BPA WMEG Additional Analysis

Stakeholder Meeting

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Energy+Environmental Economics

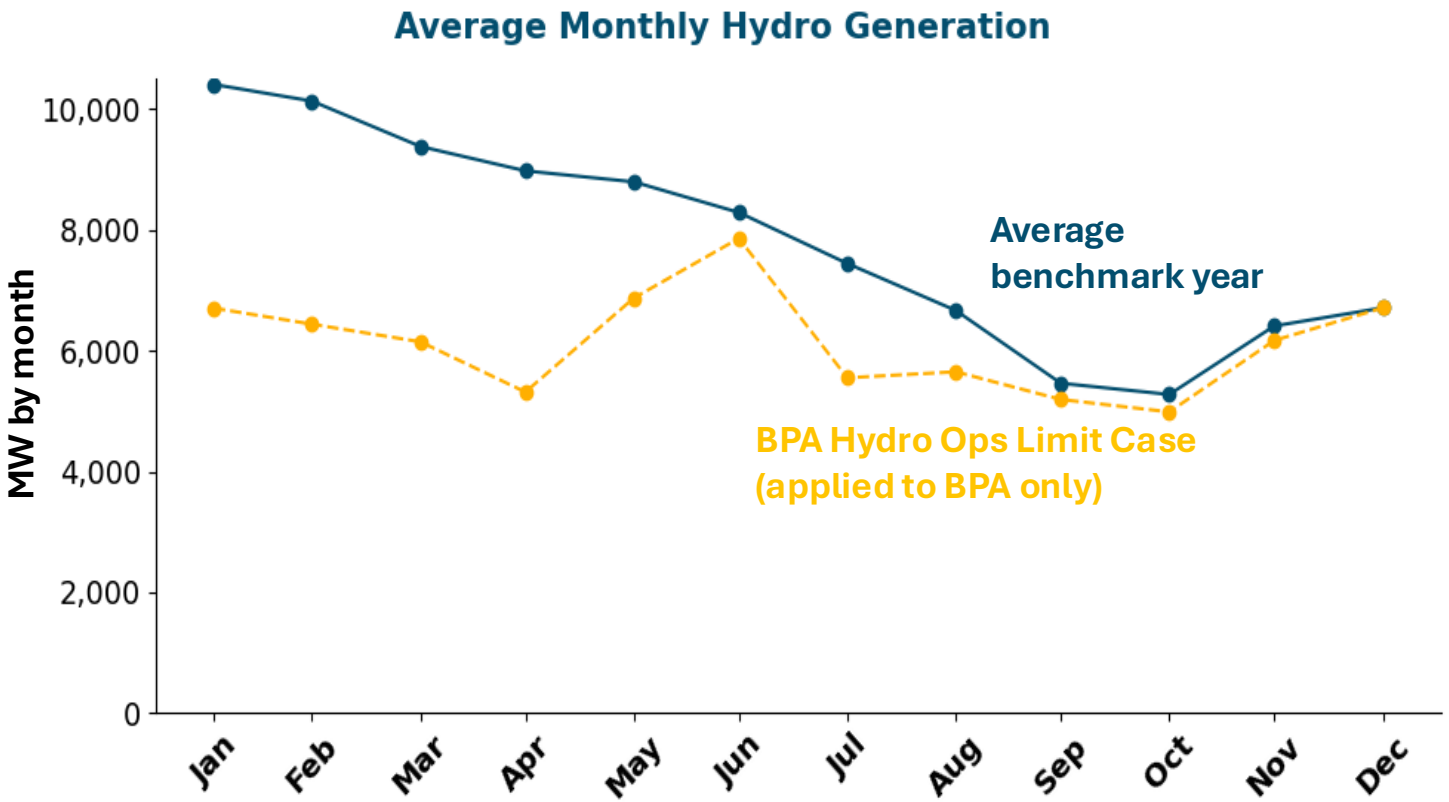
Task 12: BPA Hydro Operational Limitations Scenario

