Round II Modeling Results

Austin Energy Resource, Generation and Climate Protection Plan to 2035

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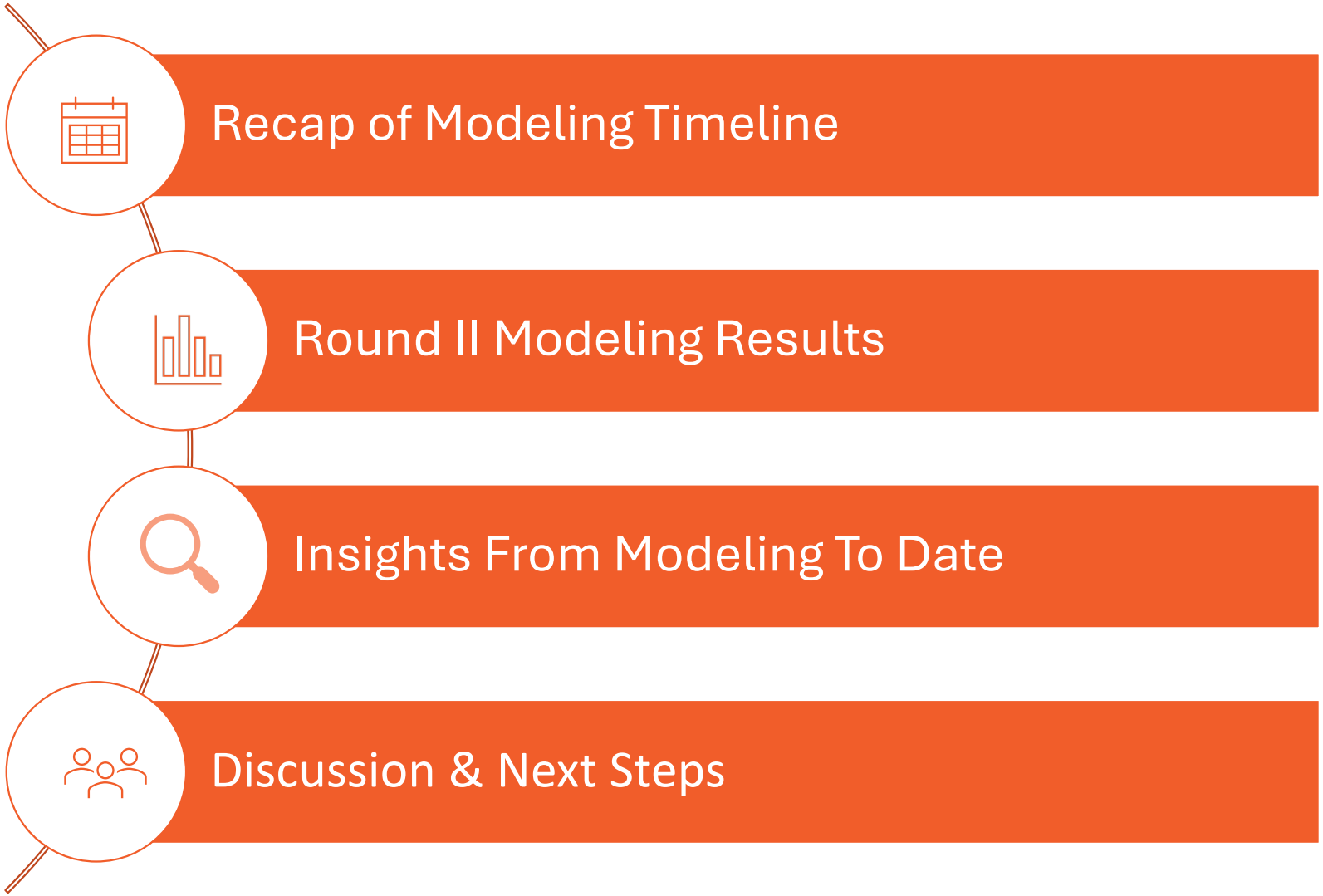
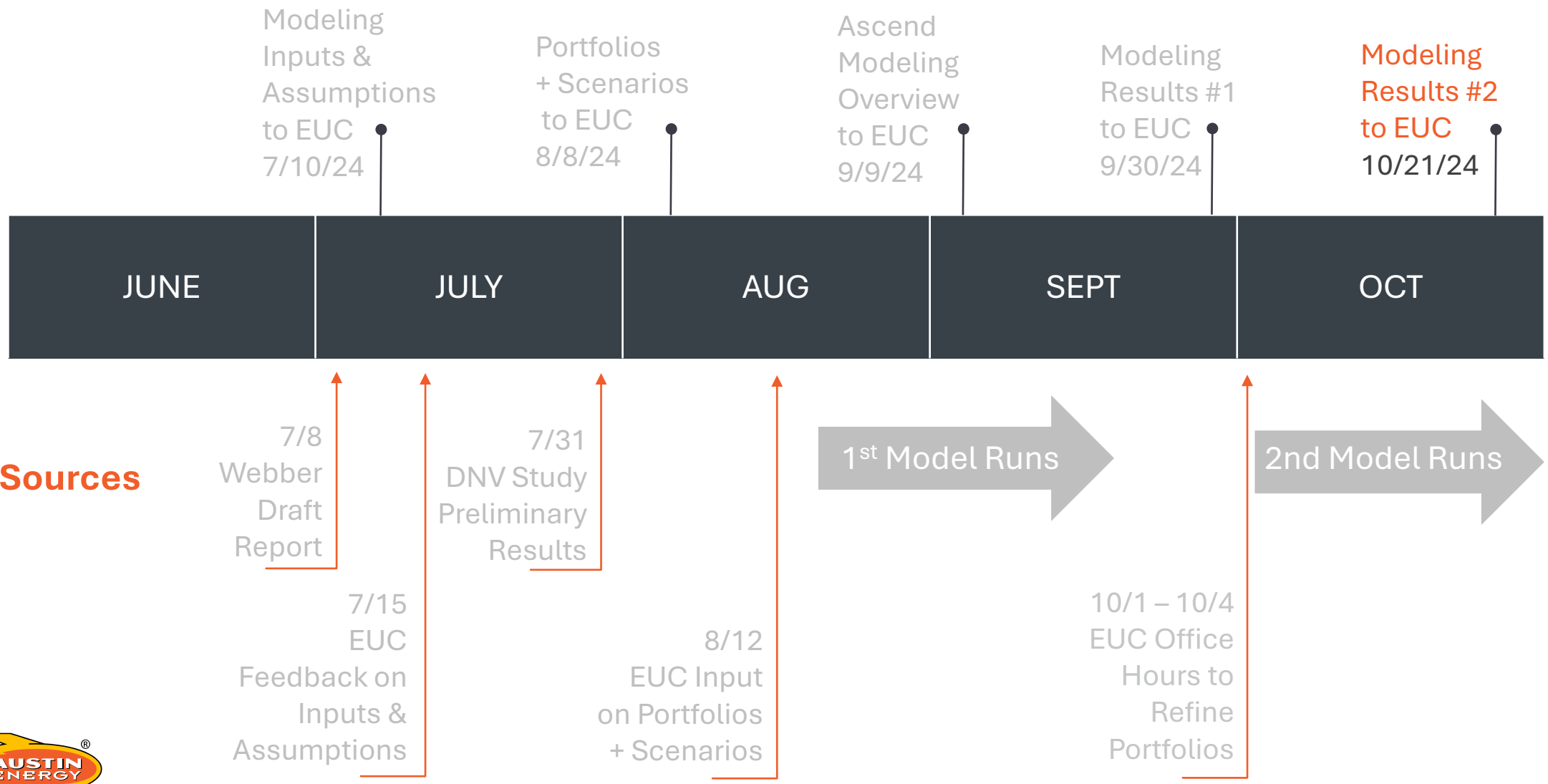
October 21, 2024

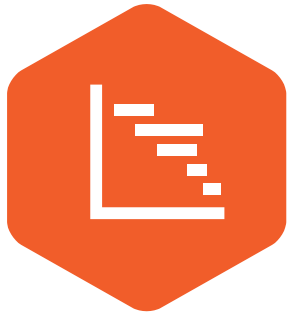
Agenda


Recap of Modeling Timeline
Round II Modeling Results
Insights From Modeling To Date
Discussion & Next Steps

Modeling Timeline



Transitioning to Plan Development



Resource Modeling

- How well do different resource mixes mitigate reliability, liquidity and load zone price separation risk?
- What are the tradeoffs in reliability, cost, and emissions between different portfolio mixes?

Resource Planning

- What insights did we learn from the modeling process that should inform the plan?
- What are the key characteristics from the modeled portfolios that mitigate risk and balance tradeoffs?

Round II Modeling

Round II Portfolios

Austin Energy and EUC selected four new portfolios to improve our understanding of risks and tradeoffs

14

- Variation of Portfolio 10 with incremental new local storage + gas
- Tests “floor” level of local resources needed to maintain reliability

15

- Variation of Portfolio 12 with more local solar + storage + DR
- Tests cost/reliability of aggressive mix of DSM + storage only

16

- Variation of Portfolio 12 with larger ratio of storage to solar + more DR
- Tests relative performance of different solar + storage mixes
- Maintains Decker/Sand Hill past 2034

