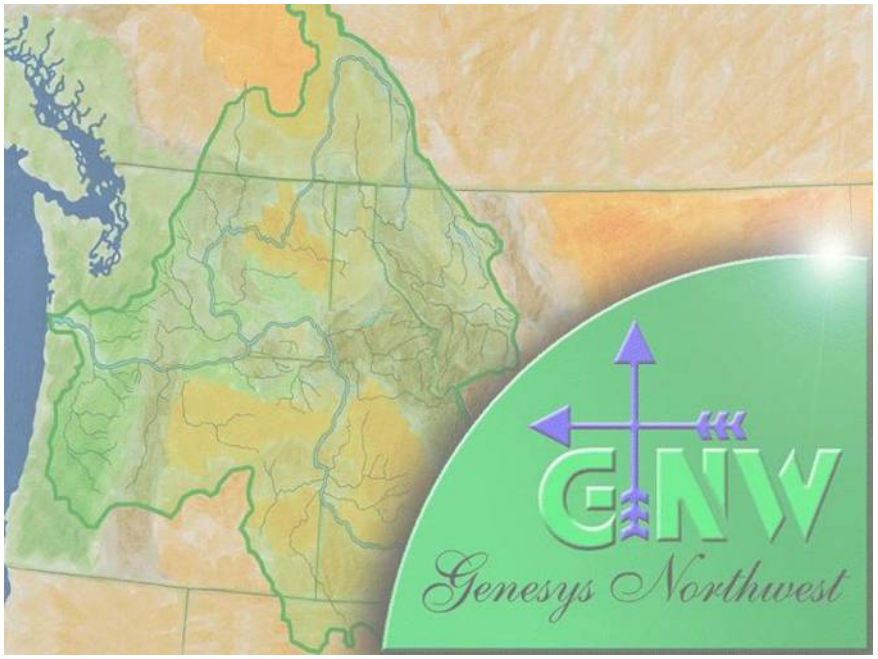
2020-21 Final Resource Adequacy Assessment

