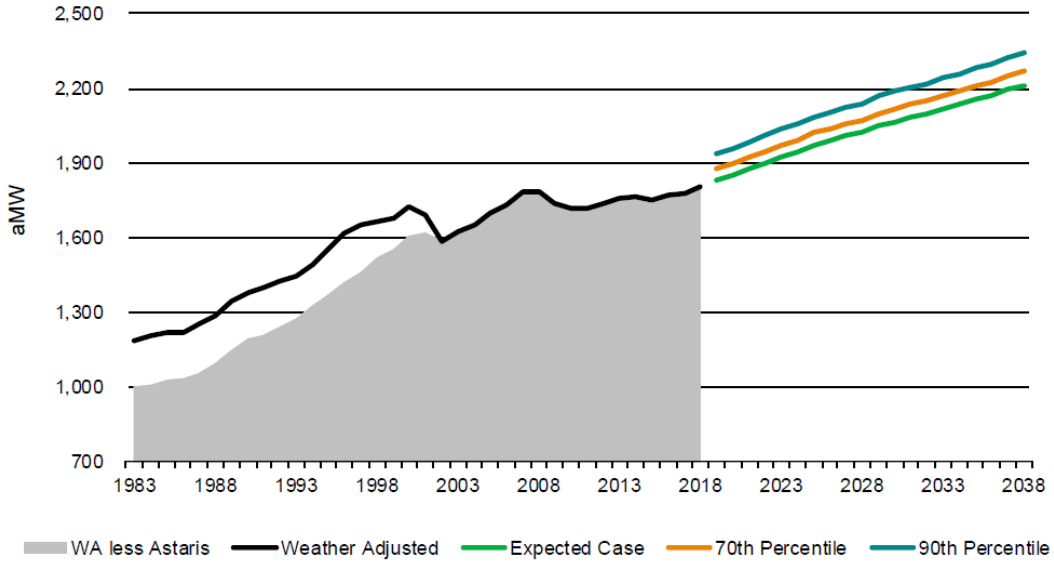
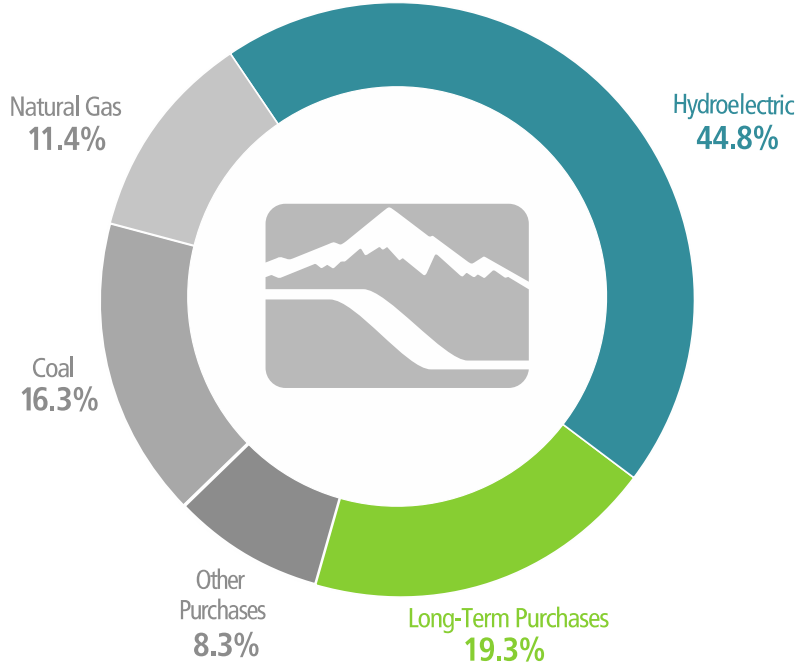
Amended 2019 IRP

Jared Hansen, Resource Planning Leader

Tuesday, March 31st, 2020

Integrated Resource Planning





2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038

Integrated Resource Planning

Integrated Resource Planning

Risk

Cost

Environment

Integrated Resource Planning

Our Clean-Energy Goal

As Idaho Power continues serving customers and communities with **reliable**, **affordable** energy, we look to do so with a new and exciting goal:

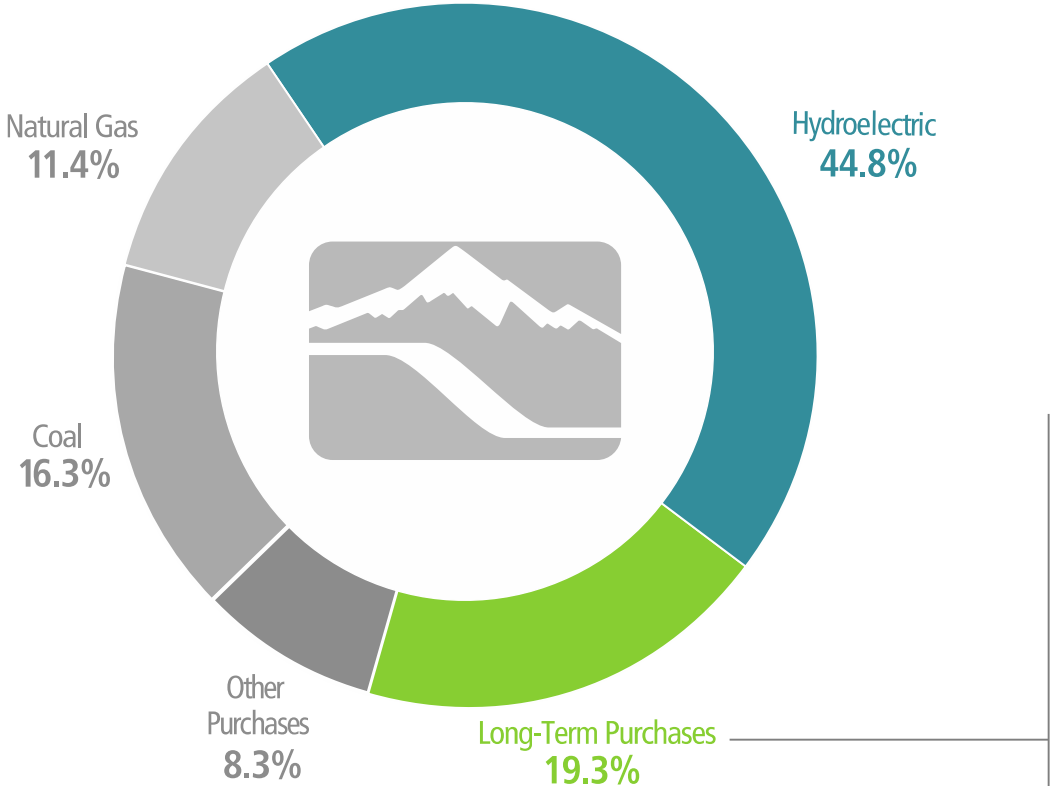
Providing

100% clean energy by 2045.

