

2021 BPA Needs Assessment

BPA Resource Program Public Workshop
May 24th, 2022



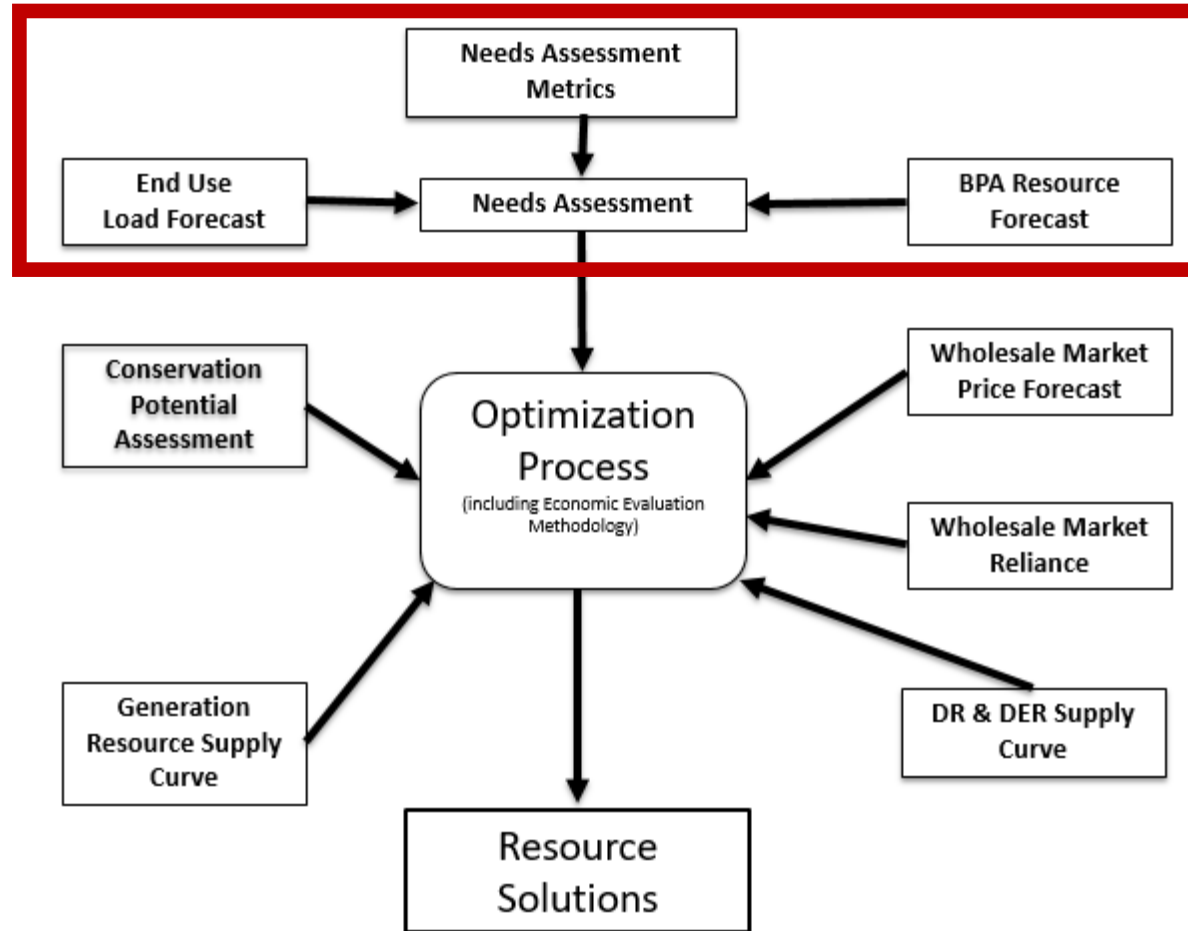
Agenda

- Overview of BPA's 2022 Resource Program
- Review 2021 Needs Assessment
 - Assumptions, Method, Results
- Provide update on next steps

Background

- BPA began its Resource Program after the passage of the Pacific Northwest Electric Power Planning and Conservation Act in 1980 which established:
 - BPA's authority to acquire resources on a long-term basis to assure an adequate supply of power to meet the Administrator's contractual firm power obligations
 - Northwest Power & Conservation Council and the Council's Power Plan
- The Resource Program examines uncertainty in loads, water supply, natural gas prices, and electricity market prices to develop a least-cost portfolio of resources that meet BPA's obligations.

