Northwest **Power** and **Conservation** Council

April 30, 2019

MEMORANDUM

TO: **Council Members**

FROM: **Ben Kujala**

SUBJECT: **The State of the Northwest Power System: 2019 Northwest Regional Forecast**

BACKGROUND:

Presenter: Shauna McReynolds, Executive Director and Tomás Morrissey, Senior Policy Analyst

Summary: The Pacific Northwest Utilities Conference Committee (PNUCC) released its annual update to the Northwest Regional Forecast (NRF). This report is a summation of the region's loads and resources over the next ten years from the utilities' perspective.

The 2019 NRF highlights several key trends, including (from the Executive Summary):

- Northwest utilities are achieving carbon-reduction goals and many are seeking opportunities to do more, while policymakers seem eager to enact more aggressive decarbonization legislation.

- Although the winter period shows improvement, serving winter peak demand remains a concern. And summertime peak demand continues to increase, focusing planners on peak capacity needs

- The loss of several coal-fired power plants over the next decade will contribute to the challenges of maintaining an adequate, reliable power

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supply. In the Northwest, nearly 2,100 MW will be retired by 2022 with another 1,500 MW by 2029. Similarly, many more retirements are anticipated across the west, adding to regional adequacy concerns.

- Current planned construction of new wind and other renewable resources cannot be expected to fully offset the anticipated loss of generation from coal-fired power plant retirements.

- The use of new technologies, such as large-scale batteries, is being explored to confirm a greater role in utilities' resource plans.

- Growth in demand for electricity is not consistent across the region. On average, load growth is forecast under one percent annually. Some utilities are experiencing declining or flat loads, while a few expect well over three percent annual growth in demand through time.

Relevance: Similar to the Council's annual resource adequacy assessment, the NRF provides a forecast of loads and of resource supply to identify potential needs in the near future. It differs in that the NRF is essentially the sum of each utilities' load forecast and current/expected resources, thus only providing an expected projection of future needs. The resource adequacy assessment uses the Council's own regional load forecast along with current/expected resources to perform a probabilistic analysis of future needs under many different combinations of future conditions. Council staff will be presenting the latest annual resource adequacy assessment at this meeting. Together, these presentations will provide a more complete summary of the current and future state of the system.

More Info: Read the full report:
http://www.pnucc.org/sites/default/files/Xdak24C14w3677n7KsL43OEL4J25MW0b3d5cmx3FGD4d9OQ3B189OF/PNUCC%202019%20NRF.pdf

2019 Northwest Regional Forecast

Northwest Power & Conservation Council

May 2019

Bringing the *Power* of good ideas *Together.*

A regional adequacy barometer

- Annual sum-of-utilities' forecasted loads & resources
  - Utility owned/contracted & long-term imports/exports
  - Excludes uncommitted independent power producers (IPPs)
  - Several 2017-vintage plans
- Examine energy, winter/summer 1-hour peak
  - Normal weather, 8% hydro, 16% planning margin
- Consistent assumptions across decades

