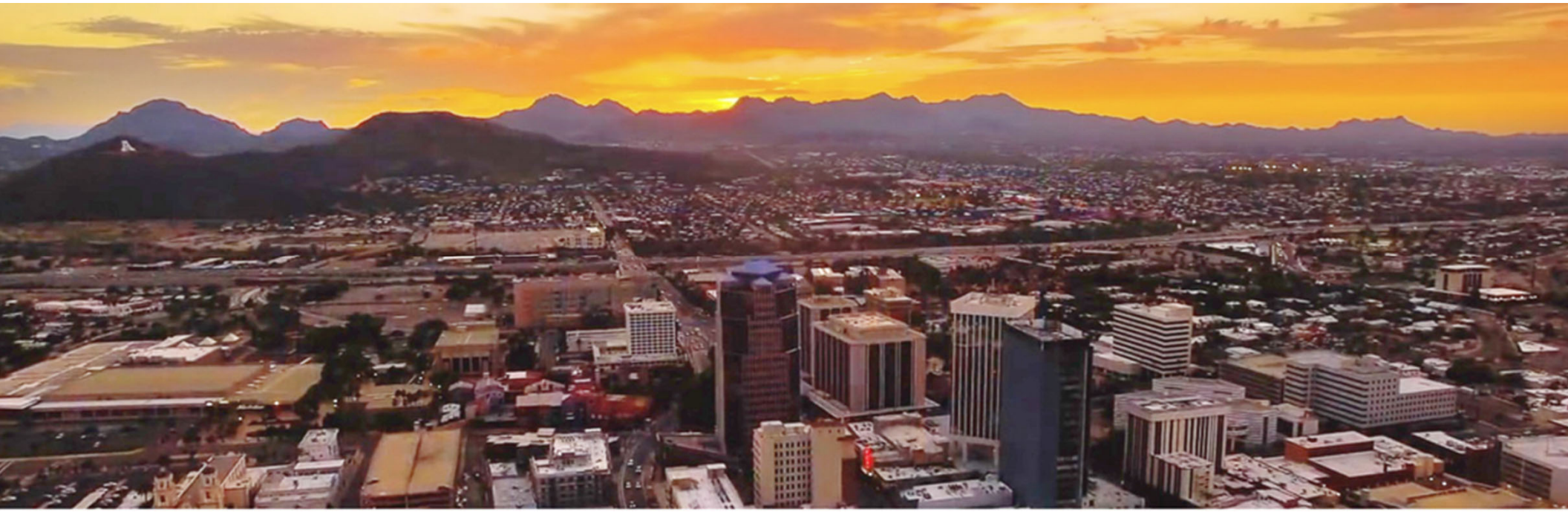


TEP/UNSE Resource Planning Advisory Council Meeting

Modeling Update

July 27, 2023

Topics

- Modeling Status
- Planning Reserve Margin
- Reference Case Draft Results
- Cost Assumptions
- Next Steps

Modeling Status

- Issues with workstation memory and SQL database connections caused serious issues with our Excel workbooks and set us back at least a week.
  - Work-arounds have been implemented and work orders have been placed to increase the resources on our servers and workstations.
- Expected to have a few portfolios complete for presentation and discussion today, but results will only be draft and will not include costs

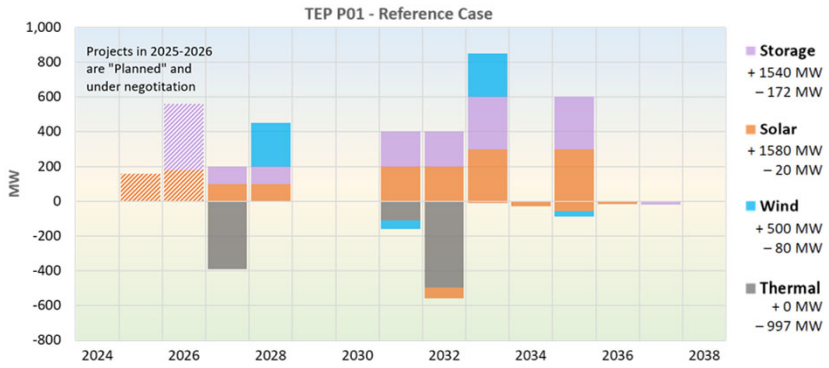
- Modeling updates from other RPAC members with Aurora?

