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March 31, 2015

### MEMORANDUM

**TO: Power Committee members**

**FROM: John Fazio, Senior Systems Analyst**

**SUBJECT: Preliminary Adequacy Assessments for 2020 and 2021**

#### **BACKGROUND:**

Presenter: John Fazio

Summary In 2011, the Council adopted a methodology, recommended by the Resource Adequacy Forum, to assess the adequacy of the Northwest's power supply. The purpose of this assessment is to provide an early warning should resource development fail to keep pace with demand growth. The Council assesses resource adequacy every year, examining the ability of the power supply to meet regional demand five years out.

The Council's maximum threshold for loss-of-load probability (LOLP) is set at five percent. This means that the power system would have a ninety-five percent chance of not having a shortfall anytime during the year being examined. The last assessment, done for the 2019 operating year, indicated that the region was slightly in adequate with a LOLP of six percent. The current adequacy assessment for 2020 shows an LOLP of five percent, just at the Council's adequacy threshold.

Many changes have occurred since last year's assessment. First, the Council's load forecast was revised downward (primarily due to decreased employment expectations). Because of this, the 2020 annual average load is 310 average megawatts lower than the average load used in the 2019 assessment. The effect of the load change alone drops the 2020 LOLP to a little under four percent.

Secondly, the region's generating capability has changed. The biggest change is the removal of the 250 megawatt Big Hanaford plant (an independent power producer). Also, hydroelectric system's generation was modified to account for amendments to the biological opinion.

Finally, the GENESYS model was enhanced to better represent hourly hydroelectric dispatch and purchase-ahead imports. The resulting LOLP for 2020, after taking all of these changes into account, is five percent.

Of greater interest perhaps, is the adequacy assessment for 2021, when the Boardman and Centralia 1 coal plants are scheduled to retire. The LOLP for that year is a little over eight percent. The region would need to acquire about 1,150 megawatts of dispatchable generation to bring the LOLP back to the five percent standard.

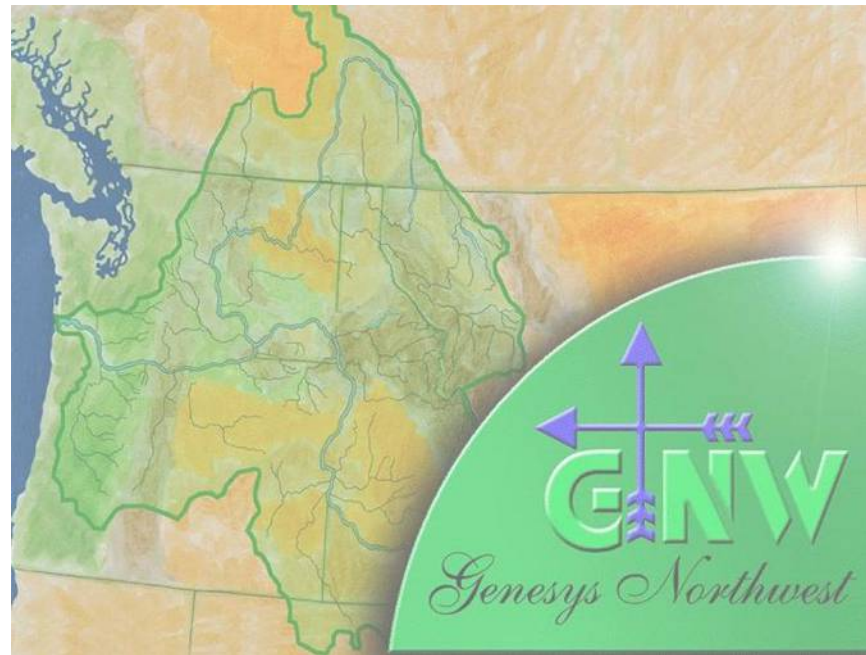
**Relevance** Besides being an early warning to ensure that the regional power supply remains adequate, the Council's adequacy standard is converted into Adequacy Reserve Margins (for both energy and capacity) that are fed into the Regional Portfolio Model to ensure that resource strategies developed by that model will produce an adequate supply.