Clean today. **Cleaner tomorrow.®**

We're Well On Our Way

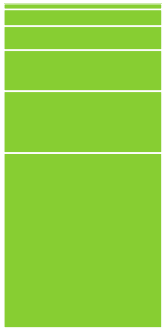
2019 Energy Mix



About the sale of renewable energy credits:

Idaho Power sells the Renewable Energy Credits (REC) associated with our renewable energy purchases on Long-Term Purchases and a small portion of our hydro generation to offset power supply costs and keep customer prices as low as possible. The buyer of the REC claims the renewable attributes of that energy; therefore, Idaho Power does not represent that this resource mix represents the energy delivered to our customers.

Breakdown of Long-Term Purchases

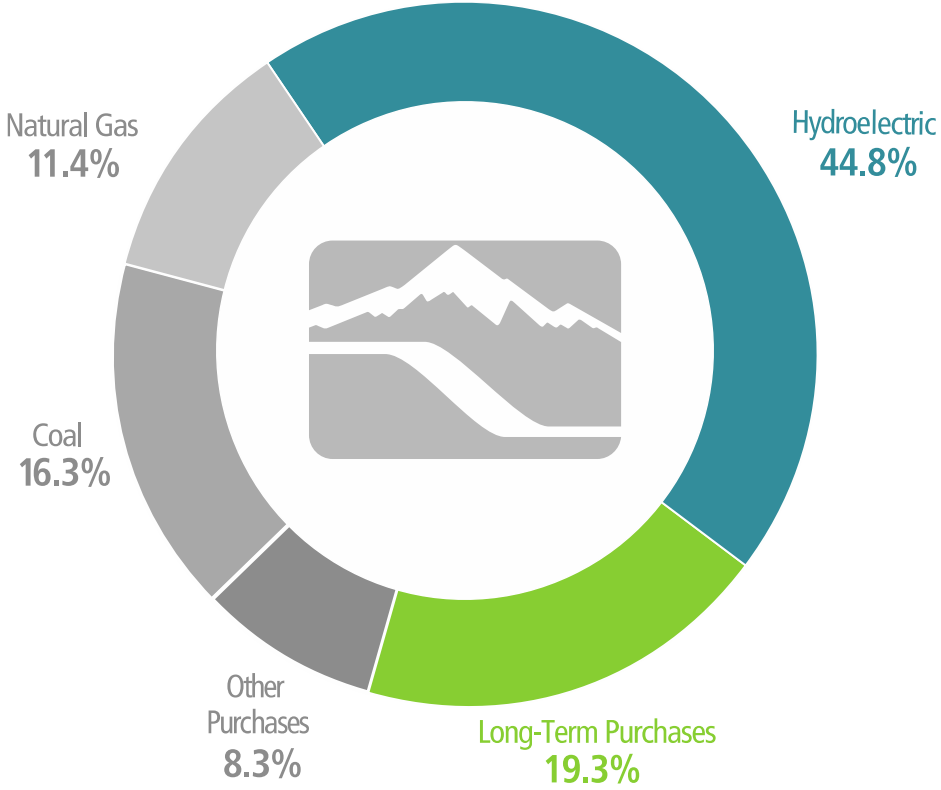


Other	0.35%
Biomass	0.99%
Geothermal	1.52%
Hydro	2.42%
Solar	3.66%
Wind	10.34%

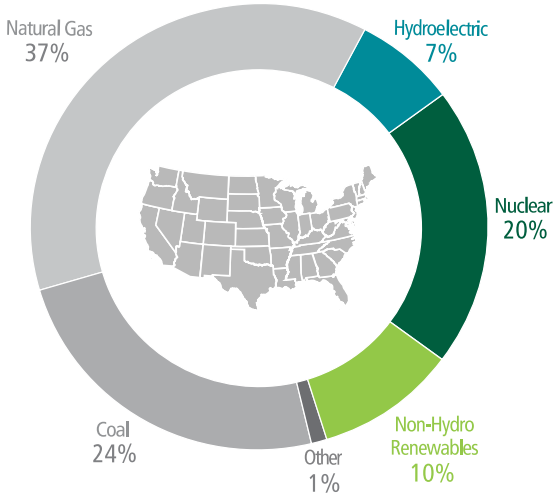
Data Source: U.S. Energy Information Administration
Totals may not equal 100% due to rounding

We're Well On Our Way

2019 Energy Mix



National Average



Data Source: U.S. Energy Information Administration
Totals may not equal 100% due to rounding