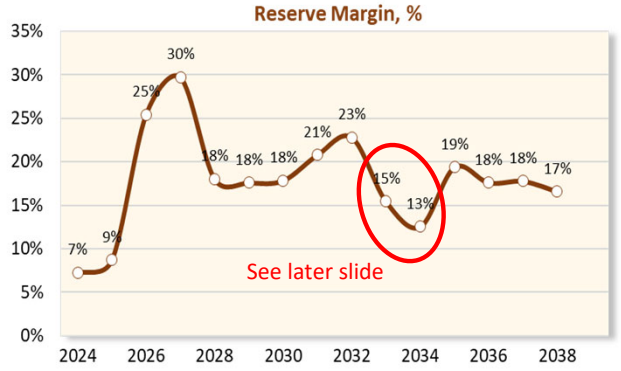
Planning Reserve Margin

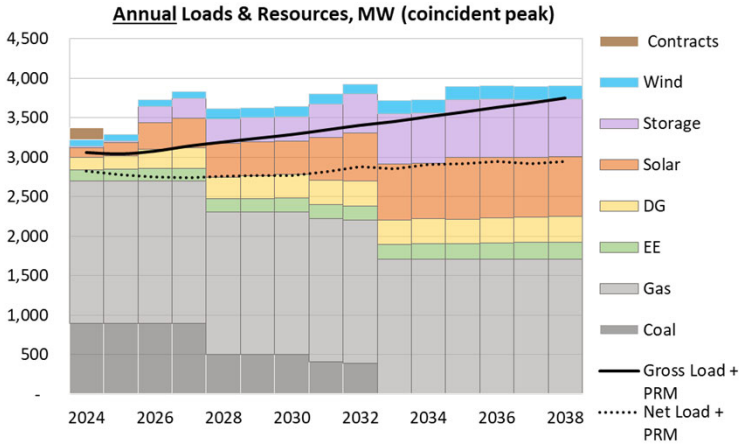
- Electric utilities in the Southwest have historically used a margin of 15%
  - This is the amount of capacity a utility should have in place above and beyond its 50th percentile peak load forecast
  - This accounts for:
    - Forecast "error" (years with peaks much larger than the 50th percentile forecast)
    - Operating reserves (outage recovery and regulation of supply and demand)
    - Thermal outages (beyond the initial minutes of recovery)

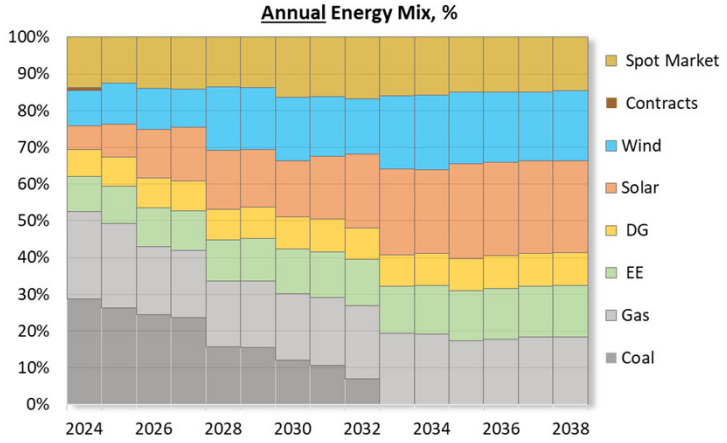
TEP/UNSE Planning Reserve Margin		
Forecast Error:	6.0%	Based on 40 years of weather data analyzed by E3
Operating Reserves:	6.0%	Based on requirements and best practices by TEP operators
Thermal Outages:	4.5%	Adjusted to account for thermal's share of total resources
Total:	16.5%	

