

Stochastic Risk Analysis



Greg Strang

Lead Planning Analyst

May 8, 2025

Acronyms and Terms



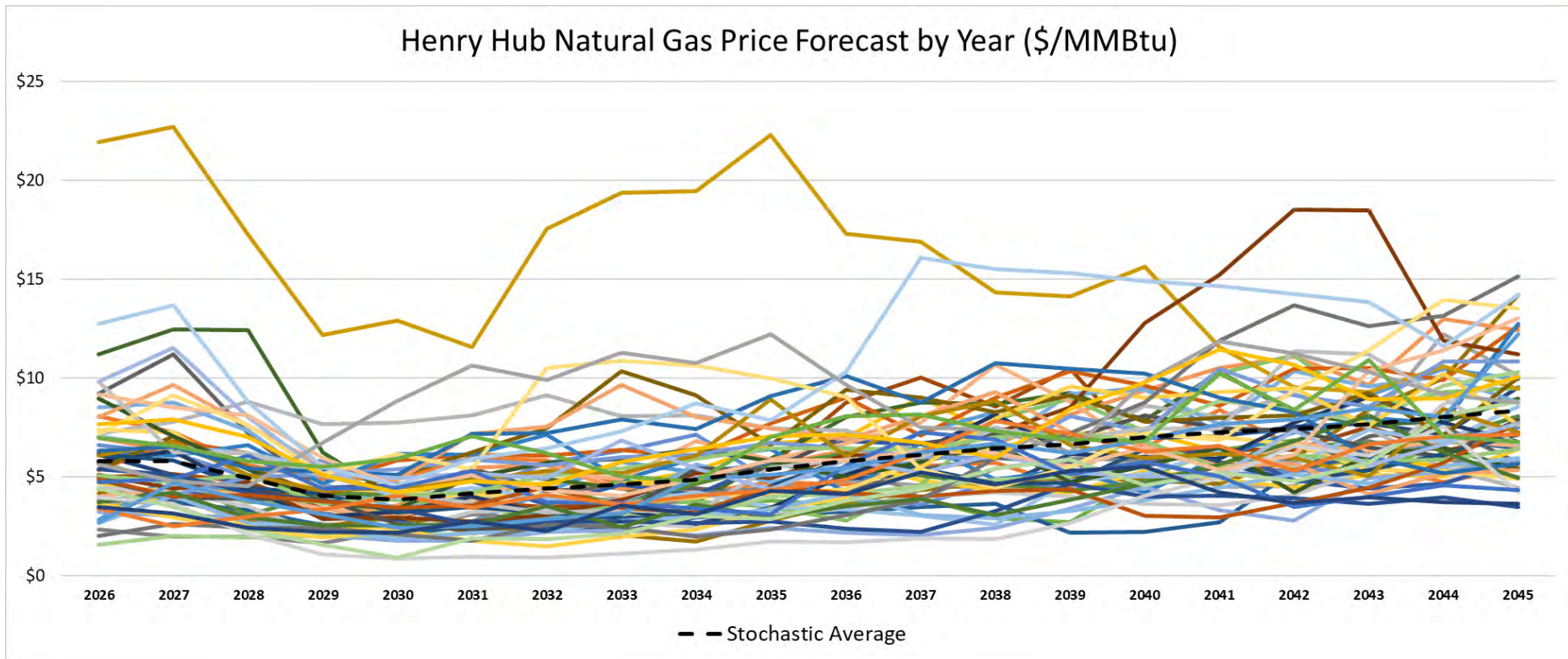
- **Stochastic:** Randomly determined; having a random probability distribution or pattern that may be analyzed statistically but may not be predicted precisely
- **MMBtu:** Million British thermal units
- **MWh:** Megawatt-hour
- **GWh:** Gigawatt-hour
- **Ton:** 2,000 pounds
- **NPV:** Net Present Value

