'



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Analysis Performed

1. Assessed regional resource adequacy in 2021 after Boardman and Centralia 1 are closed
2. Estimated how much additional dispatchable resource capacity is needed to make the regional power system adequate¹

¹The Council's adequacy standard sets a maximum limit of 5 percent for the power supply's loss of load probability.



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Summary of Results for 2021

1. Adequacy: **15.3% LOLP**
2. Needed Resource¹: **2,000 megawatts**

**Recall 2017 Adequacy Assessment:
LOLP = 6.6% and 350 megawatts to get to 5%**

¹Additional dispatchable resource capacity needed to bring the LOLP down to 5%



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Adequacy Milestones

<u>Year</u>	<u>LOLP</u>
2013	< 5%
2015	5%
2017	6.6%
2021 with coal units	8.3%
2021 without coal units	15.3%
2021 without coal, with 2,000 MW	5%



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Summary of Projected Changes From now to 2021

Changes that Increase Need	Notes
Load Growth	1,210 MWa ¹ net of EE (0.6% growth rate)
Boardman Retires	510 MWa ² (601 MW nameplate)
Centralia 1 Retires	620 MWa ² (730 MW nameplate)

¹EE savings from 2013 to 2021 are targeted to be 2,900 MW.

²Assuming an 85% availability factor for coal-fired plants.



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Summary of Projected Changes From now to 2021

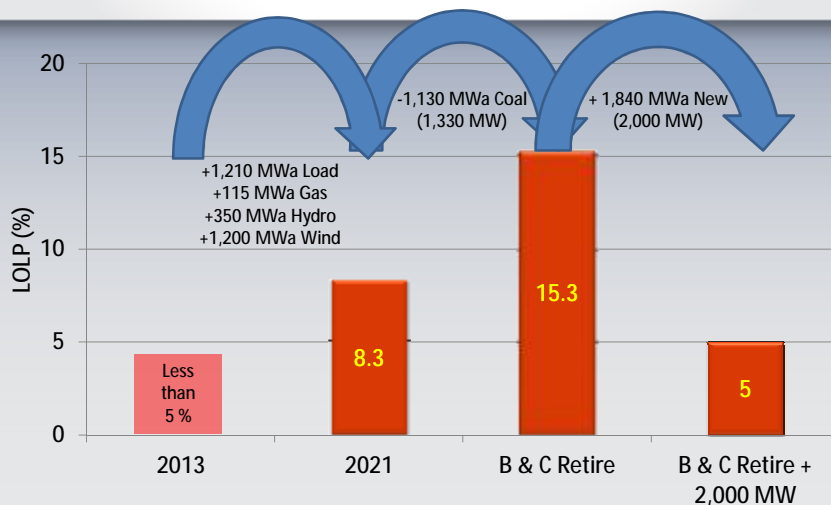
Changes that Reduce Need	Notes
Hydro Upgrades	350 MWa
Thermal Resources	115 MWa ¹ (124 MW nameplate)
RPS Resources	1,200 MWa (4,000 MW nameplate)

¹Assuming a 92% availability factor for gas-fired turbines.



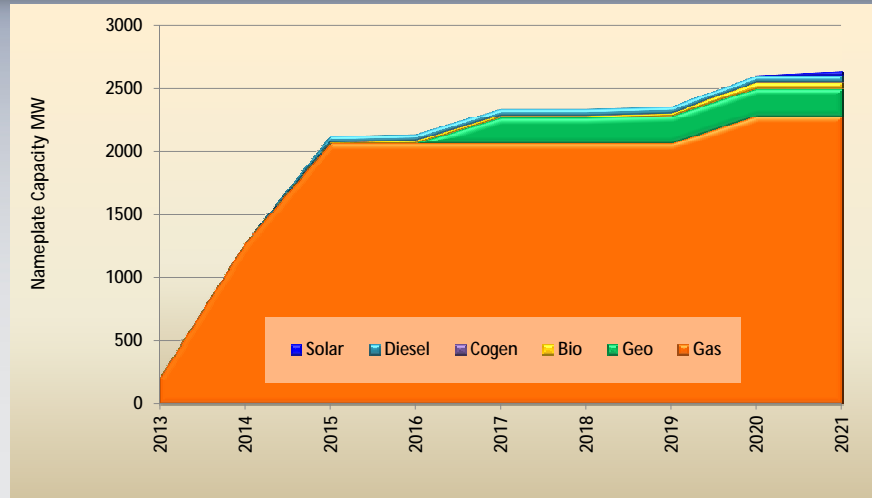
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Loss of Load Probability



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Planned Resources Not in the Analysis (Cumulative)



Source: PNUCC

Additional Slides



Sixth Plan Target Efficiency Levels

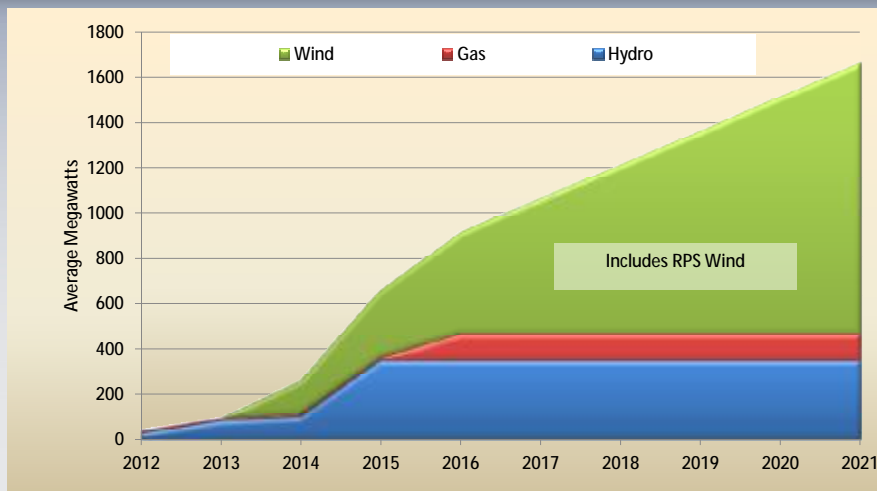
Year	Incremental Savings (MWa)	Cumulative Savings from 2010 (MWa)	Cumulative Savings from 2013 (MWa)
2010	200	200	
2011	220	420	
2012	240	660	
2013	260	920	260
2014	280	1,200 ¹	540
2015	300		840
2016	320		1,160
2017	340		1,500
2018	350 ²		1,850
2019	350		2,200
2020	350		2,550
2021	350		2,900

¹Council's target for 2014 is 1,200 MWa.

²EE savings past 2017 are limited by assumed ramp rates.



Generating Resource Additions (Cumulative)



Results

Step	Description	LOLP
0	2017 LOLP	6.6%
1	2021 LOLP with Boardman and Centralia	8.3%
2	2021 Without Boardman and Centralia	15.3%
3	2021 Without Boardman and Centralia With 2,000 MW new dispatchable capacity	5.0%