



2022 BPA Resource Program

High Policy Scenario

August 9, 2022



Agenda

- High Policy Scenario Assumptions
- Portfolio Optimization Results (aka Resource Solutions)
- Next Steps

High Policy Scenario Assumptions and Inputs



Base vs. High Policy Scenario

Base

Our expected outcome **given:**

- Assumed technology costs and availability
- Base case gas prices, loads, and hydro (30 Water Year CRSO EIS)
- Current, explicit carbon policy
- Current behavior when clean policy is confronted with reliability shortcomings
- Represents a more conservative estimate of how rapidly the system transitions to zero emission resources
 - More responsive to short-term economics and reliant on traditional resources to meet reliability

High Policy

Our expected outcome **given:**

- Rapid transition / Accelerated decarbonization
 - CA carbon price in OR and WA
 - WECC-wide carbon price beginning 2030
 - All base case goals are accelerated
 - All states aim for 100% Zero Emissions (ZEM) by 2050
- Reduced solar, wind, and storage resource costs
- More electrification in loads
- 30WY CRSO EIS hydro
- Lower gas price forecast
- Represents a 'plausibly high' case, not intended to be a rigorous study of how or if the WECC achieves zero / net zero emissions, or how quickly it could do so

Policy Constraints

Renewable Portfolio Standard and ZEM requirements were updated to be consistent with Council’s ~June 2020 WECC policy survey (including municipal and utility clean goals, ‘pseudo goals’)

- We discount pseudo goals by 20%
- For all targets, we allow 10% of incremental needs to be met on a pooled basis (anywhere in the WECC)



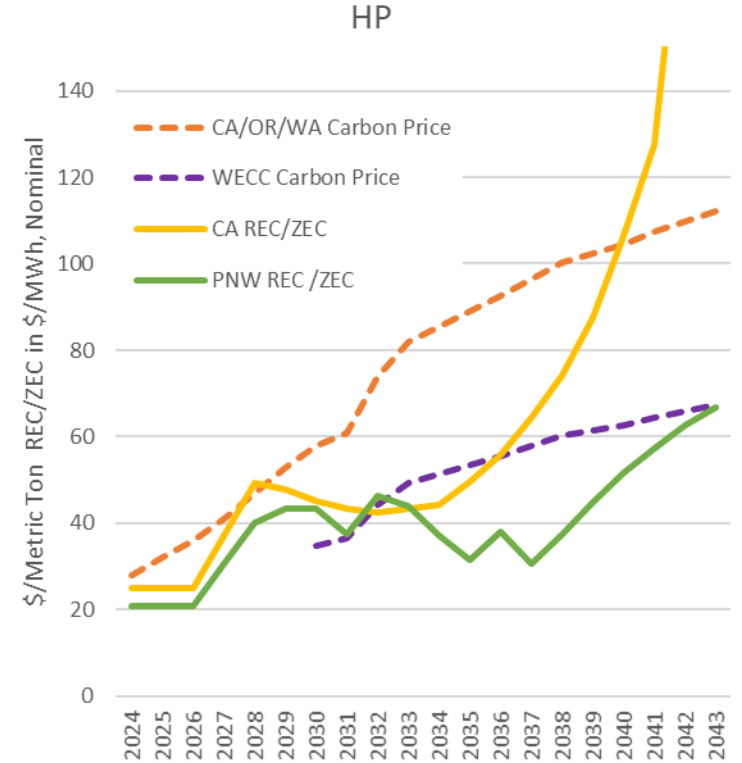
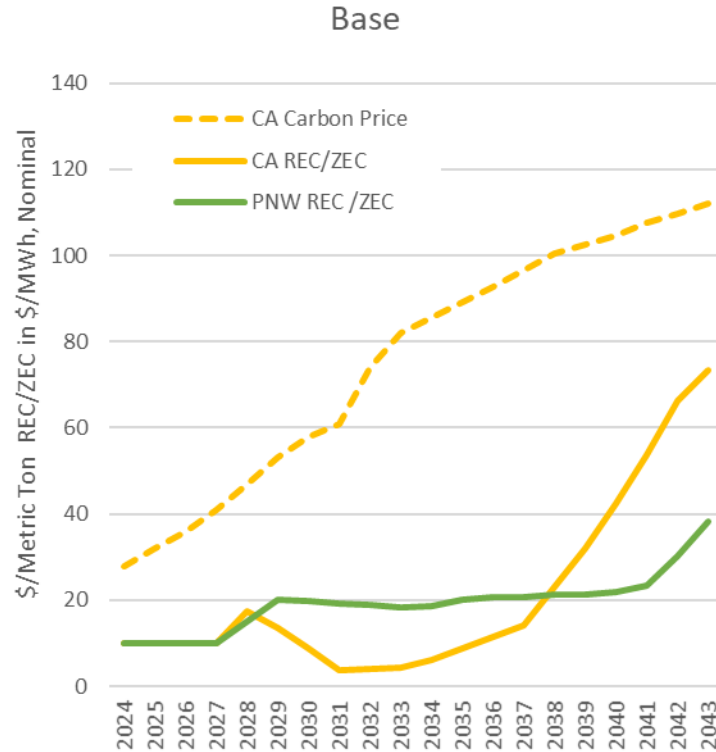
Carbon Policy Constraints