Energy+Environmental Economics

BPA Hydro Operational Limitations Scenario Inputs

- **BPA requested E3 develop a case that limited BPA's hydro generation**
  - Helps to understand the case results if environmental or other conditions caused a reduction to BPA generation
- **Similar to previous Dry case (in Task 3), here E3 reduced BPA hydro generation to 10th percentile of historical monthly output**
- **Unlike Task 3, E3 maintained normal hydro conditions for non-BPA units in the region**
- **Focused on comparison of impact on 2 market footprints: Alt 2NV (with BPA in EDAM) and Alt 4A (with BPA in M+) for all 3 study periods (2026, 2030, 2035)**
  - Also tested for BPA in EIM only for 2026 year

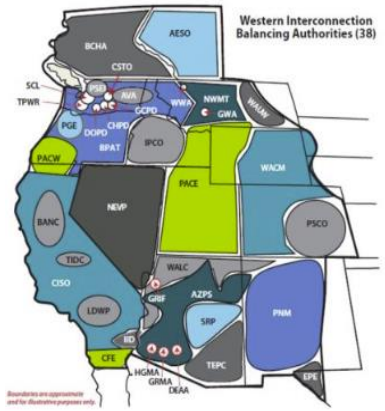
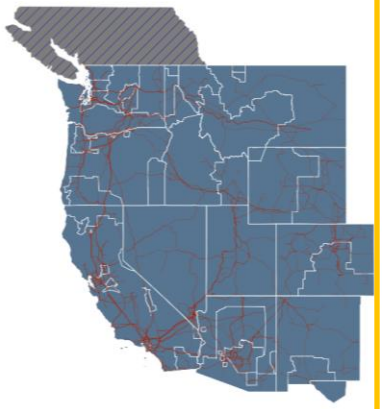
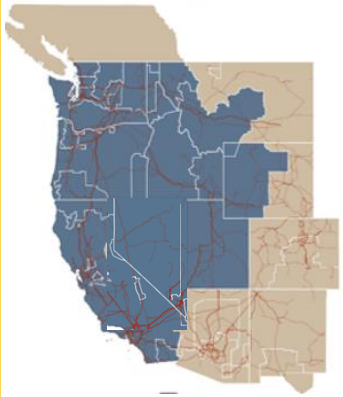
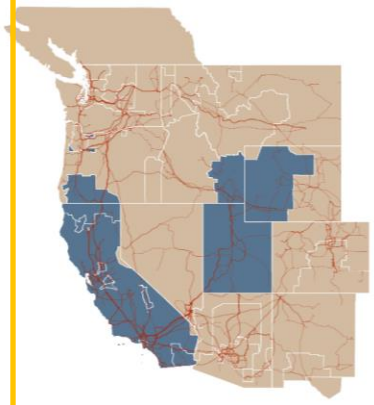
Season	P10 / medium hydro year gen.
Winter	76%
Spring	66%
Summer	83%
Fall	95%



BPA Hydro Operational Limitations Scenario applied to Two Market Footprints: Alt Split 2NV and Alt Split 4A

+ **Separately also modeled Alt Split 4A with BPA in EIM only**

Footprints for Task 12 Scenario

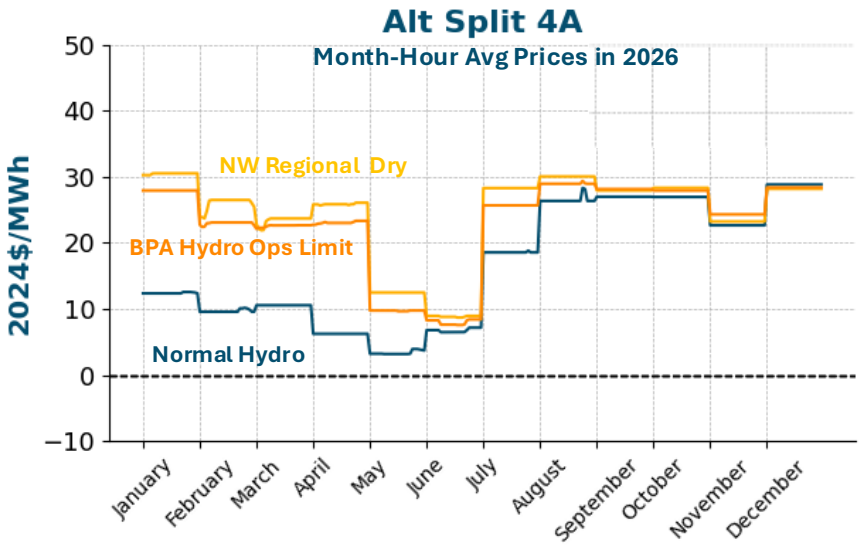
	Business as Usual	Westwide Market	Alt split 2NV	Alt split 4A	Main Split	Non-CA Westwide M+
						