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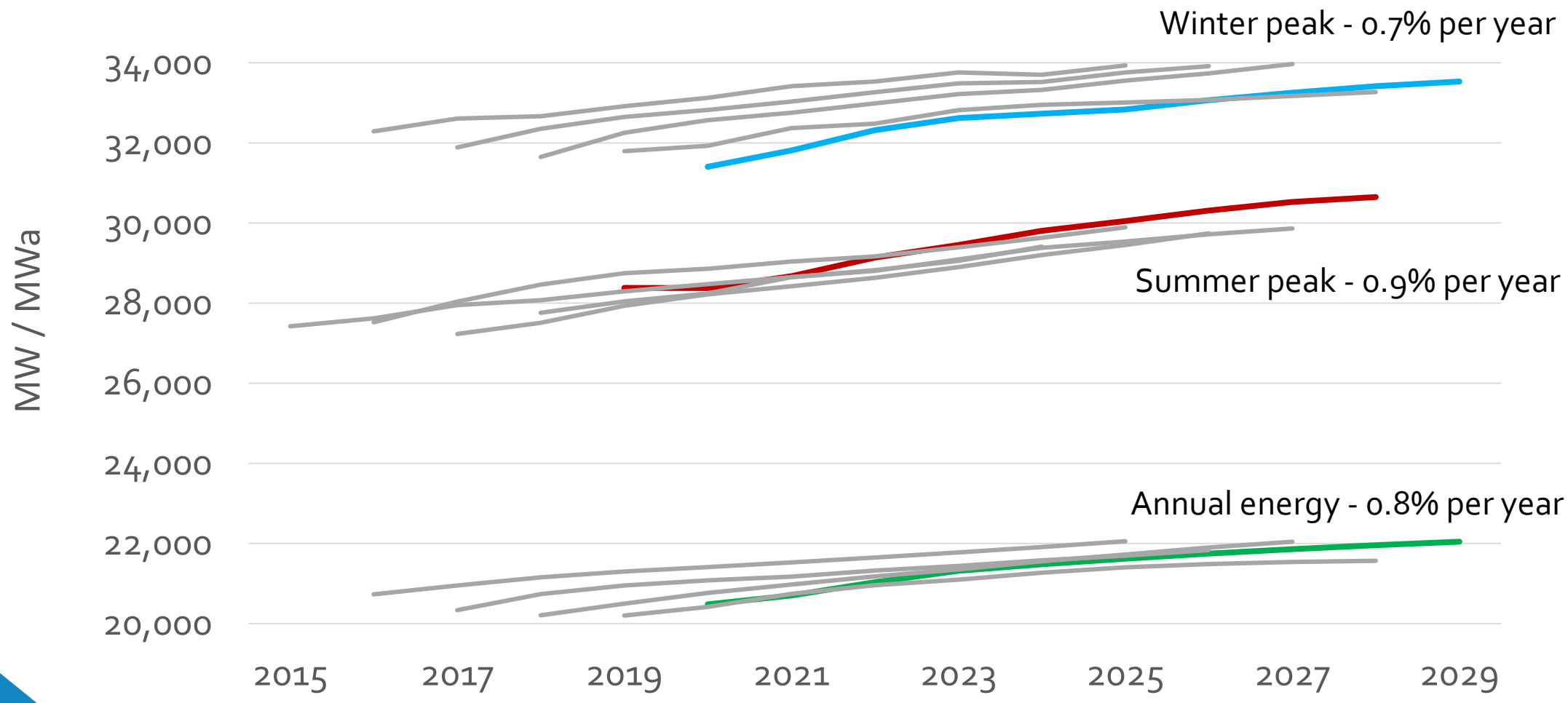
Northwest load forecasts lookback



