

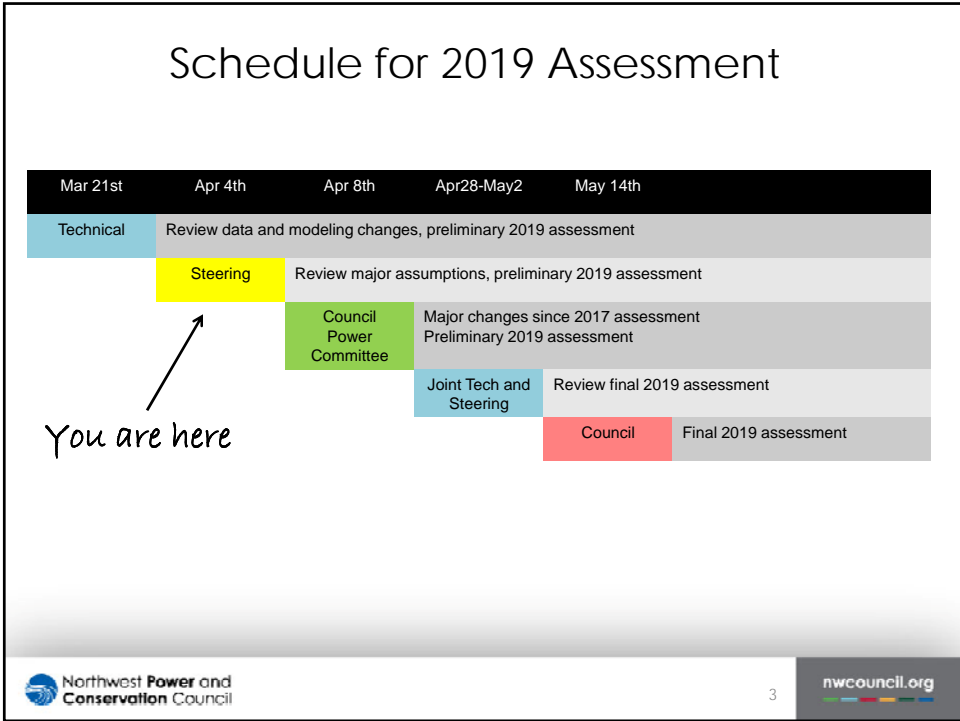
Resource Adequacy Advisory Committee

Preliminary Assessment for 2019

Steering Committee Meeting
April 4, 2014



Outline

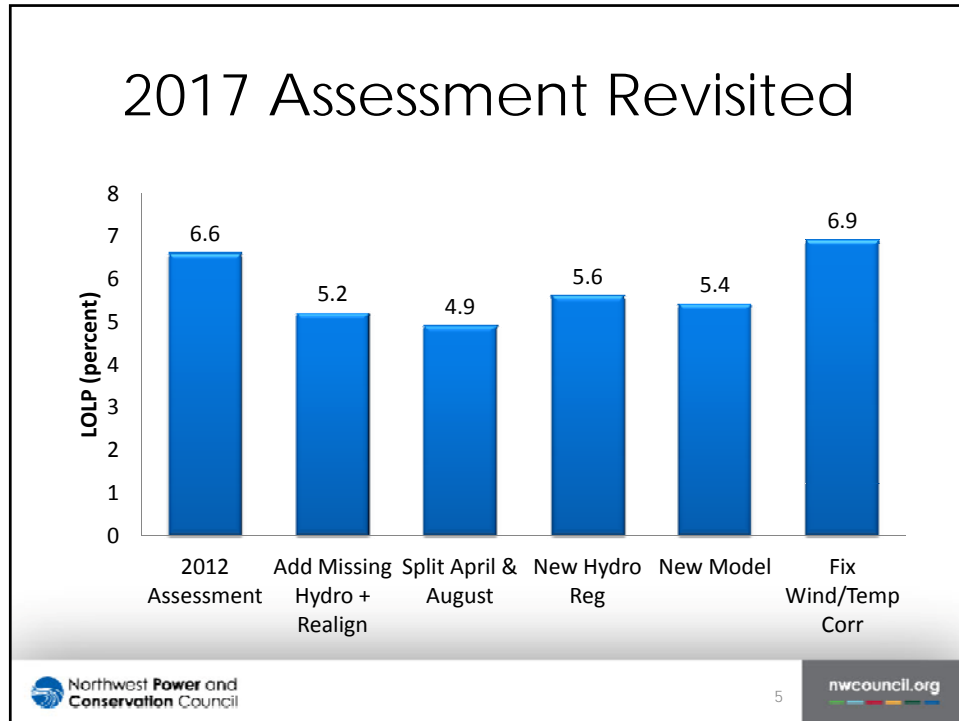
1. Schedule
2. 2017 Assessment Revisited
3. Data Updates 2017 to 2019
4. Modeling Changes
5. Preliminary Results for 2019
6. An Early Look at 2021



