

| Farmington IRP 2022

Farmington City Council
September 27, 2022

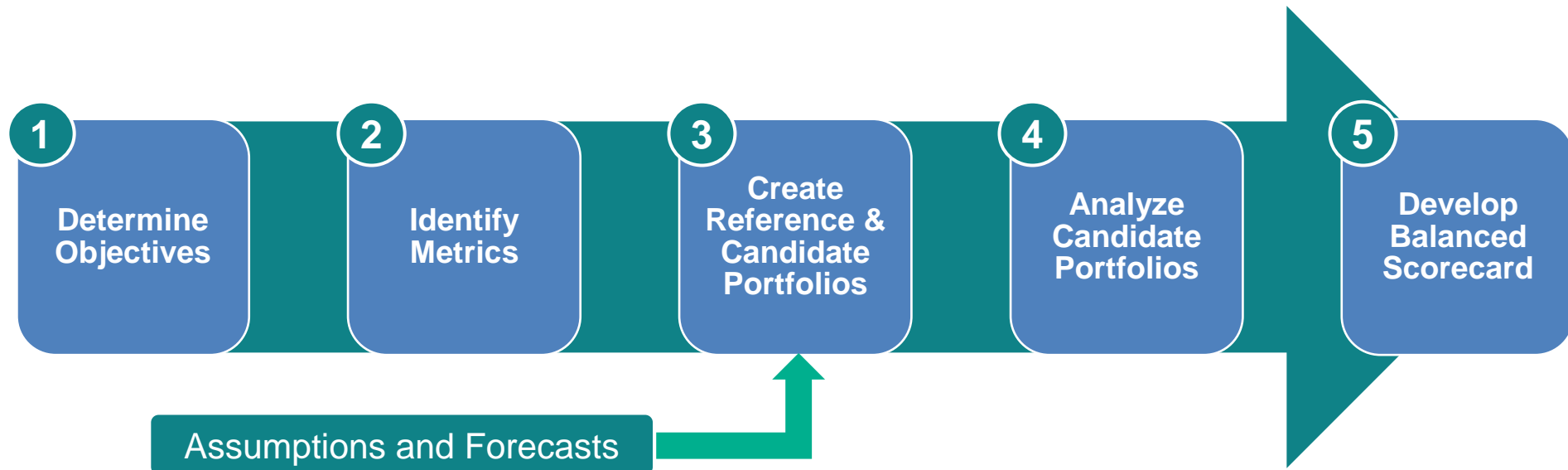
Executive Summary

- A 5-step IRP process was conducted jointly by Siemens PTI and Farmington (“Team”)
- The team spent over a year conducting analysis and incorporating feedback from Operations and Management
- Periodic reviews were conducted with Commissioners to keep them updated on the results and answer any questions during each step of the process
 - On September 14, the Commission unanimously approved Farmington’s IRP at 11-0
- After extensive analysis, which included running 200 iteration monte carlo simulation, around key uncertainties such as capital cost, fuel cost, load, and CO₂ pricing, the team ranked the 8 candidate portfolios based on the goals and metrics identified early in the project
- The two highest scoring candidate portfolios are
 - SJ 2037 - 15% Market Exposure (Reference)
 - SJ 2022 – 15% Market Exposure High Commodity (SJ 2022- 15% HC)
- Both high-scoring portfolios have different technology mix (particularly in the near term), therefore contingency planning will be required due to the uncertainty of San Juan (SJ) retirement to ensure projects are executed on schedule in the event SJ is retired in 2022 or near term

IRP 5-Step Process

Siemens PTI applies the following 5-Step process for modeling, analyzing, and reporting the Reference Portfolio and Candidate Portfolios related to Farmington's IRP. The process, detailed below, provides a holistic approach to identifying the Preferred Portfolio that best meets Farmington's defined objectives and metrics over a wide range of potential future conditions.

