Modeling Update with Scenarios and Sensitivities Follow up

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Feb. 9, 2023

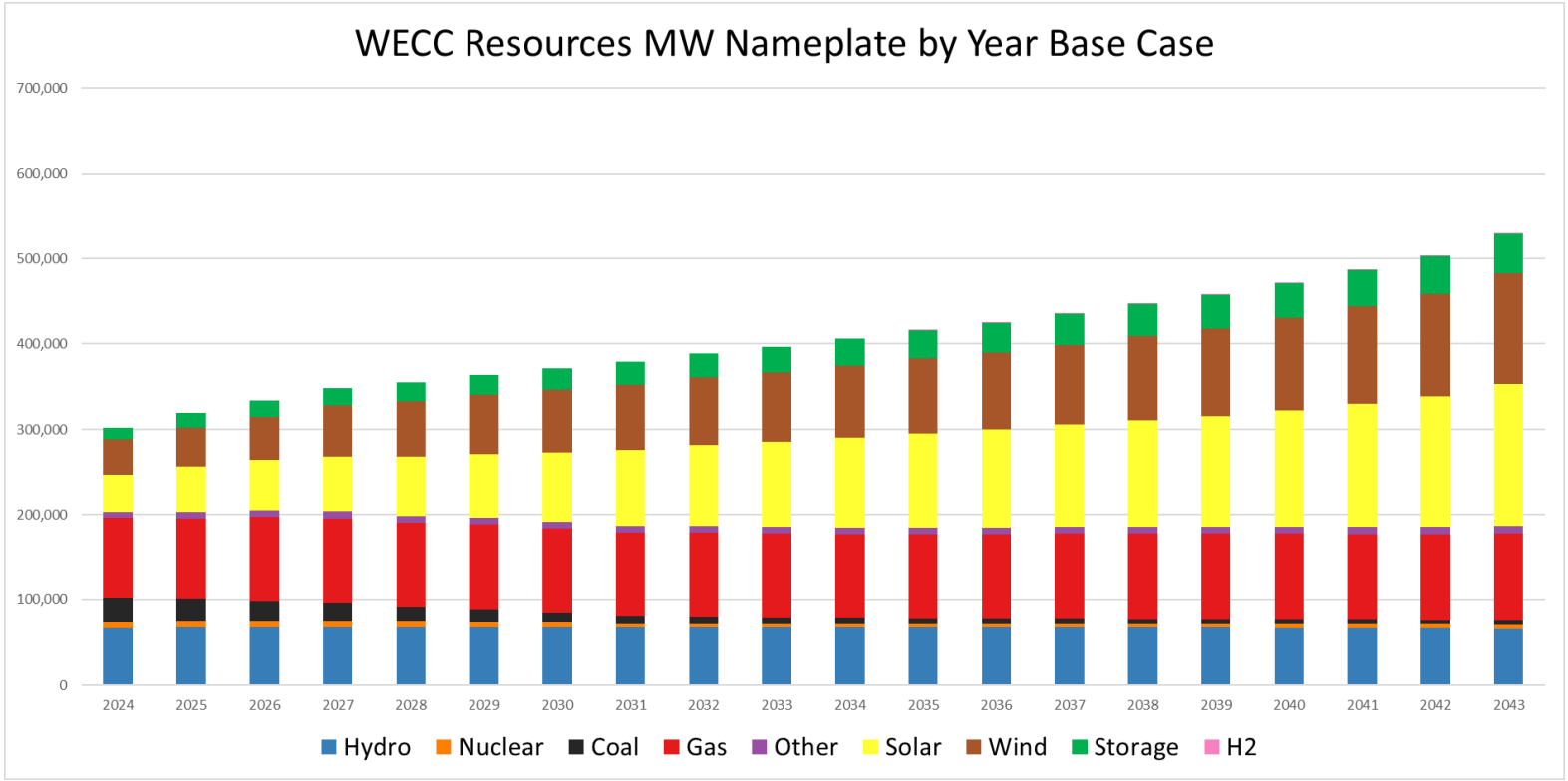
Agenda

- Modeling Update
  - Preliminary Western Electricity Coordinating Council (WECC) Results
    - Base
    - Clean By 2045/2035
- Scenarios and Sensitivities Follow Up
  - Carbon price stochastic spread
- Long Term Capacity Expansion (LTCE) Modeling Plan
  - Scenarios and sensitivities
  - Validation and verification