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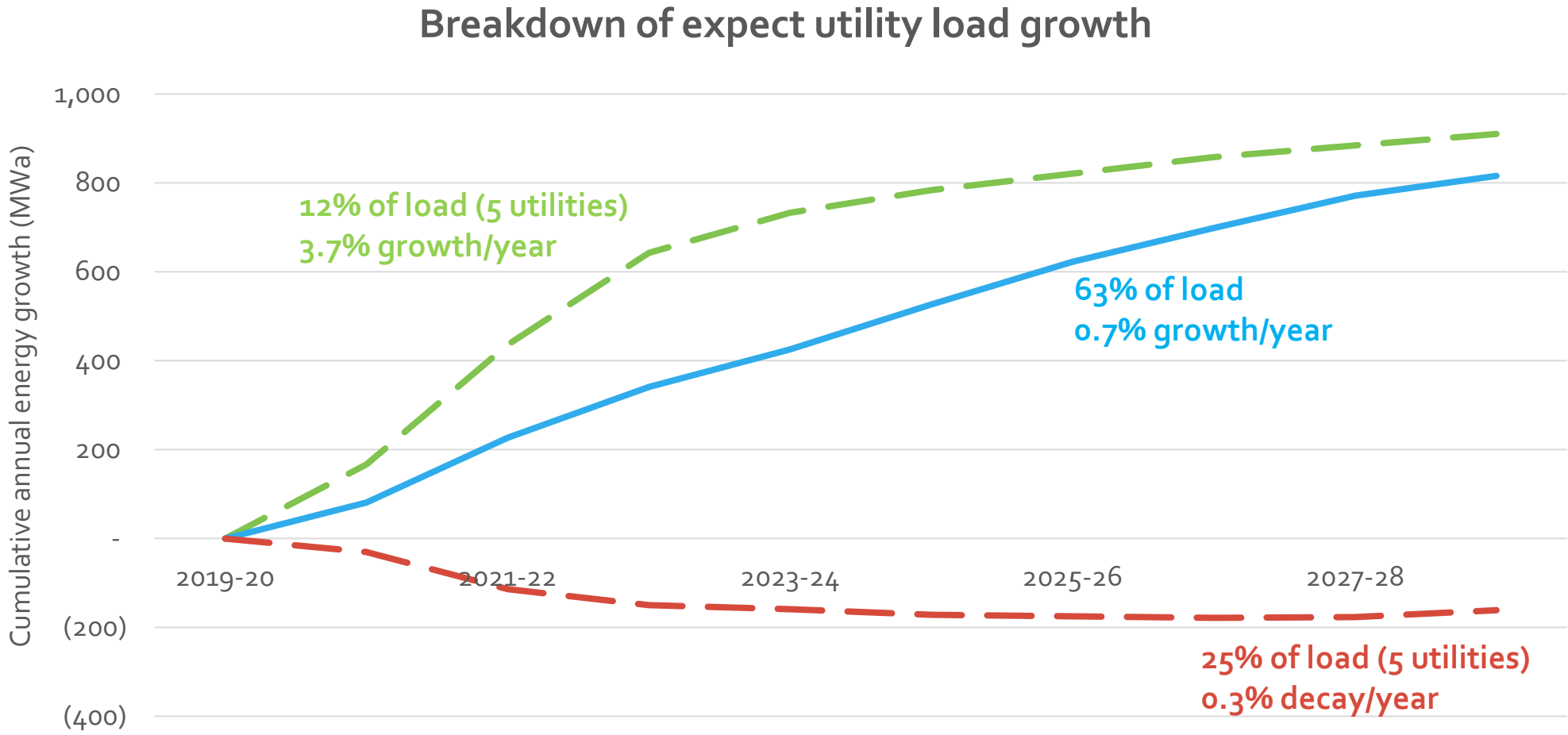