Siemens PTI: Approach to Integrated Resource Plan Modeling



Farmington IRP is focused on 4 key categories with clearly identified objectives and metrics for evaluating candidate portfolios

Category	Objective	Metric	Weighting
1 Affordability	Preserve Competitive Rates	• Net Present Value (NPV) Cost to Serve Load 2022-2040 (Average across market conditions, \$2019 Millions)	10%
	Preserve Competitive Rates	• NPV Cost to Serve Load 2022-2027 (Average across market conditions, \$2019 Millions)	10%
	Capital Investment	• Capital Expenditure for New Generation in 2024-2025 (\$Millions Nominal)	30%
2 Risk	Cost Risk	• 95th Percentile Value of NPV Cost to Serve Load (across market conditions, \$2019 Millions)	10%
	Minimize Operational and Control risks	• Farmington Operated Capacity excluding renewables (2030, MW)	5%
	Market Risk Minimization	• NPV of Spot Energy Market Purchases 2022-2040 (Average across market conditions, \$2019 Millions)	5%
3 Environmental	Reduce CO ₂ Footprint	• Total CO ₂ Emissions Reductions by 2040 as compared to 2021	5%
	Renewable Generation	• Percentage of Electric Generation from Renewables in 2040	5%
4 Operability	Manage Largest Contingency	• Firm capacity available to meet load when largest unit trips (average available capacity 2024-2030)	10%
	Fast Ramping Capability	• Lowest Ratio of Fast Ramping To Renewable Capacity in the Planning Horizon (Min 50%)	10%

Based on input from Farmington, eight candidate portfolios were developed to ensure IRP team captures all relevant scenarios for further analysis

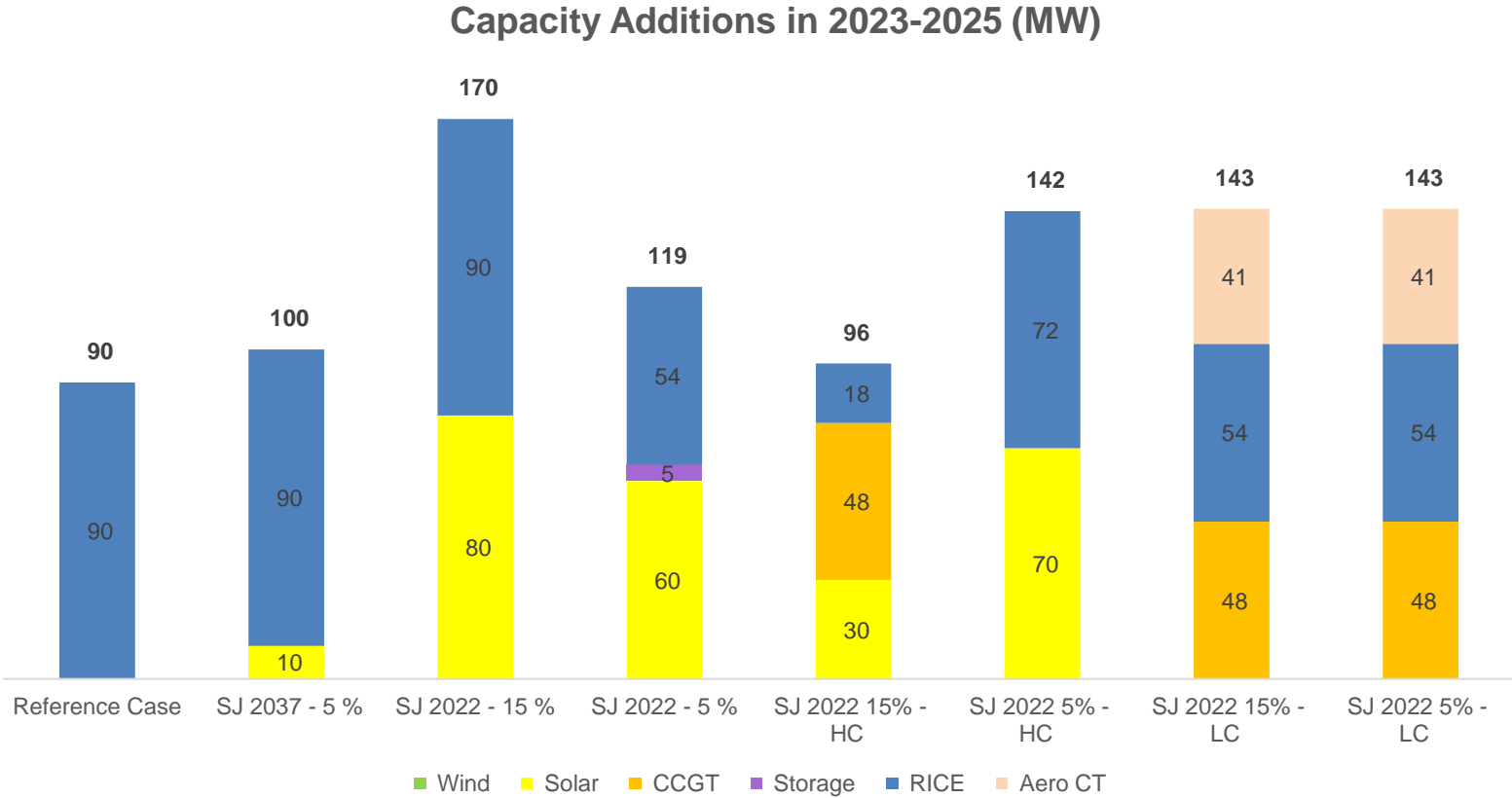
Scenario Element	Candidate Portfolios							
	SJ 2037 - 15% Market Exposure (Reference)	SJ 2037 - 5% Market Exposure (SJ 2037 - 5%)	SJ 2022 - 15% Market Exposure (SJ 2022 - 15%)	SJ 2022 - 5% Market Exposure (SJ 2022 - 5%)	SJ 2022 - 15% Market Exposure High Commodity (SJ 2022 - 15% HC)	SJ 2022 - 5% Market Exposure High Commodity (SJ 2022 - 5% HC)	SJ 2022 - 15% Market Exposure Low Commodity (SJ 2022 - 15% LC)	SJ 2022 - 5% Market Exposure Low Commodity (SJ 2022 - 5% LC)
San Juan Retirement Date	End of 2037	End of 2037	End of Sept. 2022	End of Sept. 2022	End of Sept. 2022	End of Sept. 2022	End of Sept. 2022	End of Sept. 2022
Delivered Coal and NG Price	Base	Base	Base	Base	High	High	Low	Low
Max Purchase and Sales Exposure to Market (% of Annual Load)	15%	5%	15%	5%	15%	5%	15%	5%