Current State of 2023 IRP Modeling

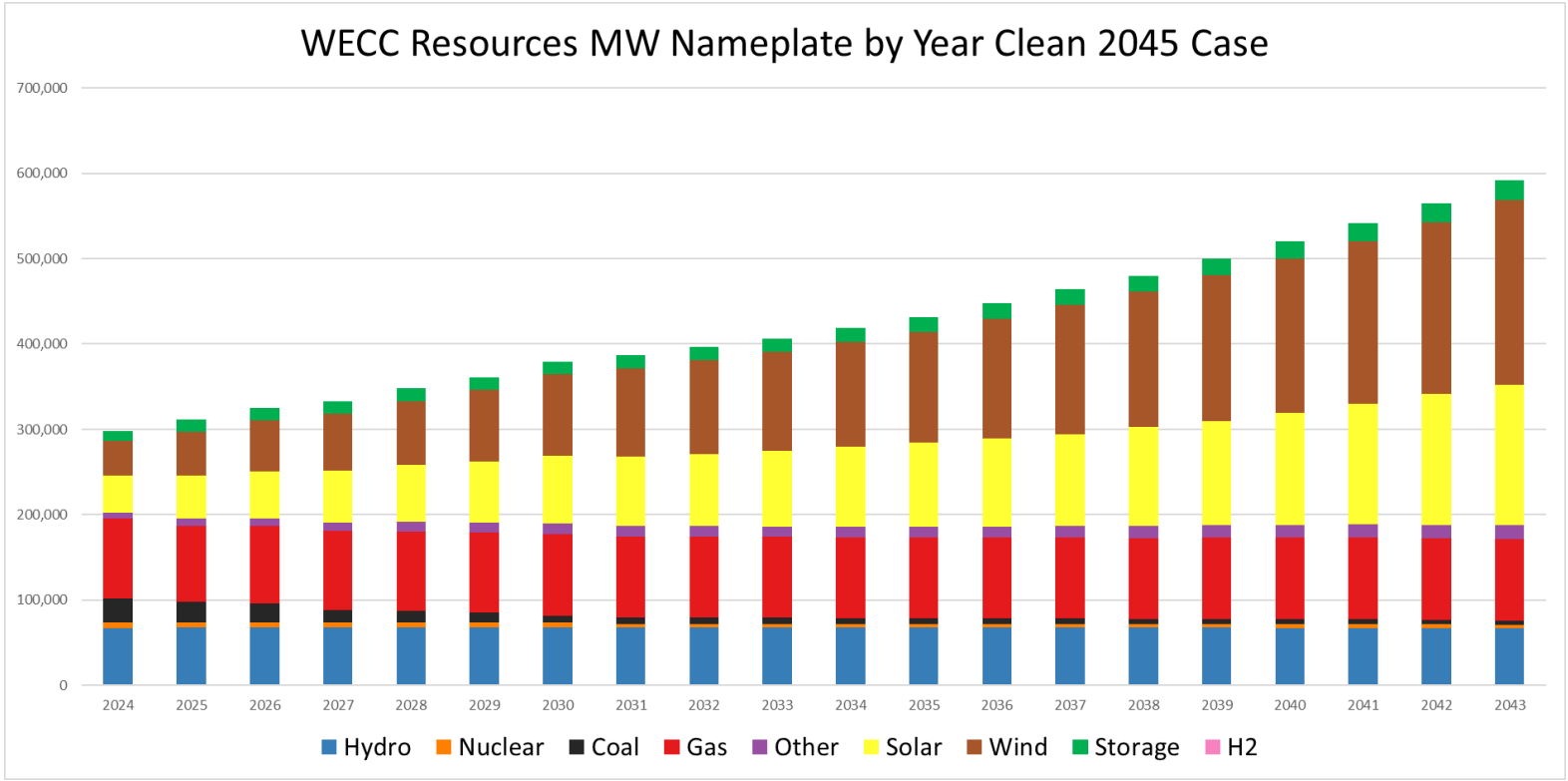
Preliminary Results:

Base WECC Assumptions



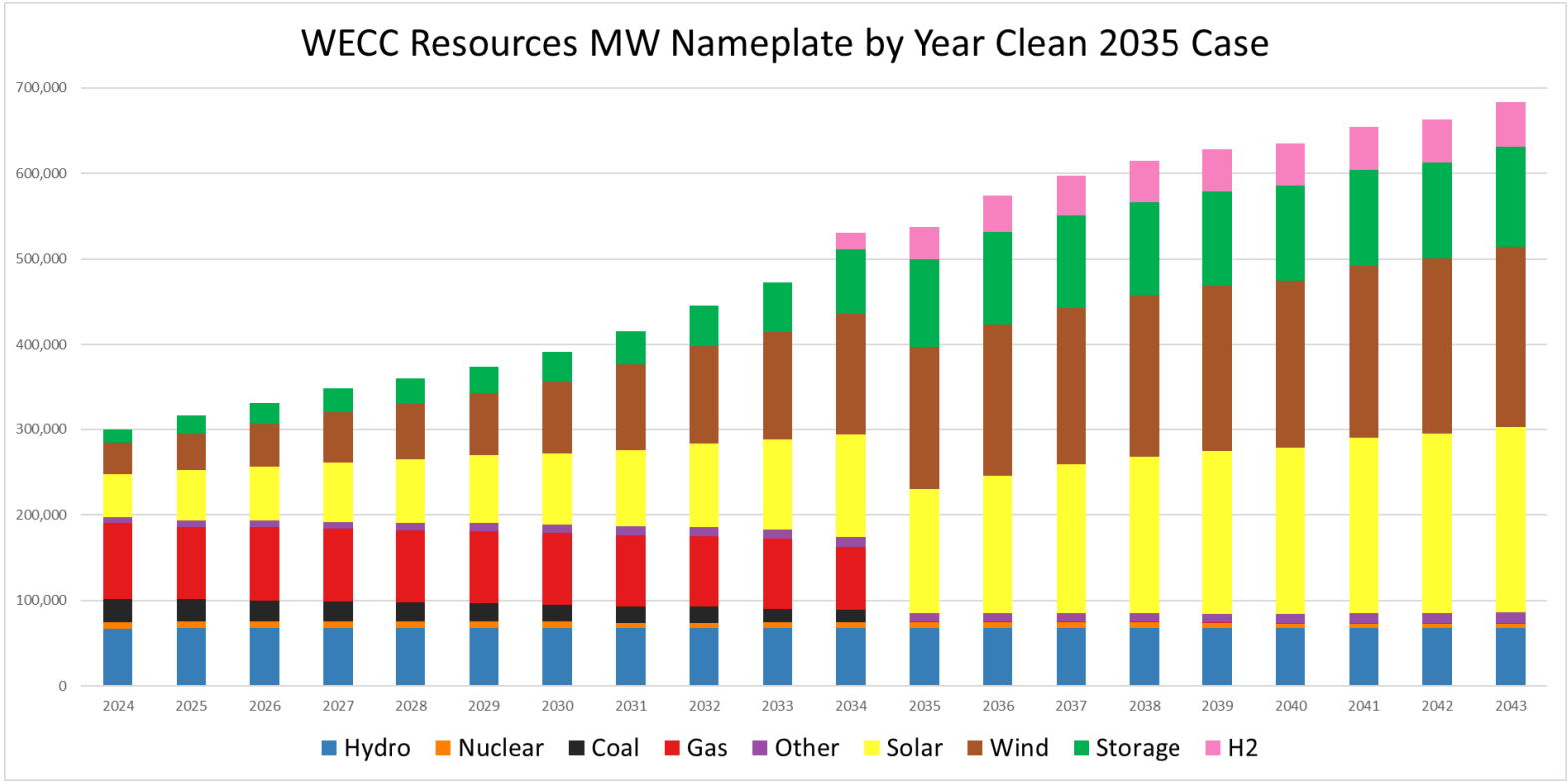
Preliminary Results:

Clean by 2045



Preliminary Results:

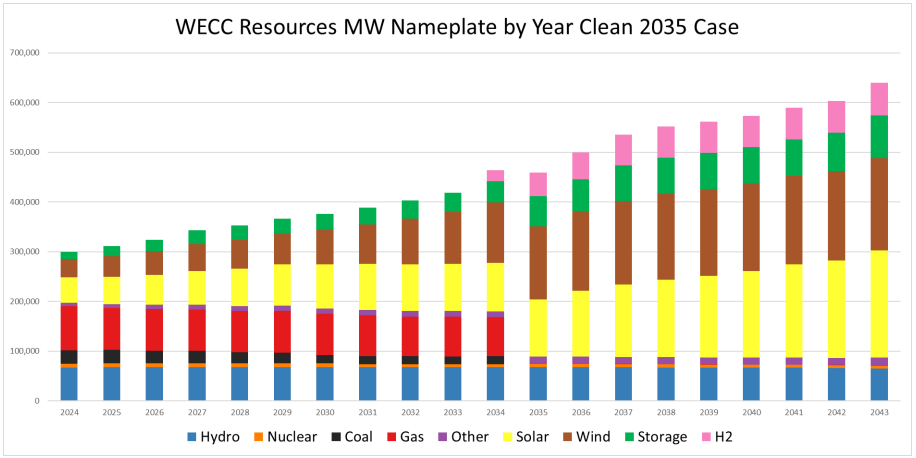
Clean by 2035

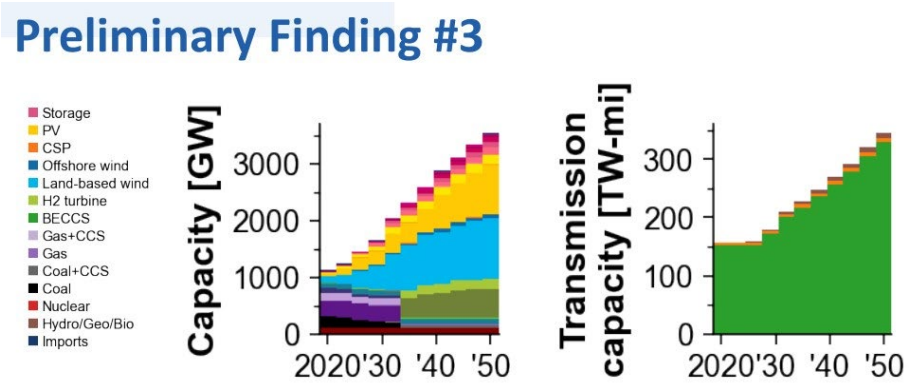


Preliminary Results:

Clean by 2035

DOE **Interim** National Transmission Planning Study results show similar pattern.