Agenda

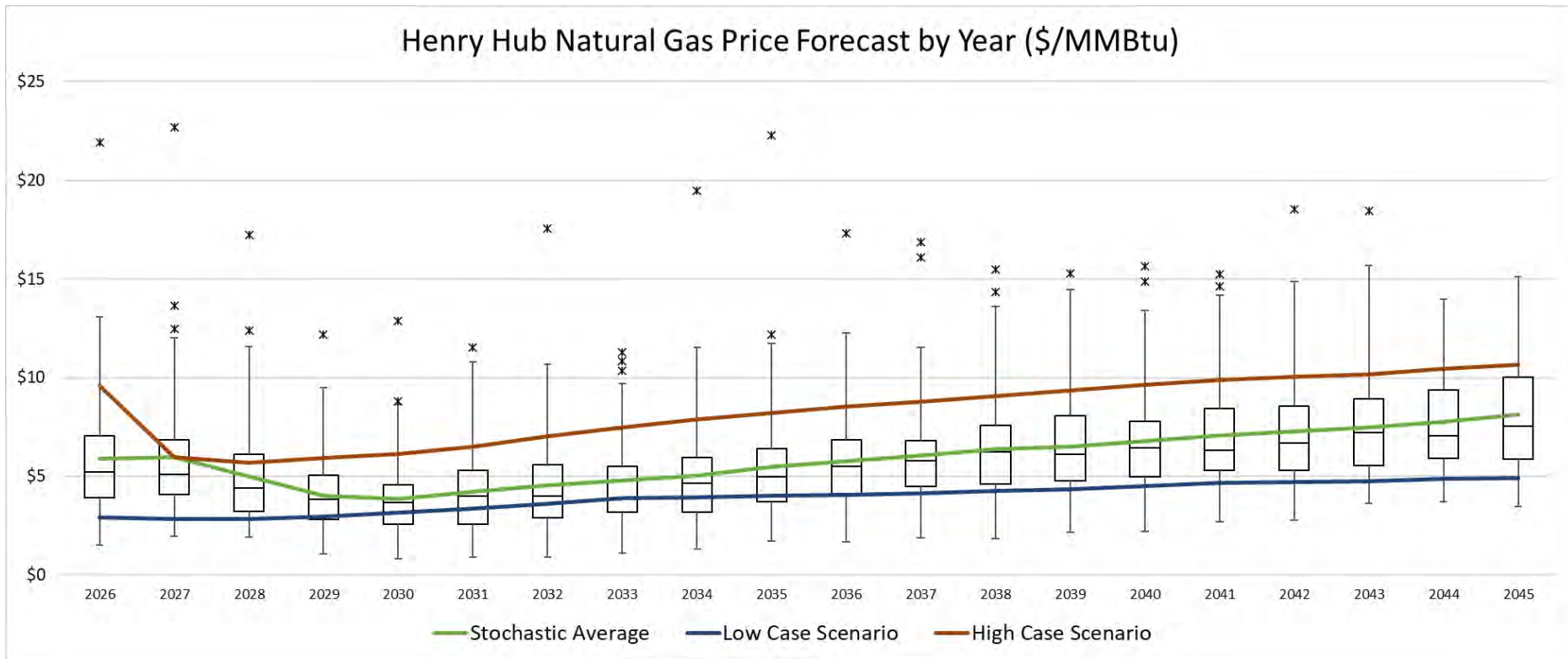


- Process Review
 - Stochastic Variables Input
 - Modeling Process
- Stochastic Results
 - Output Variables
 - Kernel Comparison