Portfolio naming convention:

- SJ 2022 or SJ 2037 refers to retirement date for San Juan coal plant
- Market exposure 15% & 5% refers to % of annual load that can be purchased or sold in the market
- HC or LC refers to High or Low commodity prices outlook for fuel

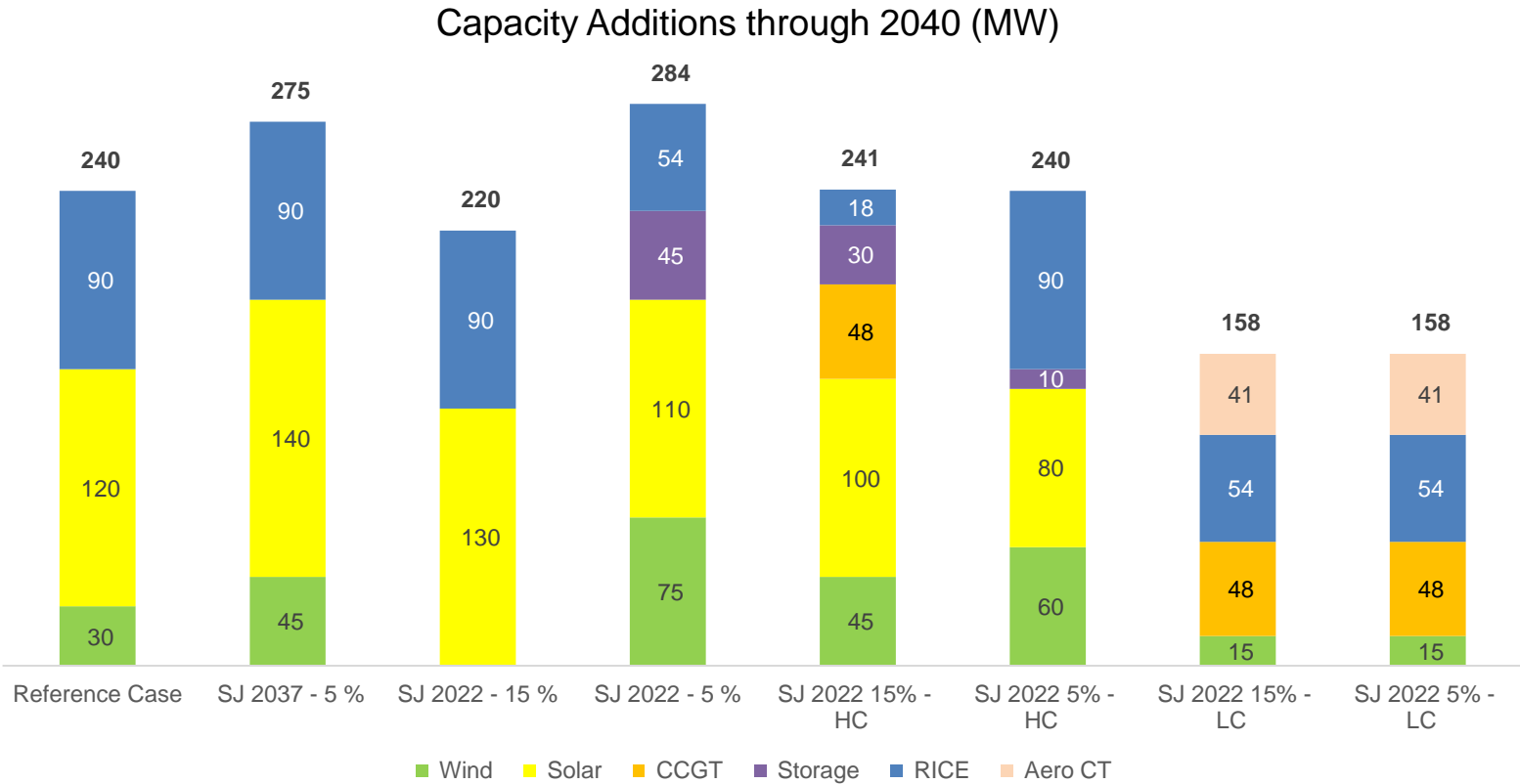
Results from the step 3 analysis, yield the following generation build that meets IRP objectives