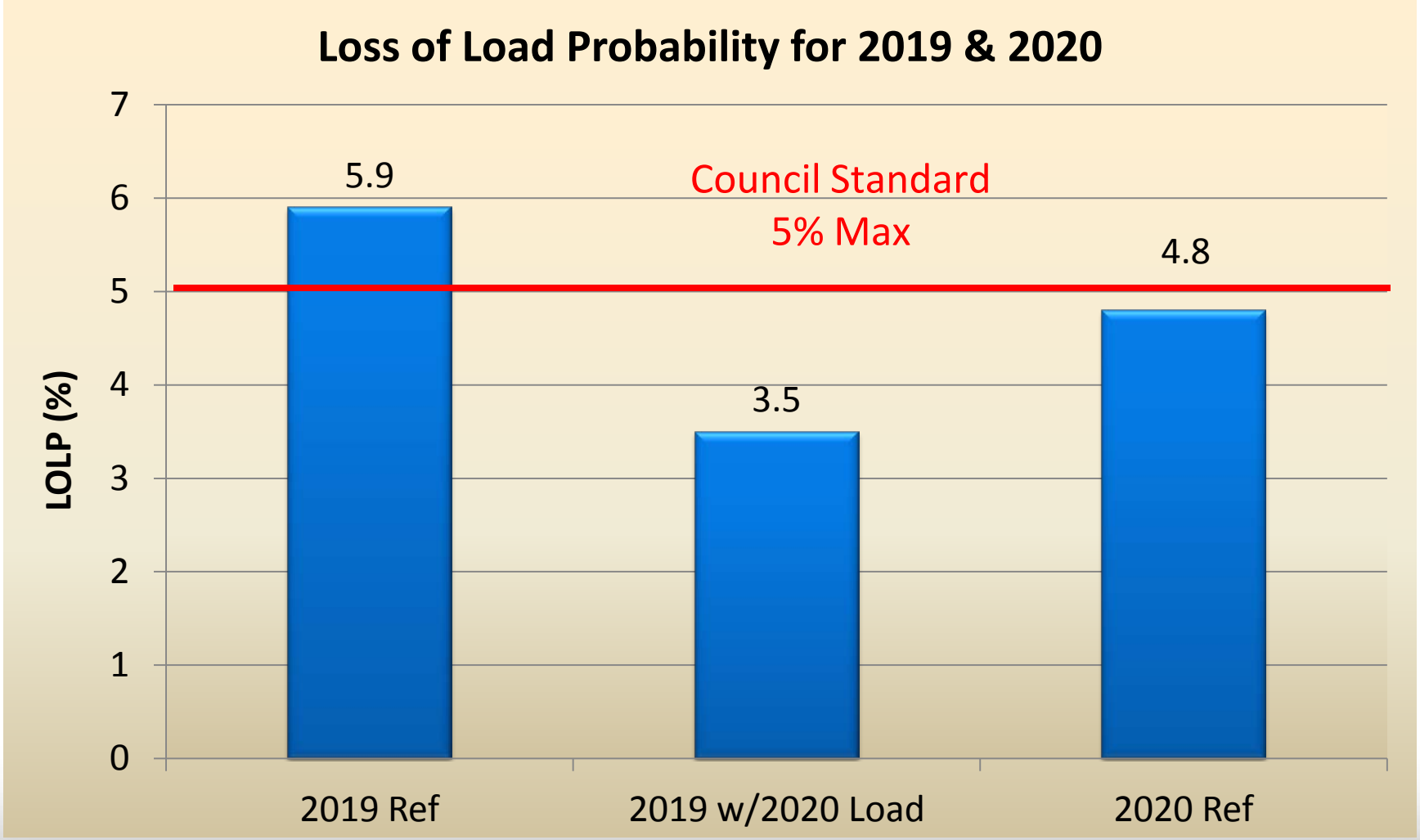


Resource Adequacy Advisory Committee
Steering Committee Conference Call
May 1, 2015

Outline

- 2020 Adequacy Assessment
- Changes from 2019 assessment
- 2021 Assessment
- Using Wind/Solar to Fill the Gap
- Potential Recommendations for Council

2020 Final Assessment



Final Results for 2020

Load Adjust> / Spot Import[1]	Low -2.5%	-1.5%	Med 0%	+1.5%	High +2.5%
0	10.1%	10.2%	13.3%	14.2%	17.5%
1500 MW	4.4%	5.0%	6.2%	7.3%	8.3%
2500 MW	3.2%	3.8%	4.8%	5.9%	6.9%
3400 MW	1.4%	1.9%	2.7%	3.4%	3.9%
4500 MW	0.2%	0.4%	0.7%	1.3%	1.7%

[1]Winter spot-market availability (from the SW). South-to-North intertie transfer capability set to 3,400 max to also accommodate firm transfers. Based on historical calculations there is a 95% chance that transfer capability will be 3,400 MW or greater.

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
- Updated hydro regulation (new BiOp, including summer spill)
- Used Council's updated Generating Resources Database

Modeling Enhancements

- GENESYS Version 12
  - Revised purchase ahead logic
  - Cleaned up dead code

- Trapezoidal Model
  - Assesses hydro peaking capability
  - Modified to explicitly include INC/DEC

Effects of Coal Retirement 2021

- Resource changes 2020 to 2021
  - Boardman retires 600/522 MW
  - Centralia 1 retires 730/670 MW
  - Total loss of 1,330/1,192 MW
    (nameplate/winter capacity)

- Load change 2020 to 2021
  - 6th Plan EE savings (350 aMW)
  - Net load growth of ≈40 aMW (~0.18%)

2021 Adequacy Assessment

- Plants retire on December 31, 2020
- 2021 operating year Oct 2020 – Sep 2021
- Operational for 1st three months
- LOLP = 7.6%
- Needed capacity = 1,000 MW

- Generic Study (with coal out all year)
- LOLP = 8.3%
- Needed capacity = 1,150 MW

2021 Coal Retirement Analysis

	2021 Coal Closure Studies:			
Date of Study:	**Jan-13**	**Oct-14**	**Feb-15**	**March-15 (Final)**
Genesys Version:	N/A	v-10	v-10	v-10
Boardman & Centralia in Study	No	No	No	Oct-Dec
LOLP	15.3%	10.9%	8.1%	7.6%
Dispatchable Plants Required for LOLP of 5%	2,000	1,700	1,150	1,000
Resources:		+PW2	-Big Hanna	ford
		+Carty		

Note: major drop in Load Forecast in Febuary and March 2015

Summary of 2021 Analysis (Generic Study[1])