Draft Reference Case Results

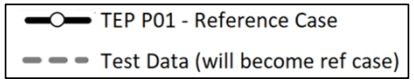


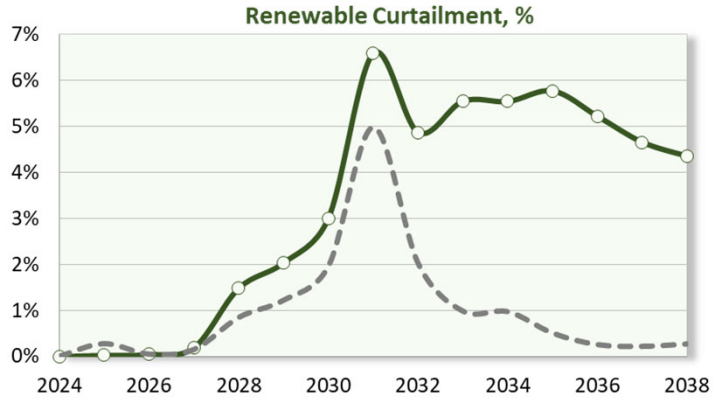


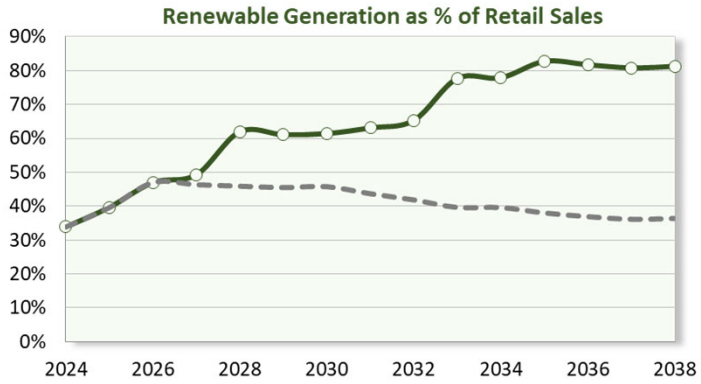


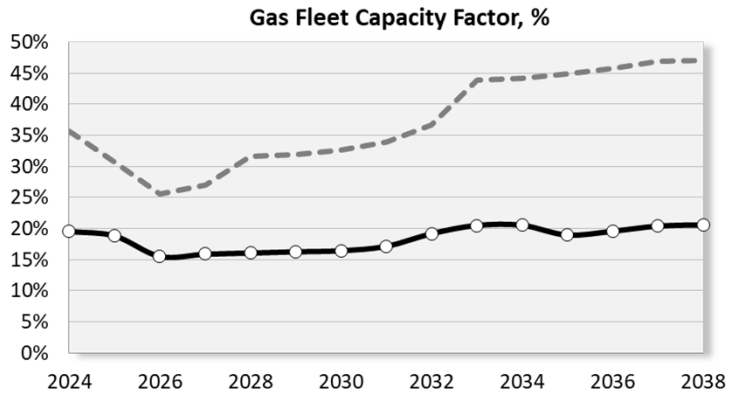


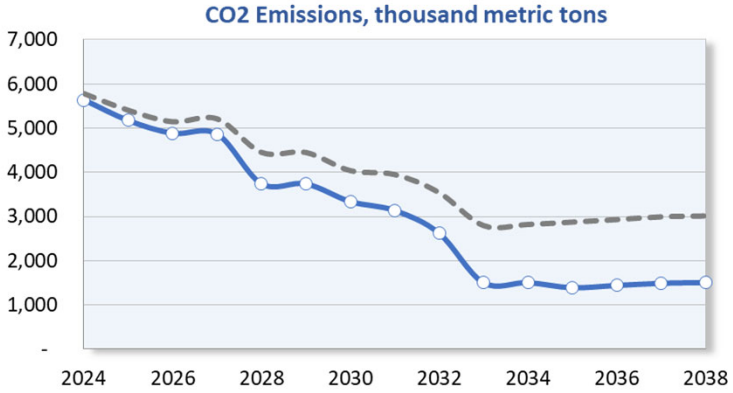
Draft Reference Case Results







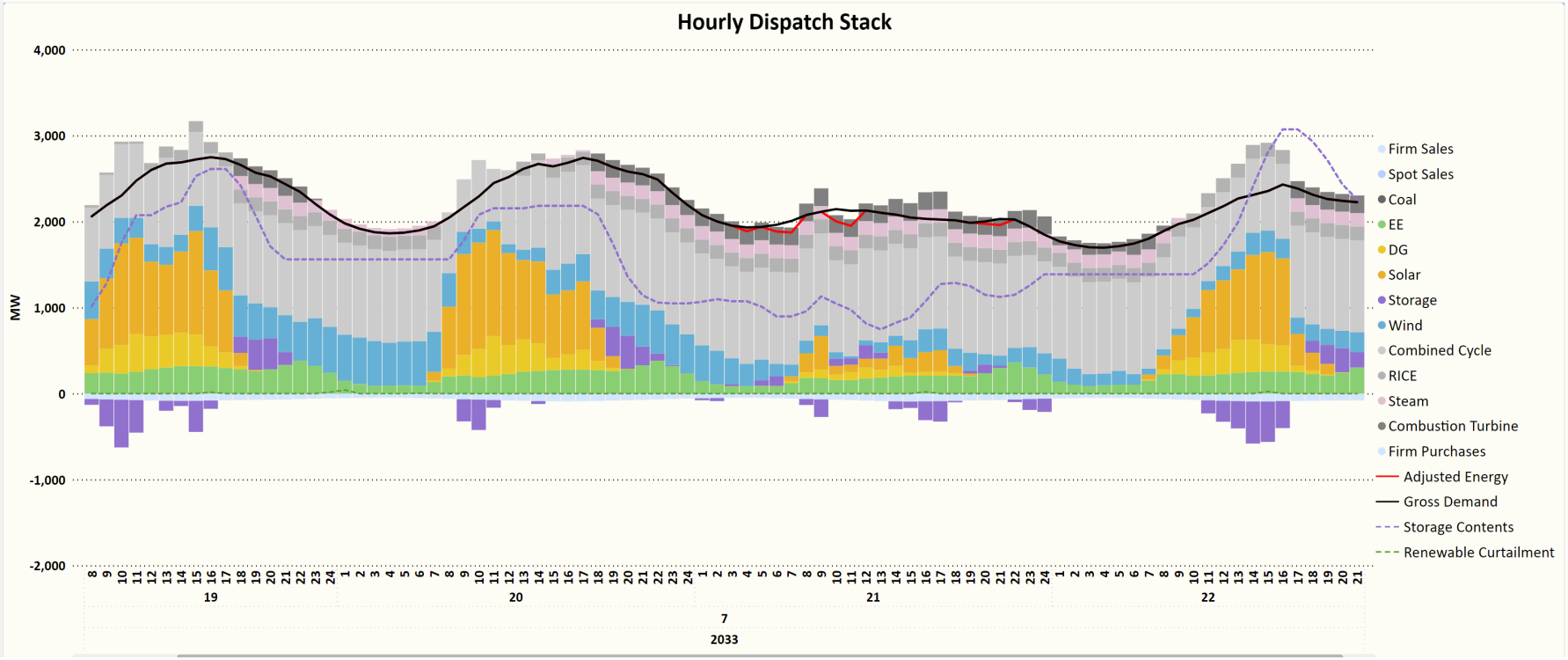




Draft Reference Case Results

Resource Adequacy Stress Test: Demand increased 12% and no market availability (one of six weather year)

Min Demand	Max Demand	Curtailment, MWh	Year	Month	Day	Hour	Shortfall, MWh	Shortfall, Hours
1,697	2,748	123	2033	7	Multipl...	All	674	7



Year	Month	Day	Hour	Shortfall, MWh
2033	7	21	11	175
2033	7	21	10	143
2033	7	21	7	134
2033	7	21	6	79
2033	7	21	21	72
2033	7	21	4	44
2033	7	21	20	27
2033	7	19	1	0
2033	7	19	2	0
2033	7	19	3	0
2033	7	19	4	0
2033	7	19	5	0
2033	7	19	6	0
2033	7	19	7	0
2033	7	19	8	0
2033	7	19	9	0
2033	7	19	10	0
2033	7	19	11	0
2033	7	19	12	0
2033	7	19	13	0
2033	7	19	14	0
2033	7	19	15	0
2033	7	19	16	0
2033	7	19	17	0
2033	7	19	18	0
2033	7	19	19	0
Total				674