Recap: Stochastic Variable Inputs

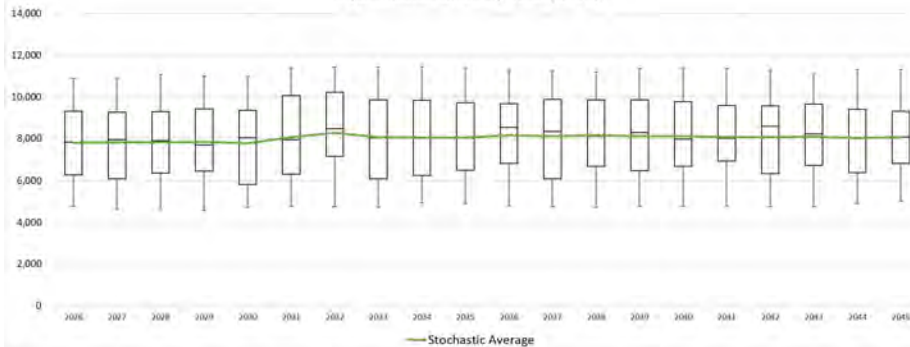


Recap: Stochastic Variable Inputs

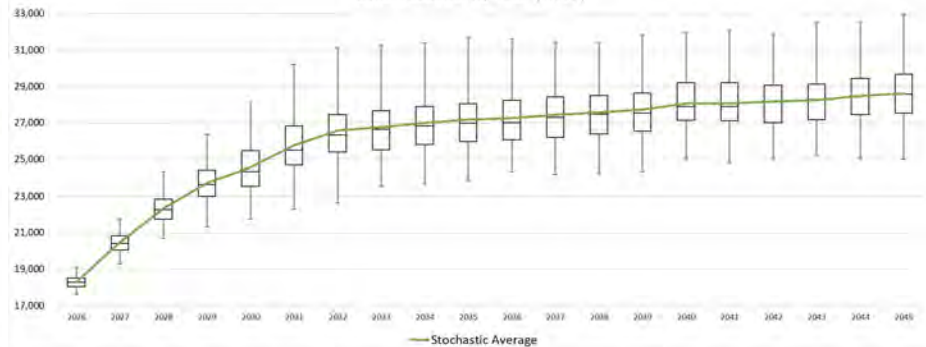


Recap: Stochastic Variable Inputs

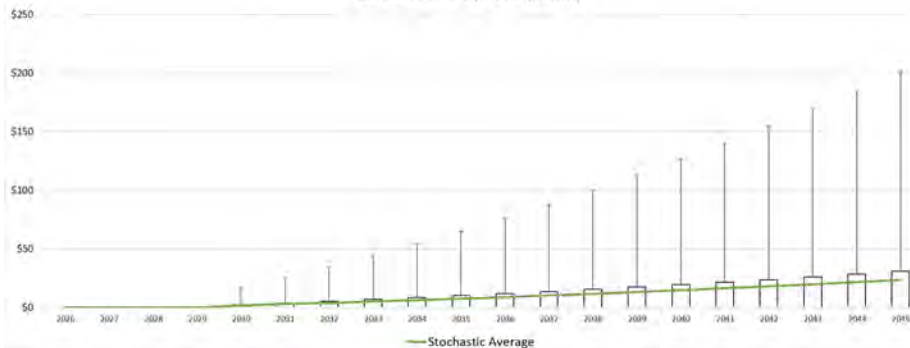
Hydro Generation by Year (GWh)



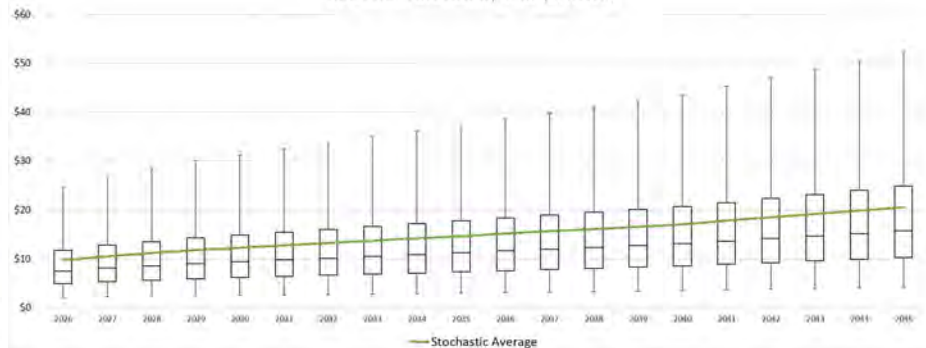
Load Forecast by Year (GWh)



Carbon Price by Year (\$/ton)

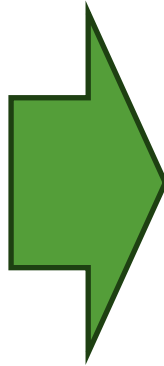


REC Price Forecast by Year (\$/MWh)

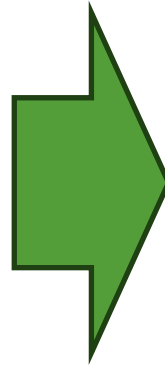


Modeling Process

- Natural Gas Prices
- Hydro Conditions
- Load Forecast
- Carbon Prices
- REC Prices