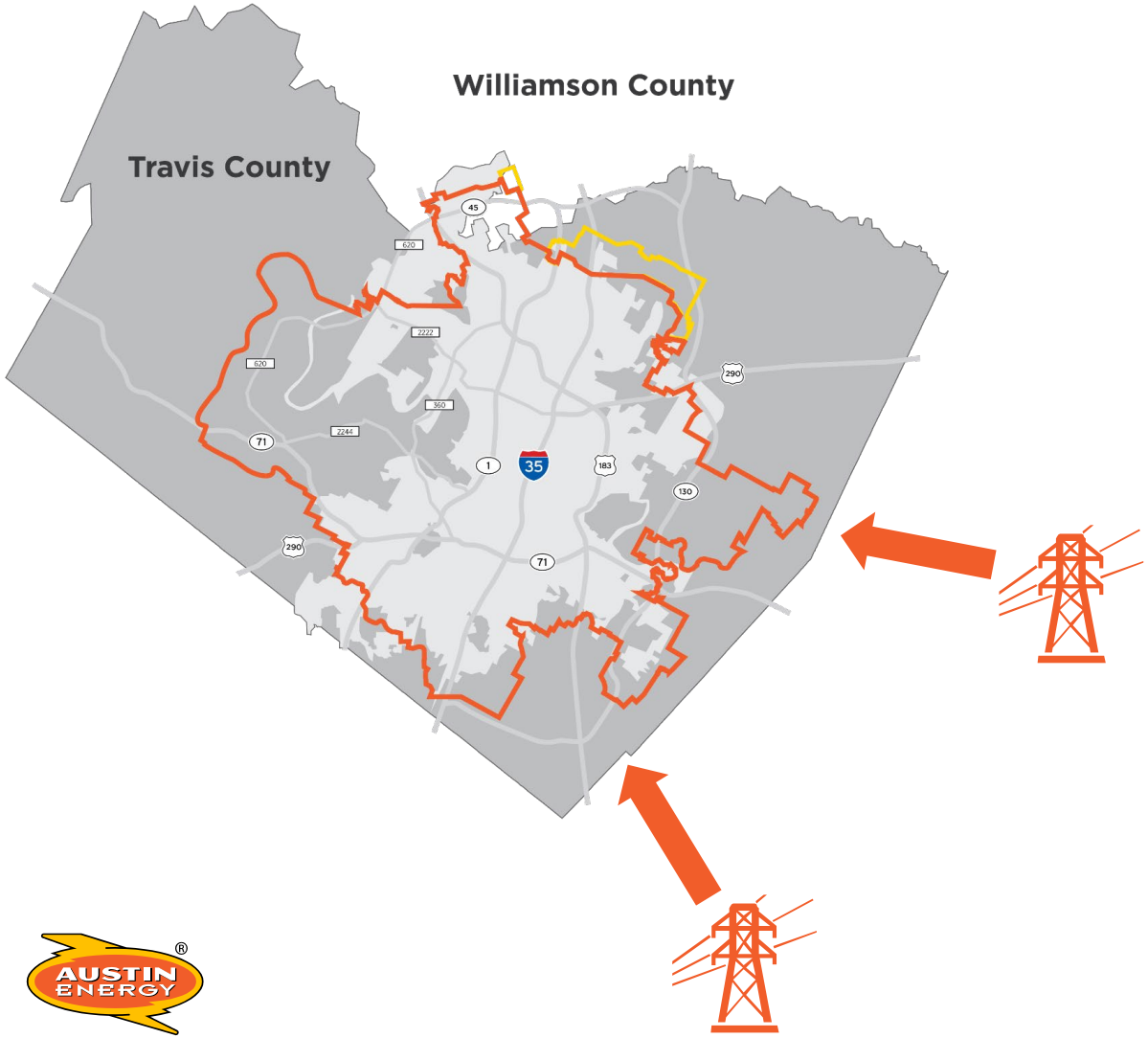
17

- Identical to Portfolio 12 with Decker/Sand Hill operating past 2034

Reference Guide to New Portfolios

REF #	DESCRIPTION
10	**395 MW local storage**, 100% DNV projections, 65% RE (1,800 MW wind/solar PPAs), REACH on gas, **Decker/Sand Hill run through 2035**
14	**125 MW local storage** (100 MW 4-hr, 25 MW 2-hr), **200 MW local peakers**, 100% DNV projections (431 MW local solar, 270 MW demand response), 250 MW import capacity increase, 65% RE (1,800 MW wind/ solar PPAs), REACH on gas, Decker/Sand Hill run through 2035
12	**525 MW local storage** (300 MW 12-hr, 200 MW 4-hr, 25 MW 2-hr)**, 700 MW local solar, 300 MW demand response**, 100% RE as % of load (2,500 MW wind/solar PPAs), 100% CF, REACH on gas, retire Decker/Sand Hill 2034
15	**625 MW local storage** (350 MW 12-hr, 250 MW 4-hr, 25 MW 2-hr), **960 MW local solar, 325 MW demand response**, 250 MW import capacity increase, 100% CF, 100% RE as % of load (2,500 MW wind/solar PPAs), REACH on gas, retire Decker/Sand Hill in 2034
16	**525 MW local storage** (300 MW 12-hr, 200 MW 4-hr, 25 MW 2-hr), **860 MW local solar, 400 MW demand response**, 250 MW import capacity increase, 100% RE as % of load (2,500 MW wind/solar PPAs), REACH on gas, Decker/Sand Hill run through 2035
17	Same as 12 except **Decker/Sand Hill run through 2035**

Transmission Import Capacity



Portfolios 14-16 include 250 MW increase of import capacity in 2031

- When the lines we use to bring electricity into the service territory get overloaded (“local congestion”), Austin Energy can experience higher costs and higher reliability risk
- Caused by high load, reduced local generation, issues with transmission system, or some combination of these

Scenarios

Future states (2025-2035) through which portfolios are stress-tested to measure risk to Austin Energy

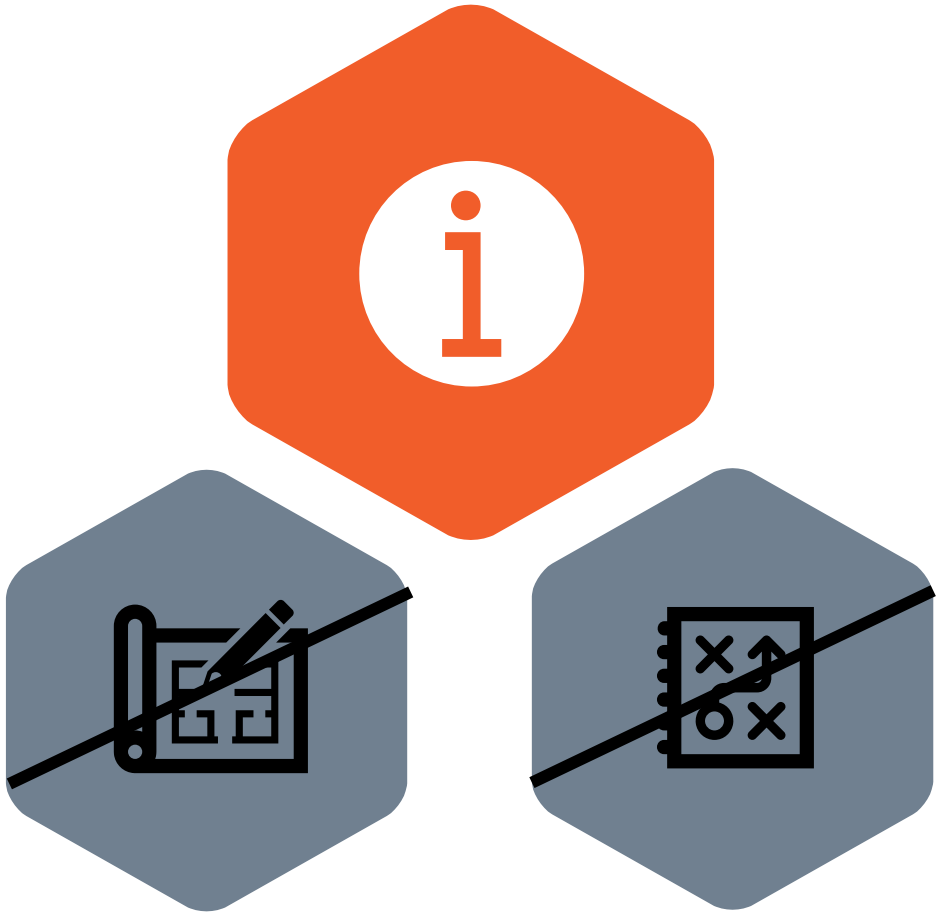
Austin Energy Load
Uses higher load growth projection from Webber Energy Group study

Extreme Local Congestion
Simulates local generation and/or transmission outages

Extreme Events
Summer heat, winter storm, low wind days

Natural Gas Prices
Gas price increases

Important Context for this Discussion



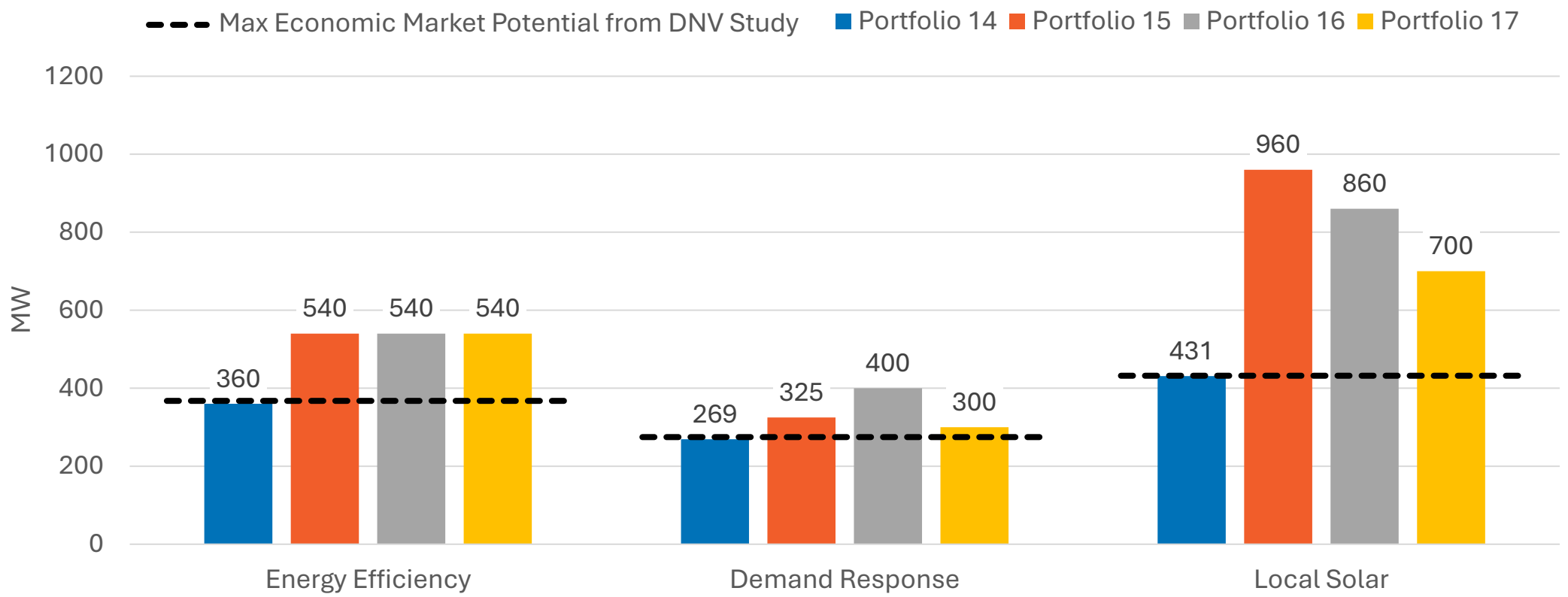
Models provide information

not a specific plan or recommendation

The following slides show data results associated with preliminary modeling efforts for the Resource, Generation and Climate Protection Plan to 2035. **These results do not reflect a recommendation, and they do not reflect a plan.** These results are for informational purposes only. All modeling reflects the input assumptions coordinated with the Electric Utility Commission earlier this year.