Minimum 90 MW of generation capacity required across all portfolios



- RICE natural gas selected in all Portfolios
- Solar is selected when SJ is retired in 2022 to meet base load needs (except for Low Commodity Portfolios)
- A 48 MW 1x1 CCGT is selected in 3 Portfolios
- A 41 MW Aero Simple Cycle Peaker is selected in Low Commodity Cases

Beyond 2025, analysis show renewable capacity additions increasing through 2040



- Portfolios provide a range of technology options
- Wind selected after 2030 (most portfolios) to support generation at night
- Portfolios with renewables require more installed capacity (not available in all hours nor dispatchable)

Renewable capacity additions are not firm. Therefore, more capacity is required. However, due to their lower levelized cost, it is selected in various portfolios.

Balance score card results in Reference and SJ 2022 – 15% High Commodity with highest scores

Green = Favorable
Red = Less Favorable

Categories	Objectives	IRP Metric	Weight	Reference: SJ 2037- 15% Mrk. Limit	SJ 2037- 5% Mrk. Limit	SJ 2022- 15% Mrk. Limit	SJ 2022- 5% Mrk. Limit	SJ 2022- 15% High Commodity	SJ 2022- 5% High Commodity	SJ 2022- 15% Low Commodity	SJ 2022- 5% Low Commodity
Affordability	Preserve Competitive Rates	Net Present Value (NPV) Cost to Serve Load 2022-2040 (Average across market conditions, \$2019 Millions)	10%	\$516	\$542	\$530	\$531	\$524	\$557	\$581	\$598
	Preserve Competitive Rates	NPV Cost to Serve Load 2022-2027 (Average across market conditions, \$2019 Millions)	10%	\$210	\$222	\$218	\$220	\$212	\$224	\$231	\$241
	Capital Investment	Capital Expenditure for New Generation in 2024-2025 (\$Millions Nominal)	30%	\$121	\$134	\$229	\$160	\$129	\$192	\$191	\$192
Risk	Cost Risk	95th Percentile Value of NPV (\$Millions)	10%	\$638	\$654	\$653	\$696	\$648	\$670	\$723	\$743
	Minimize Operational and Control risks	Farmington Controlled Capacity (2030, MW)	5%	149	159	149	178	155	149	161	161
	Market Risk Minimization	NPV Energy Market Purchases 2022-2040 (Average, \$Millions)	5%	\$76	\$49	\$90	\$59	\$89	\$58	\$83	\$53
Sustainability	Reduce CO ₂ Footprint	CO ₂ Emissions Reductions by 2040	5%	-45%	-49%	-38%	-57%	-53%	-50%	-23%	-25%
	Renewable Generation	Renewable Penetration by 2040	5%	38%	41%	31%	50%	43%	41%	11%	11%
Reliability	Manage Largest Contingency (N-1)	Firm Capacity available to met largest contingency including SRSg (Min 16 MW)	10%	61	67	59	30	39	54	65	68
	Fast Ramping Capability	Ratio Fast Ramping To Renewable Capacity in Single year (Min 50%)	10%	59%	48%	68%	52%	65%	51%	100%	100%
Total Score				6.4	4.7	3.8	5.4	6.5	3.9	3.0	2.8