BPA in:	**DA** bilateral trading only with RT within the existing EIM and EIS footprints	**Single DA and RT market** that covers the entire WECC excluding Alberta and BC	**EDAM:** CA, PacifiCorp, NVE, all Northwest **Markets+**; Southwest and Rockies	**EDAM**: CA, PacifiCorp, NVE, Idaho Power, PGE, SCL **Markets+**: Rest of US WECC & BC	**EDAM**: All CA LSEs + PacifiCorp **Markets+**: Rest of US WECC & BC	**EDAM**: CA LSEs only **Markets+**: Rest of US WECC & BC
	EIM only	**Single Market**	**EDAM**	**Markets+**	**Markets+**	**Markets+**

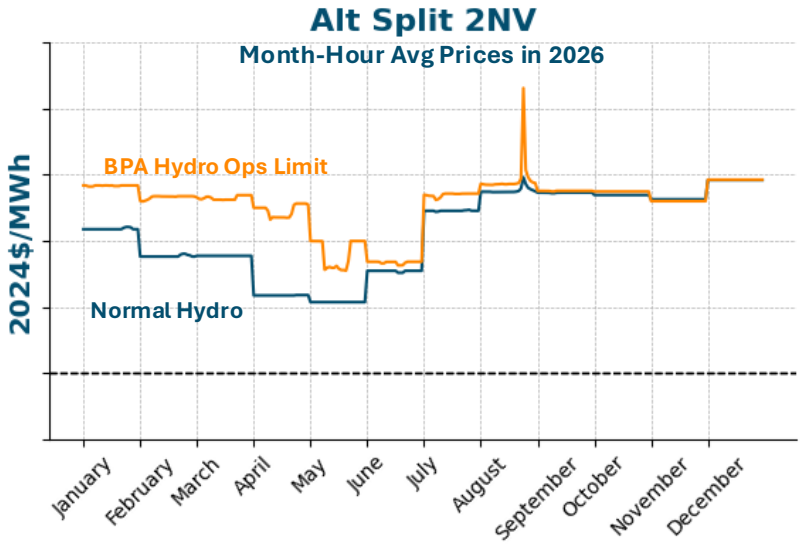
EDAM

Markets+ (M+)

Credit: Greg MacDonald, PSE

BPA Hydro Operational Limitation Scenario Results in Higher Market Prices than Cases with Normal Hydro Conditions