Round II Portfolios Demand-Side Management vs. DNV Market Potential Study

DSM targets in Portfolios 15-17 exceed the maximum economic market potential from recent DNV market potential study

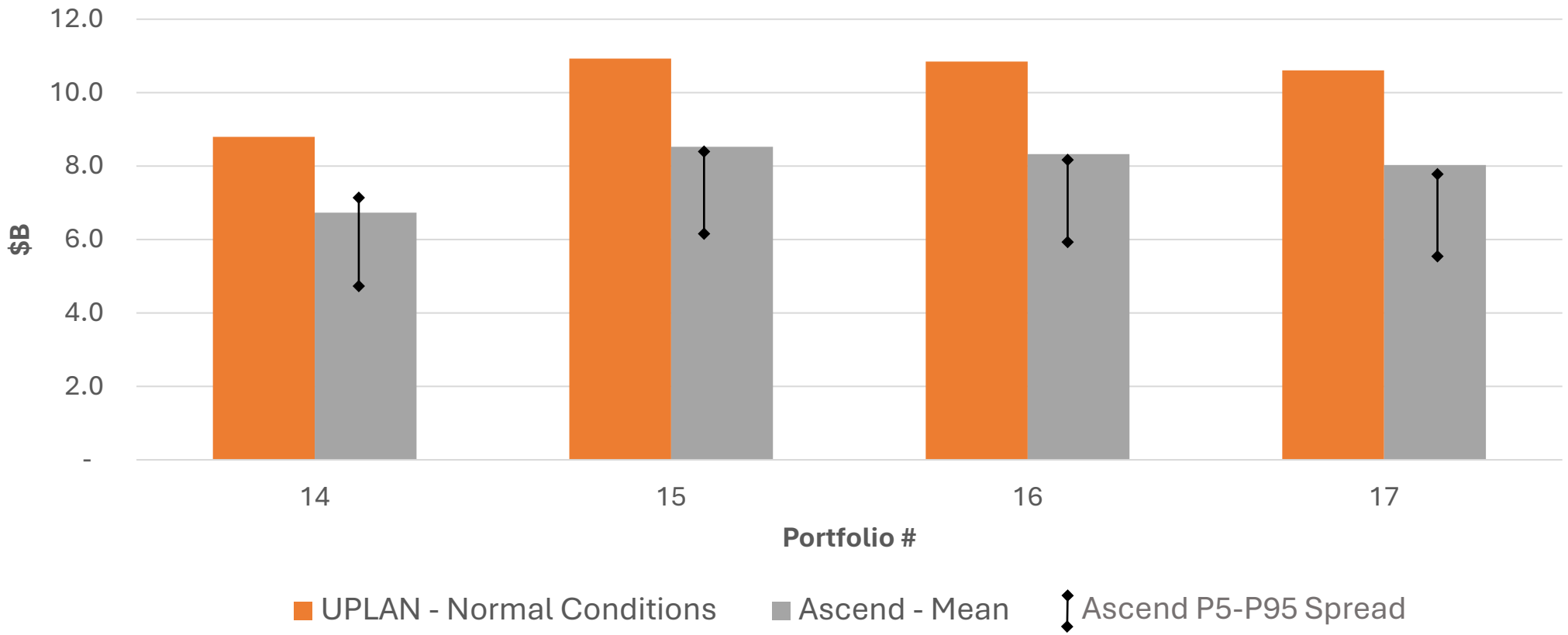


Round II Modeling Portfolio Comparison – Net Cost

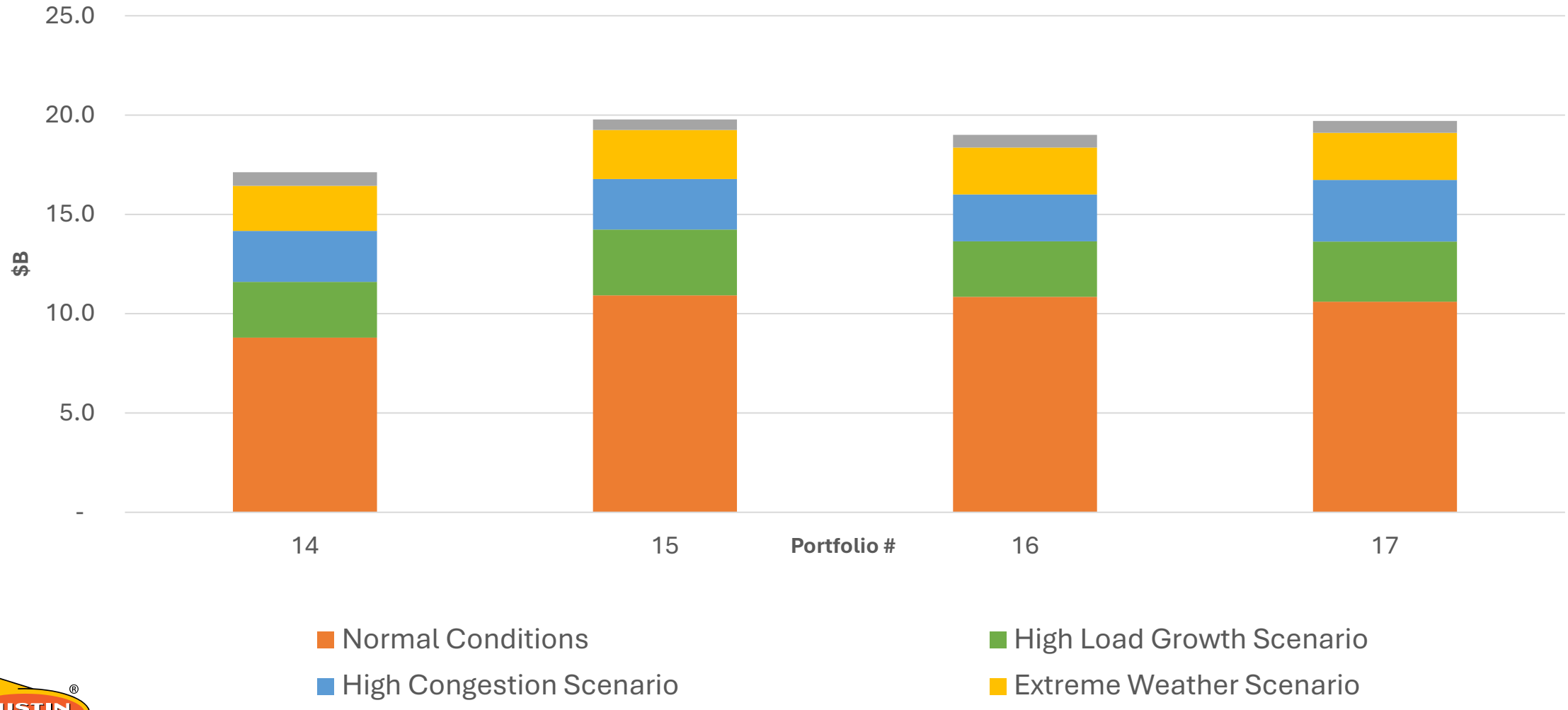
Net Cost

- “Net Cost” = Total capital + O&M costs to generate power – Total revenue from sale of power for a given portfolio mix.
- Capital costs for new assets amortized (spread out evenly) over expected life of asset.
- O&M costs include fuel, personnel, regular maintenance, etc.
- To compare a single “Net Cost” value across portfolios we use the Net Present Value (NPV) of the annual net costs for the 20-year period 2025-2045 using 7.8% discount rate.

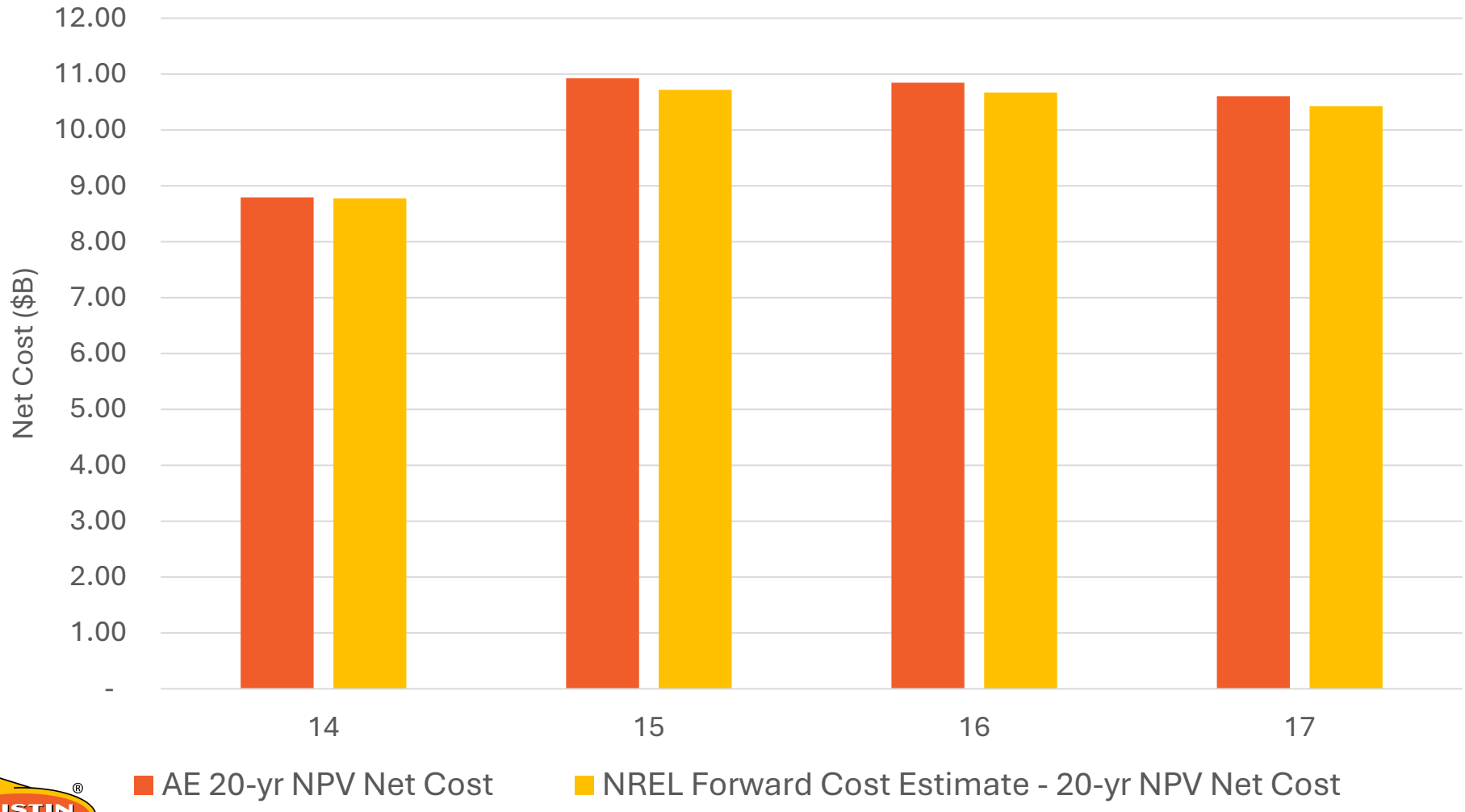
Net Present Value of 20-Yr Annual Net Costs ($B)