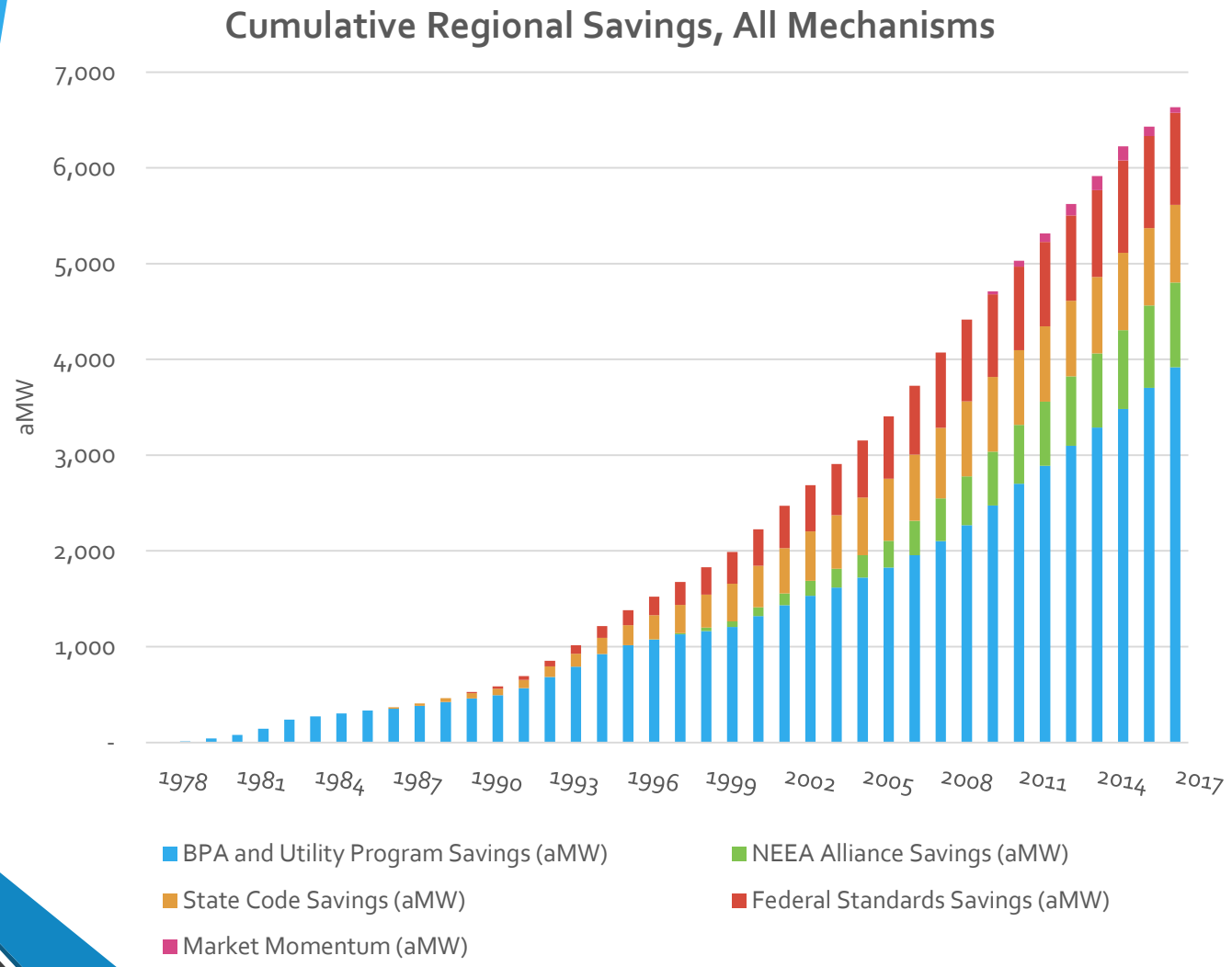
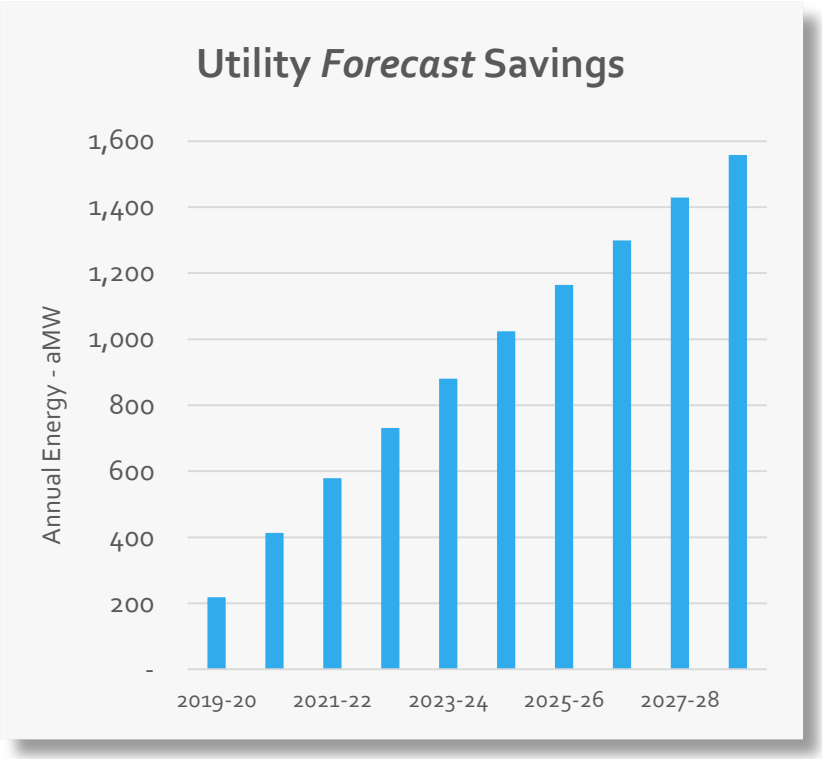
Each utility is unique