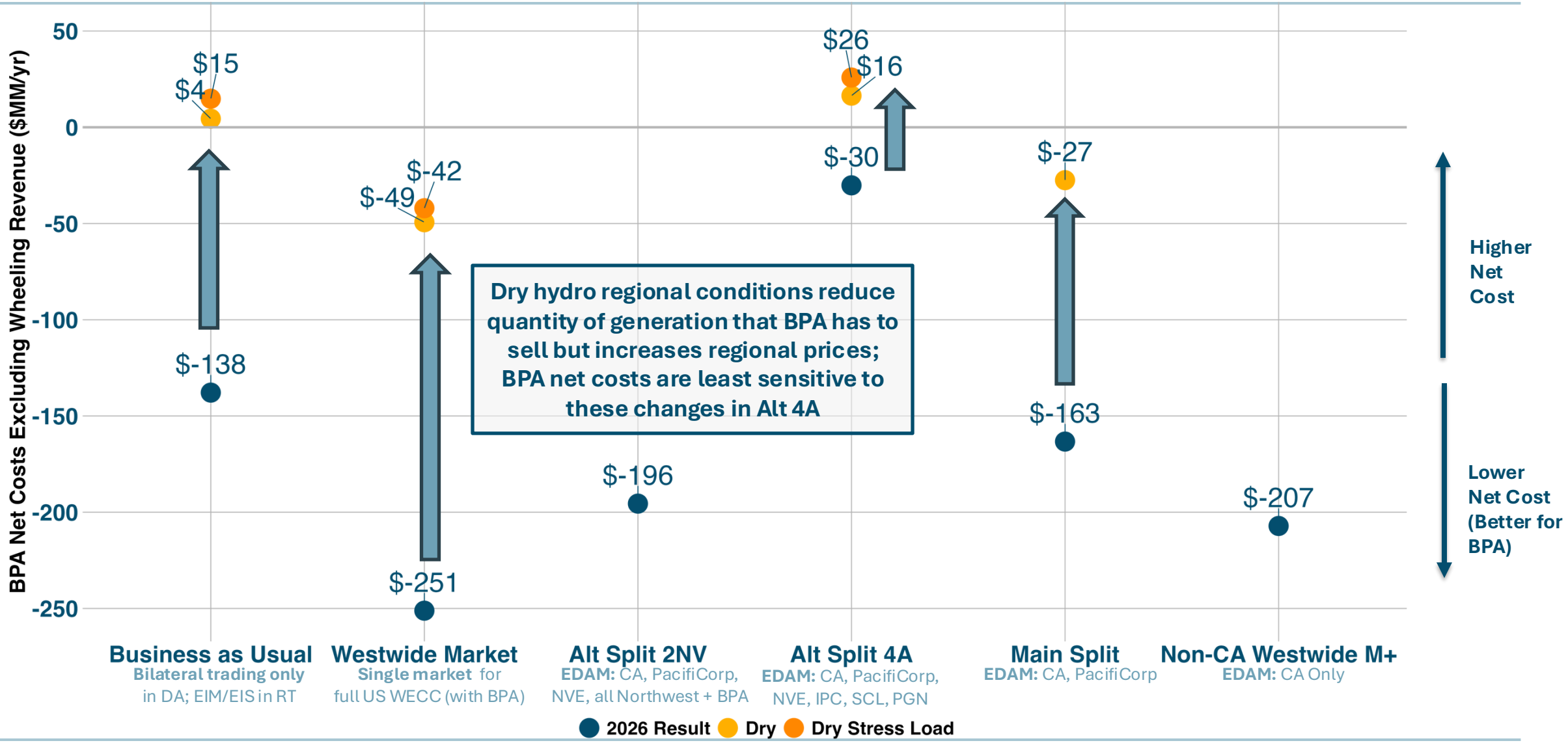




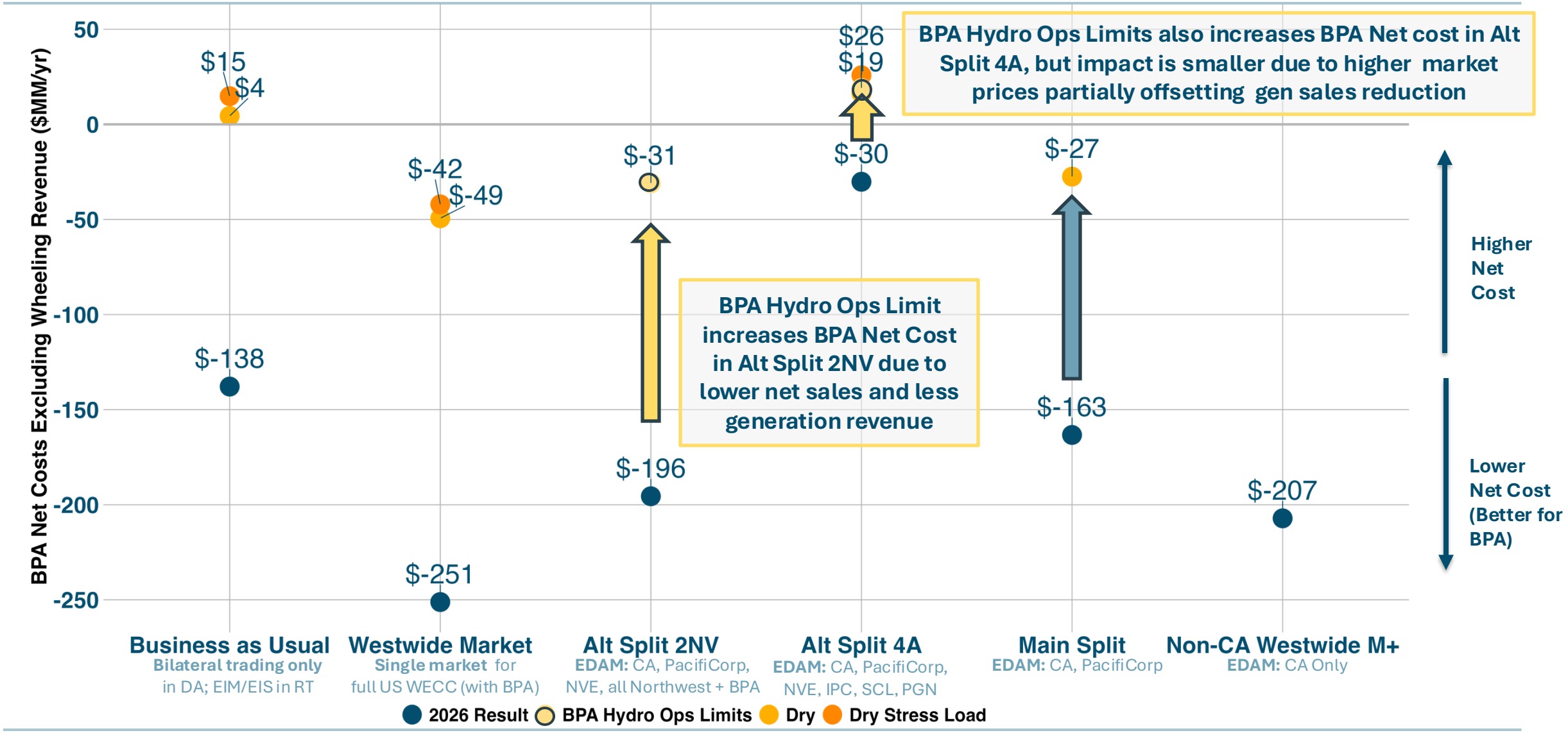
+ **In Alt Split 4A (2026), BPA Hydro Ops Limitation results in significantly higher prices in spring months vs. Normal Hydro conditions**
  - Very similar prices as in regional Dry Hydro case but slightly less high prices due to normal availability to market of non-BPA hydro units

+ **For Alt Split 2NV (2026), BPA Hydro Ops Limitation shows an increase in BPA prices vs. Normal Hydro, but by less than the change in Alt Split 4A**
  - Alt Split 2NV footprint has more resources, which absorb and moderate the impact of BPA hydro ops limitations
  - In normal conditions, Alt Split 2NV starts at a price that is less low than Alt Split 4A, so has less room for increase
  - Overall, BPA Hydro Ops Limit Scenario produces similar prices in Alt Split 4A & 2NV footprints