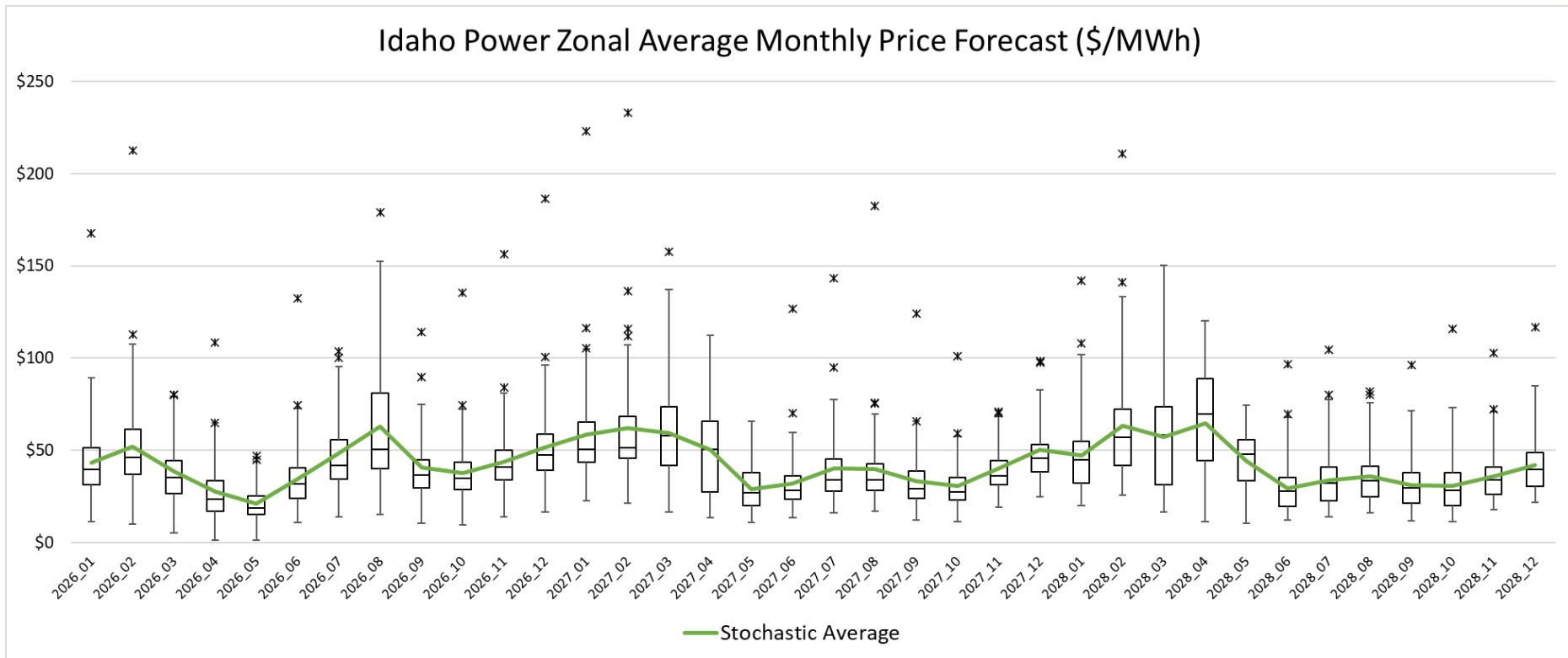


AURORA



Portfolio Output
Variations

Recap: Stochastic Variable Outputs



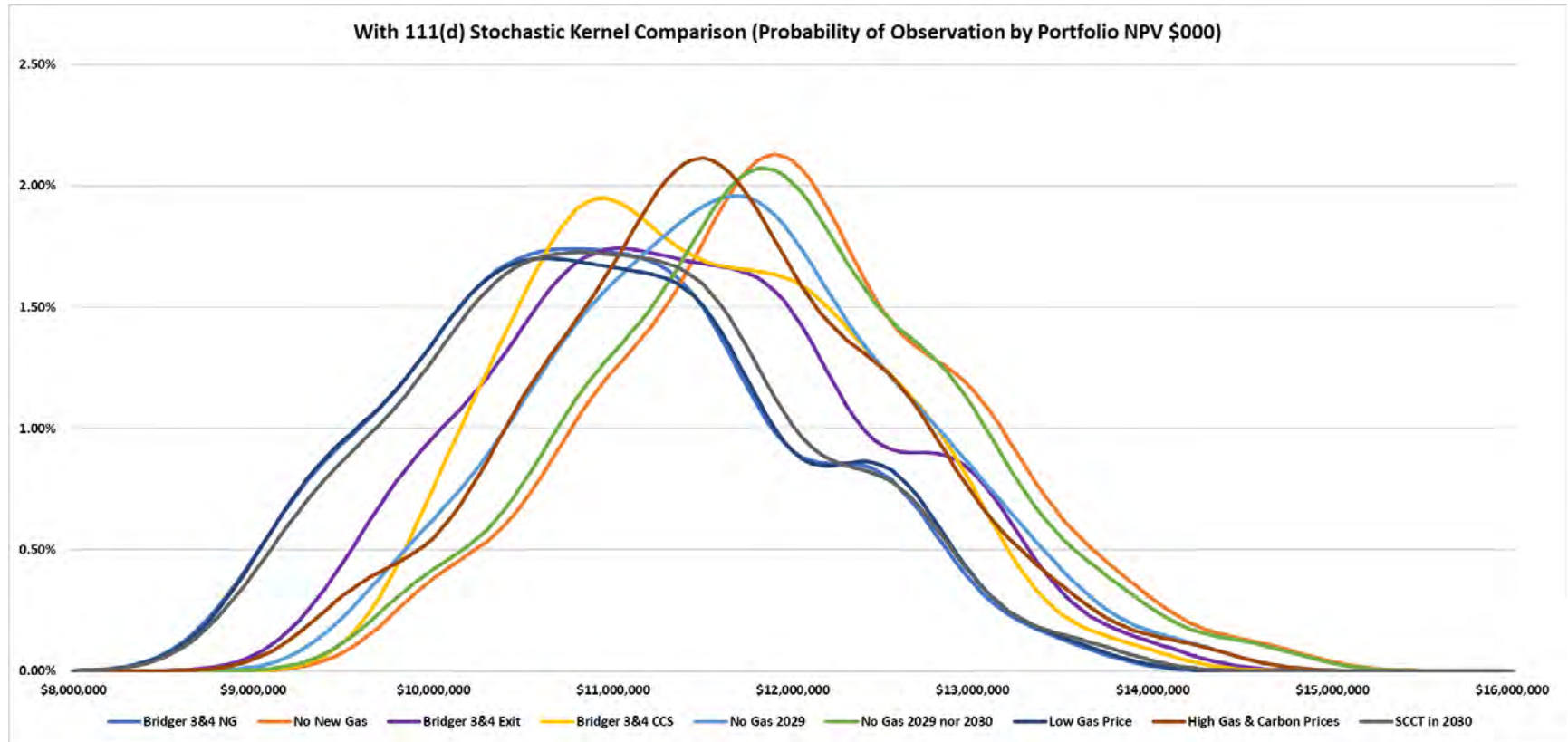
Portfolio Cost Output

Portfolio	Iteration 1	Iteration 2	Iteration 3	Iteration 4	Iteration 5
P1	\$9,523,939	\$11,353,543	\$10,911,280	\$10,957,648	\$10,022,641
P2	\$10,054,823	\$11,901,356	\$11,380,258	\$11,389,744	\$10,533,610
P3	\$10,640,301	\$12,137,871	\$11,402,917	\$11,336,532	\$10,705,469
P4	\$9,525,729	\$11,540,808	\$11,043,388	\$11,012,466	\$10,130,025
P5	\$10,022,984	\$12,192,563	\$11,843,540	\$11,677,751	\$10,957,144
P6	\$10,087,173	\$12,545,122	\$12,132,346	\$11,966,988	\$11,359,995
P7	\$9,543,259	\$11,448,979	\$10,920,583	\$10,958,687	\$10,052,382
P8	\$9,757,109	\$12,202,391	\$11,874,942	\$11,657,981	\$11,015,868
P9	\$10,132,336	\$12,649,175	\$12,211,891	\$12,084,567	\$11,401,668