Energy Efficiency is one utility constant





Demand-side similar to 2018's picture

- **Utility energy efficiency is significant**; modest increase from last year
- Winter demand response down slightly
- Summer demand response steady

Energy efficiency	1st year	5th year	10th year
2018 forecast	191	876	1,519
2019 forecast	**218**	**881**	**1,558**

DR - winter	2020	2024	2028
2018 forecast	85	226	330
2019 forecast	**42**	**146**	**228**
DR - summer			
2018 forecast	410	481	537
2019 forecast	**415**	**486**	**542**

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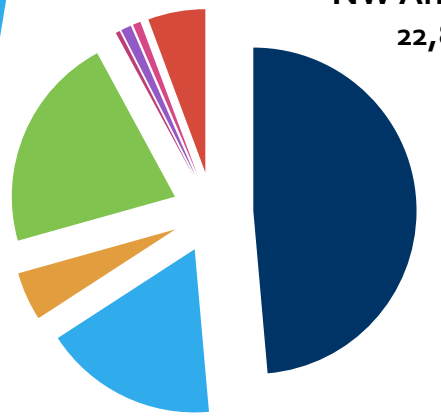
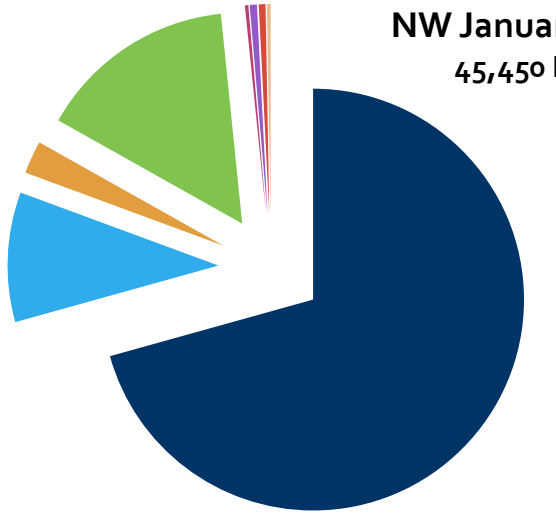
Existing resource mix – different ways to look at it

NW Annual Energy
22,850 (MW)

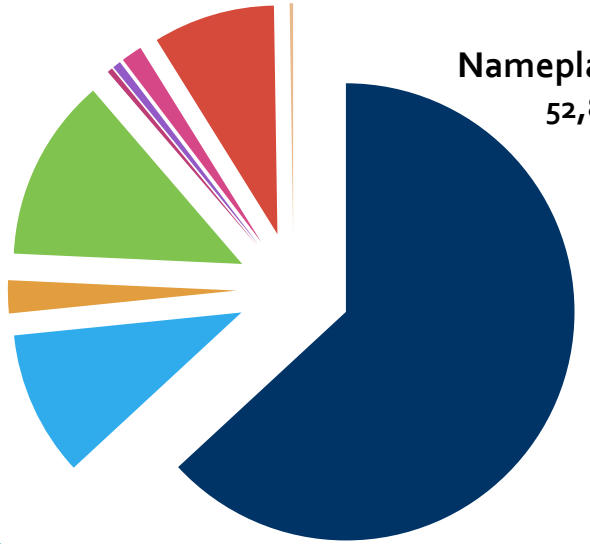


NW January Peak
45,450 MW

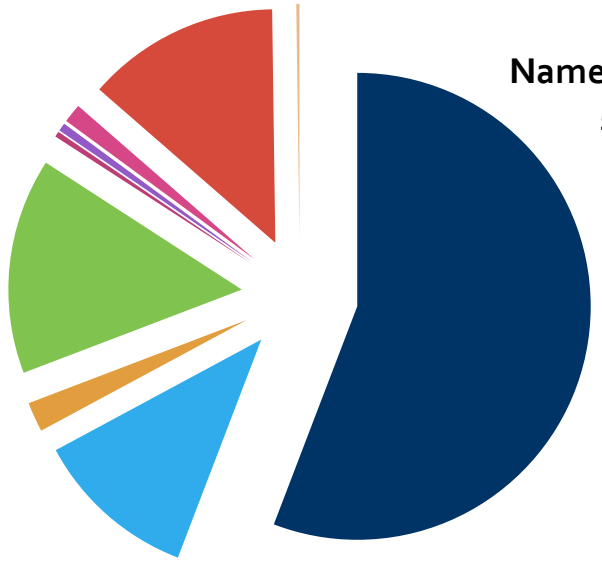


- HYDRO
- COAL
- NUCLEAR
- NATURAL GAS
- COGENERATION
- RENEWABLES-OTHER
- SOLAR
- WIND
- Sml Therm./Misc.