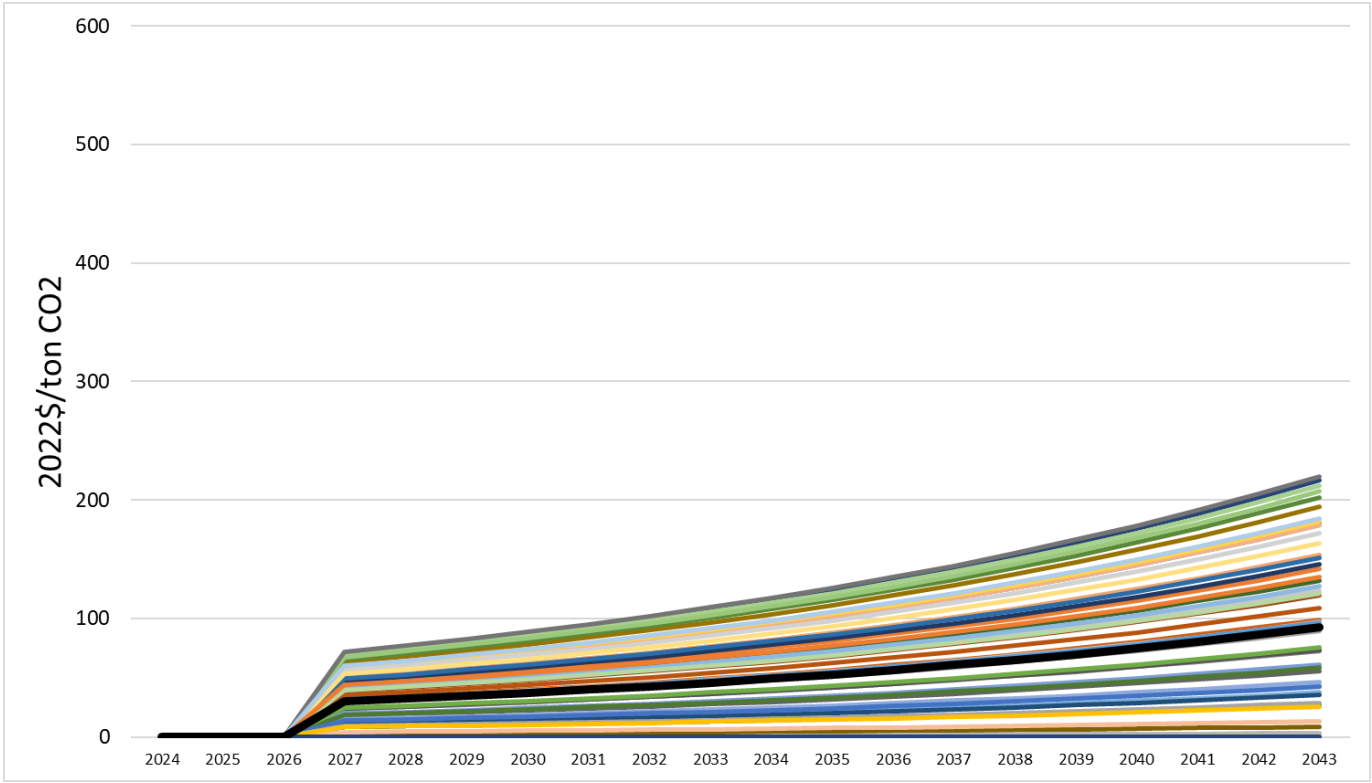




https://www.energy.gov/sites/default/files/2022-11/NTPS%20Public%20Webinar%20no%202%20October%2021%202022_ICF%20v2_508.pdf