Net Present Value of 20-Yr Annual Net Costs ($B) – All Scenarios



Net Present Value of 20-Yr Annual Net Costs ($B) – Sensitivity of Forward Battery Costs



Portfolios 15-17: Average cost difference is 2% ($190M) using NREL Cost Estimates

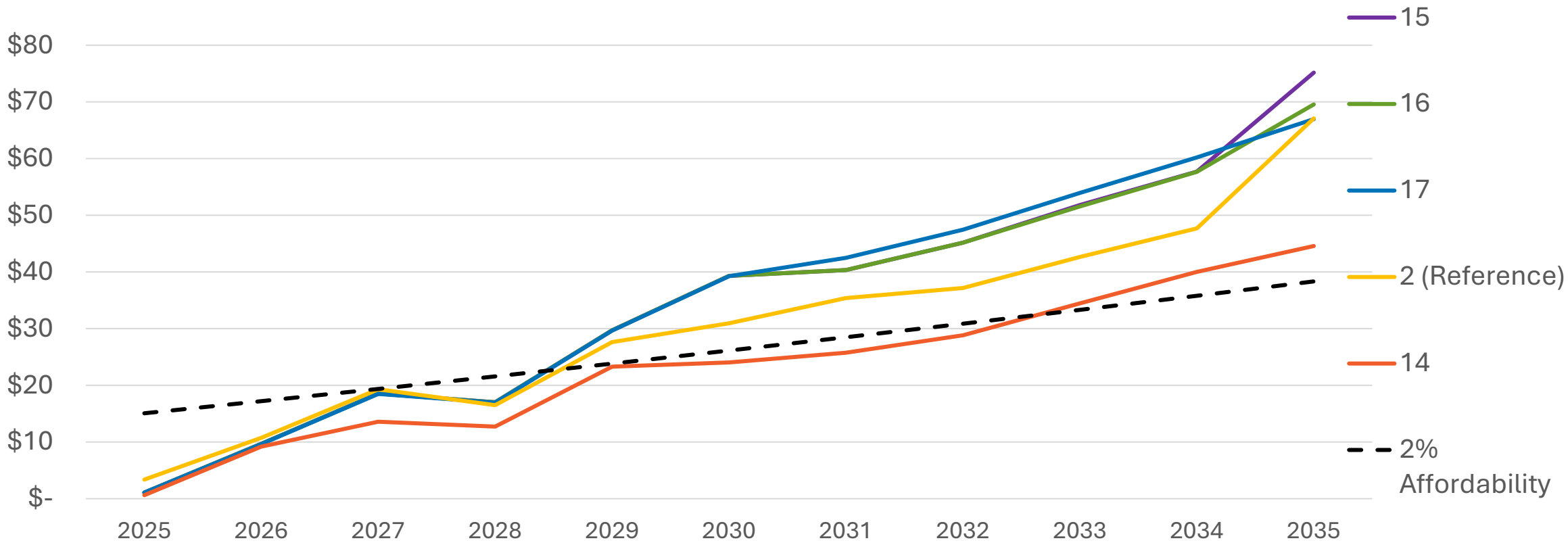
Bill Impact

- "Average Monthly Residential Bill Increase" = expected increase in a typical Austin Energy residential customer's monthly electricity bill over time due to the additional net costs associated with the generation portfolio only
- Based on the "Net Cost" of each portfolio
- Does not account for any other new or required Austin Energy capital or O&M costs in the future

2035 Average Monthly Residential Bill Increase

Austin Energy 2% Affordability Target is not adjusted for inflation.

Monthly bill impact data provided in nominal dollars



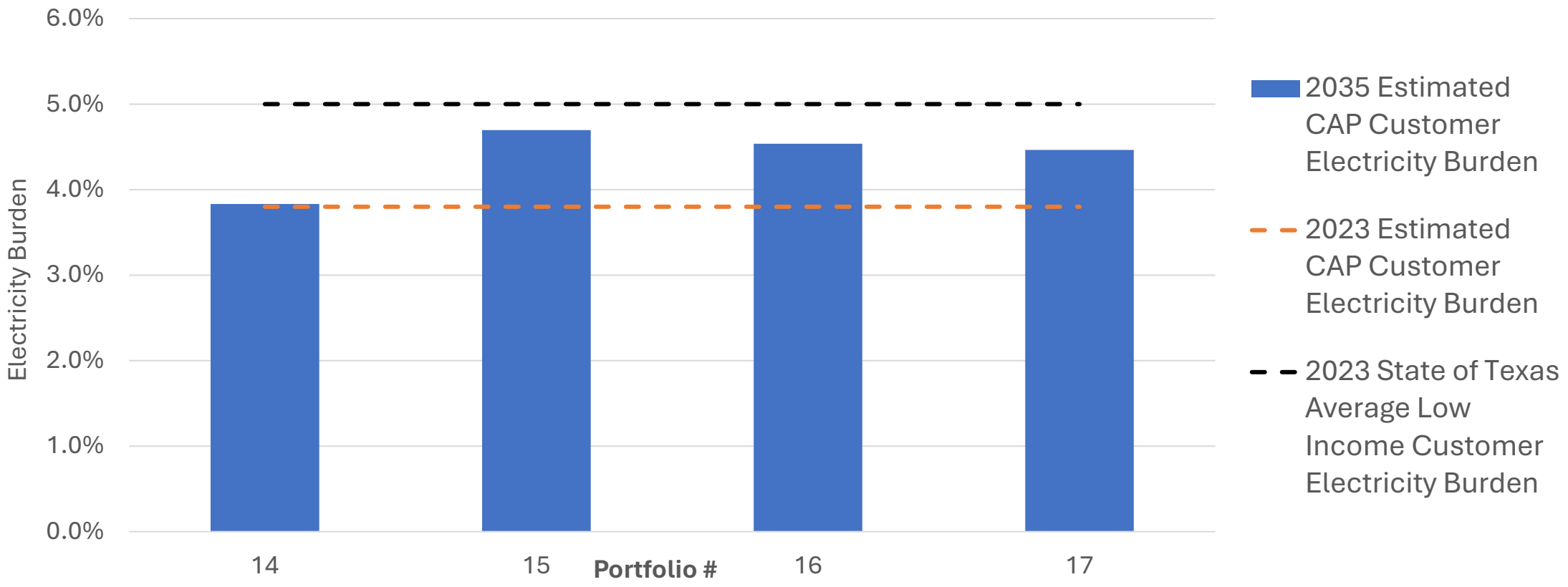
DISCLAIMER: These are representative results based on modeling for the 2035 Resource Generation Plan and are not projections of Austin Energy's future prices. The results are not inclusive of factors beyond the scope of this Resource Generation Plan modeling.

Electricity Burden

- “Electricity Burden” is the percentage of a household’s monthly income that goes toward their electricity bill
- A higher percentage of income dedicated to electricity costs indicates a higher “electricity burden” for that household
- For this analysis Austin Energy estimates the electricity burden for a typical customer in its Customer Assistance Program (CAP) using the 2023 Federal Poverty Income guidelines as a reference for estimated annual income