Nameplate NW Only
52,800 MW



Nameplate with IPPs
59,800 MW



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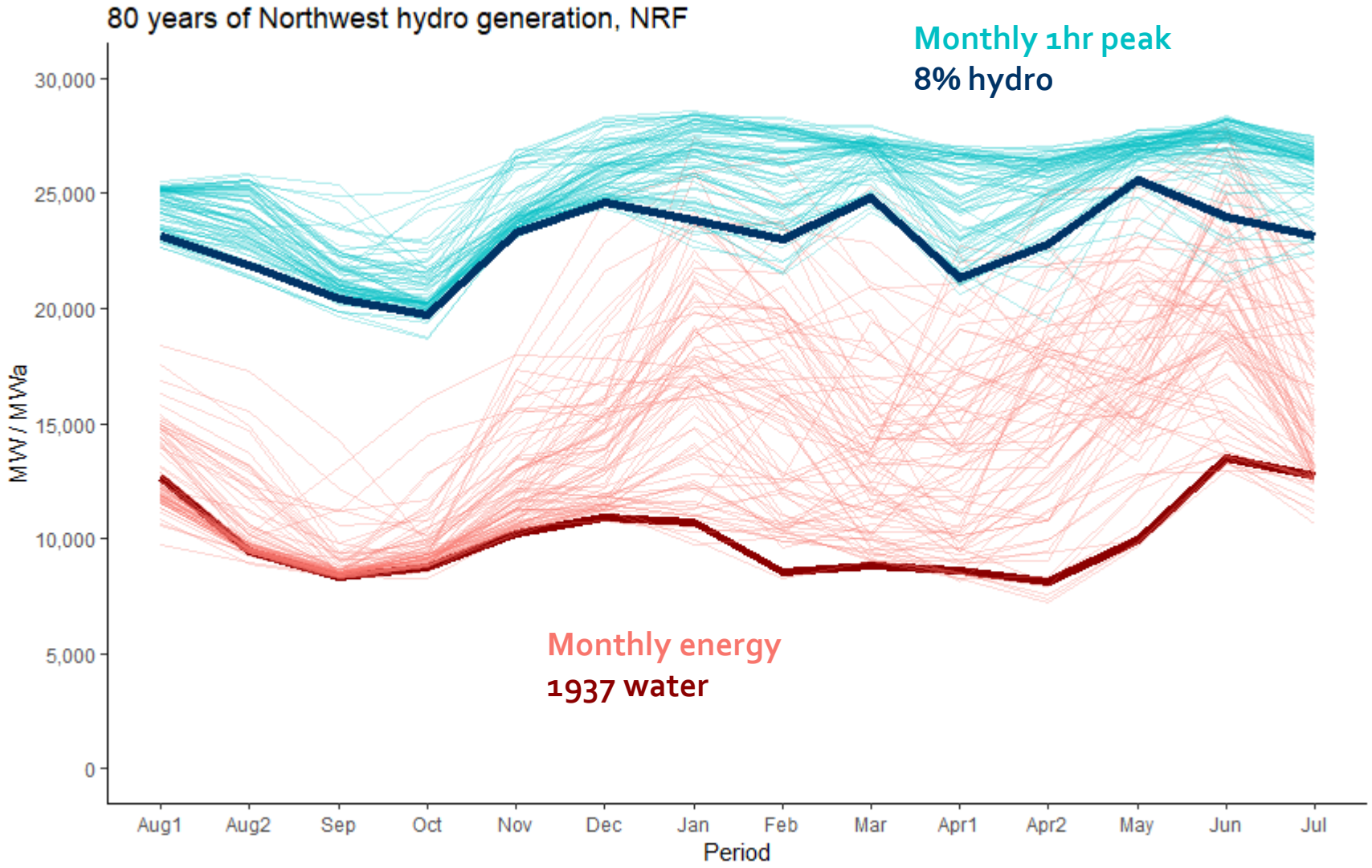
Hydro driven by water supply