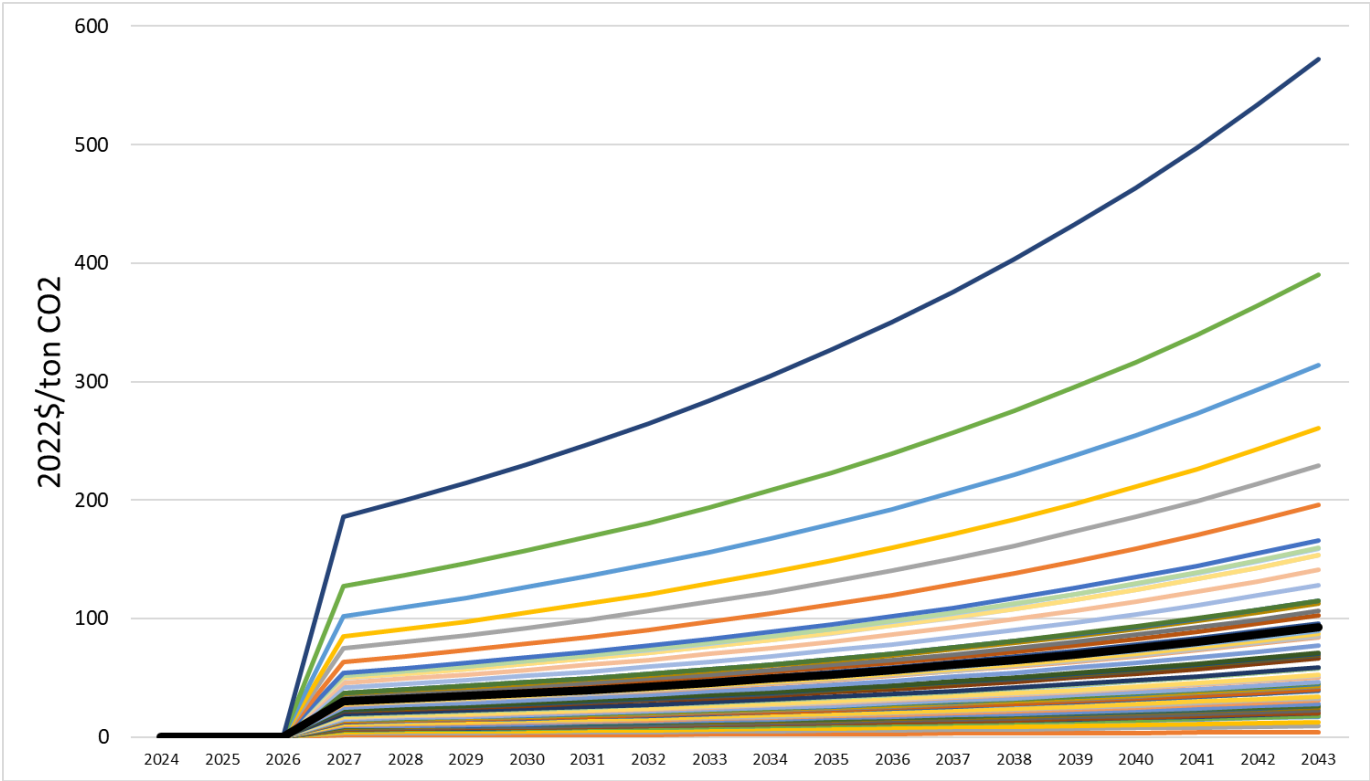
Carbon Price Follow Up:

Initial Proposal Jan. 12 IRPAC Meeting



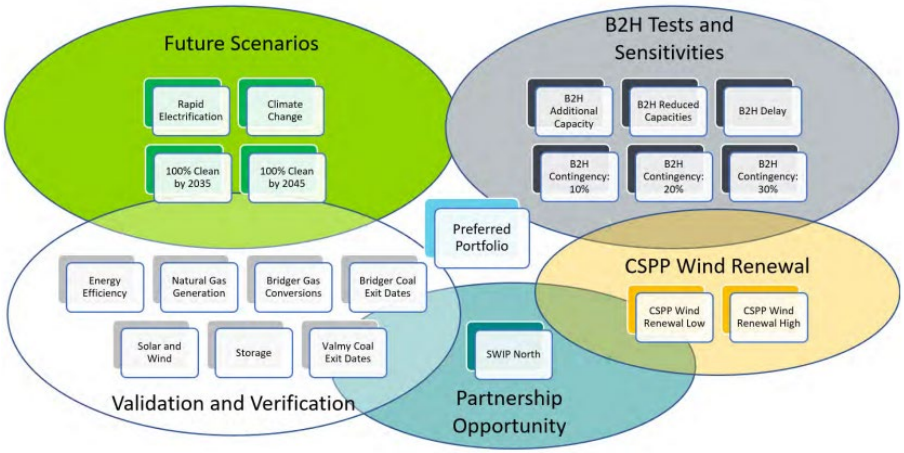
Carbon Price Follow Up:

Post Feedback Update: Log Normal



Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review, EPA-HQ-OAR-2021-0317 September 2022

LTCE Scenarios, Sensitivities, Validation and Verification



Validation & Verification Tests	Cost
Preferred Portfolio (Base with B2H)	$7,942,428
Demand Response	$7,944,368
Energy Efficiency	$8,169,838
Natural Gas in 2028 Rather than Solar and Storage	$8,078,645
Bridger Exit Units 1 & 2 at the End of 2023	$8,077,805
Bridger Exit Unit 2 at the End of 2026	$8,014,305
Bridger Unit 2 Delayed Gas Conversion (2027)	$7,962,665
Bridger Exit Unit 4 in 2027	$7,951,878
Bridger Exit Units 3 and 4 in 2028 and 2030	$7,997,453
Geothermal	$8,000,506
Biomass	$7,994,989
Valmy Unit 2 Exit in 2023	$7,957,116
Valmy Unit 2 Exit in 2024	$7,956,390

LTCE Scenarios and Sensitivities

Scenarios & Sensitivities

Preferred Portfolio Contenders

- Base Assumptions
- Increased Southern Transmission
- High Carbon and High Gas Prices
- Zero Carbon and Low Gas Prices
- Constrained Transmission
- Constrained Storage
- Clean by 2045

Informational

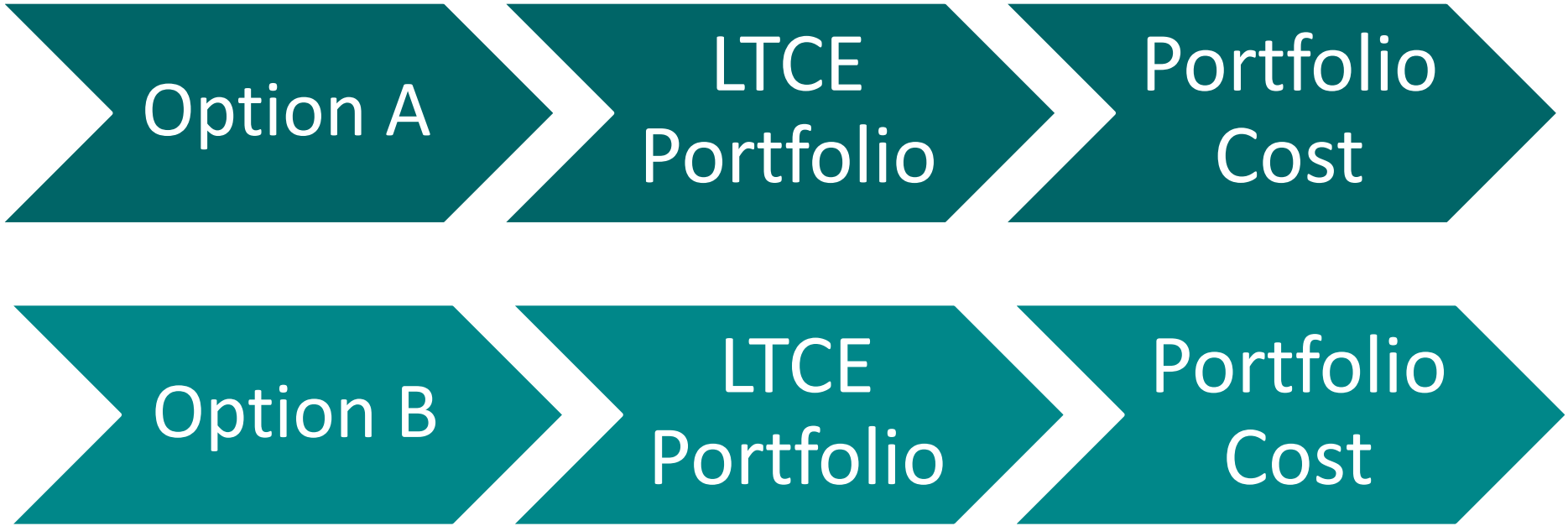
- Clean by 2035
- Forecasted PURPA Projects
- Extreme Weather
- Faster Electrification
- Load Flattening