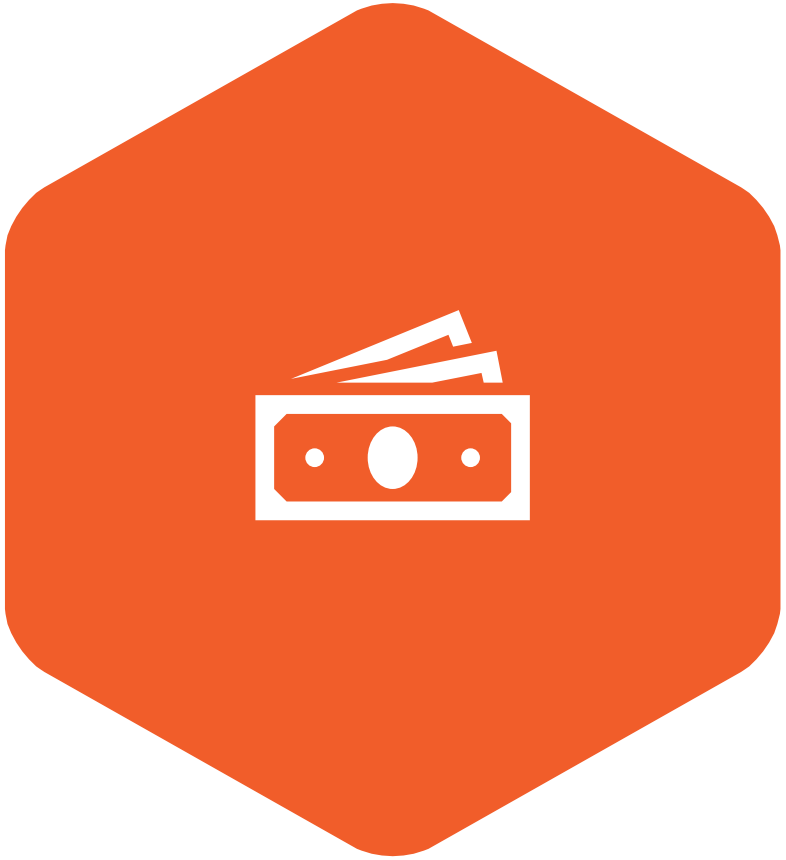
2035 Electricity Burden

2035 Estimated Customer Assistance Program (CAP) Customer Electricity Burden (Avg of Scenarios)



Round II Modeling Portfolio Comparison – Liquidity Risk

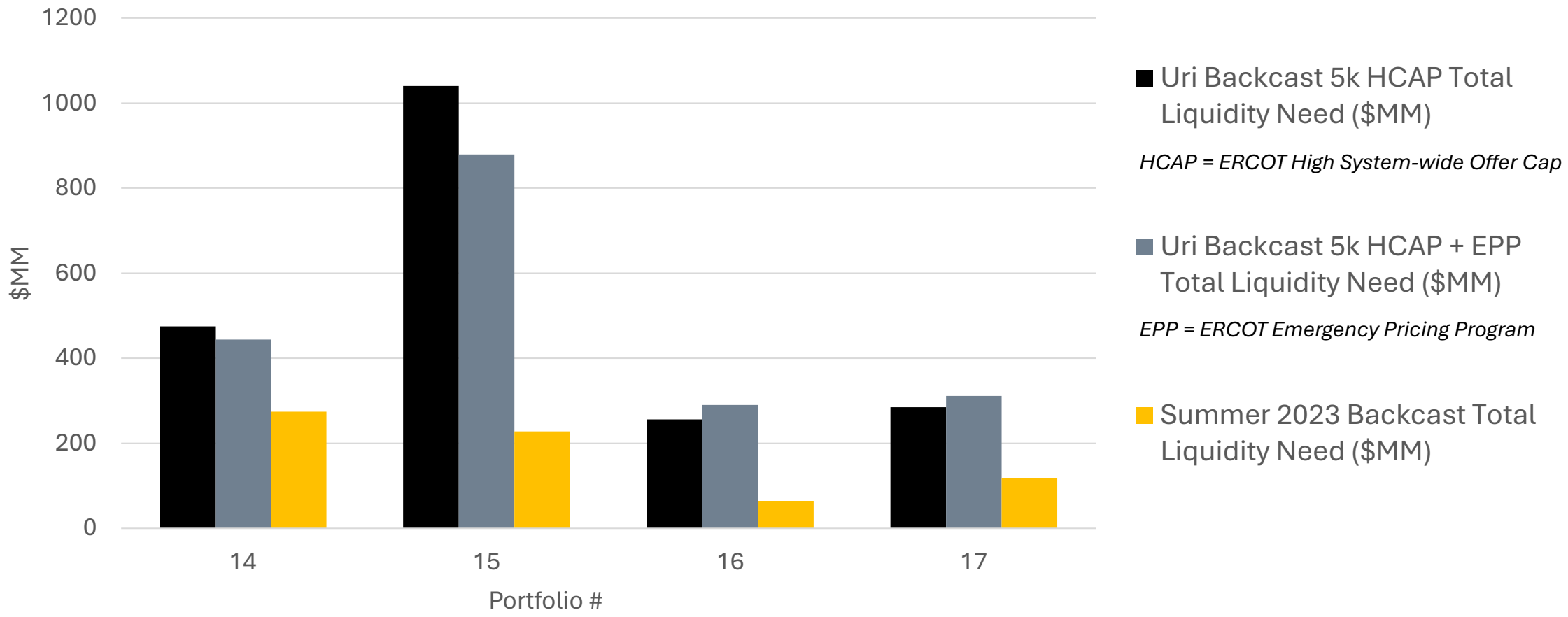
Liquidity Risk



- “Liquidity Risk” = Risk to Austin Energy of not having enough cash on-hand to settle financial account with ERCOT after an extreme event
- Uses a modeling technique called “backcasting” to estimate how a portfolio of resources would have performed financially during an extreme winter & summer event
- During an extreme event, ERCOT prices can spike – Austin Energy must purchase power from ERCOT to cover local load – if Austin Energy does not sell enough electricity at the same prices to cover expense, it must pay the difference to ERCOT immediately
- Based on portfolio mix in 2035

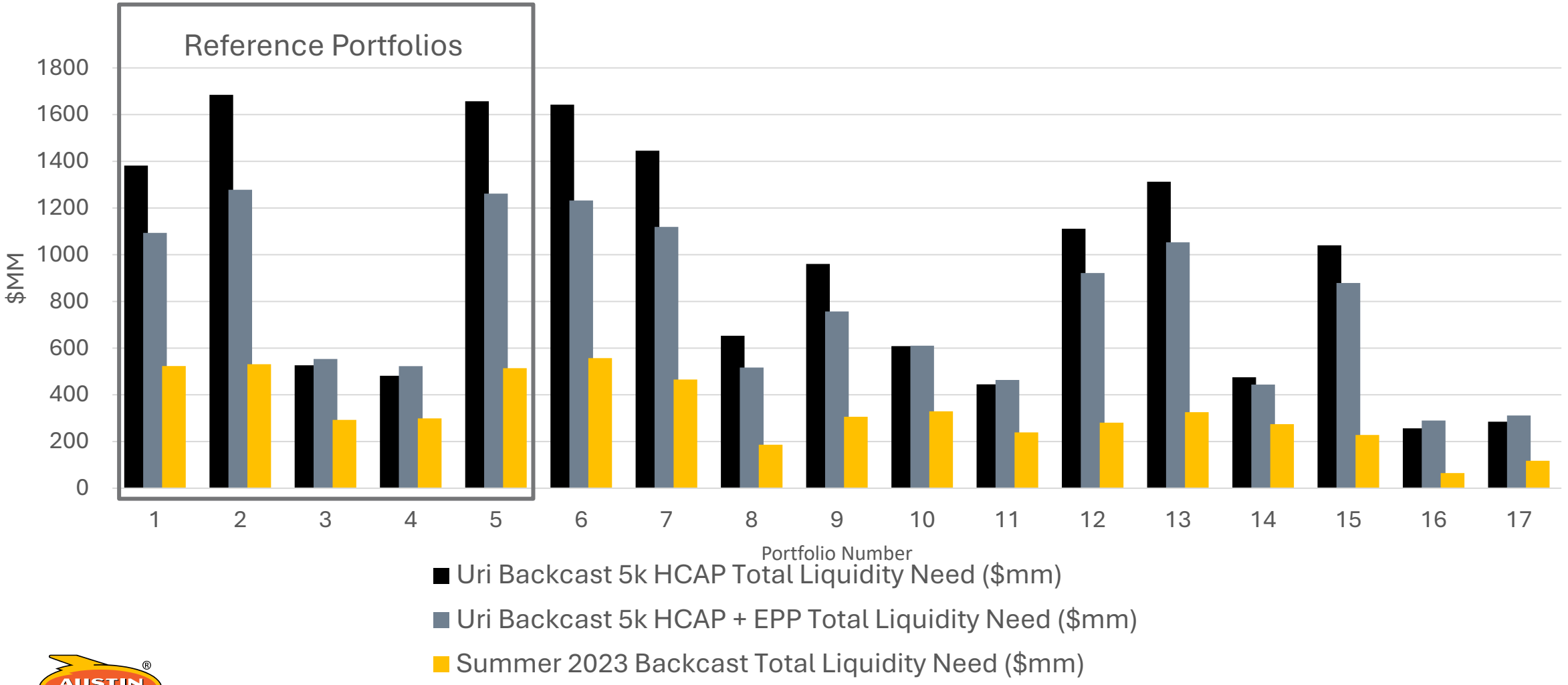
Stress Test Results – Liquidity Risk

Based on 2035 portfolio mix



Stress Test Results – Total Liquidity Risk

Based on 2035 portfolio mix



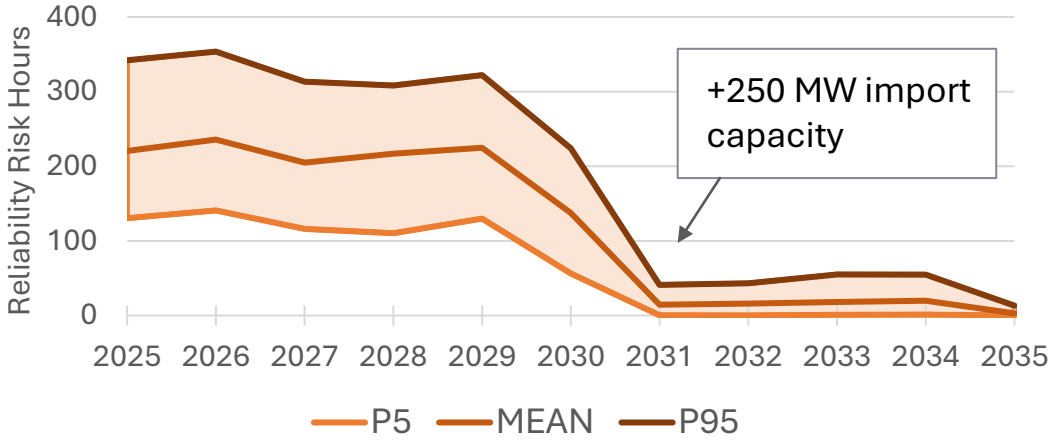
Round II Modeling Portfolio Comparison – Reliability

Reliability Risk Hours

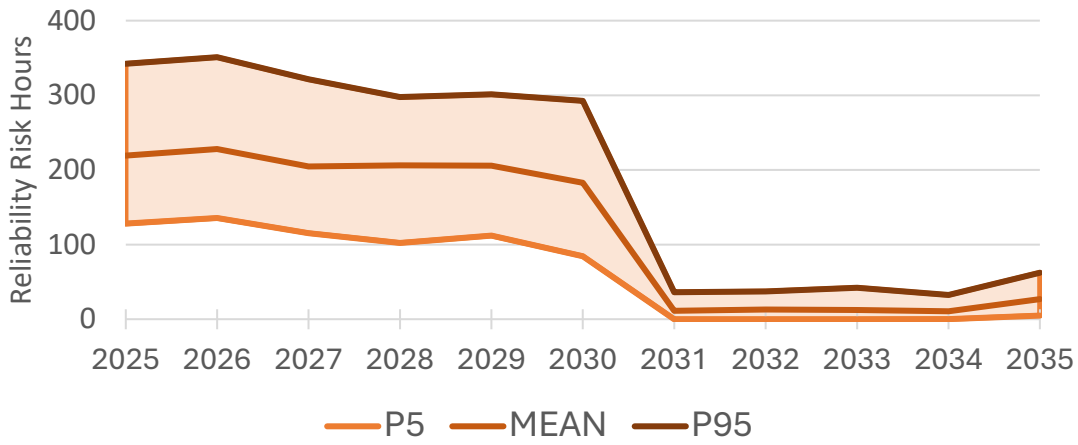
- “Reliability Risk Hours” = total number of hours in a given year that the model predicts there will be increased risk of local outages
- Local outages in this case are a result of not enough electricity physically available to meet Austin’s load
- Can be caused by high local load, decrease in local power generation, decrease in import capacity, or a combination of these factors