Resources

1773 MW

1284 MW

762 MW

1118 MW

Resources

1773 MW

1284 MW

+

Jackpot Solar
120 MW

762 MW

1118 MW

−

Valmy Unit 1
127 MW

Resources – Demand-Side

Energy Efficiency 234 aMW

Demand Response 440 MW

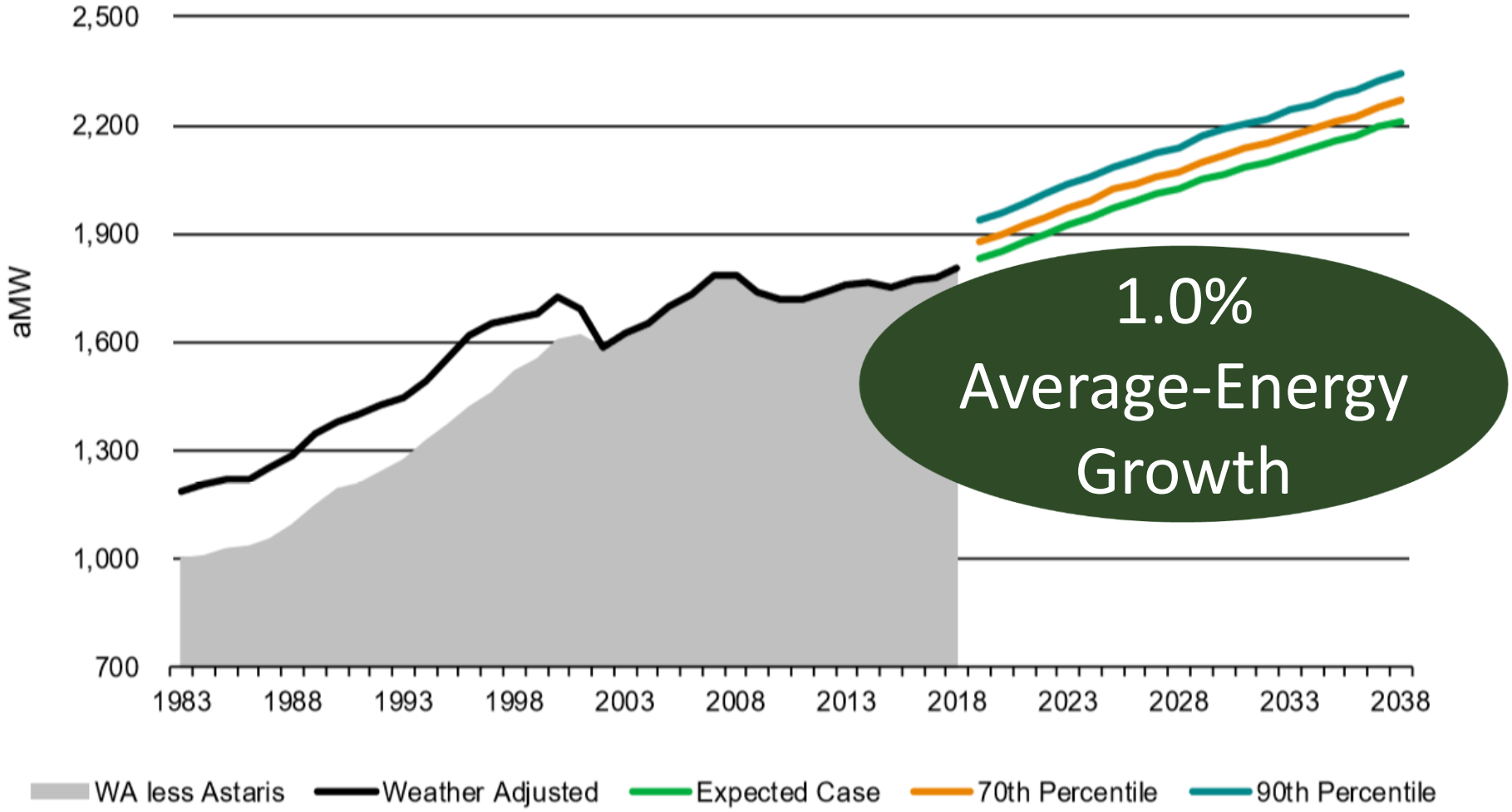


Figure 7.1 **Average monthly load-growth forecast**

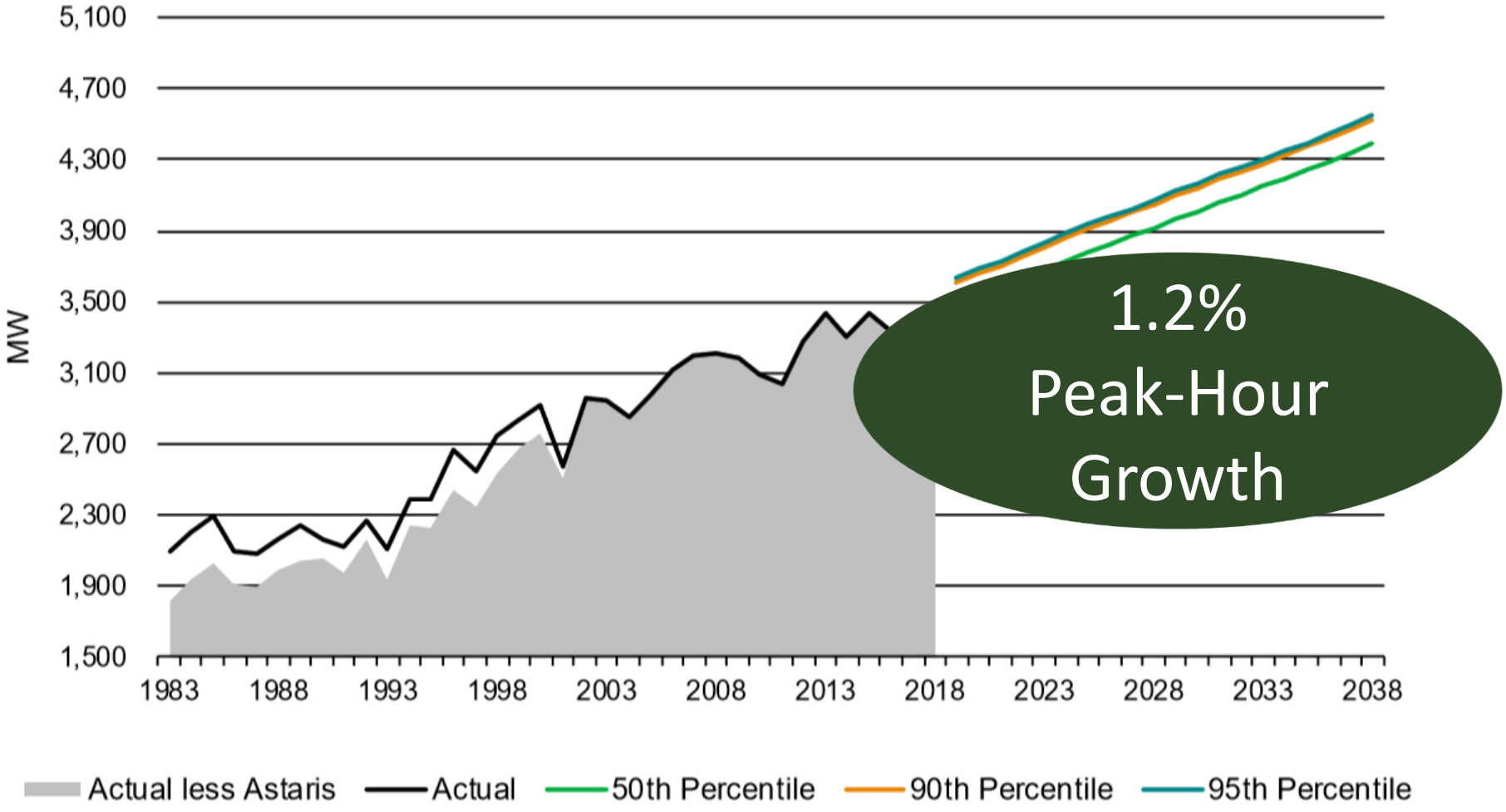


Figure 7.2 **Peak-hour load-growth forecast (MW)**

Levelized Capacity Costs