Study_Info

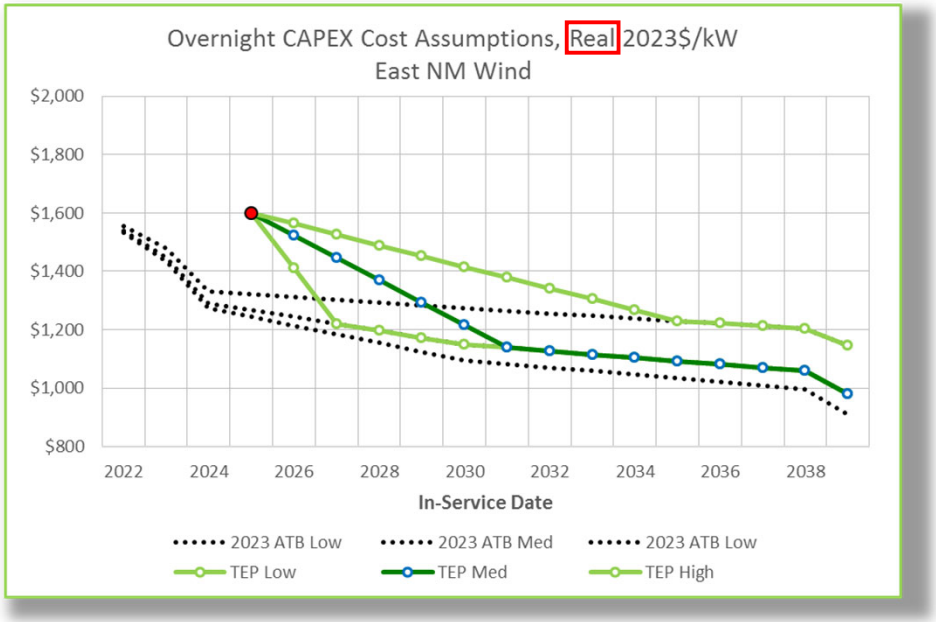
Nominal | 7/21/2023 9:43:50 AM

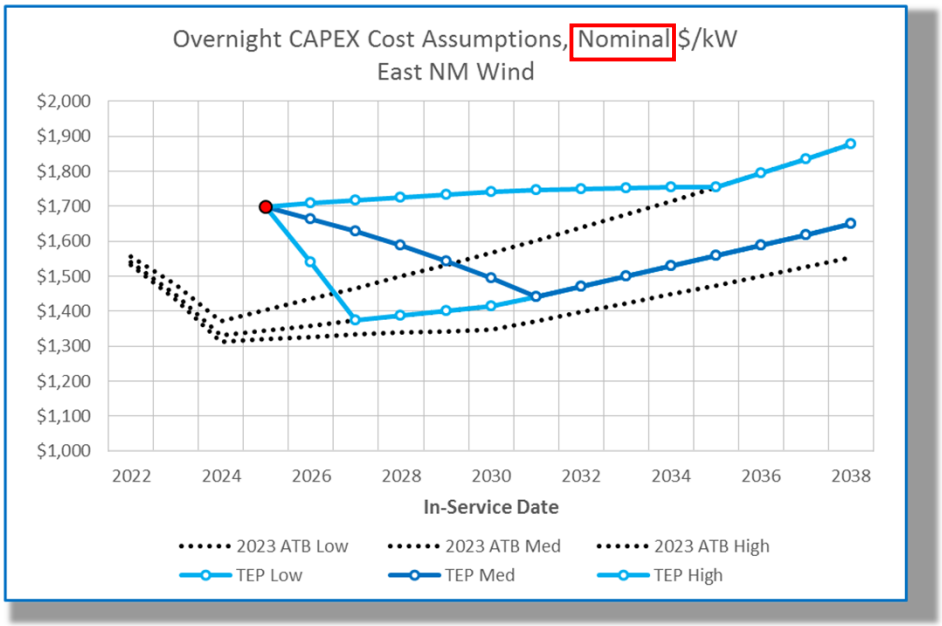
Run_ID

TEP P01 - Reference Case - RA Test

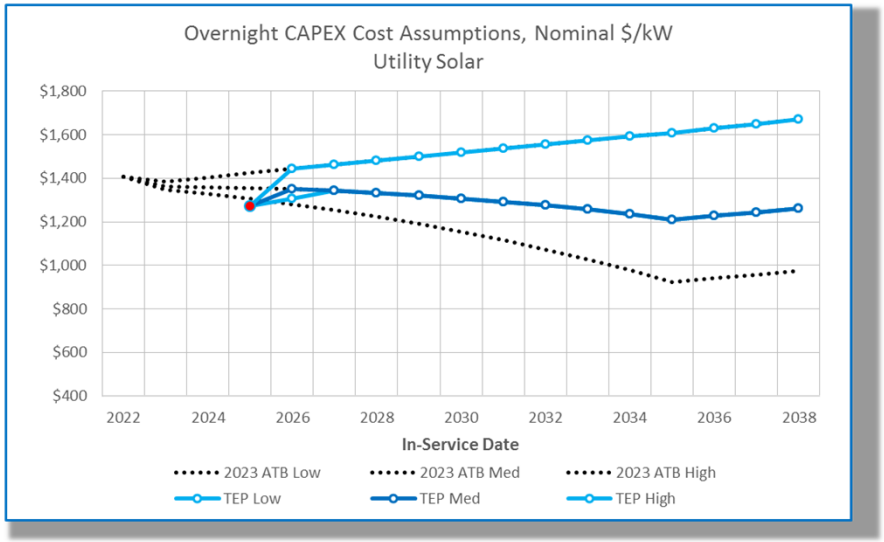
Insert DB name.
Click here and here for help