Reliability Risk Hours – Ascend

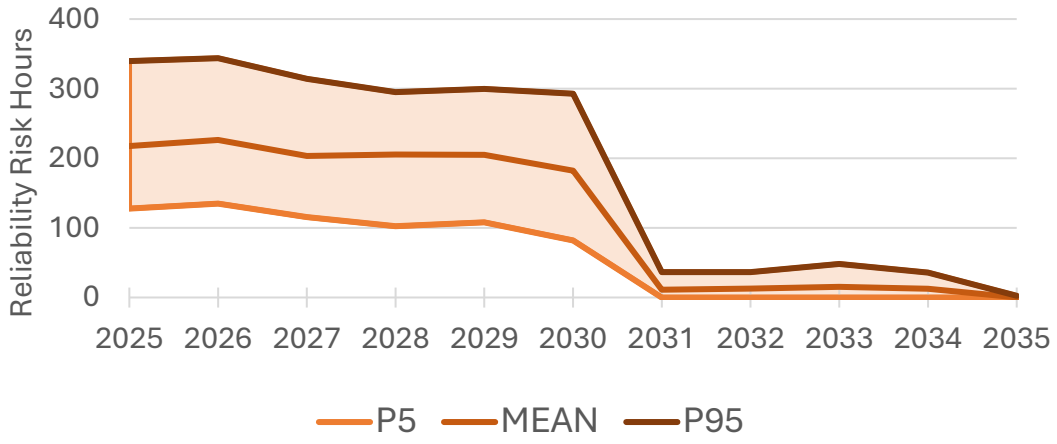
Portfolio 14



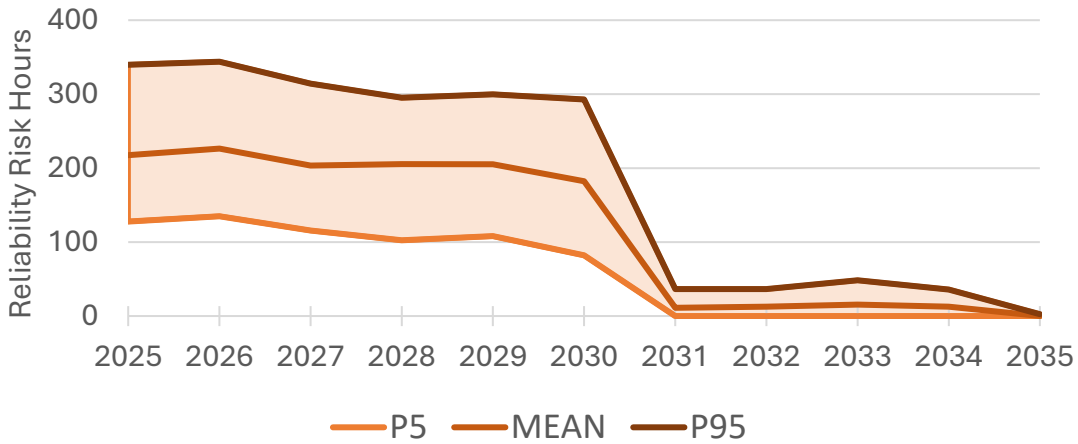
Portfolio 15



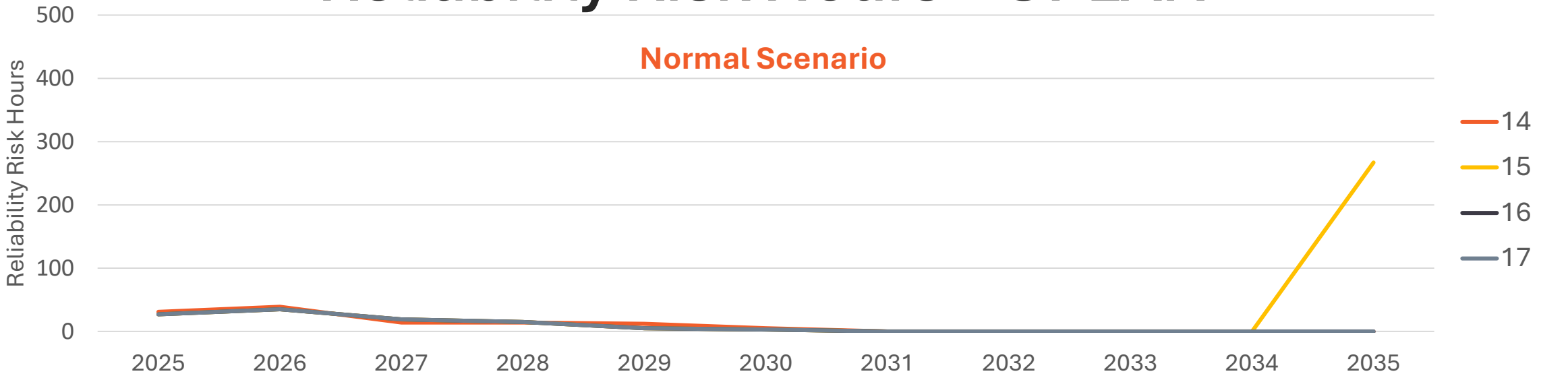
Portfolio 16

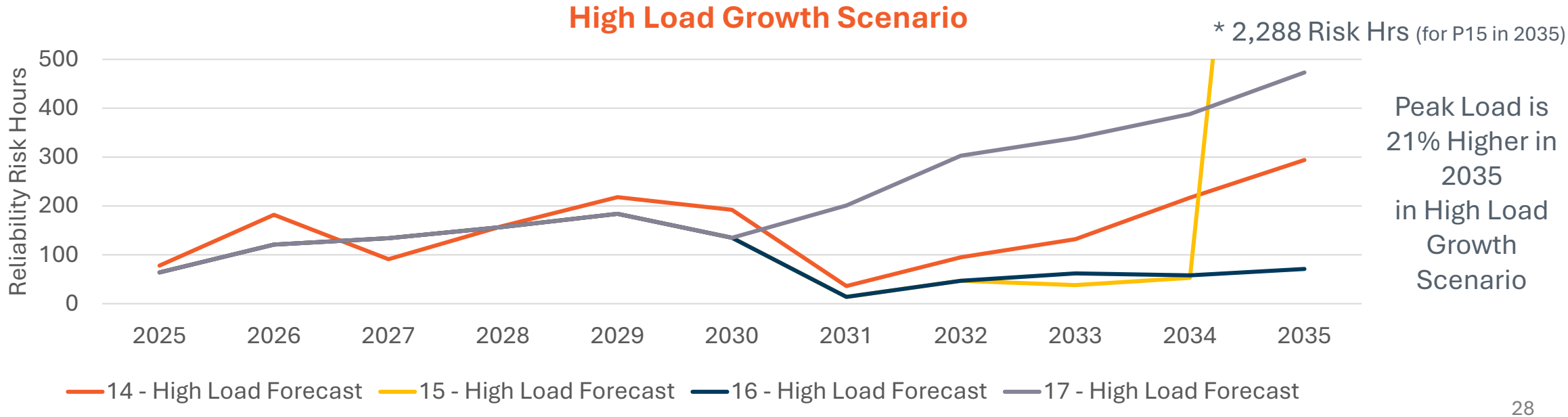


Portfolio 17



Reliability Risk Hours – UPLAN

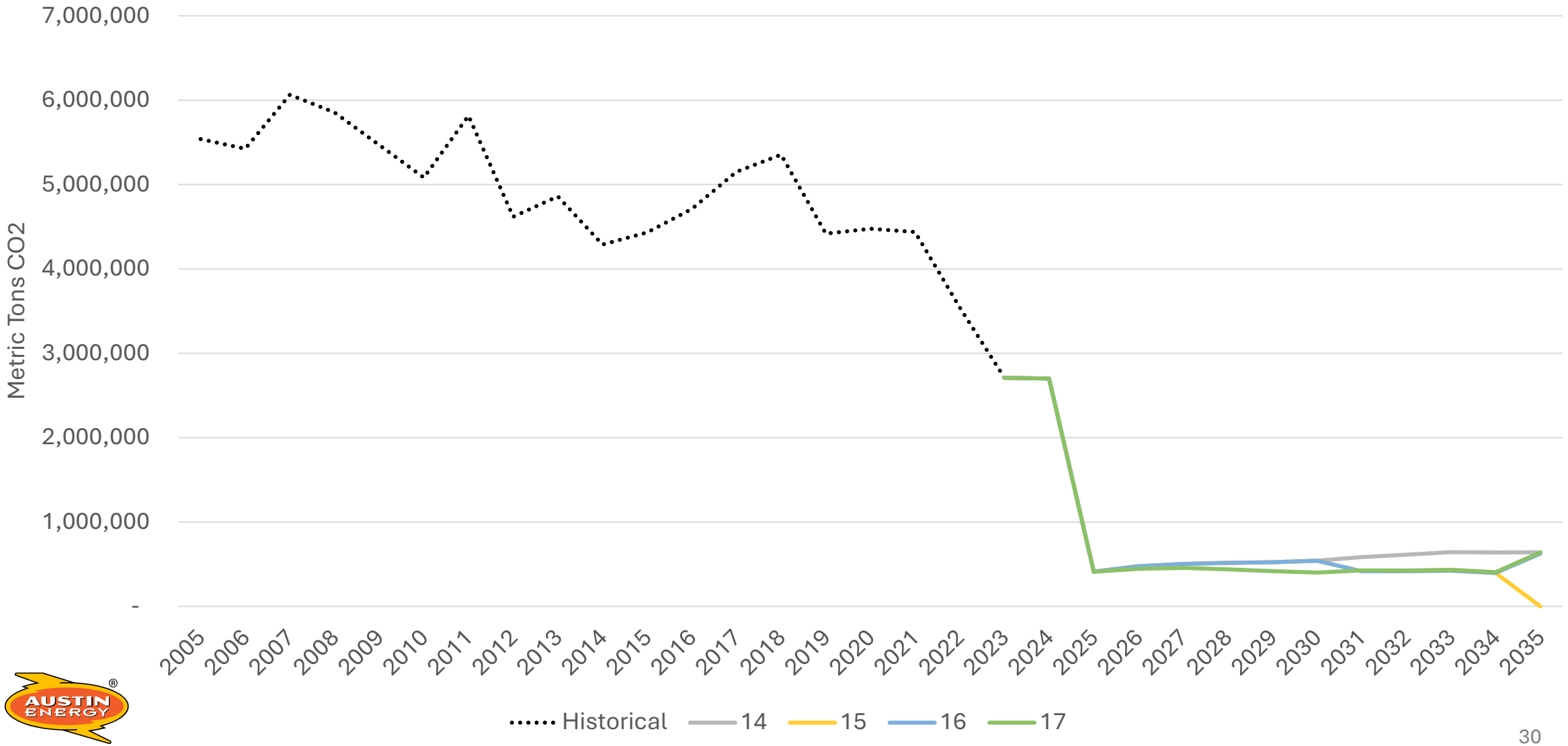




Round II Modeling Portfolio Comparison – Emissions

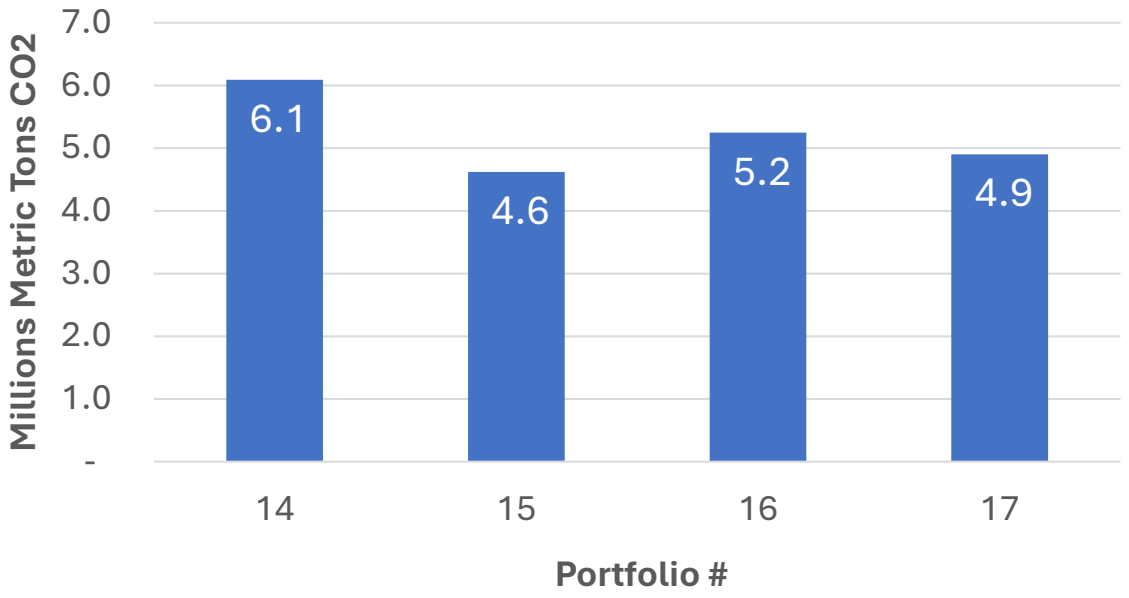
Modeled Austin Energy Stack CO_2 Emissions

By Year vs. Historical

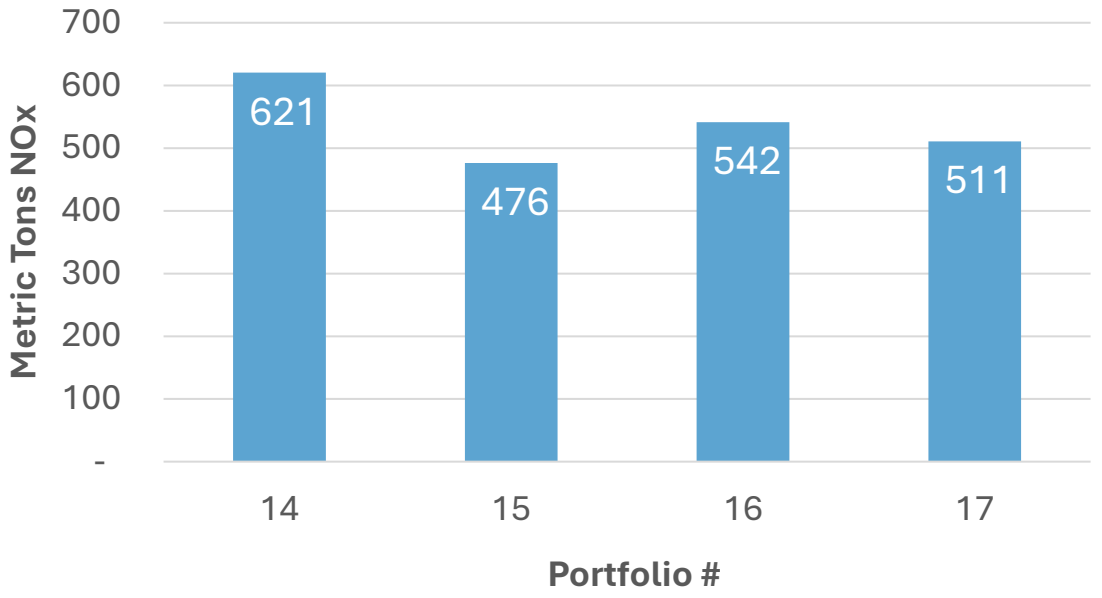


Modeled Austin Energy Stack Emissions

Total CO_2 Emissions (Million Metric Tons) 2025-2035



Total NOx Emissions (Metric Tons) 2025-2035