Carbon prices:

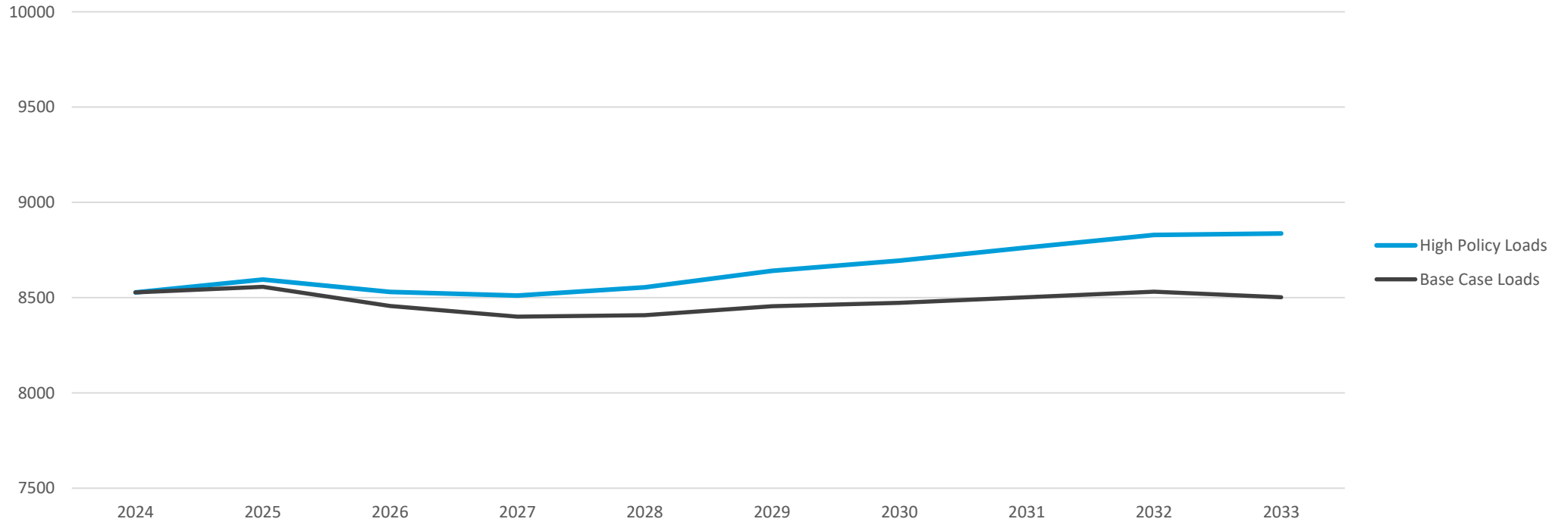
- Base: CA and AB
- High Policy: CA/OR/WA adopt CA price, rest of WECC adopts lower price beginning 2030

Include emission penalties on WA thermals after 2030 and ensure 80% of WA loads are met with zero emission generation, ramping up to 100%