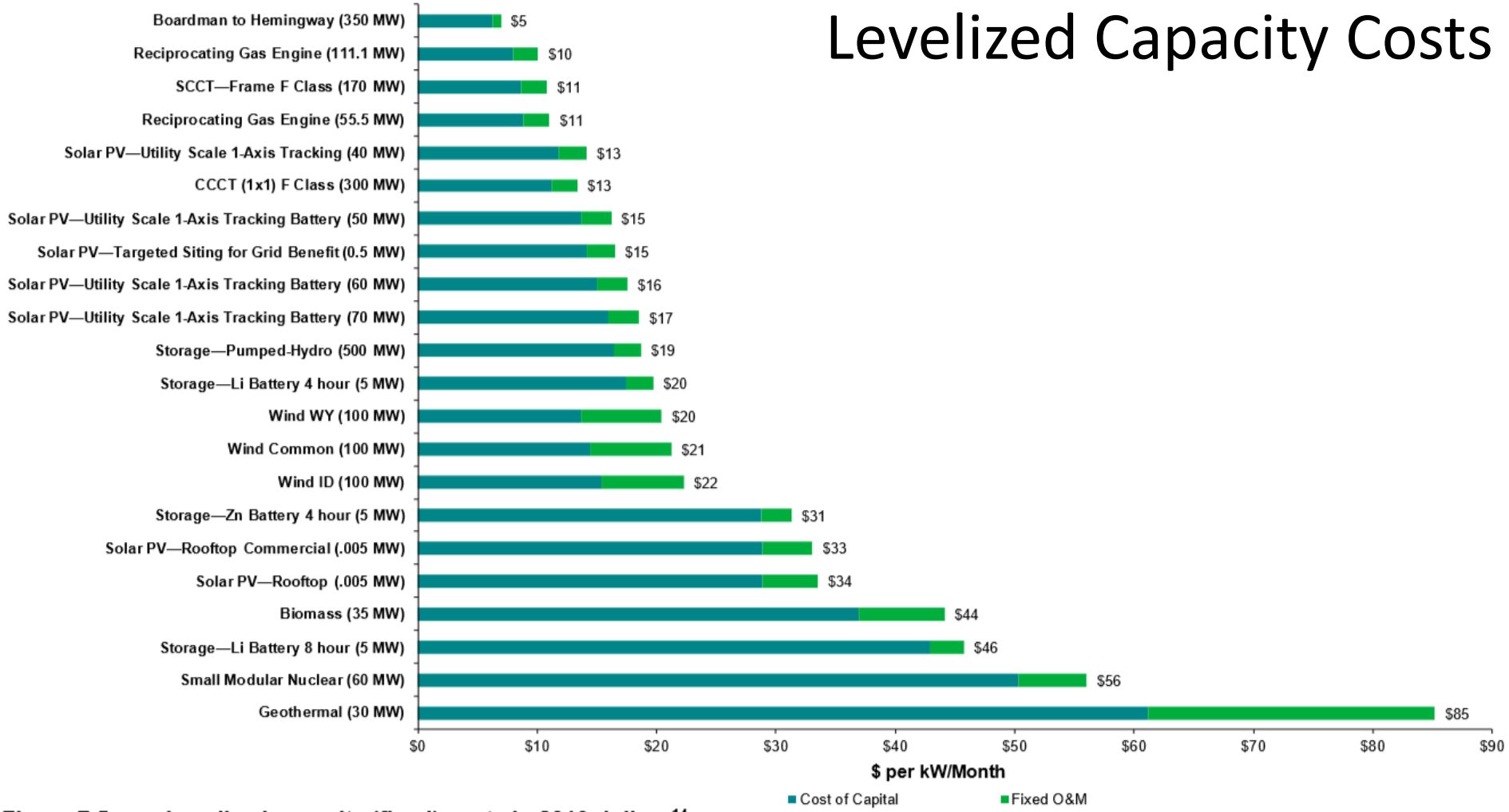


Figure 7.5 **Levelized capacity (fixed) costs in 2019 dollars**[14]

Levelized Energy Costs

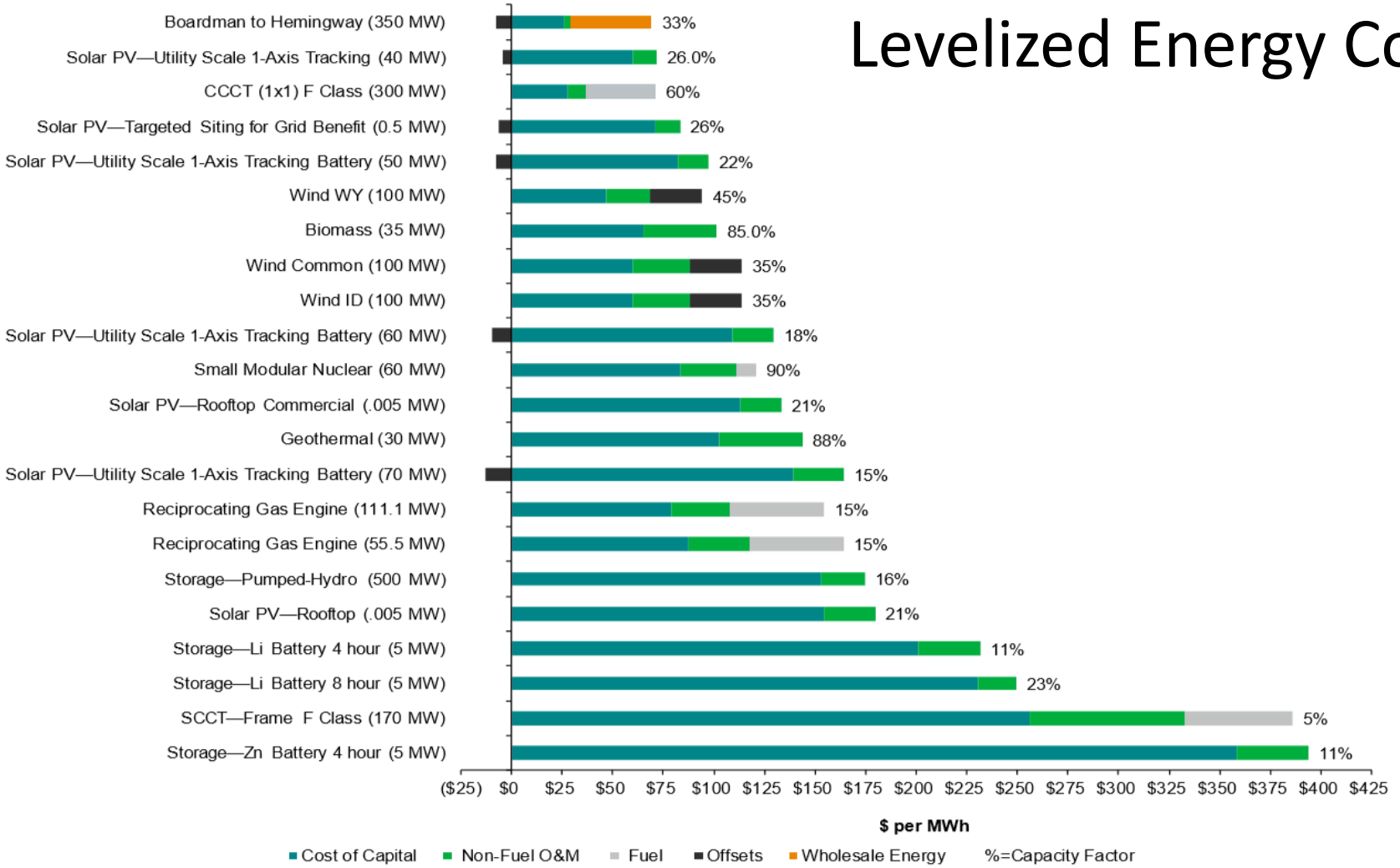
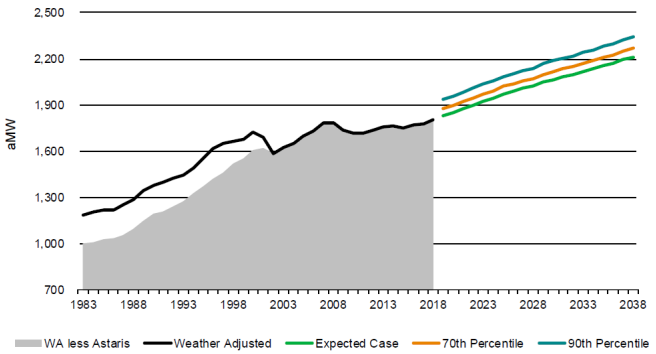