Capacity Factor of Peakers - Ascend

Capacity Factor (P14)	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Sand Hill Peakers	10%	9%	8%	8%	7%	7%	6%	5%	5%	5%	4%
Decker Peakers	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
New NG Peakers	0%	0%	8%	7%	7%	16%	9%	9%	8%	8%	5%

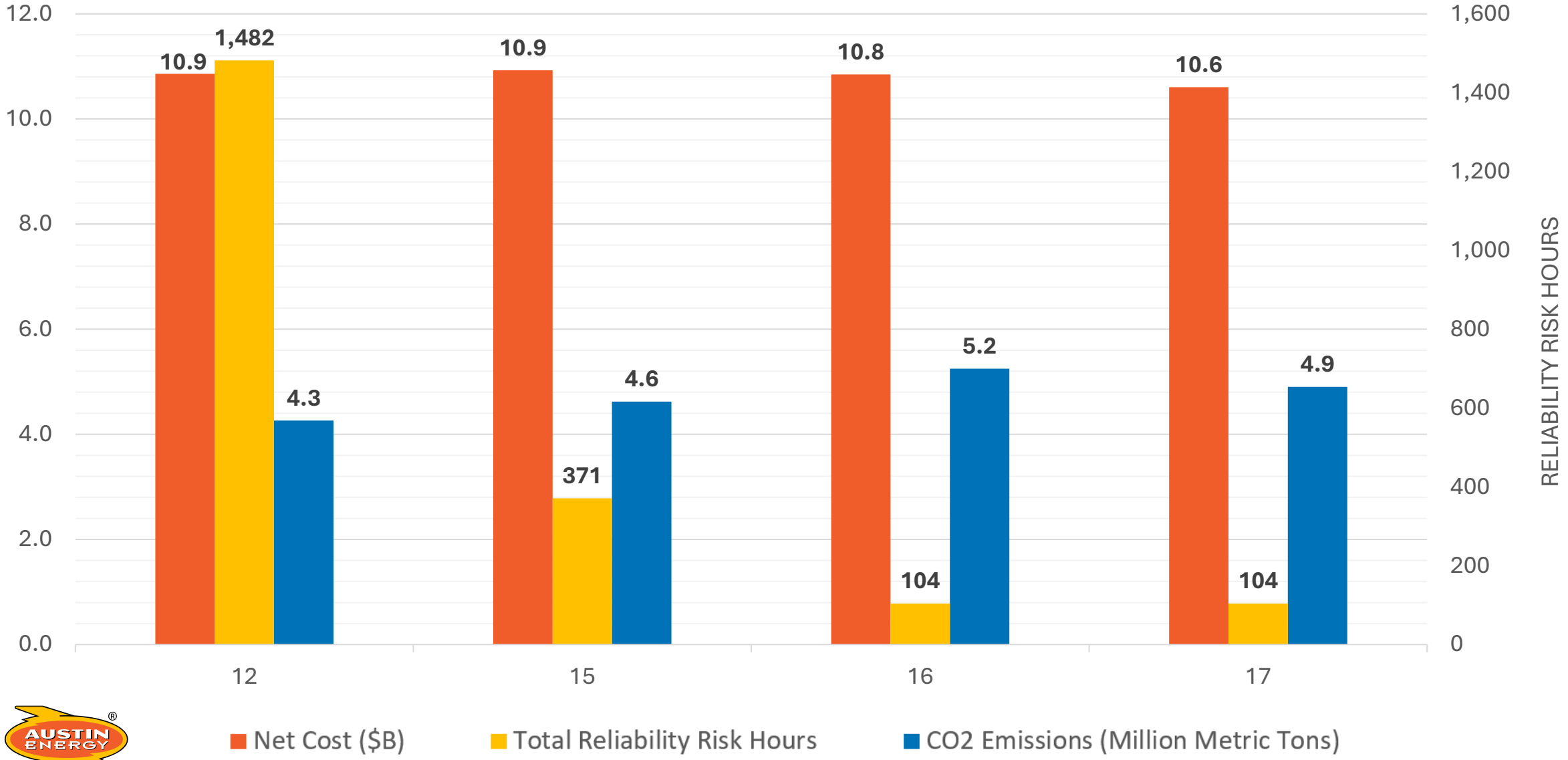
Capacity Factor (P15)	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Sand Hill Peakers	9%	9%	8%	7%	7%	6%	4%	4%	3%	3%	0%
Decker Peakers	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	0%

Capacity Factor (P16)	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Sand Hill Peakers	10%	9%	8%	7%	7%	6%	4%	4%	4%	3%	3%
Decker Peakers	8%	8%	8%	8%	8%	8%	8%	7%	8%	8%	7%