2017 Assessment Revisited

- **LOLP = 6.6%** (released in Dec 2012)
- **Modeling and Data Changes**
 - Added missing Tacoma hydro
 - Moved Bonneville to east node
 - Split April and August
 - Updated hydro constraints
 - Minor model enhancements
 - Fixed wind/temperature correlation
- **LOLP = 6.9%** (reassessed in Mar 2014)


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Data Updates 2017 to 2019

- **Temperature – 84 years available**
Oct 1928 through Sep 2012
- **Wind – 77 years (temperature correlated)**
Oct 1928 through Sept 2005
- **Load – 77 years used to match wind data**
- **Load growth from 2017 to 2019 = 260 MWa (about a 0.6% annual rate, includes 700 MWa of energy efficiency savings)**

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Data Updates 2017 to 2019

- **Major resource additions:**
 - Carty Generating Station (440 MW)
 - Port Westward 2 (220 MW)
 - Minor updates reflect retirements and adjustments to data
 - **Net increase is 667 MW**
- **Wind additions** (sited and licensed, for NW load):
 - From 4265.6 MW to 4532.4 MW
 - **Net increase 266.8 MW**
- **Contracts** (imports, exports, intra-regional transfers) updated from 2013 White Book

Data Updates 2017 to 2019

- **Standby Resources 2017:**
 - Annual energy = 83,000 MW-hr
 - Oct-Mar peak = 660 MW
 - Apr-Sep peak = 720 MW
- **Standby Resources 2019:**
 - Annual energy = 41,650 MW-hr
 - Oct-Mar peak = 673 MW
 - Apr-Sep peak = 733 MW

Data Updates 2017 to 2019

- **Hydro Regulation 2017:**
 - Initial 2017 assessment (reported in 2012) used the initial 2017 hydro regulation
 - Revised 2017 assessment (redone this year) used the final 2017 hydro regulation
- **Hydro Regulation 2019:**
 - Used the final 2019 hydro regulation
- **Sustained peaking data for 2019 based off of the final 2019 hydro regulation**

Modeling Changes for 2019

- **12 period to 14 period**
 - April and August periods are now split-month
 - Initial 2017 assessment modeled April and August as single periods
- **Nodal allocation of resources**
 - Hydro resource node allocation revised to line up with nodal allocation used in Aurora (3 nodes)
 - 2019 assessment was run in 2-node configuration
- **Multiple wind year sets**
 - 2017 assessment used a single set of temperature-correlated wind capacity factors per year
 - 2019 assessment incorporates a random draw from 20 wind sets per year

Preliminary 2019 Case

- **Test case assumptions**
 - Council's medium load forecast
 - SW winter peak import max is 1700 MW (same as for the 2017 assessment)
 - Off-peak SW import max is 3000 MW year round

- **LOLP = 5.93%**

Preliminary Results for 2019

Load	-2.5%	-1.5%	0%	+1.5%	+2.5%
Import (MW)					
0	6.95%	8.04%	9.63%	12.27%	14.14%
900	5.37%	5.97%	7.32%	9.17%	10.88%
1700	4.14%	4.98%	5.93%	7.82%	8.72%
2400	3.69%	4.32%	5.11%	6.67%	7.48%
3200	3.38%	3.98%	4.64%	5.91%	7.03%
4000	3.10%	3.80%	4.37%	5.42%	6.53%

- Low import and high load case LOLP ~ 14.1%
- High import and low load case LOLP ~ 3.1%

Preliminary Results for 2019¹

Load	-2.5%	-1.5%	0%	+1.5%	+2.5%
Market (MW)					
0	6.95%	8.04%	9.63%	12.27%	14.14%
900	5.37%	5.97%	7.32%	9.17%	10.88%
1700	4.14%	4.98%	5.93%	7.82%	8.72%
2400	3.69%	4.32%	5.11%	6.67%	7.48%
3200	3.38%	3.98%	4.64%	5.91%	7.03%
4000	3.10%	3.80%	4.37%	5.42%	6.53%


¹Using font size to illustrate the likelihood for each LOLP value. This assumes that 1700 to 2400 MW of import reflect the “expected” amount, which is not necessarily the case.