BPA Resource Program Process



BPA Generating Resource Portfolio

- 31 Federal Hydro Projects
 - US Army Corps of Engineers (operator)
 - US Bureau of Reclamation (operator)
 - ~ 22,000 MW nameplate capacity

- Columbia Generating Station
 - Nuclear power plant near Richland, WA
 - Energy Northwest (operator)
 - ~1,169 MW capacity

- Other
 - Small amounts of wind and non-federal hydro

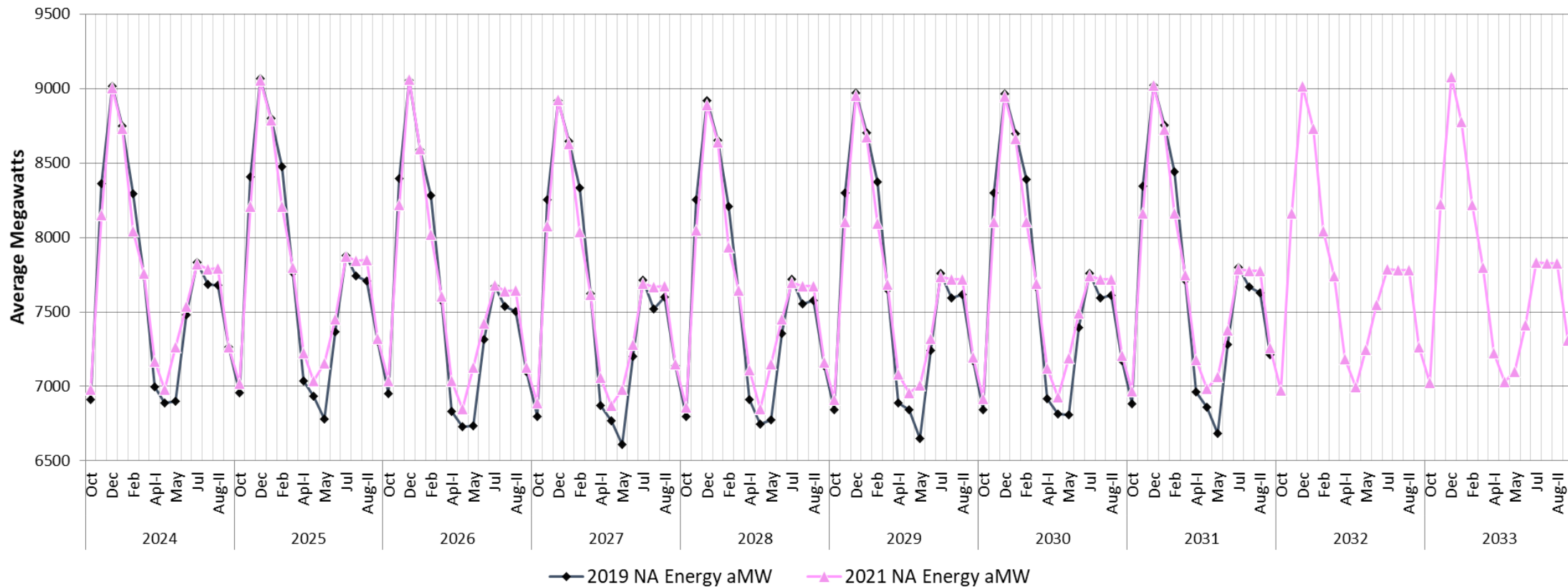
Needs Assessment Overview

- Needs Assessment (NA) forecasts Federal system energy and capacity surplus/deficit positions by assessing generating resources and load obligations for 2024 – 2033 without relying on wholesale power market
- 2021 Needs Assessment relied on a new hourly hydro generation forecasting model
 - Riverware
 - HYDSIM (Hydro System Simulator) is still our monthly hydro model; same model used by BPA and Council to run classic GENESYS
- Studies include:
 - Obligations – new Frozen Efficiency Load Forecasts from BPA’s load forecasting group
 - Resources – hydro operations based on BP22 Final Rates Proposal (same as CRSO Final EIS Preferred Alternative)
 - Impacts of both 80 and more recent 30 years of historical streamflows modelled independently