**Workplan:** 1.C. Co-chair and manage the Resource Adequacy Advisory Committee

**Background:** Since the late 1990s, the Council has worked to develop a more robust method of assessing the adequacy of the region's power supply. In 2011 it formally adopted the loss-of-load probability (LOLP) metric as the measure to assess adequacy and set its maximum threshold at five percent. The Council reassesses this every year, looking at the adequacy of the power supply five years out, as an early warning to ensure that adequacy is maintained.

**More Info:** Summary information and updates are available at <http://www.nwcouncil.org/energy/resource/home>

# 2020-21 Preliminary Resource Adequacy Assessment



Power Committee Meeting  
Helena, Montana  
April 7, 2015

# Outline

- **Changes since the 2019 assessment**
- **Major Assumptions**
- **Preliminary Results for 2020**
- **Effects of Coal Retirement in 2021**

# Major Changes from 2019 Assessment

- 2020 load **310 aMW lower** than 2019 load
  - 2019 forecast = 22,030 MWa
  - 2020 forecast = 21,720 MWa
- Big Hanaford (**250 MW**) removed
- GENESYS enhancement
  - Improved purchase-ahead simulation
  - Streamlined logic, removed dead code

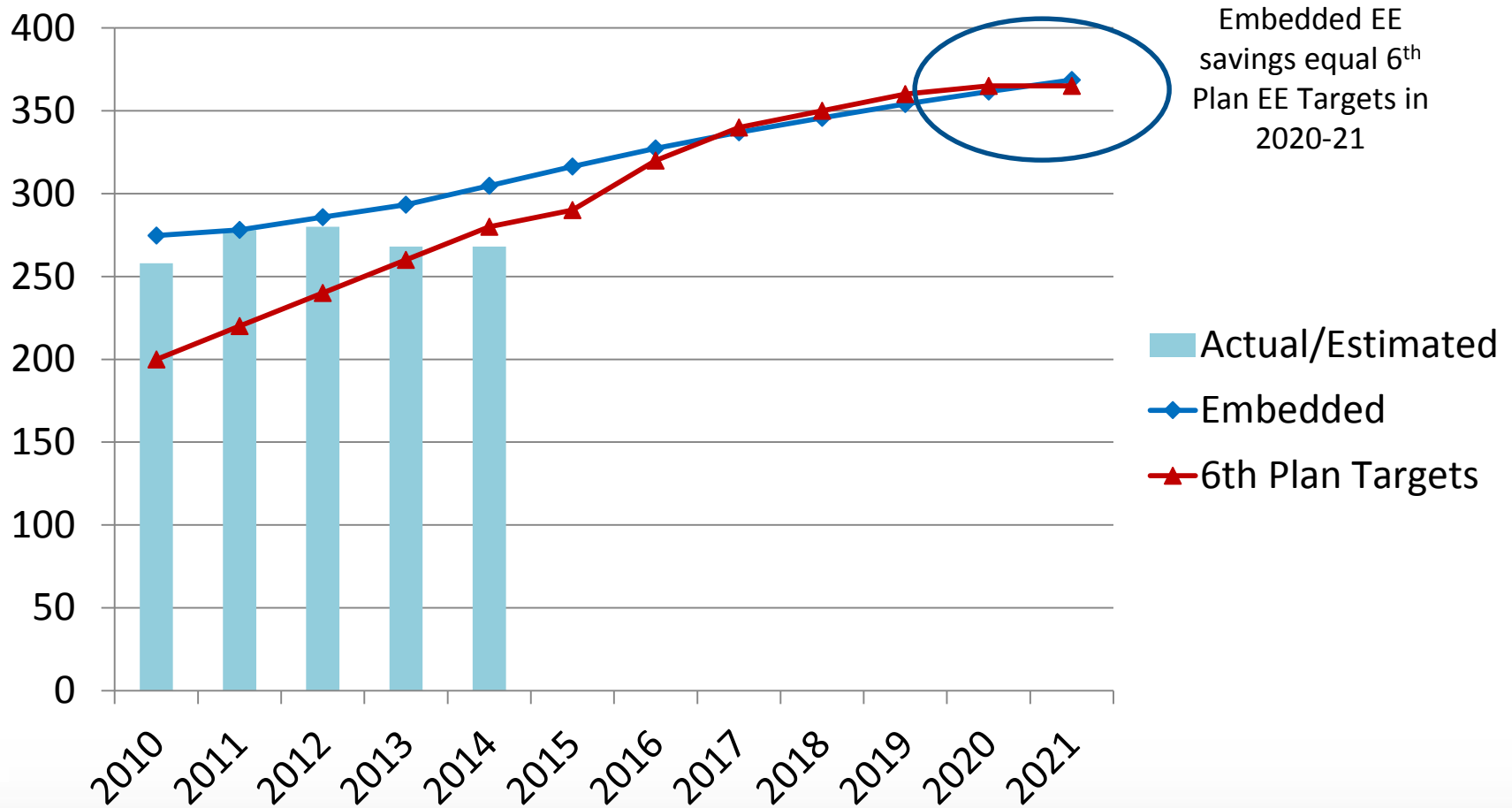
# Other Changes from 2019 Assessment

- Updated biological opinion constraints on hydroelectric operation
- New method of including within-hour balancing needs (INC/DEC) into hydro peaking file
- Minor resource updates

# Major Assumptions

- **Hourly Loads**
  - Include projected EE savings
  - 2020-21 projected savings = 6<sup>th</sup> Plan Targets
- **SW Spot Market**
  - Winter – 2,500 MW all hours
  - Summer – 1,000 MW light-load hours only
- **Purchase Ahead Market**
  - Light load hours only, year round
  - 3000 MW
- **S-to-N Intertie Limit 3,400 MW**