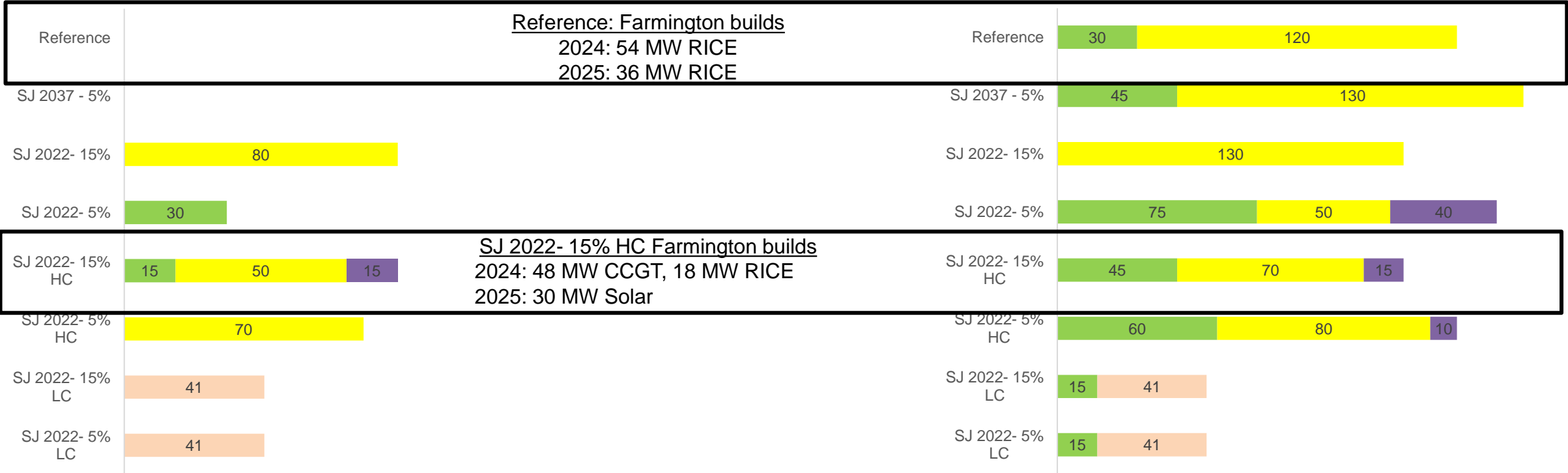
With ~\$150 M capital cost limit, Farmington will require PPAs to supplement generation requirement to meet IRP objectives around market risk and reliability

All units in MW

PPA Capacity 2022-2030*

■ Wind ■ Solar ■ Storage ■ Aero CT

PPA Capacity (2022-2040)



~100 MW of generation capacity could be built by Farmington with current capital constraint

*Note: SJ 2022 retirement cases require 40 MW short term PPA while new capacity comes online. This short term PPA is not include in the charts but is reflected in the IRP analysis.