Include OR CO2 emission caps



HLH Obligations – Base vs. High



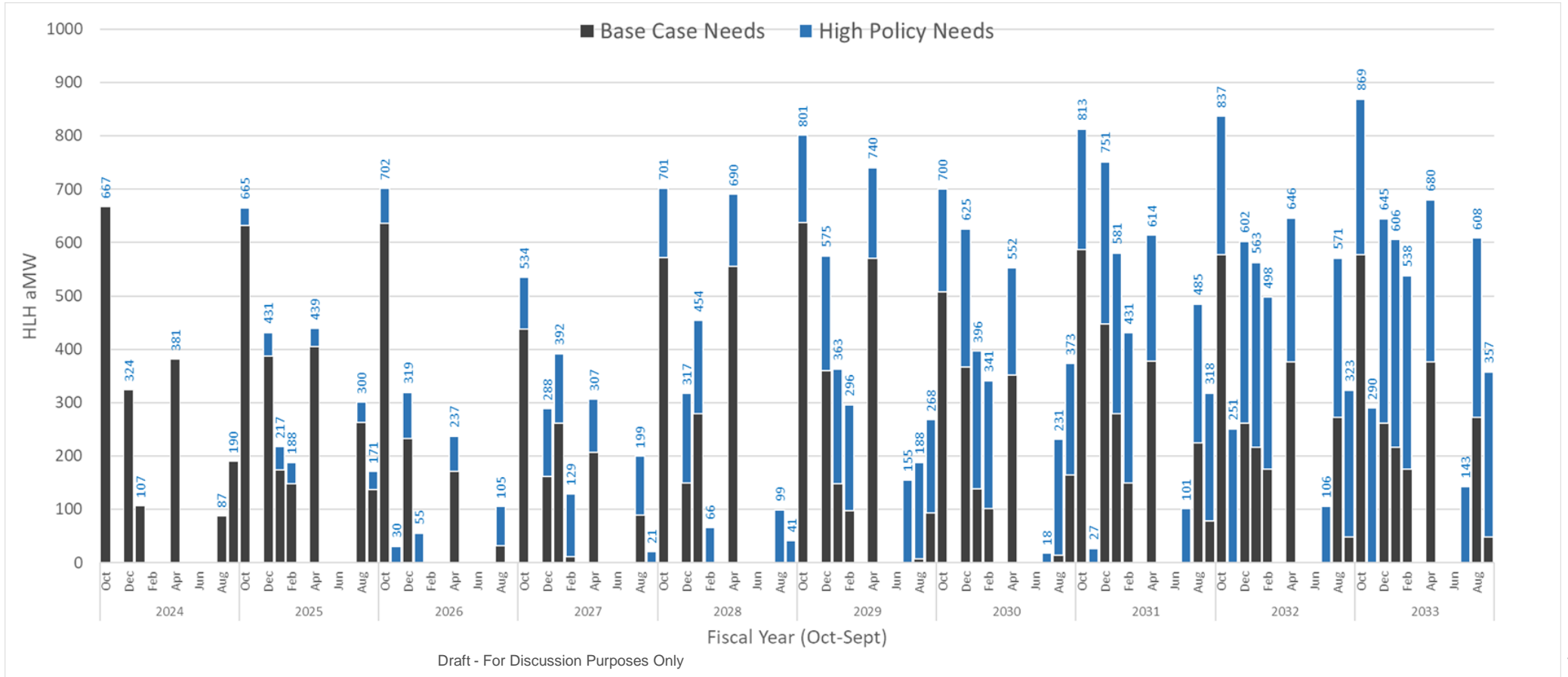
High Policy Load Growth Assumptions

- 0.4% average annual load growth difference over 30WY base-case
 - Excludes growth in large new loads
 - 0.7% annual average growth rate for base and 1.15% for high policy
- High Policy Load Forecast Drivers
 - Slightly higher economic conditions would resume in late 2022 into early 2023 then continue.
 - Increased penetration rates for emerging electro technologies like electric vehicles, solar rooftop installations, etc.
 - Increase penetration of electric equipment over other fuel types due to mandates.
 - Other speculative loads would start up due to economic conditions and increasing growth in the Northwest.
 - No change in customer base post 2028.