Frozen Efficiency Load Forecasts

- Based on hybrid of Statistically Adjusted End-Use (SAE) implementation and econometric approaches.
 - BPA has over 135 firm regional power customers. Approximately 40 of those are modeled using SAE today and we continue to migrate customers into this evolving process established in 2018
- SAE Data Sources
 - Saturations – RBSA, Utility data
 - Efficiencies- Northwest Power & Conservation Council model results
 - UEC- Northwest Power & Conservation Council model results
 - Economic Data- IHS Markit

Frozen Efficiency Load Obligations



Needs Assessment Metrics

- **Annual Energy**
 - Evaluates the annual energy surplus/deficit under 1937-critical water conditions

- **P10 Superpeak**
 - Evaluates the 10th percentile (P10) surplus/deficit over the six peak load hours per weekday by month, given variability in hydro generation

- **18-Hour Capacity**
 - Evaluates the ability to meet the six peak load hours per day over three-day extreme weather events assuming median water conditions

- ***P10 Heavy Load Hour (HLH)***
 - Evaluates the P10 surplus/deficit over heavy load hours by month, given variability in hydro generation

Annual Energy

** 80 Water Year

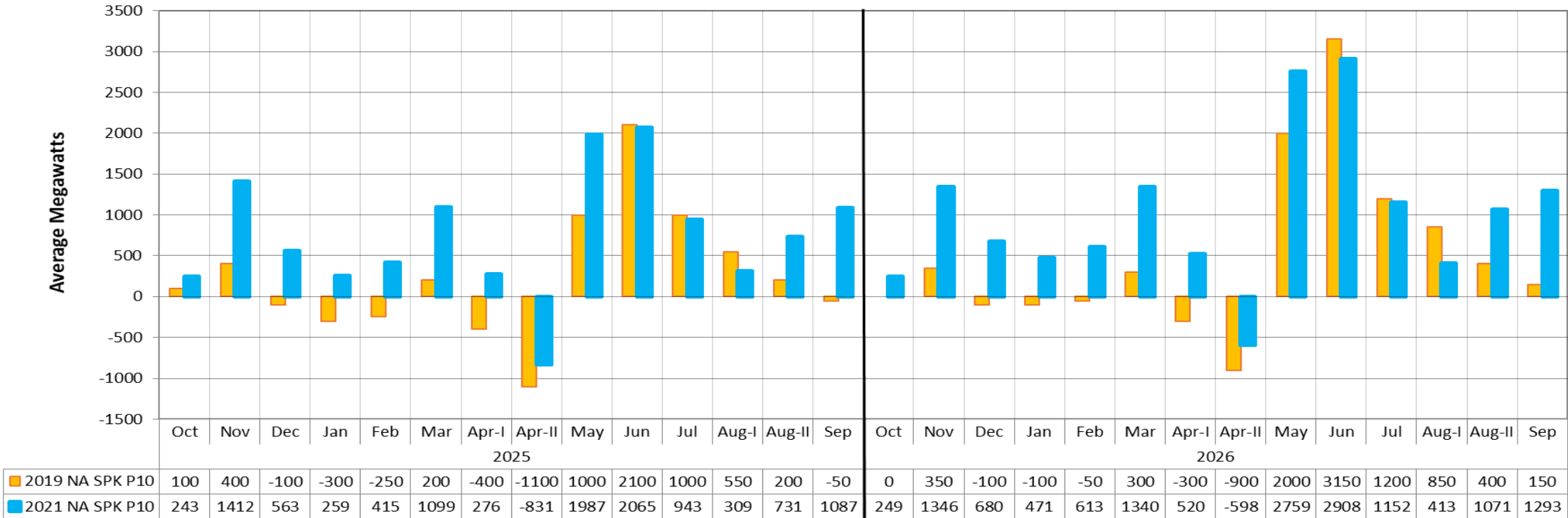
Annual Energy 1937 Surplus/Deficit



- Hydro updates including (CRSO PA) reduced 1937 annual generation by approximately 125 aMW
- The larger deficits in odd years represent Columbia Generating Station maintenance/refueling outages
- Large change between 2025 and 2026 is the expiration of a sales agreement to PGE