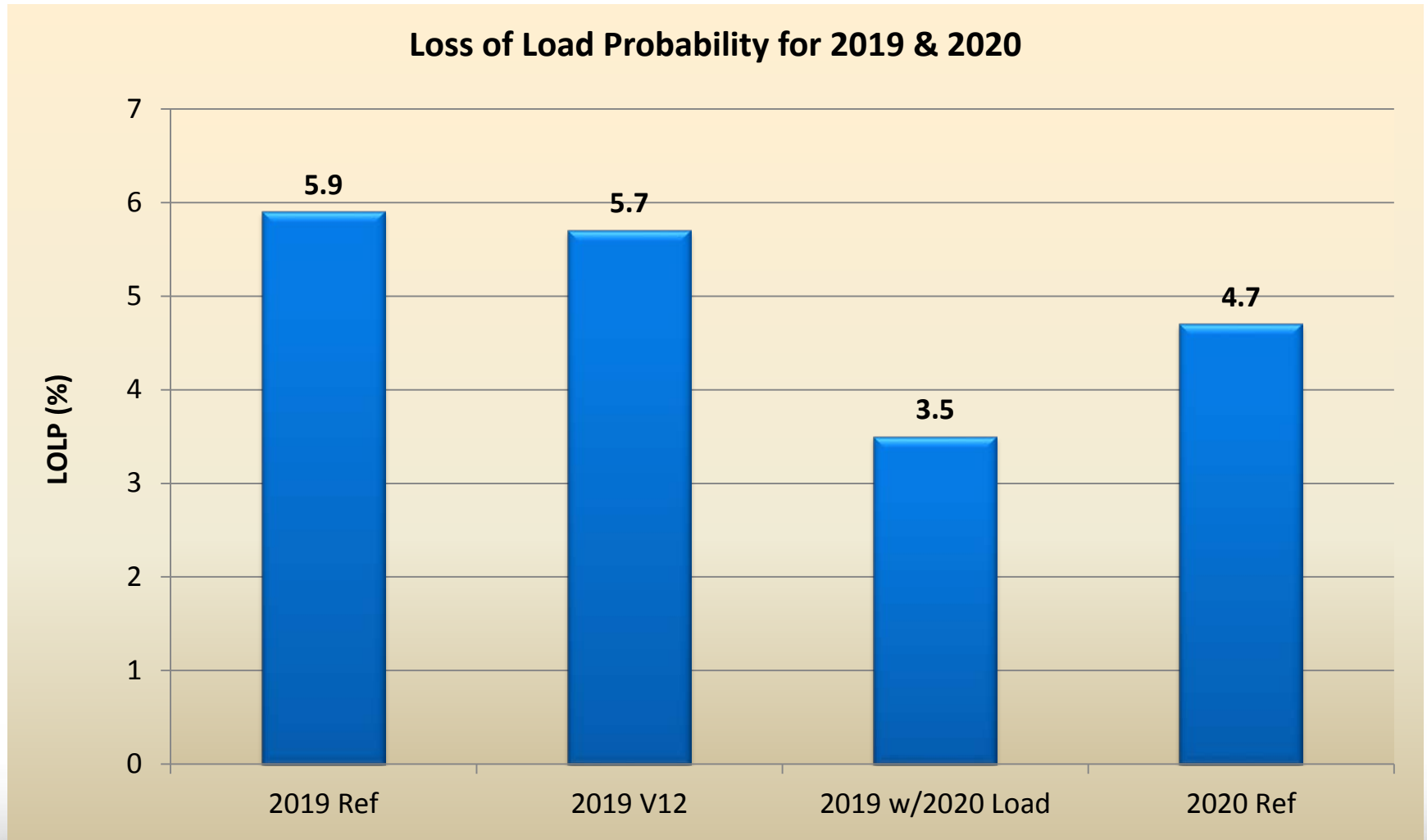
# Energy Efficiency is Accounted for in the Hourly Load Forecast<sup>1</sup>



<sup>1</sup>Embedded Conservation equation was Last updated: 06/28/13



# 2020 Preliminary Assessment



# Preliminary Results for 2020

Load ADJ >>>	-2.5%	-1.5%	0%	+1.5%	+2.5%
Import (MW)					
0	10.1%		13.3%		17.5%
1500		5.0%	6.2%		
2500	3.2%	3.8%	4.7%	5.9%	6.9%
3400			4.1%	4.9%	
4500			0.7%		1.7%

# Effects of Coal Retirement 2021

- **Resource changes 2019 to 2020**
  - Boardman retires (600 MW nameplate)
  - Centralia 1 retires (730 MW nameplate)
  - Total loss of 1,330 MW
- **Load change 2020 to 2021**
  - 6<sup>th</sup> Plan EE savings (350 aMW)
  - Net load growth of ~80 aMW (~0.35%)

# Summary of 2021 Analysis

	2013 Analysis	2014 Analysis	2015 Analysis
Changes in Loads and Resources	N/A	+660 MW Gen	-250MW Gen -310 aMW Load
5-year out LOLP	6.6%	5.9%	4.7%
MW needed	700 MW <sup>1</sup>	400 MW	- 150 MW
2021 LOLP	15.3%	10.9%	8.3%
MW needed	2,000 MW	1,700 MW	1,150 MW
<b>Net MW needed</b>	<b>1,300 MW</b>	<b>1,300 MW</b>	<b>1,300 MW</b>

<sup>1</sup>This is an updated estimate.

# Coal Replacement Resources Needed to get to 5% LOLP

- Gas **1.15 GW**
- Solar PV **12.7 GW**
  - Current US installed 15.9 GW
  - Current NW installed 17.4 MW
- Wind **10 GW**
  - Only achieved an LOLP of 6.9%
  - More wind did not help

# Effects on June Oversupply (Expected Amount)