Key Takeaways

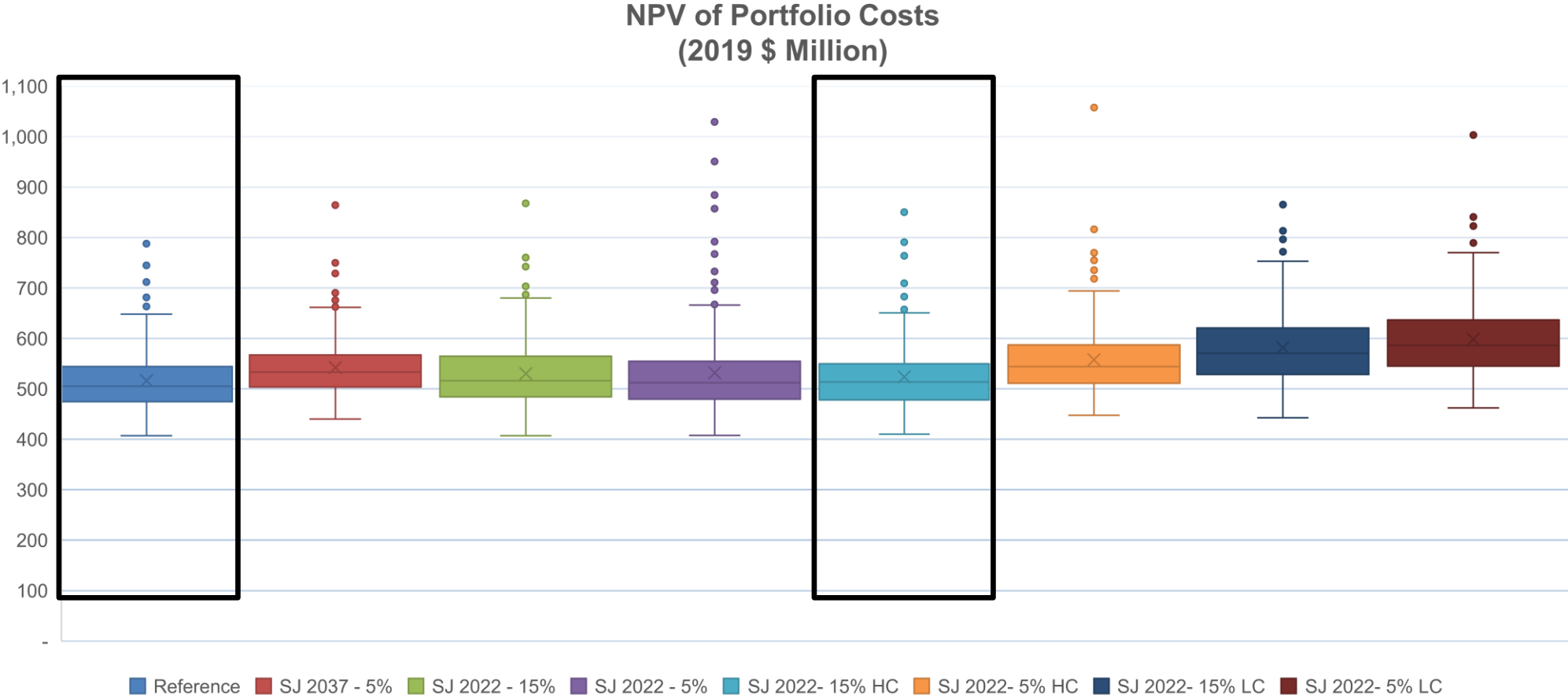
- Farmington will require generation capacity in the near term and longer term to meet its objectives, particularly around reliability and market exposure. All portfolios meet 150 MW firm generation requirement
- Portfolios with 15% market exposure have lower costs vs. portfolios with 5% market exposure. Lower market exposure portfolios have higher capital costs, particularly in the near term
- Farmington's ~\$150 M capital cost limit will require PPAs to supplement generation requirement to meet IRP objectives. Approximately 100 MW of generation capacity could be built with the capital constraint
- Reference portfolio and SJ 2022 – 15% High Commodity are the highest scoring portfolios, though, they have different generation build
- High level engineering and site studies should be conducted, while uncertainty around SJ retirement date is mitigated or preferred portfolio is selected