P10 Superpeak

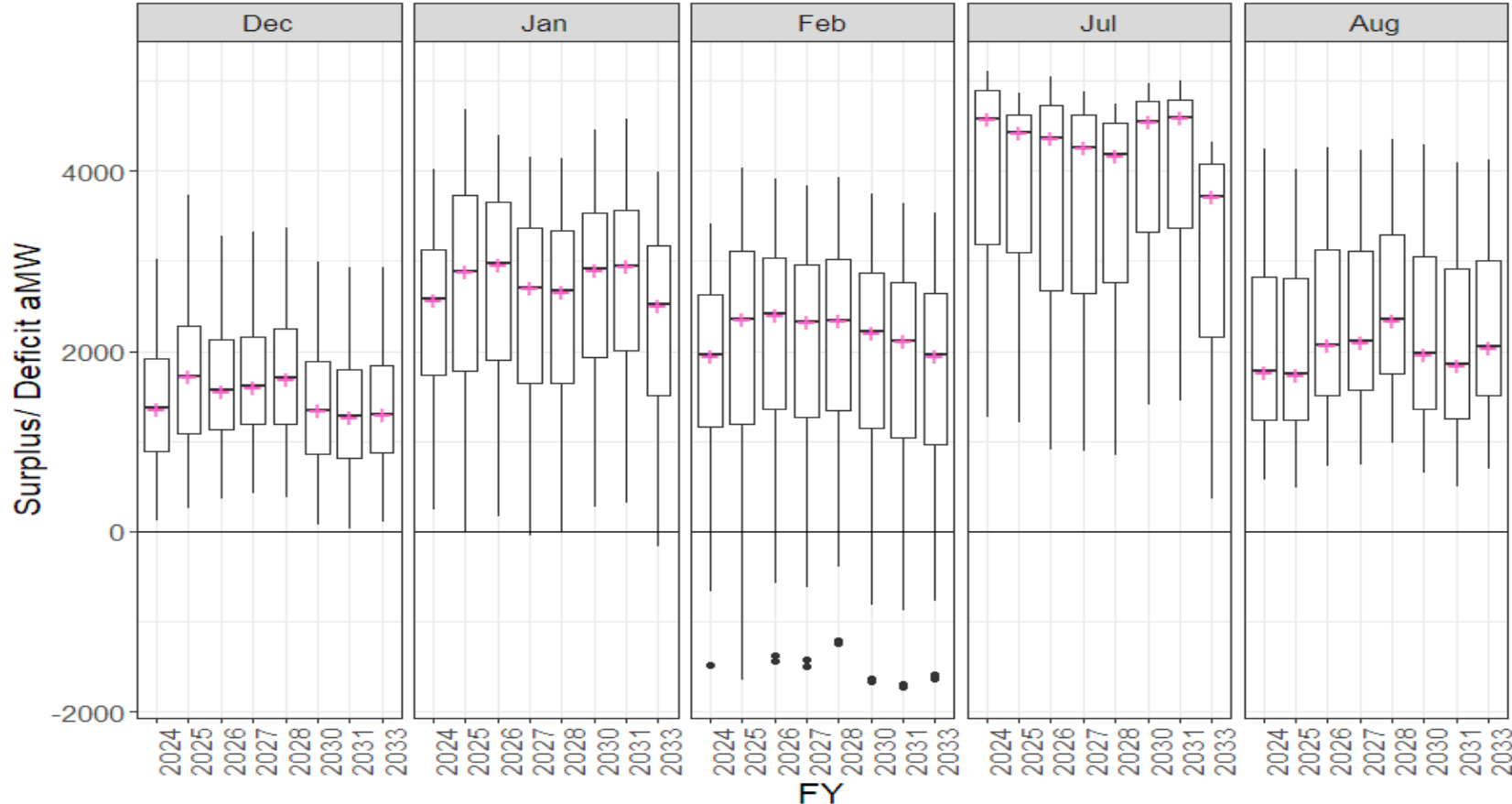
** 80 Water Year



- Updated hourly modeling includes pseudo-optimization of shaping the Lower Columbia projects to meet peak demand hours.