Annual variation in monthly energy & 1-hour peak

More variation in winter than summer

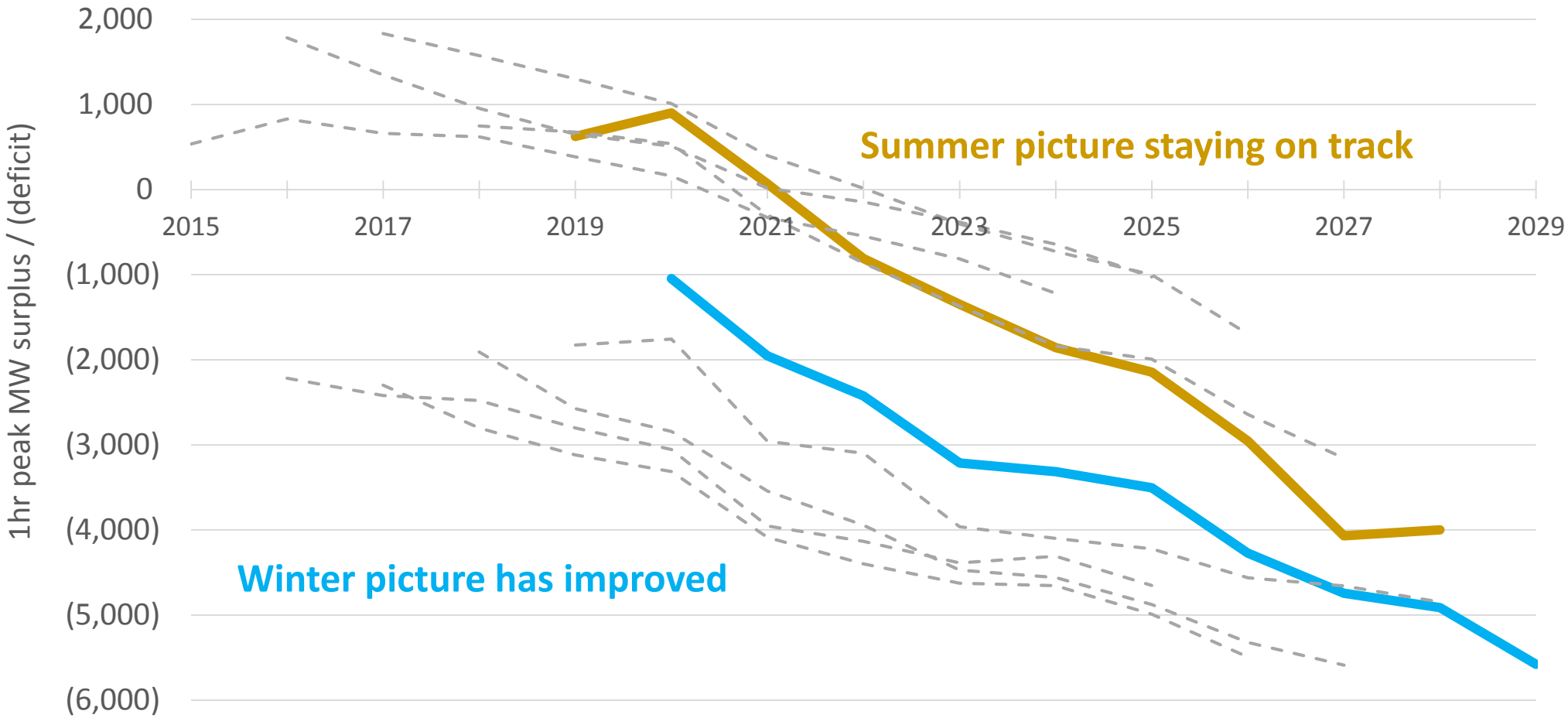


Data from 2017 BPA White Book and Army Corps of Engineers

Resource characteristics matter (Chelan PUD & National Hydro Assoc.)

	Flexible capacity	Firm capacity	Annual energy	Regulation	Spin reserves	Non-spin reserves	Long-term Storage	Inertia	Black start	Carbon free
Hydroelectric (large project)	yes	yes, water dependent	yes, water dependent	yes	yes	yes	yes	yes	yes	yes
Gas (CCCT)	yes	yes	yes	yes	yes	yes, could be limited	no	yes	yes	no
Gas (SSCT)	limited	yes	yes, could be limited	yes	yes	yes, could be limited	no	yes	yes	no
Coal	no	yes	yes	limited	limited	no	no	yes	no	no
Nuclear	no	yes	yes	no	no	no	no	yes	no	yes
Biomass	limited	yes	yes	yes, could be limited	yes, could be limited	yes, could be limited	no	no	no	limited
Geothermal	no	yes	yes	yes	yes	yes	no	no	no	yes
Solar, PV	no	location dependent	yes, location dependent	yes, limited by energy potential	yes, limited by energy potential	yes, limited by energy potential	no	no	no	yes
Solar, thermal	no	limited to yes	yes, location dependent	yes, limited by energy potential	yes, limited by energy potential	yes, limited by energy potential	yes	no	no	yes
Wind	no	location dependent	yes, location dependent	yes, limited by energy potential	yes, limited by energy potential	yes, limited by energy potential	no	possibly, using synthetic product	no	yes

Forecasted peak load/resource balance



Sun setting on NW coal plants

	Nameplate MW	Offline year	Captured in Forecast?
Valmy Unit 1	254	End of 2019	Yes, 50%
Centralia Unit 1	670	End of 2020	No
Boardman	585	End of 2020	Yes, 100%
Colstrip Unit 1 & 2	660	July 2022	Yes, 50%
Centralia Unit 2	670	End of 2025	Yes, ~50%
Valmy Unit 2	267	End of 2025	Yes, 50%
Jim Bridger 2	540	End of 2028	Yes, 100%
Total	3,646 MW		2,051 MW