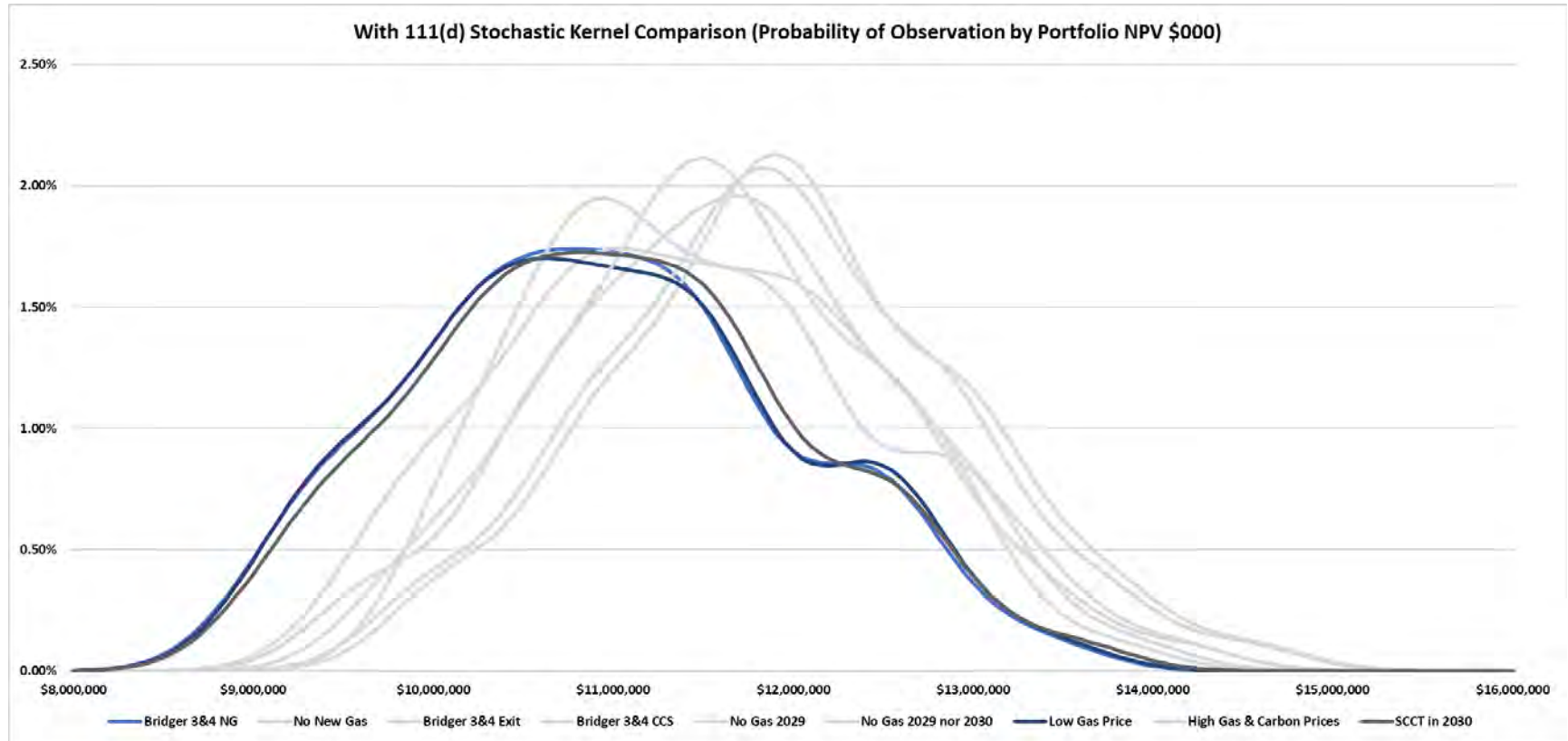
● ● ●

Iteration 57	Iteration 58	Iteration 59	Iteration 60
\$11,367,490	\$10,686,036	\$11,141,368	\$9,466,300
\$11,848,622	\$11,095,593	\$11,670,876	\$9,976,589
\$11,762,297	\$11,114,428	\$11,783,770	\$10,303,678
\$11,447,922	\$10,746,339	\$11,165,279	\$9,580,337
\$12,029,825	\$11,522,022	\$11,894,475	\$10,411,579
\$12,216,200	\$11,828,370	\$12,172,003	\$10,746,653
\$11,429,051	\$10,651,356	\$11,151,054	\$9,447,242
\$11,848,458	\$11,519,258	\$11,888,071	\$10,451,964
\$12,258,036	\$11,948,260	\$12,190,710	\$10,817,597