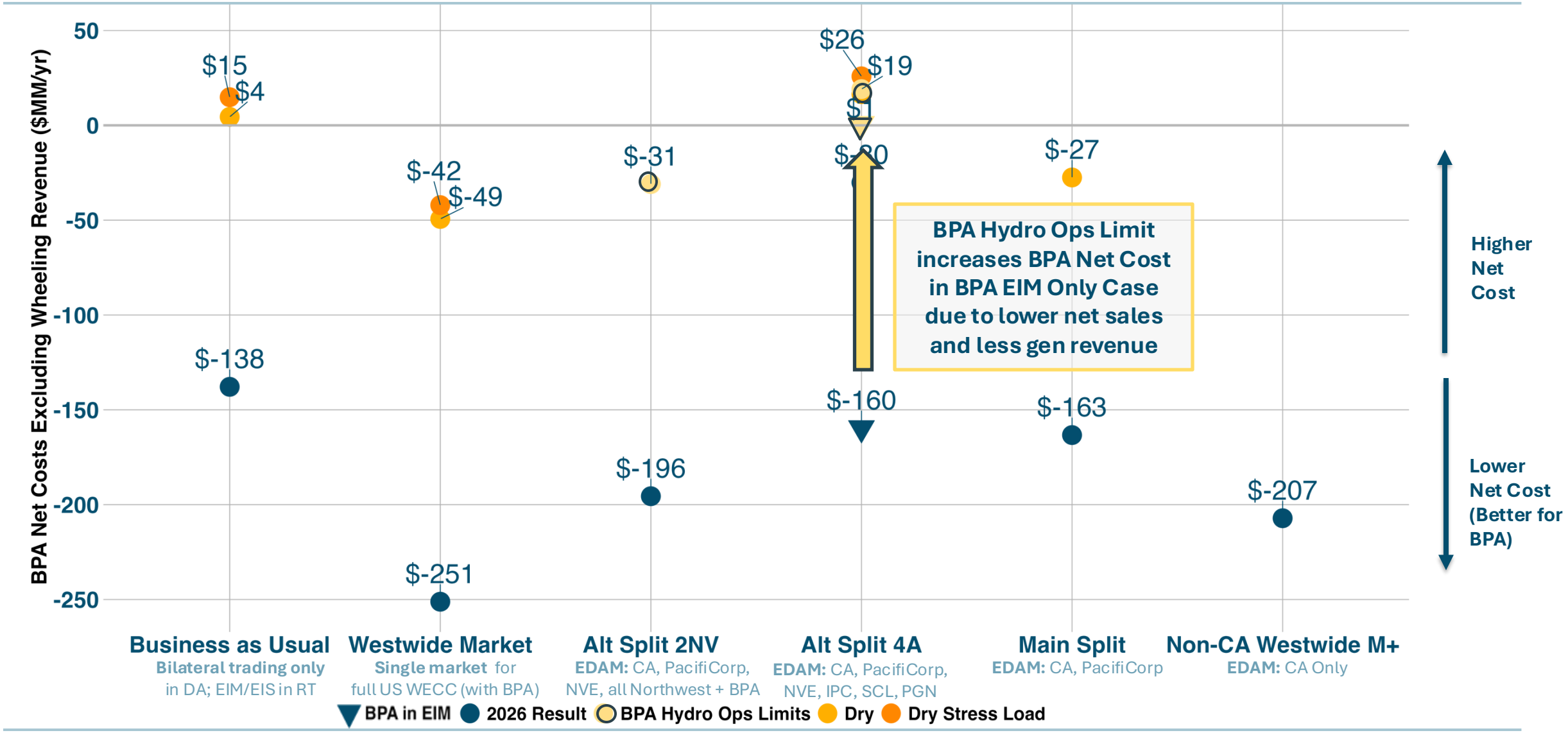
Previous Results from November 2024 Meeting: 2026 Cases with Dry Hydro for NW Region