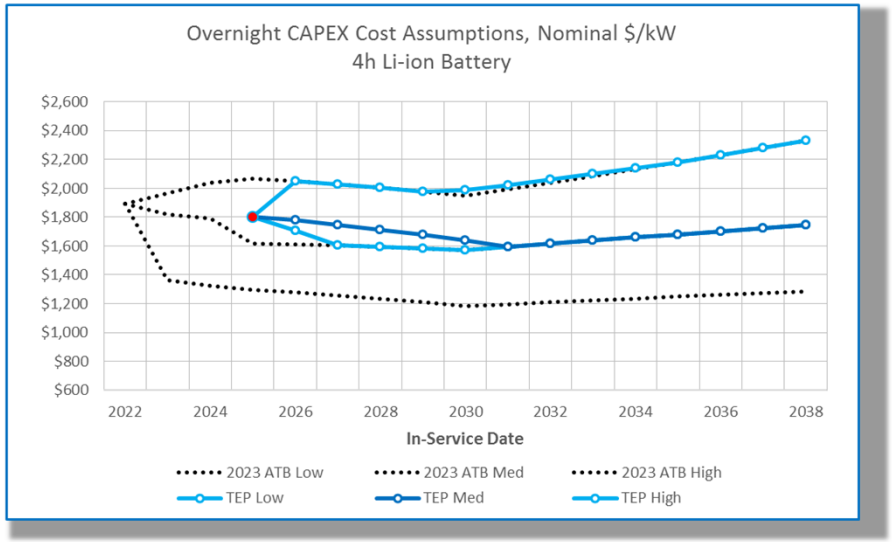
New Resource Cost Assumptions





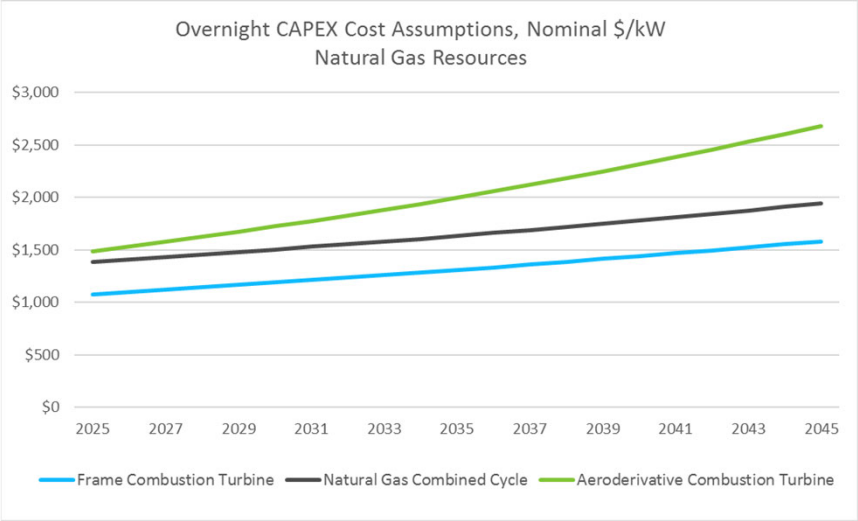
New Resource Cost Assumptions





* 8h Li-ion assumed to cost 80% of 4h battery on a per kW basis, per ATB

New Resource Cost Assumptions



O&M Cost Assumption, beginning 2025 with a 3% escalation factor

	Fixed O&M, $/kW-yr	Variable O&M, $/MWh
Frame CT	24	6.4
Aero CT	24	6.4
NGCC	30	1.9
4h Li-ion	36	0
Solar	20	0
Wind	29	0

All O&M assumptions from 2023 ATB

Natural gas capital costs based on 2023 ATB, with some adjustment based on vendor information

Next Steps

- Over next 2-3 weeks:
  - Finalize Reference Case and share results with RPAC, inc. financial results and risk analysis
  - Evaluate and review with RPAC a handful of alternative portfolios and CO2 targets, such as
    - Retire Springerville sooner (100% CO_2 reduction)
    - Retire Springerville later (80% and/or 100% CO_2 reduction)
    - Explore options on 300-550 MW of flexible natural gas capacity
    - Develop options on long-duration, long-lead time storage capacity
  - Develop Reference Case for UNSE and review with RPAC