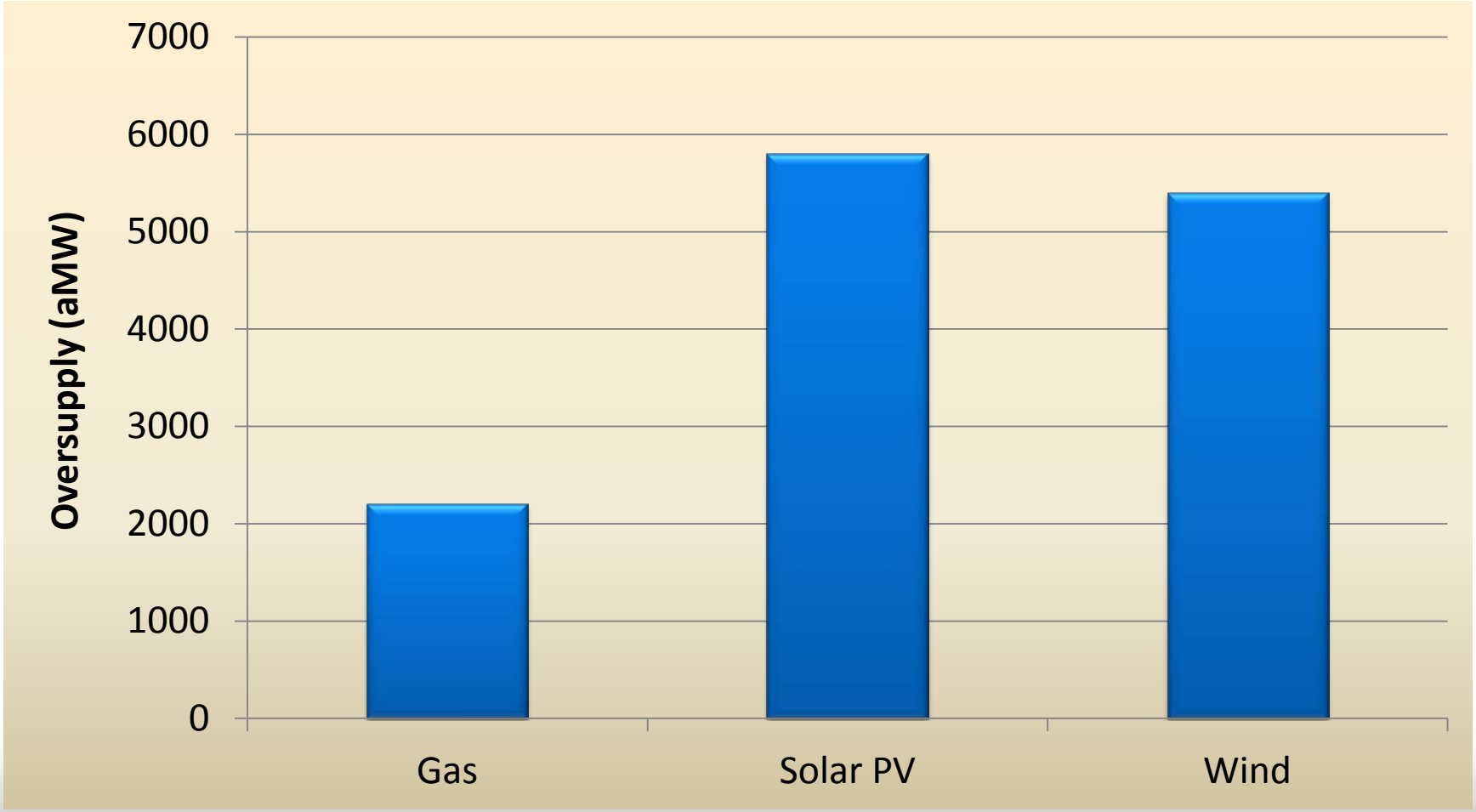
	2013 Analysis	2014 Analysis	2015 Analysis
Changes in Loads and Resources	N/A	+660 MW Gen	-250MW Gen -310 aMW Load
5-year out LOLP	6.6%	5.9%	4.8%
MW needed	700 MW[2]	400 MW	- 80 MW
2021 LOLP	15.3%	10.9%	8.1%
MW needed	2,000 MW	1,700 MW	1,150 MW
Net MW needed	**1,300 MW**	**1,300 MW**	**1,230 MW**

[1]Generic means results of coal retirement over entire operating year.
[2]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
  - Projected by 2021 for PNW ≈ 450 MW
- Wind 10 GW
  - Only achieved an LOLP of 6.9%
  - More wind did not help

Effects on June Oversupply
(Expected Amount)



Recommendations?

- Release the 2020/21 adequacy assessment (and associated State of the System Report)
- Add an action item to the Seventh Plan to review and amend, if necessary, the Council's Adequacy Standard
- Suggested new metrics are the Expected Unserved Energy (EUE) and Loss of Load Hours (LOLH) both being used by NERC

Appendix - Utility Scale Solar > 500 kW

PNW Utility Solar	
Greater than 0.5 MW	
	MW
Baldock	1.8
Bellevue	1.7
Black Cap	2.0
King Estate	1.0
Outback	5.7
Prologis	3.5
Wildhorse	0.5
Yamhill	1.2
	17.4