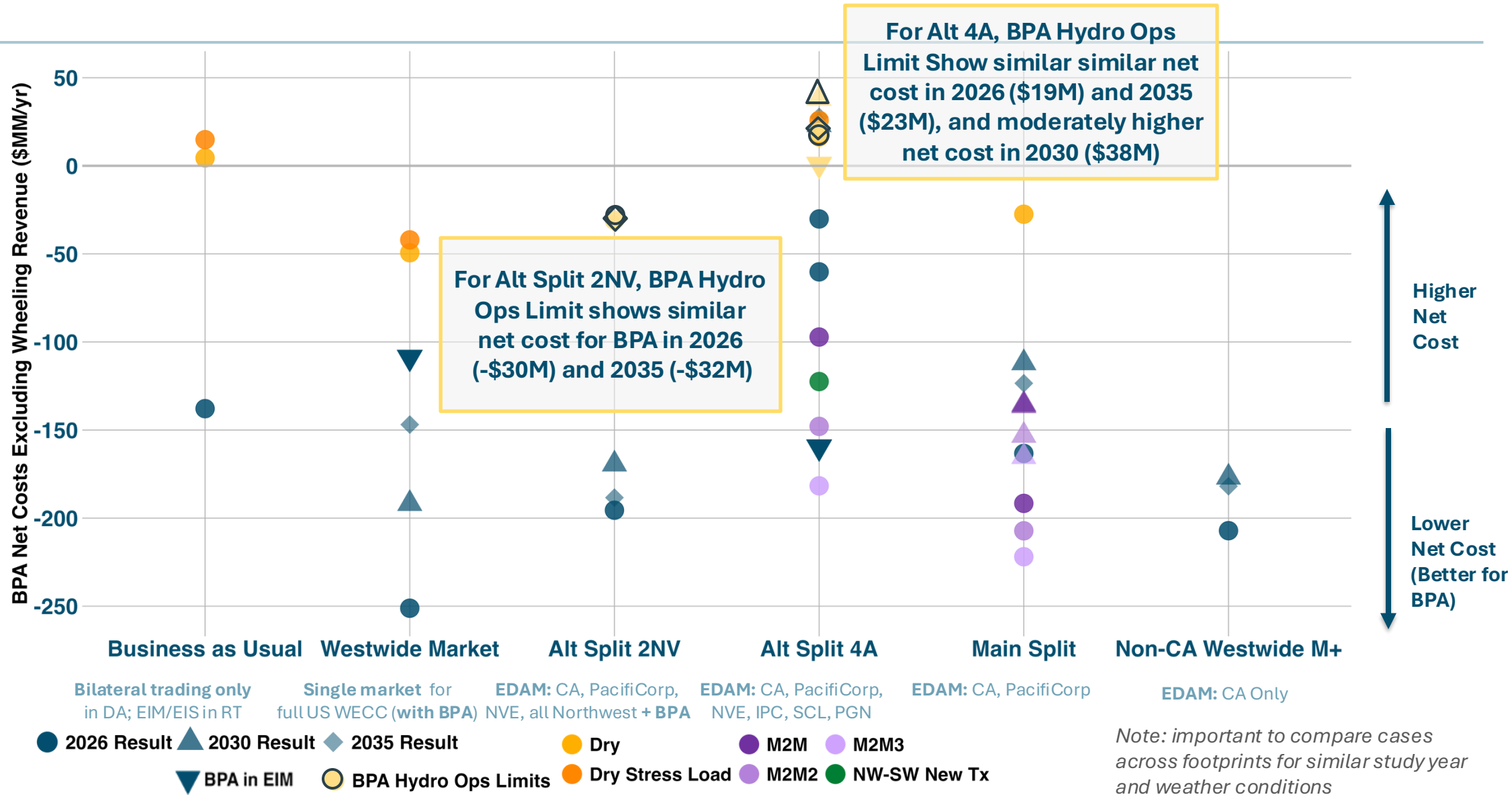
2026 Case Results for BPA Hydro Operational Limitations Scenarios



2026 Case Results with BPA EIM Only for Hydro Operational Limitations Scenario



All Case Results for 2026, 2030 and 2035 Study Years



Note: important to compare cases across footprints for similar study year and weather conditions

2030 Case results still pending Alt Split 2NV for BPA Hydro Ops Limit Scenario, will be posted when available

BPA Hydro Operational Limitations Scenario: Results for 2026, 2030, and 2035 Study Years

+ Comparison Between Study Years

- In normal hydro condition cases, the net cost to BPA goes up over time as more renewables cause lower prices in spring and summer, reducing BPA's generation revenue from sales
- For BPA Hydro Operational Limitations Scenario, net cost do not change as much between study years, likely due to lower net sales by BPA

+ Comparison Between BPA Hydro Operational Limitations Scenario and Normal Hydro Conditions

- Under Hydro Operational Limitations Scenario, Alt Split 4A net cost results are more similar to Alt Split 2NV because AS 4A results show less sensitivity to BPA Hydro conditions due to impact of BPA Hydro Ops Limits to market price in AS 4A, partially offsetting net impact on gen revenue