High Policy Resource Assumptions

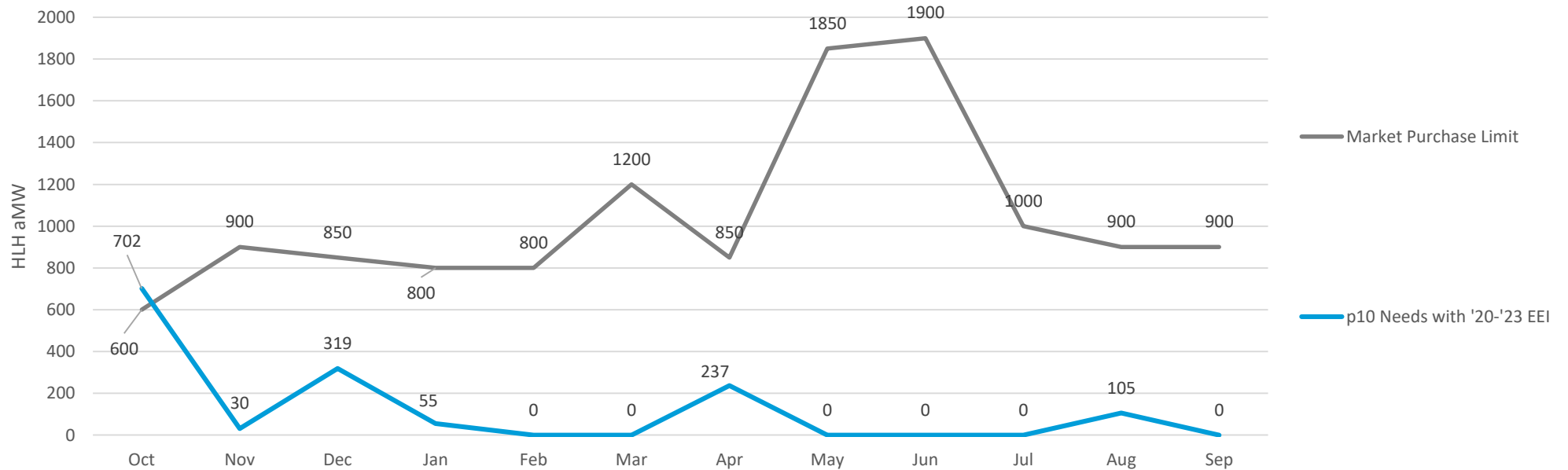
- Lower cost forecasts for renewable generation resources
- More renewable generation in WECC-wide buildout → lower average market prices vs. base
 - Base Case study average \$22.83, High Policy study average \$16.53 (2020 \$/MWh)
 - Base Case, 2027: January HLH \$38.04; October HLH \$37.15 (nominal \$/MWh)
 - High Policy, 2027: January HLH \$28.61; October HLH \$35.70 (nominal \$/MWh)
- Limitations:
 - EE and DR capacities are not adjusted for higher regional loads
 - Market Purchase Limit study is same as Base Case