Figure 7.6 **Levelized cost of energy (at stated capacity factors) in 2023 dollars**

2019 Integrated Resource Plan



Optimized Resource Expansion

	Gas	Wind	Solar	Battery	Demand Response	Coal Exit
2019						-127
2020						-58
2021						
2022			120			-177
2023						
2024						
2025						-133
2026						-180
2027						
2028						-174
2029			40	30		
2030	300					-177
2031					5	
2032			80	10	5	
2033			80	20	5	
2034			80	20	5	
2035	111				5	
2036					5	
2037			320			
2038		300	440			
Nameplate Total	**411**	**300**	**1,160**	**80**	**30**	**-1,026**
B2H (2026)	500					

Qualitative Risks

Uncertainty Analysis

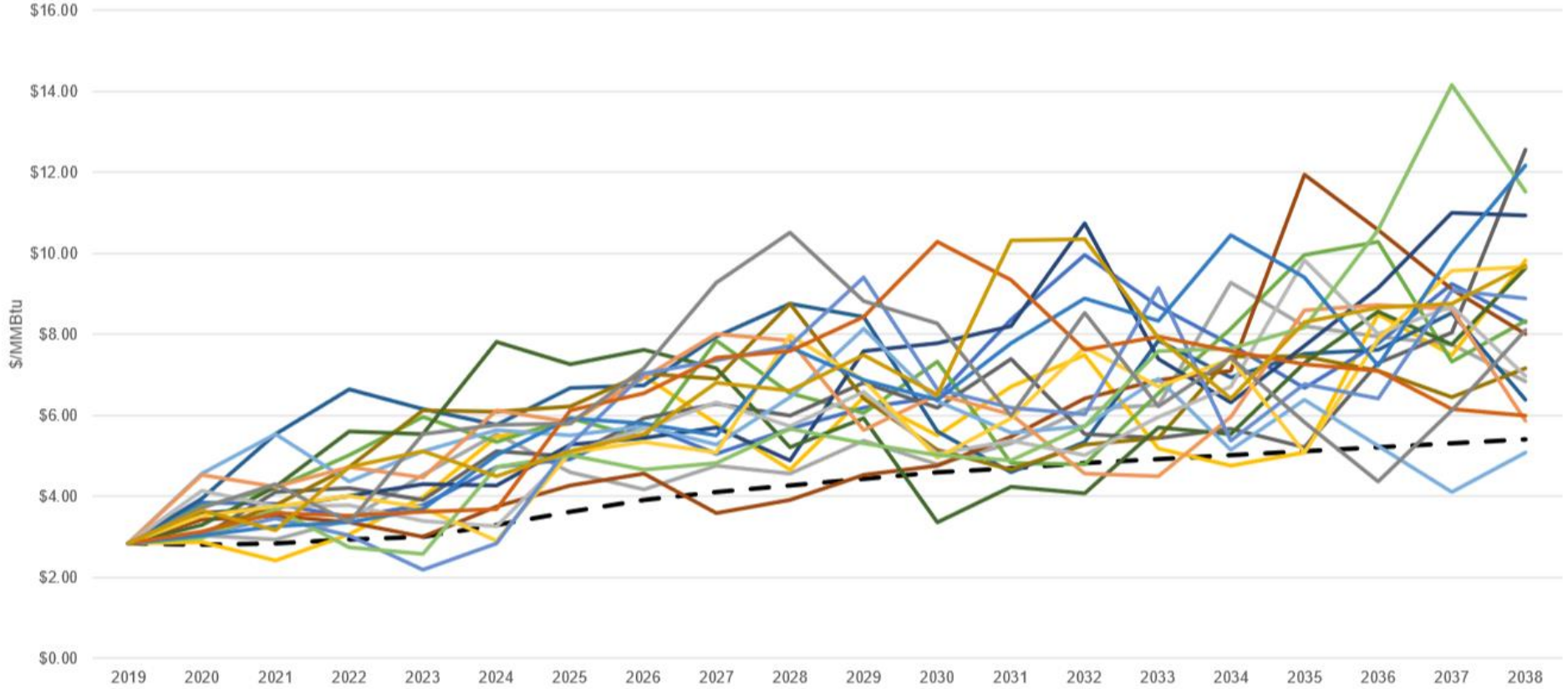


Figure 9.2 **Natural gas sampling (Nominal $/MMBtu)**

Uncertainty Analysis

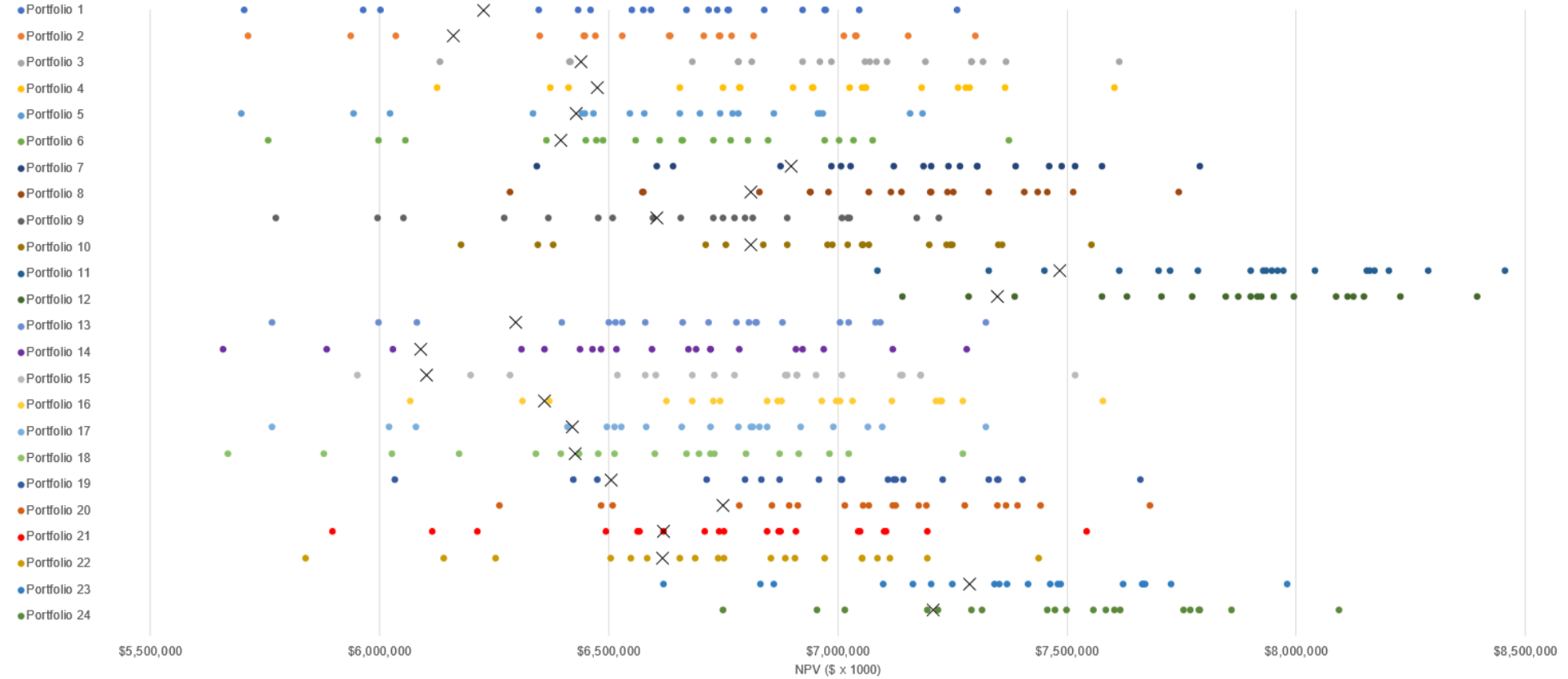


Figure 9.5 **Portfolio stochastic analysis, total portfolio cost, NPV years 2019–2038 ($x 1,000)**