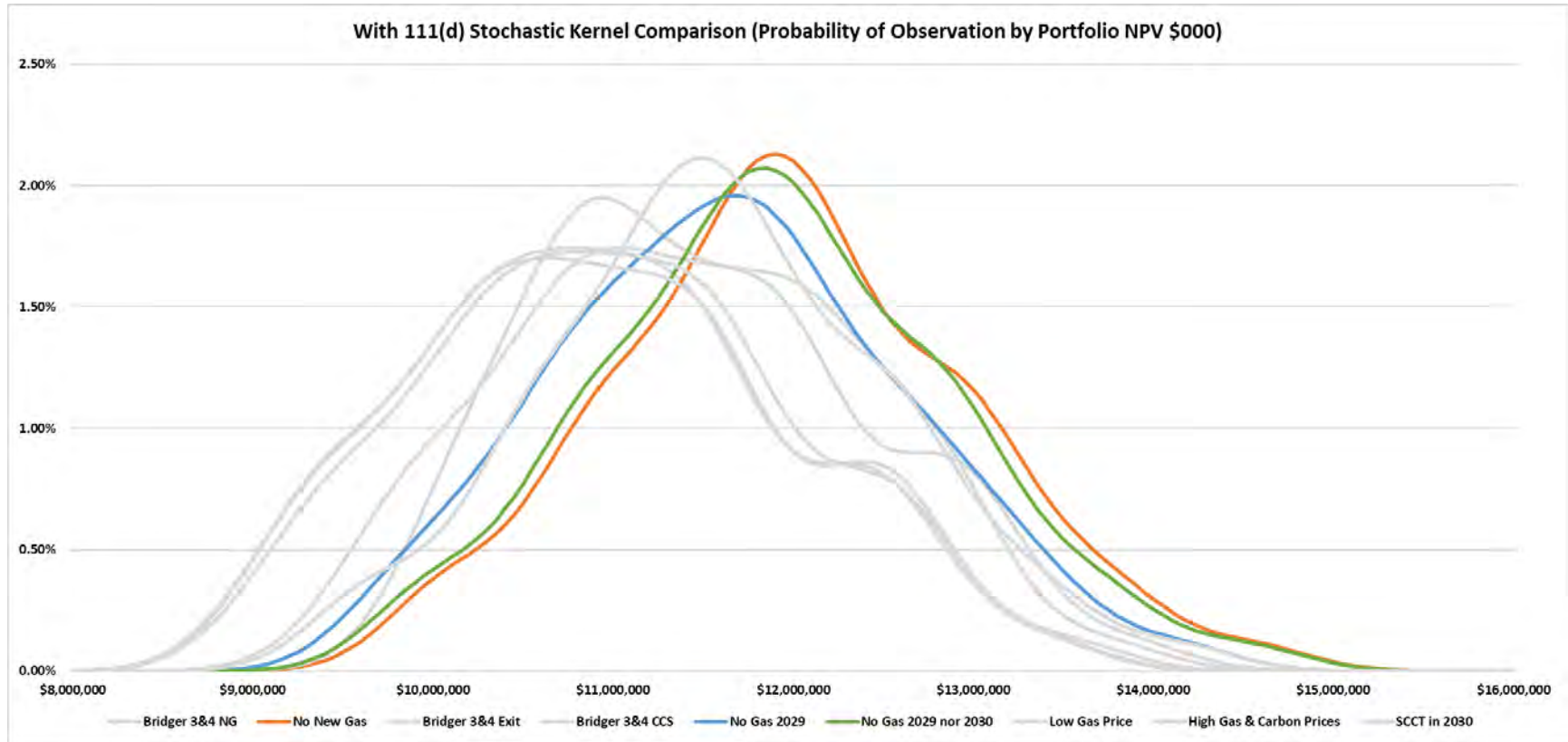
With 111(d) Kernels



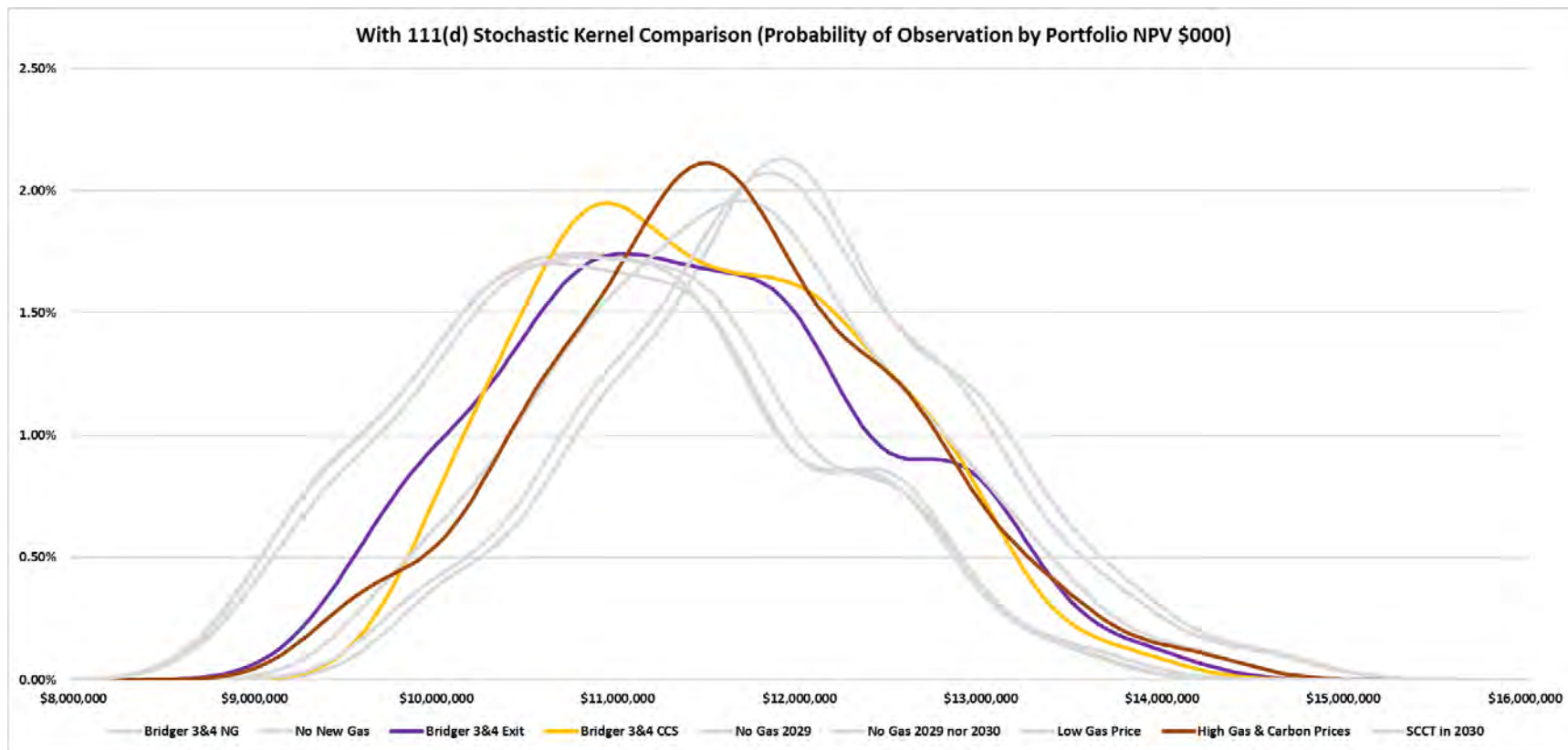
With 111(d) Kernels



With 111(d) Kernels



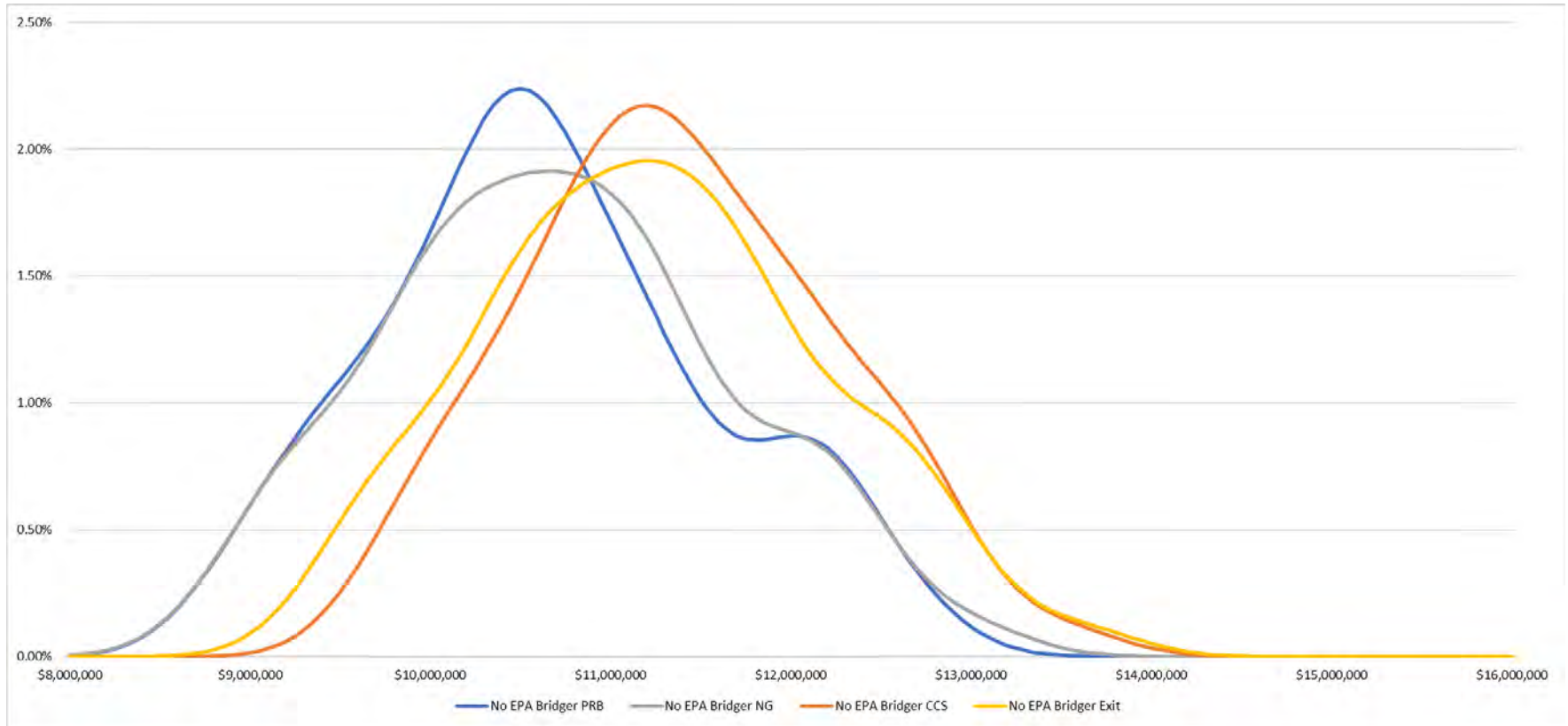
With 111(d) Kernels



With 111(d) Ranking Table

Rank	With 111(d) Portfolio	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
1	Bridger 3&4 NG	38	19	2	0	1	0	0	0	0
2	Low Gas Price	15	32	10	2	0	0	1	0	0
3	SCCT 2030	5	8	47	0	0	0	0	0	0
4	Bridger 3&4 Exit	0	0	0	33	16	6	2	2	1
5	Bridger 3&4 CCS	0	0	0	14	31	3	5	2	5
6	High Gas & Carbon Prices	2	1	0	10	8	13	26	0	0
7	No Gas 2029	0	0	0	0	4	36	20	0	0
8	No Gas 2029/2030	0	0	0	1	0	2	5	51	1
9	No New Gas	0	0	1	0	0	0	1	5	53

Without 111(d) Cases



Without 111(d) Ranking Table

Rank	Without 111(d) Portfolio	1st	2nd	3rd	4th
1	Bridger 3&4 PRB	36	22	2	0
2	Bridger 3&4 NG	24	36	0	0
3	Bridger 3&4 Exit	0	2	49	9
4	Bridger 3&4 CCS	0	0	9	51

Questions and Answers