p10 HLH Needs – Base vs. High

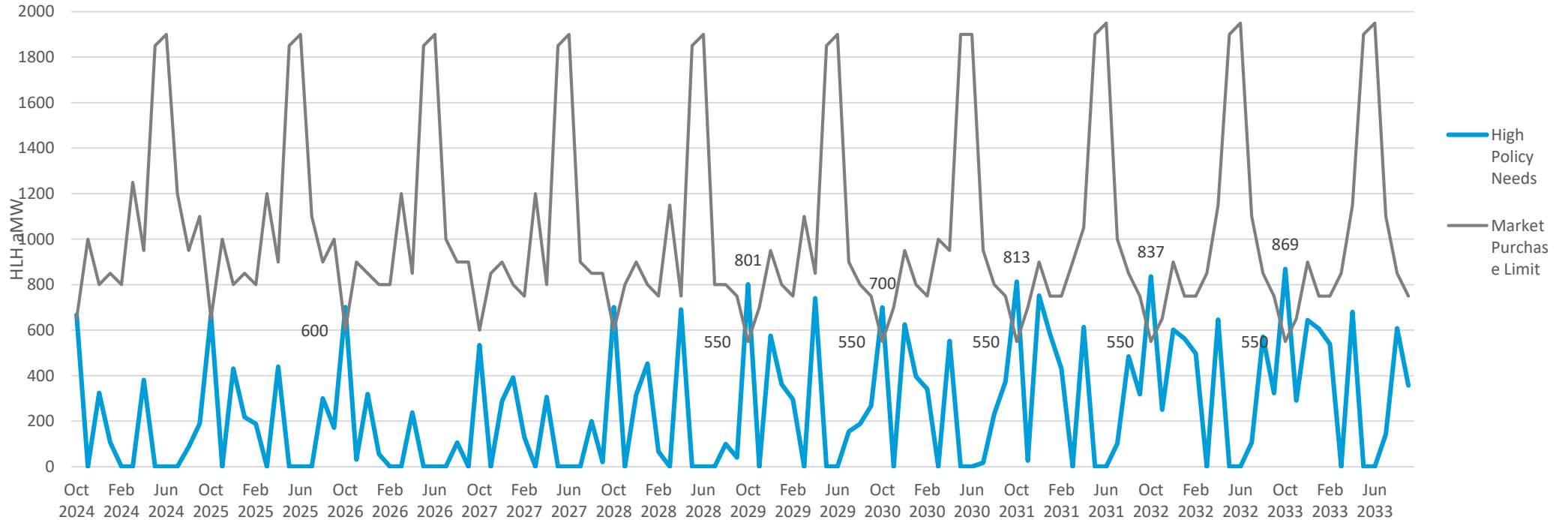


2025 Needs vs. Market Purchase Limit

2025 p10 HLH Needs with 2020-2023 EEI vs Market Purchase Limits



2024-2033 Needs vs. Market Purchase Limit



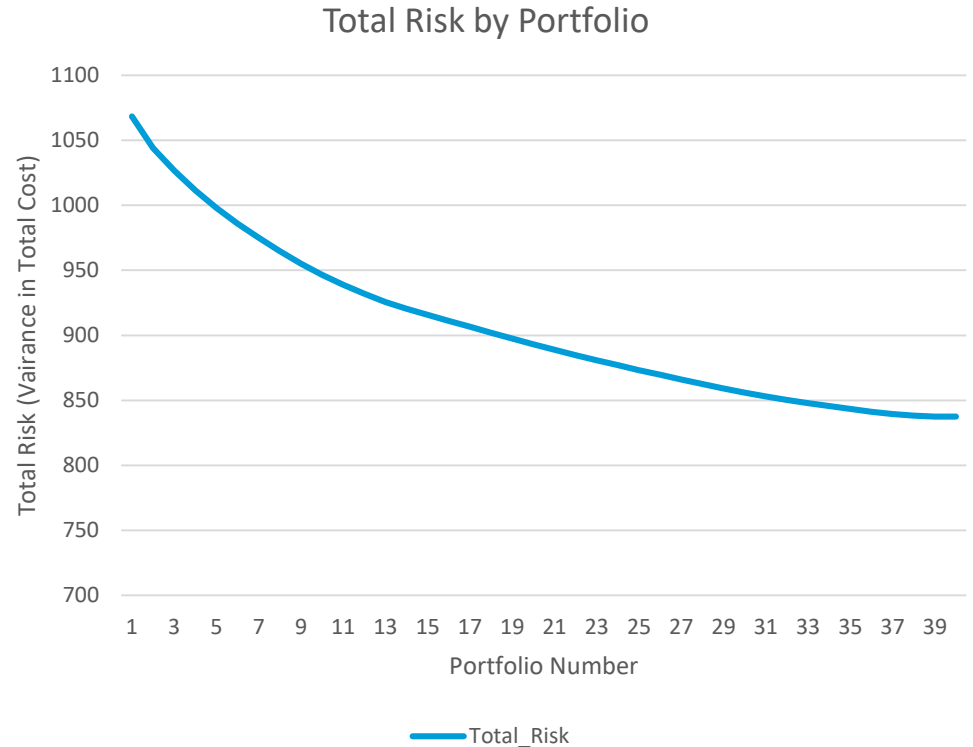
Portfolio Optimization Refresher



Refresher: Portfolio Optimization

- **Step 1:** Find Portfolio 1, the “least-COST” mix of resources that meet P10 HLH Energy needs and don’t violate Market Purchase Limit
- **Step 2:** Find Portfolio 40, the “least-RISK*” mix of resources that meet P10 HLH Energy needs and don’t violate Market Purchase Limit
- **Step 3-40:** Incrementally add budget to Portfolio 1’s budget value and remix resources to find risk minimizing combination at given budget level

*Risk is the variance in total portfolio cost across iterations, with expected resource costs and expected market prices causing most of the variance