Portfolio Cost and Variance

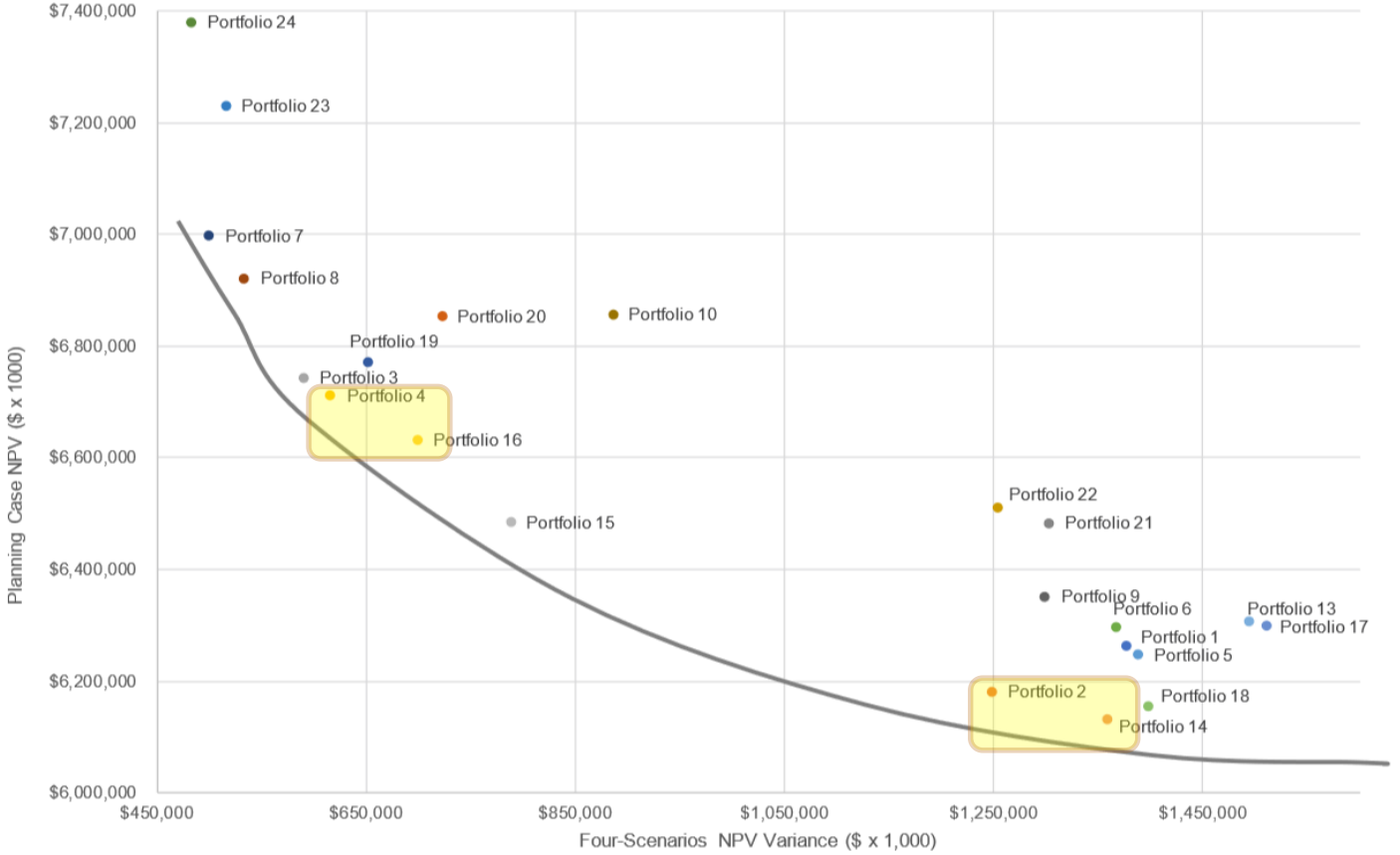


Figure 9.1 **NPV cost versus cost variance**

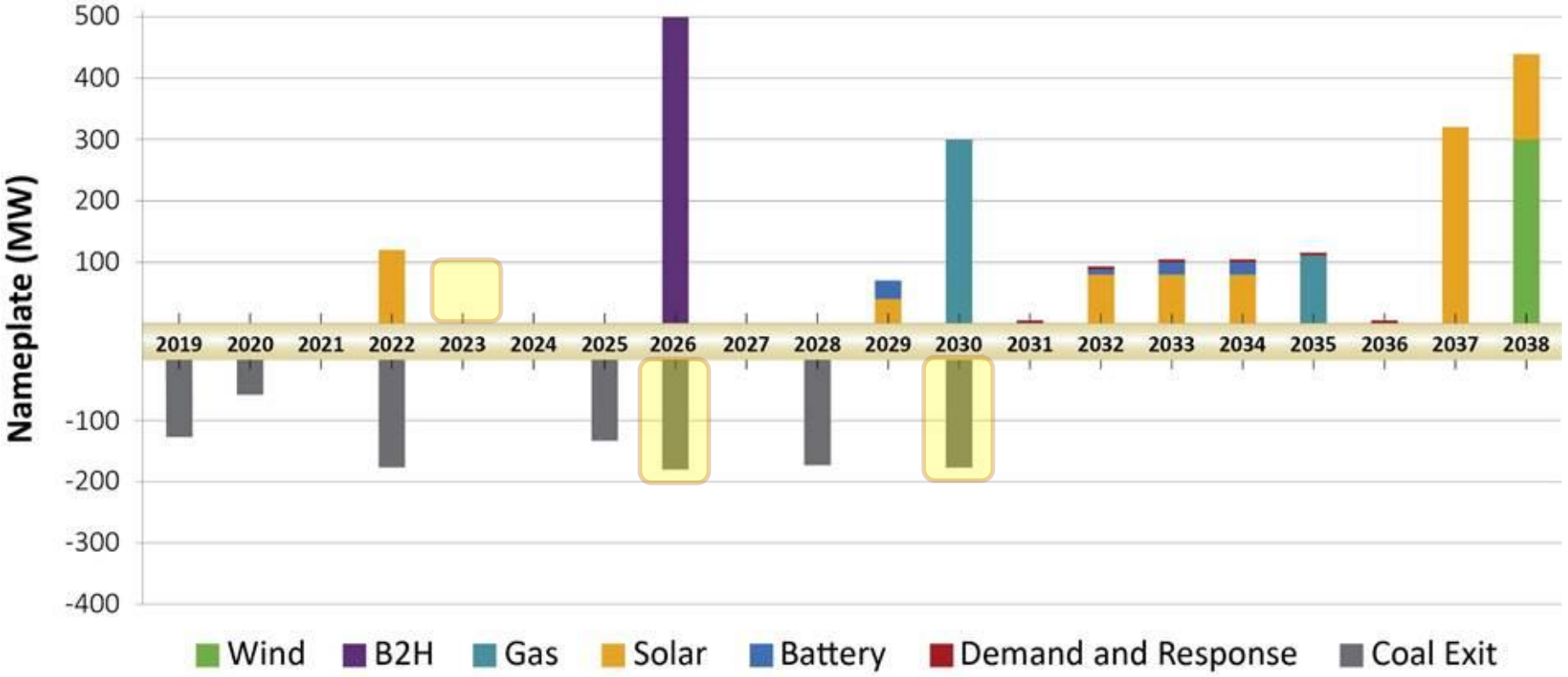
Manual Adjustments - Timing

Table 9.4 Jim Bridger exit scenarios

Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
2022	2022	2022	2022	2023	2024
2026	2026	2028	2026	2026	2026
2034	2028	2034	2028	2028	2028
2034	2034	2034	2030	2030	2030

P14 derived portfolios—P14(1), P14(2), P14 (3), P14 (4), P14 (5), P14 (6)

Amended 2019 IRP



Action Plan

Table 10.3 Action Plan (2019–2026)