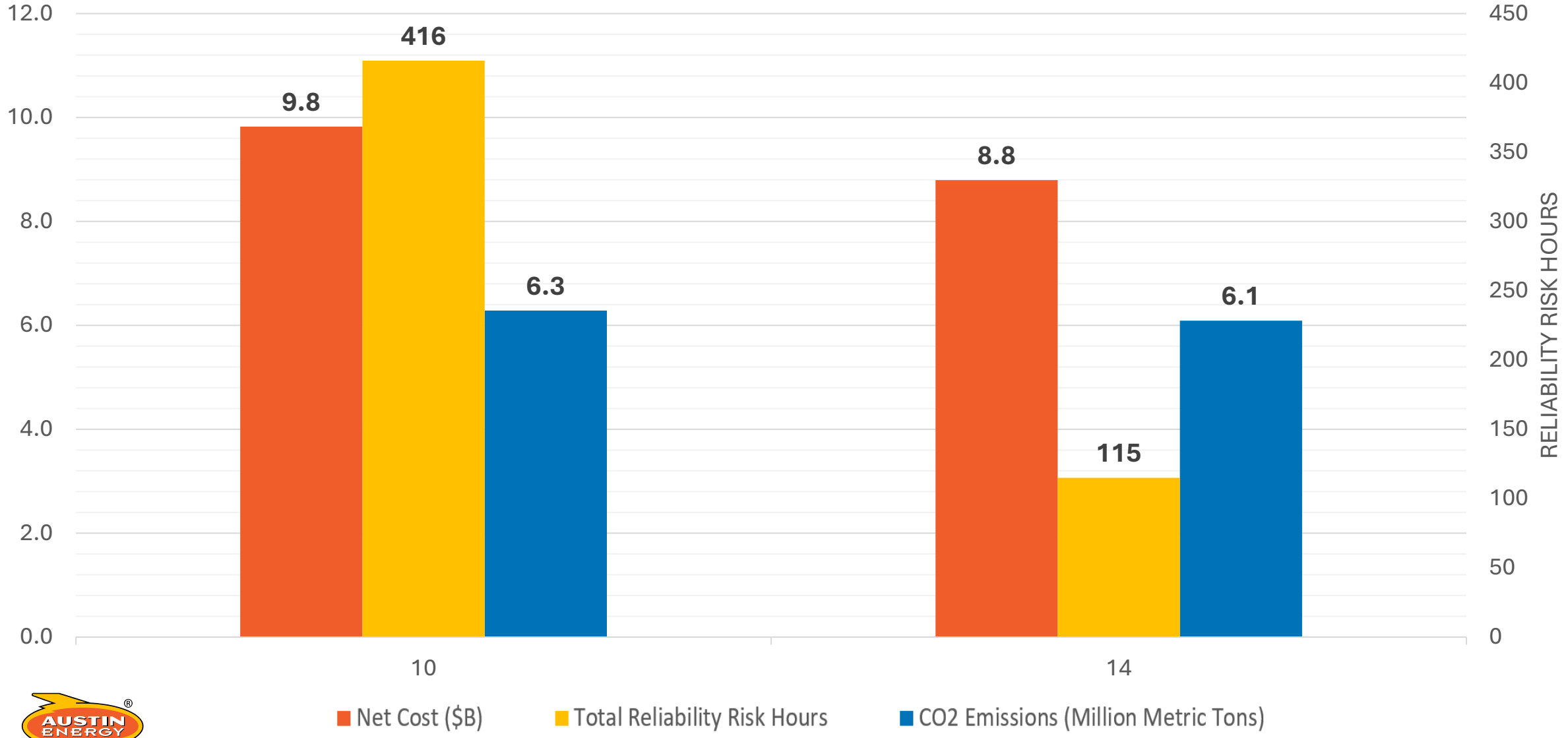
Capacity Factor (P17)	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Sand Hill Peakers	10%	9%	8%	7%	7%	6%	4%	4%	4%	3%	3%
Decker Peakers	8%	8%	8%	8%	8%	8%	8%	7%	8%	8%	7%

Round II Modeling Portfolio Comparison - Summary

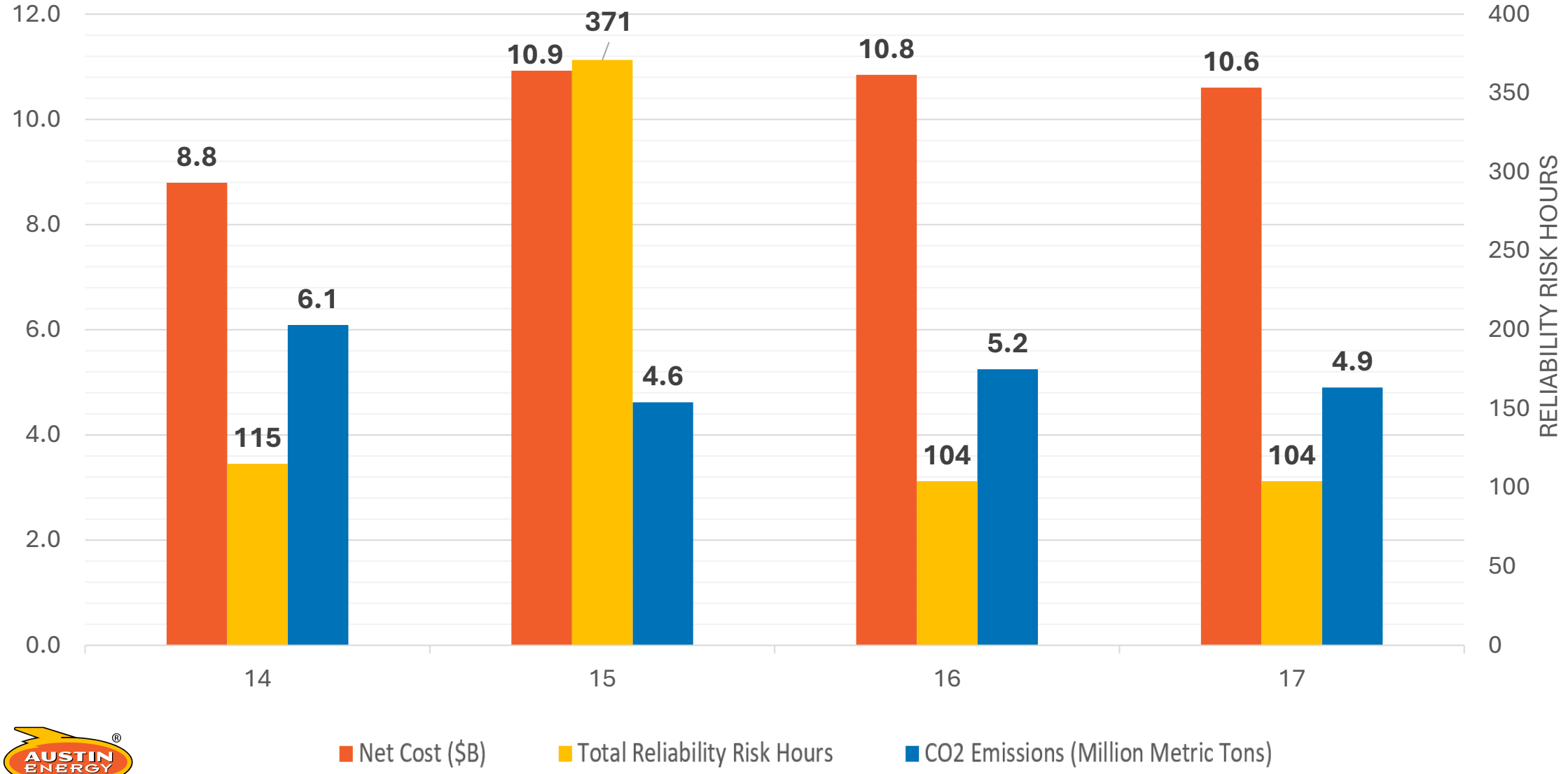
P12 vs. P15-17 (2025-2035)



P10 vs. P14 (2025-2035)

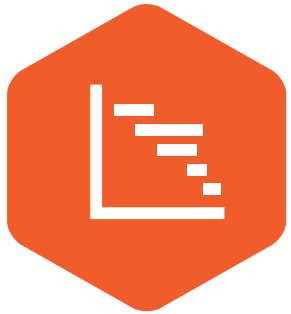


Round II Results Summary (2025-2035)



Key Insights from Modeling To Date and Next Steps

Transitioning to Plan Development



Resource Modeling

- How well do different resource mixes mitigate reliability, liquidity and load zone price separation risk?
- What are the tradeoffs in reliability, cost, and emissions between different portfolio mixes?

Resource Planning

- What insights did we learn from the modeling process that should inform the plan?
- What are the key characteristics from the modeled portfolios that mitigate risk and balance tradeoffs?

Key Insights from Modeling Results – Austin Energy

- Addition of 250 MW import capacity beyond known transmission upgrades significantly reduces reliability risk and net costs
- Loss of generation from Decker and Sand Hill significantly increases reliability risk and net costs
- High levels of new energy efficiency, demand response, local solar and storage plus existing generation manage reliability and liquidity risk – at a high cost, and pace of adoption exceeds estimated feasibility
- Model results are very sensitive to high load growth scenario
- Local solar, storage and natural gas peaker units manage reliability while maintaining low overall capacity factor (<8% in 2035) – peakers used only when local demand and prices are high

Discussion & Collaboration

What did you observe?

What surprised you?

What insights did you gain?

What are the key characteristics from the modeled portfolios that you would like to see reflected in the plan?

EUC Office Hours

- Tuesday, Oct. 22 3 p.m. – 4 p.m.
- Wednesday, Oct. 23 8:30 a.m. – 10 a.m.
- Thursday, Oct. 24 2:30 p.m. – 4 p.m.
- Friday, Oct. 25 9:30 a.m. – 10:30 a.m.

If you wish to attend and none of the above times work, please let us know so we can find a time to collaborate.

Office Hours Objectives:

- Answer questions
- Share detail
- Discuss learnings

By Wednesday, Oct. 30 – Seeking survey response from every Commissioner

Survey Questions

What **key insights** or **lessons learned** did you take away from the 2035 Resource Generation Plan modeling exercise?

What are the **most important characteristics** from the portfolios we modeled that **you would like to see reflected** in the Resource, Generation and Climate Protection Plan to 2035?

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