Results

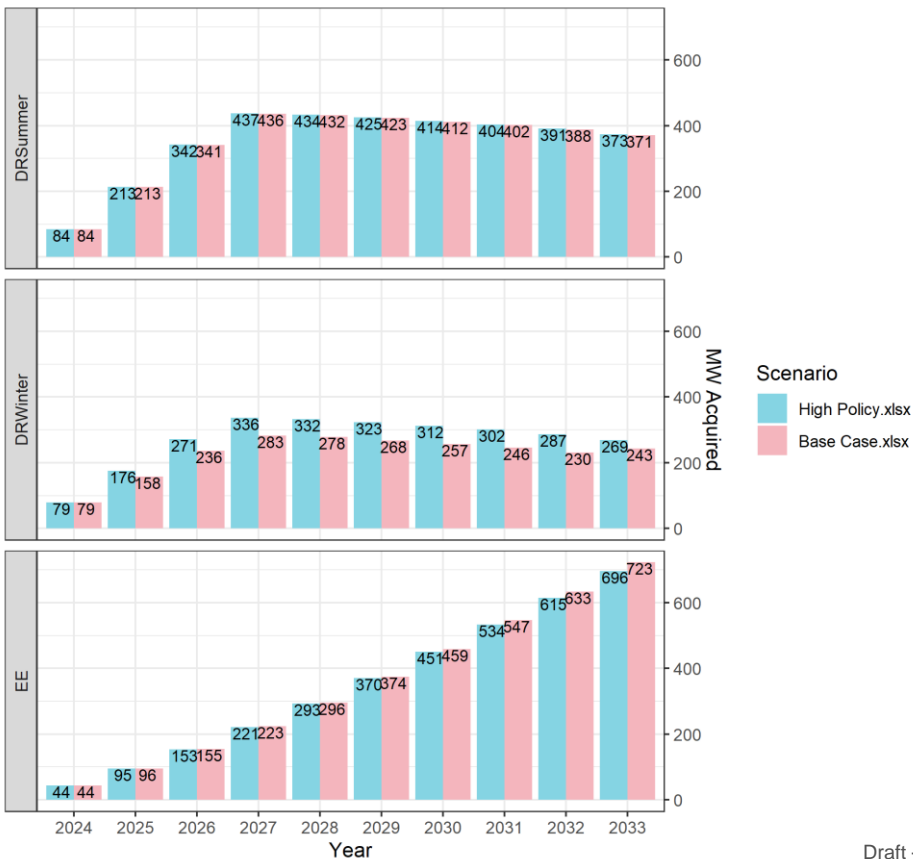


Resource Solutions Summary

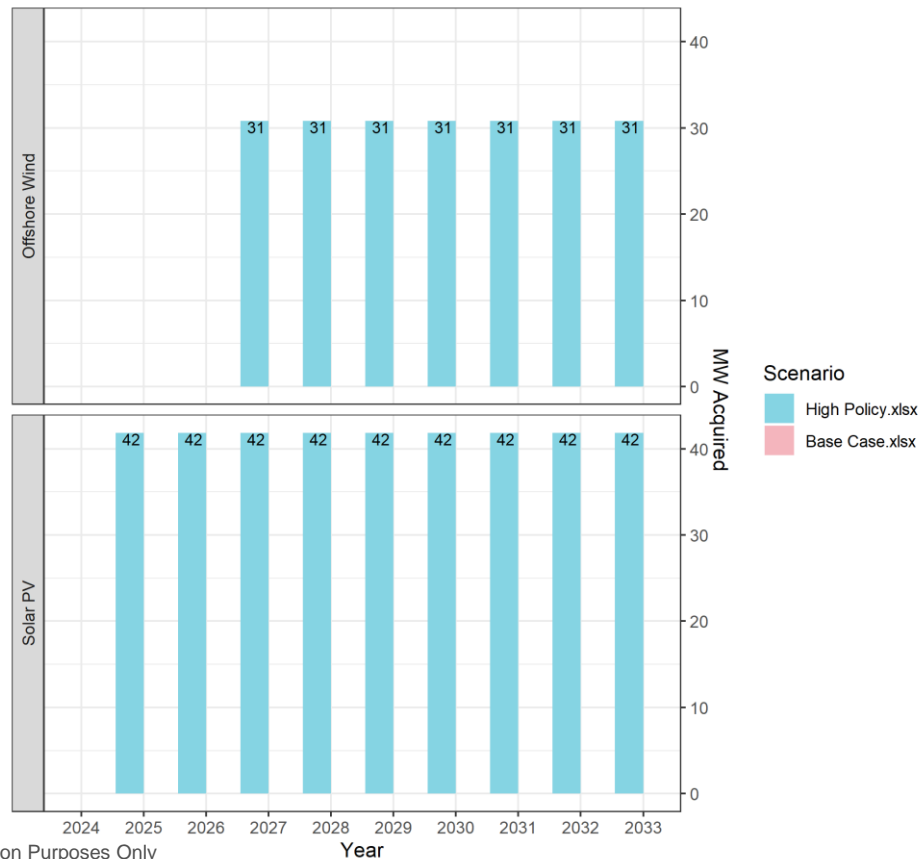
- EE aMWs in High Policy show little change from 30WY Base
- Demand Response continues to be selected as a regularly deployed, low impact, low cost energy-related load management product
 - Adds industrial curtailment product to DR from base case
- Renewables are selected in the High Policy least-cost portfolio to meet modest growth to BPA's load obligations
 - Small amounts of standalone solar photovoltaic, offshore wind