Appendix

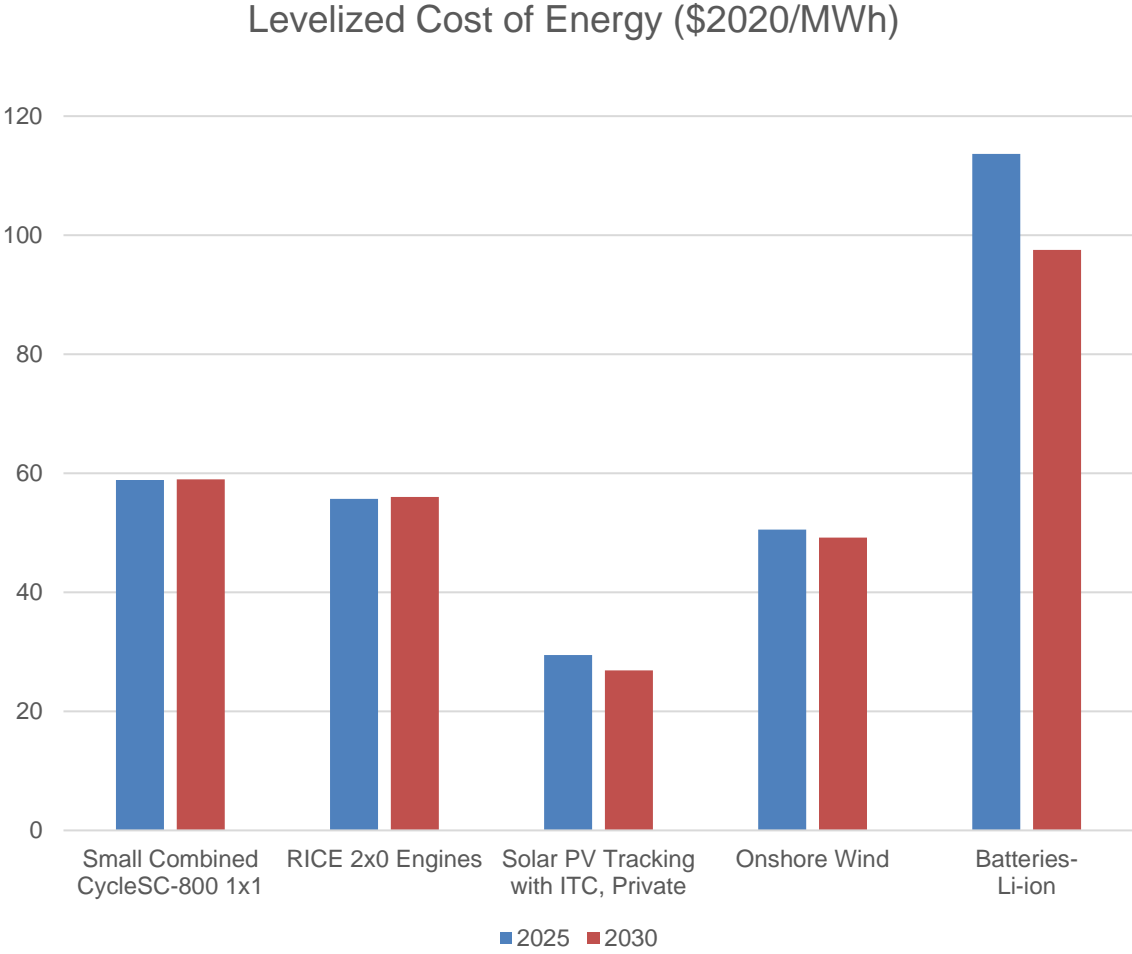
Passing of the Inflation Reduction Act 2022 has created tax incentives for generating technologies that have zero emissions

- Solar PV tax incentives have been increased and extended through 2034 with 30% tax credits available through 2032
- Battery Storage (stand-alone and hybrid) tax incentives have been increased consistent with Solar PV
- On-shore Wind receives production tax credits
- Carbon Capture and Sequestration projects may also qualify for production tax credits
- Incentives for tax credits will vary from project to project depending on local wage and apprentice requirements and other factors

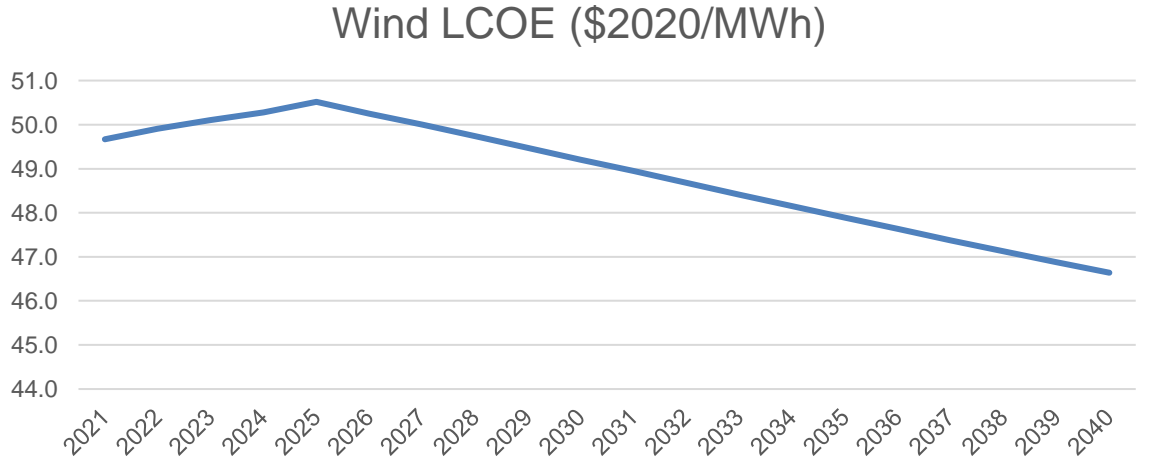
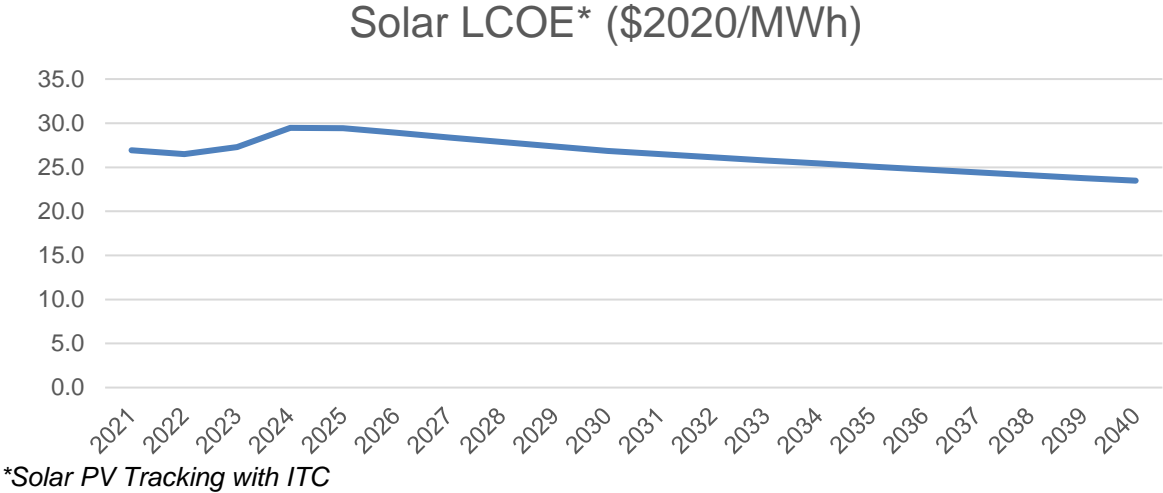
NPV of Portfolio Costs shows the Reference and SJ 2022 15% HC with lowest average NPV and Cost Risk