- The largest deficits occur in the second half of April, followed by deficits across the winter (Dec/Jan) late in the study period.

18-hour Capacity

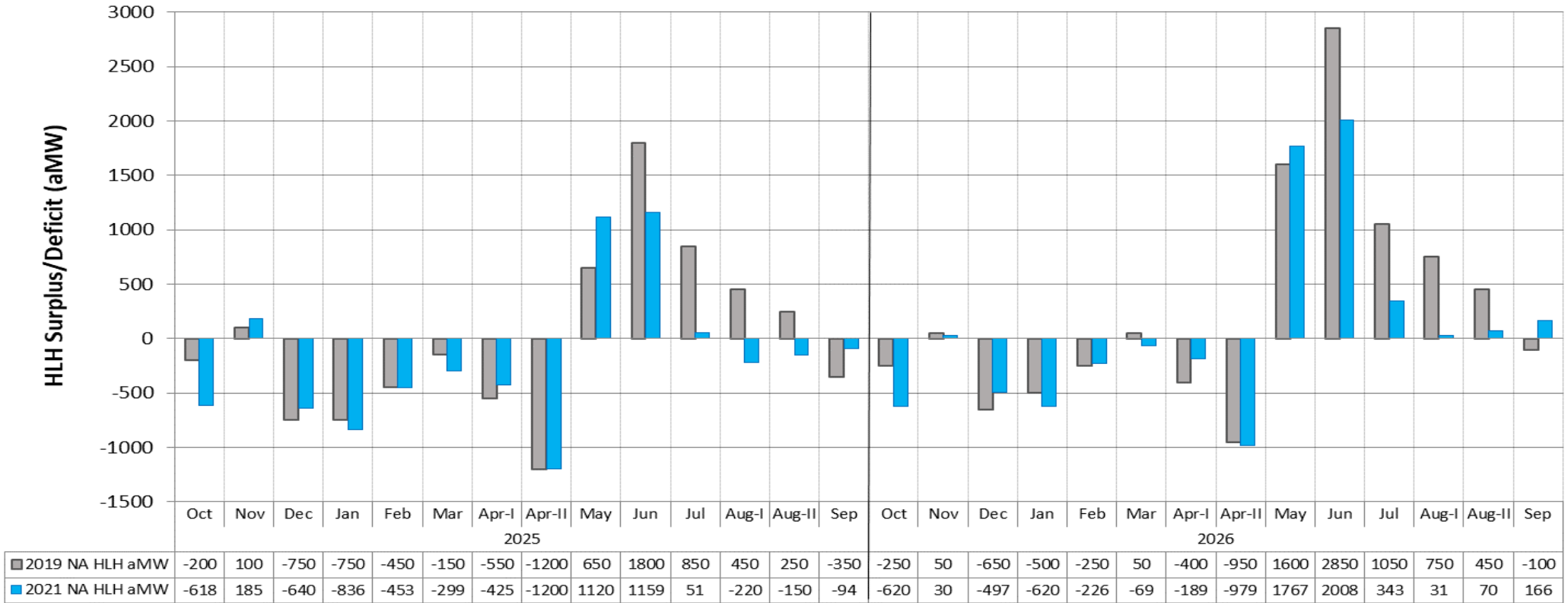
80-WY Extreme Weather Surplus/ Deficit Distributions, and P50 (pink)