Resource Solutions

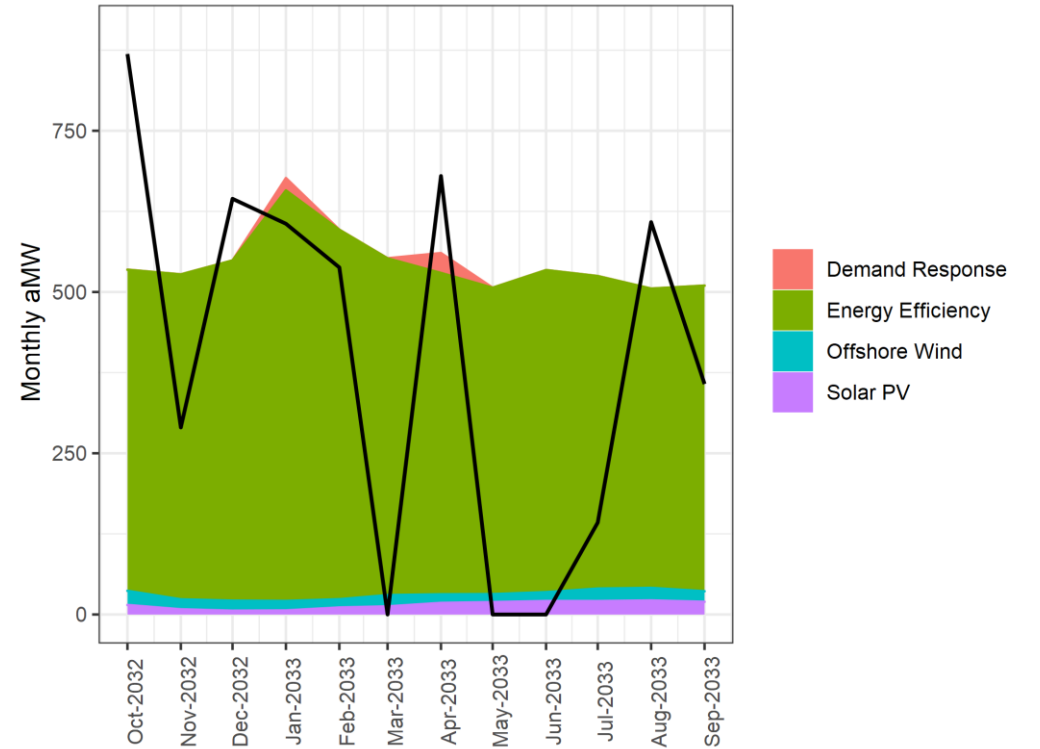
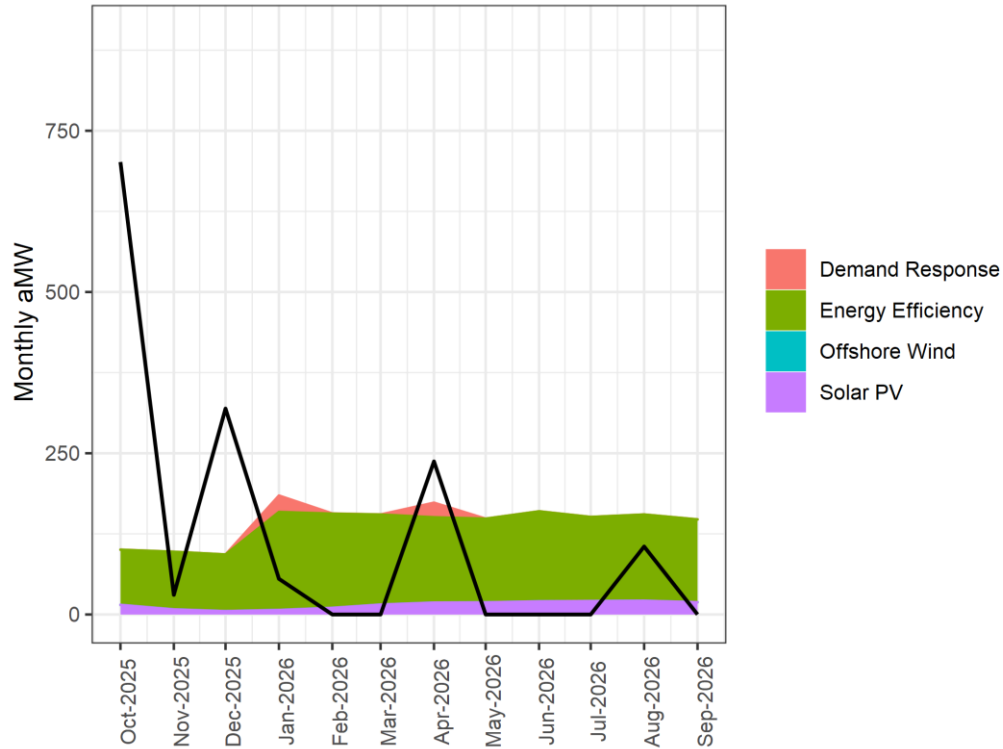
Scenario Comparison: Least Cost Portfolio Selections
Demand-Side Resources