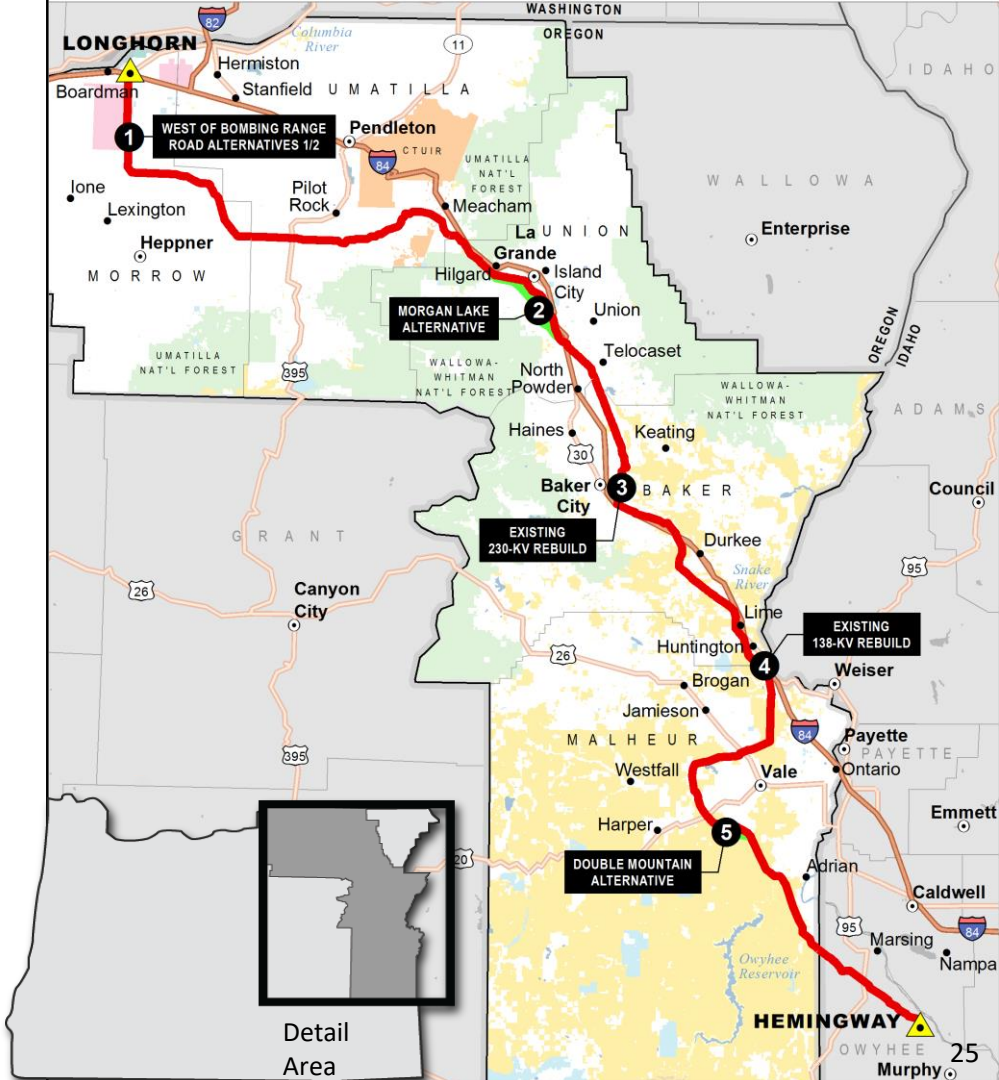
Year	Action
2019–2022	Plan and coordinate with PacifiCorp and regulators for early exits from Jim Bridger units. Target dates for early exits are one unit during 2022 and a second unit during 2026. Timing of exit from second unit coincides with the need for a resource addition.
2019-2022	Incorporate solar hosting capacity into the customer-owned generation forecasts for the 2021 IRP.
2019	Jackpot Solar PPA regulatory approval*—on-line December 2022
2019	Exit Valmy Unit 1 by December 31, 2019.*
2019–2021	Conduct ongoing B2H permitting activities. Negotiate and execute B2H partner construction agreement(s).
2019–2026	Conduct preliminary construction activities, acquire long-lead materials, and construct the B2H project.
2019–2020	Monitor VER variability and system reliability needs, and study projected effects of additions of 120 MW of PV solar (Jackpot Solar) and early exit of Bridger units.
2020	Exit Boardman December 31, 2020.
2020	Bridger Unit 1 and Unit 2 Regional Haze Reassessment finalized.
2020	Conduct a VER Integration Study.
2021–2022	Continue to evaluate and coordinate with PacifiCorp for timing of exit/closure of remaining Jim Bridger units.
2022	Subject to coordination with PacifiCorp, exit Jim Bridger unit (as yet undesignated) by December 31, 2022.
2022	Jackpot Solar 120 MW on-line December 2022.
2023–2026	Procure or construct resources resulting from RFP (if needed).
2025	Exit Valmy Unit 2 by December 31, 2025.
2026	Subject to coordination with PacifiCorp, exit Jim Bridger unit (as yet undesignated) by December 31, 2026. Timing of the exit from the second Jim Bridger unit is tied to the need for a resource addition (B2H).

Boardman to Hemingway Transmission Line Project

Mitch Colburn
Engineering & Construction Director

B2H Overview

- 500 kV transmission line
- ~300 miles through Oregon and Idaho
- ~1,000 MW bi-directional capacity
- Proposed by Idaho Power, PacifiCorp, and Bonneville Power Administration



Need and Benefits

- ✓ Cost: serve customers cost-effectively
- ✓ Connectivity: move energy between Pacific Northwest and Mountain West
- ✓ Reliability: new infrastructure increases robustness of the grid.
- ✓ Flexibility: able to accommodate any resources type and future changes in technology
- ✓ Environment: operating B2H is carbon neutral and provides ability to integrate and move renewable resources

Bliss Dam, Idaho

Project Updates

- All major federal permits secured
  - BLM Record of Decision (ROD) – Nov 2017
  - Forest Service ROD – Nov 2018
  - Navy ROD – Sept 2019
- Oregon permitting process:
  - ODOE issues Draft Proposed Order – May 2019
  - 20,000 page application
- Preliminary construction activities commenced in 2018 and are ongoing

Costs

Total cost to-date ~$106 million

Total cost estimate is $1 to 1.2 billion, includes:

- Permitting
- Engineering
- Construction
- Substations
- 20% contingency

B2H Upcoming Activities

- ODOE Proposed Order
- Preliminary construction activities
- Construction agreement

Supplemental Slides

Inputs Modified During Filing Suspension

1. REC Values for Jackpot Solar
2. Transmission Interconnection Costs for Jackpot Solar
3. Removal of Franklin Solar
4. Corrected Online Date for Jackpot Solar
5. Peak Capacity Credit for Solar Resources
6. B2H Transmission Revenue Credits
7. Discount Rate Modification
8. Natural Gas Pipeline and Capacity Considerations

Preferred Portfolio Comparison

June 2019 Filing

	Gas	Solar	Battery	B2H	Demand Response	Coal Exit
2019						-127 (Valmy)
2020						-58 (Boardman)
2021						
2022		120				-177 (Bridger)
2023		100				
2024						
2025						-133 (Valmy)
2026				500 (April–September)/ 200 (October–March)	5	-174 (Bridger)
2027						
2028	111					
2029					5	
2030	111				5	
2031					5	
2032					5	
2033					5	
2034		45	30		5	-357 (Bridger)
2035	300	40	20		5	
2036					5	
2037		40	10			
2038	300				5	
Nameplate Total	**822**	**345**	**60**		**50**	**-1,026**

Amended Filing

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2019						-127
2020						-58
2021						
2022			120			-177
2023						
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2026						-180
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