Levelized Cost of Energy (\$2020/MWh)

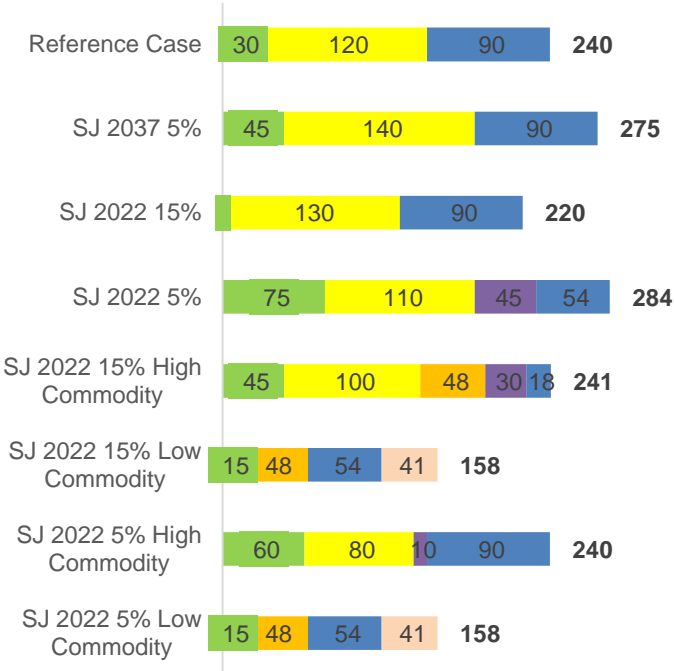


Note: LCOE does not reflect IRA 2022

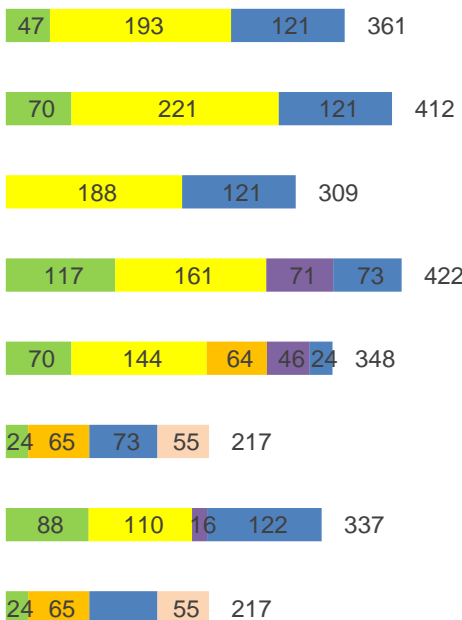


Farmington's candidate portfolios show 158 MW to 284 MW of new generation, with expected nominal capital cost ranging from \$217M to \$422M through 2040

Generation Capacity Expansion - MW



Nominal Spend - \$M



Cumulative Nominal Capex- \$M