Validation and Verification Process

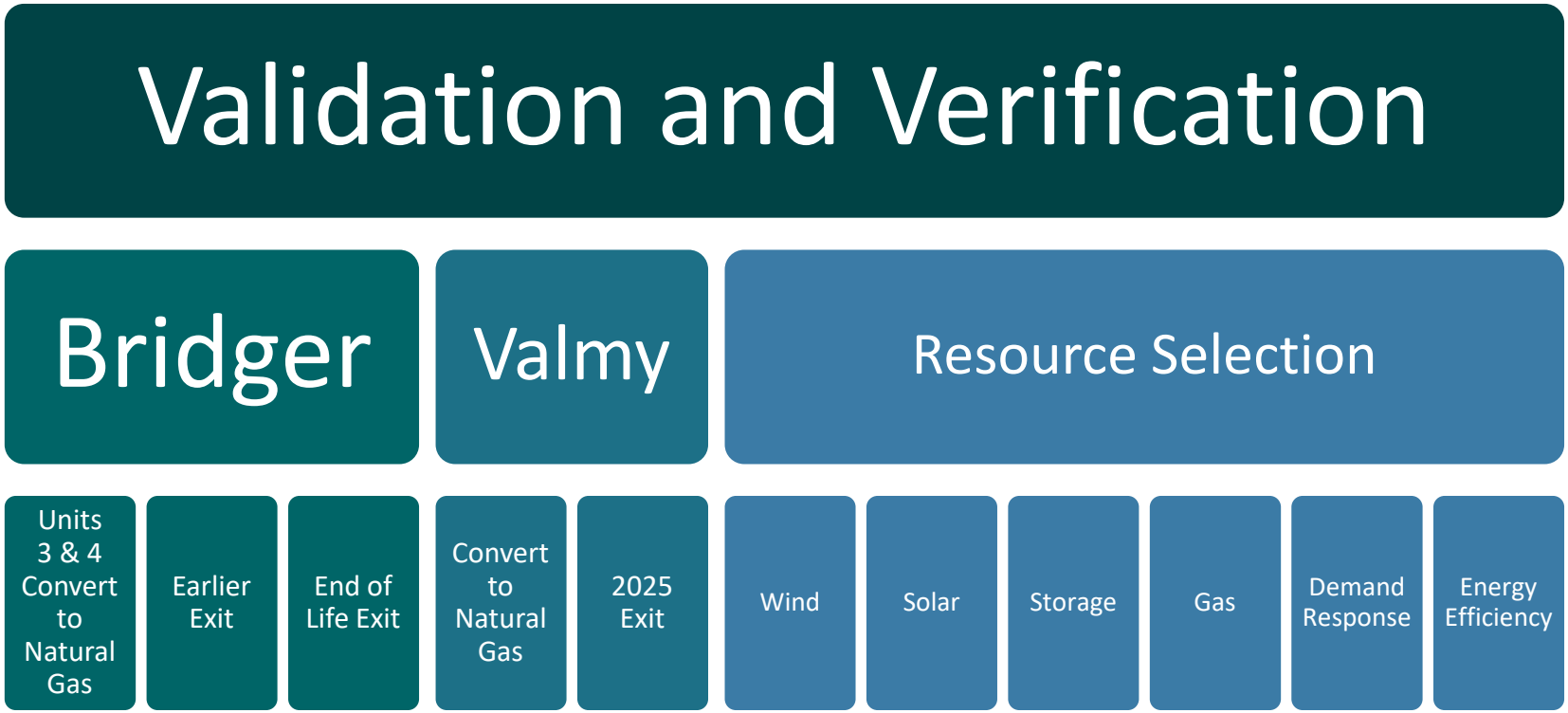
Option A

Option B

Validation and Verification Process



Validation and Verification



Thank you!

Questions?