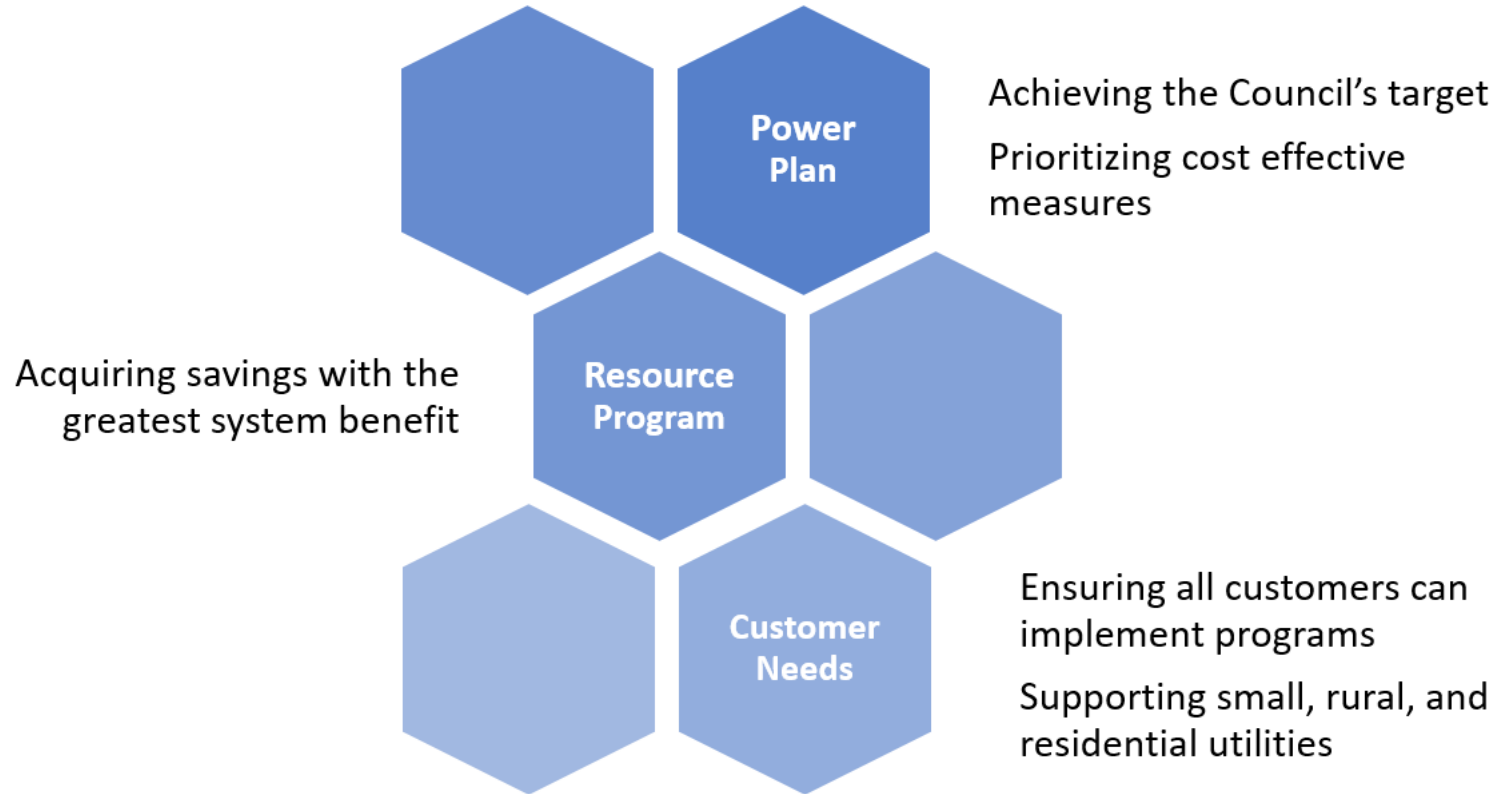
Scenario Comparison: Least Cost Portfolio Selections
Generating Resources



Resource Output



Balancing Priorities



Next Steps

- **EE Action Plan**
 - Provides an operational plan for BPA to achieve its energy efficiency goals.
 - Bottoms up plan using Power Plan, Resource Program, customer needs, and market intelligence to create an operational roadmap.
 - Will guide BPA's implementation efforts over the 2021 Power Plan period.
 - Timeline
 - Spring/Summer: Internal workshops and input gathering
 - Fall: Draft Action Plan
 - Winter: Publish draft Action Plan for comment
 - Spring: Final Action Plan published
- **Generating Resources**
 - Continue to evaluate these resources in the context of other ongoing initiatives (Provider of Choice and Western Resource Adequacy Program)
 - Continue to monitor actual resource costs and contract opportunities, as well as the pace of clean policies and rates of load growth