- Surpluses in Winter and Summer
- January was traditionally the constraining month, now that has changed to February
- February shows deficits in low water conditions

P10 HLH

** 80 Water Year

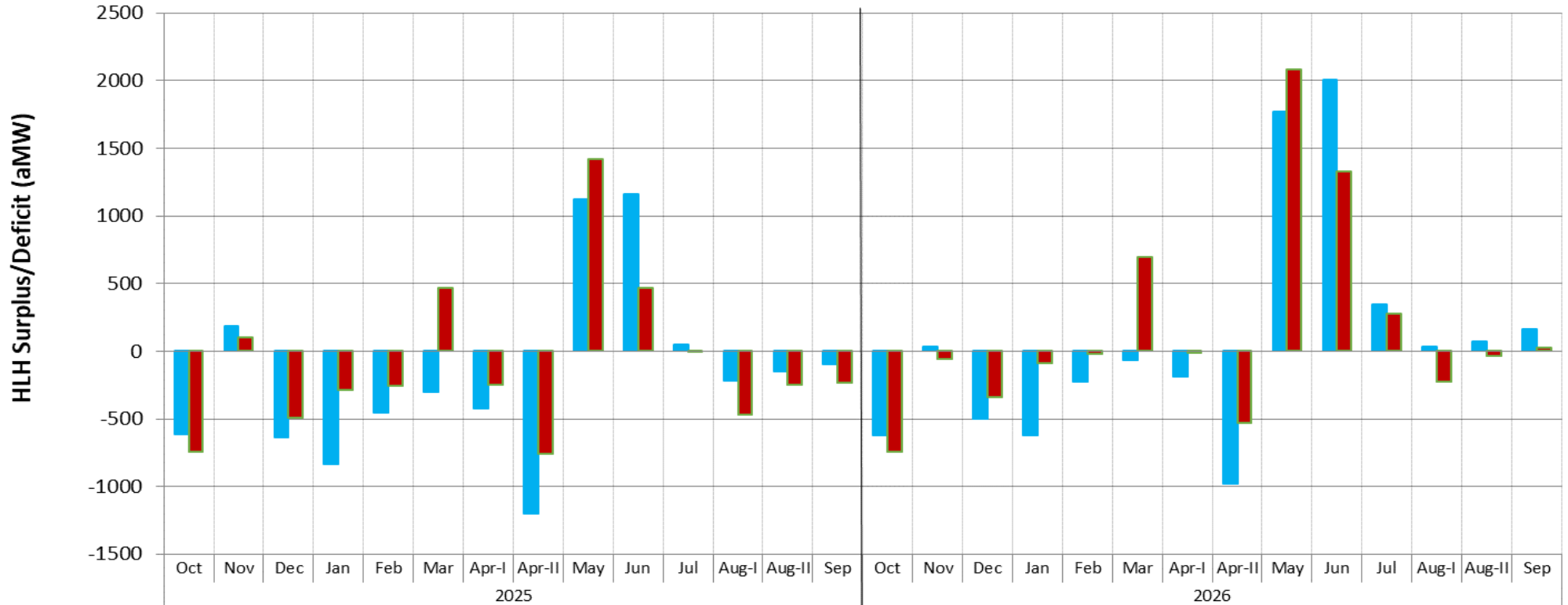


- Riverware modeling results in reduced HLH-block in summer due to better alignment with river operations

- Largest deficits occur in October, winter, and second half of April (aka April II)

P10 HLH – Climate Change Updates

** 80 vs 30 WY



- 30 years of historical streamflows results in more generation in winter and less generation in summer, compared to the 80 years of history

Conclusion

- 2021 Needs Assessment results continue to demonstrate that BPA is energy (hydro fuel) limited
 - P10 Heavy Load Hour deficits are the most constraining results compared to the other metrics being evaluated
- More recent 30 years of historical streamflows results in more generation in winter and less generation in summer, compared to the 80 years of history
- For additional questions or details on the Resource Program please send an email to Communications@bpa.gov with the subject “2022 Resource Program”.