- *Other coal units in the WECC retiring in this timeframe*
- *Potential retirement of other Northwest units also being discussed*

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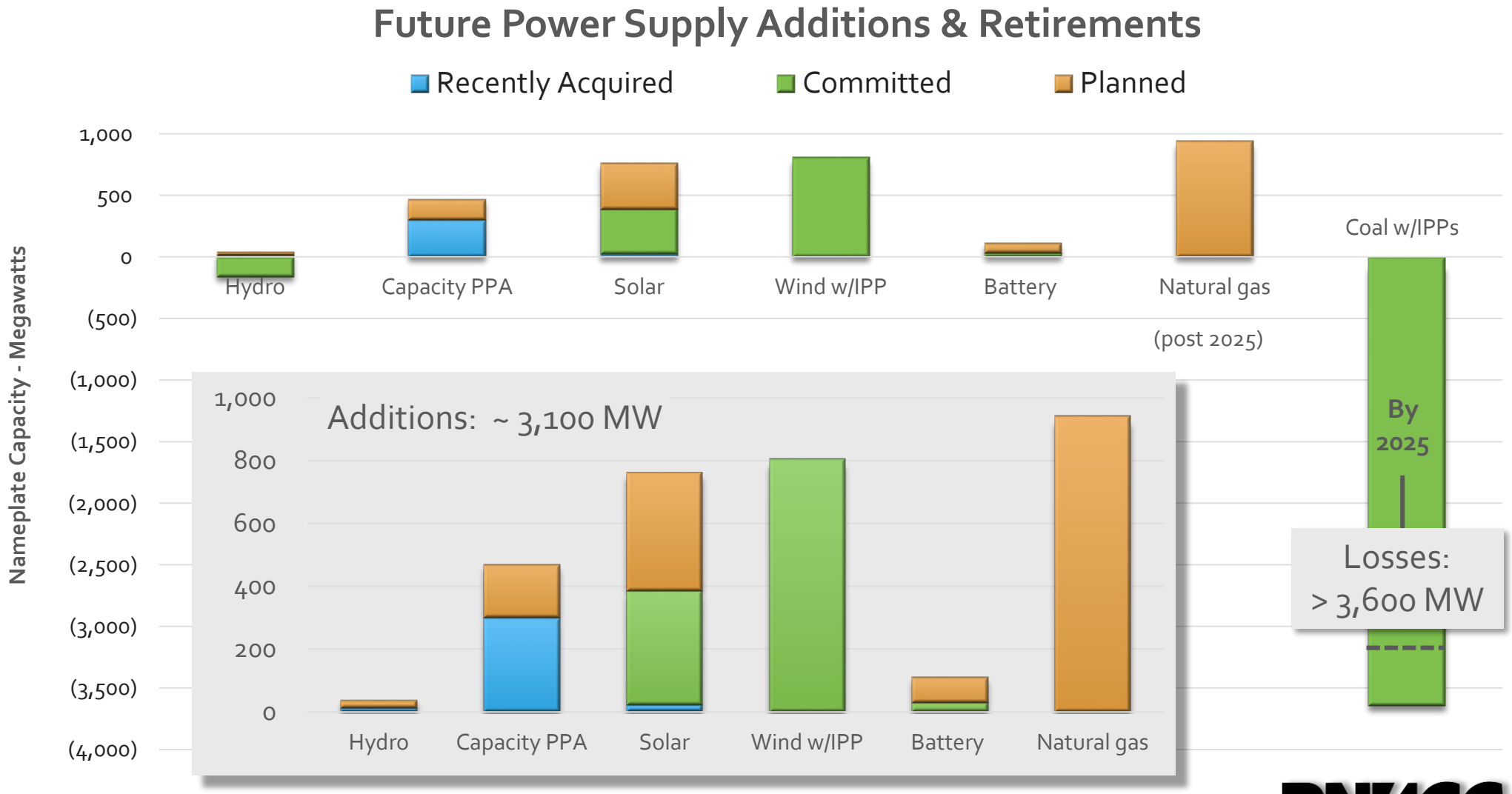
Changing power supply



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The story – power supply's pace of change

- Utilities are achieving carbon-reduction goals
- Focus is peak capacity need and flexibility
  - Over 3,600 MW of coal generation retiring
  - Few new dispatchable resources planned
  - Planned wind/solar cannot fully offset retired generation
- New technology being tested, not yet proven

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Thanks much!

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