South to North Tie Limits

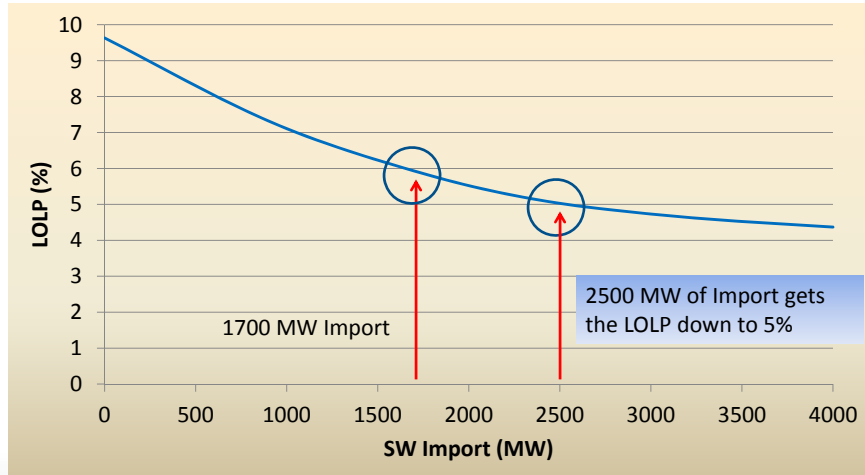
AC+DC Scheduling Limits (5-Year Average) for South to North Flows		
Month	Avg MW	Avg Min MW
January	3,968	3,310
February	3,715	3,371
March	3,624	3,425
April	3,698	3,421
May	3,668	3,420
June	3,670	3,424
July	3,638	3,366
August	3,721	3,403
September	3,104	2,912
October	2,938	2,706
November	3,625	3,409
December	3,768	3,417

Preliminary Results for 2019

Load Variation	-2.5%	-1.5%	0%	+1.5%	+2.5%
Imports (MW)					
0	6.95%	8.04%	9.63%	12.27%	14.14%
900	5.37%	5.97%	7.32%	9.17%	10.98%
1700	4.14%	4.98%	5.93%	7.82%	8.72%
2400	3.69%	4.32%	5.11%	6.67%	7.48%
3200	3.38%	3.98%	4.64%	5.91%	7.03%
4000	3.10%	3.80%	4.37%	5.47%	6.53%

Let's just look at this column 

LOLP vs. SW Imports (Medium Load)

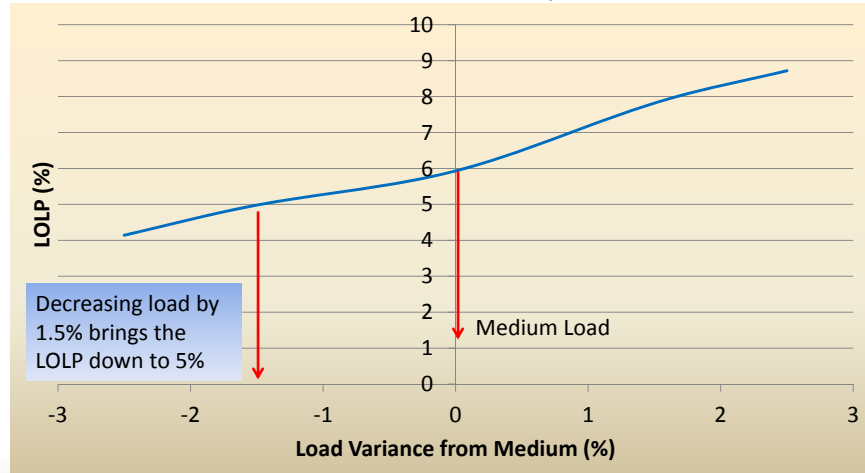


Preliminary Results for 2019

Load Variation	-2.5%	-1.5%	0%	+1.5%	+2.5%
Imports (MW)					
0	6.95%	8.04%	9.63%	12.27%	14.14%
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3200	3.38%	3.98%	4.64%	5.91%	7.03%
4000	3.10%	3.80%	4.37%	5.42%	6.53%

Let's just look at this row

LOLP vs. Variation in Load (1700 MW SW Import)



Actions to get Test Case LOLP to 5%

- 500 MW of additional new resource capacity
- **or**
- 450 MW of additional standby resource capacity
- **or**
- 325 MWa load reduction
- **or**
- Various combinations of new resource and EE

Planned New Resources

- 2017 report noted that utility IRPs included about 3,000 MW of planned generating resources
- More than enough to bring the power supply within the adequacy standard (5%)
- 2019 IRPs should also show more than enough planned generating resources to keep the supply adequate

An Early Look at 2021

- **Loss of two coal plants**
 - Boardman - 601 MW
 - Centralia 1 - 730 MW
- **Load growth between 2019 and 2021**
 - About 260 MWa
 - Includes 700 MWa of energy efficiency
- **2019 assessment will include a section for the estimated LOLP for 2021**