WORK SESSION MINUTES – WEDNESDAY, JULY 3, 2023

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The Board of Public Utilities of Kansas City, Kansas (aka BPU, We, Us, Our) met in Work Session on Wednesday, July 3, 2024 at 4:30 PM. The following Board Members were present: Thomas Groneman, President; David Haley, Vice President; Stevie A. Wakes Sr., Secretary; Mary Gonzales, Rose Mulvany Henry and Brett Parker.

Also present: William Johnson, General Manager; Angela Lawson, Acting Chief Counsel; Jeremy Ash, Chief Operating Officer; Lori Austin, Chief Financial Officer; Abbey Frye, Chief Administrative Officer; Andrew Ferris, Director Financial Planning; Patrice Townsend, Director Utility Services; Ingrid Setzler, Director Environmental Services; Douglas Bowen, Director Electric Production Operations/Maintenance; Nicholas Moreno, Communications Coordinator; and Robert Kamp, IT Project Manager.

A video of this meeting is on file at the Board of Public Utilities and can be found on the BPU website, www.bpu.com.

Mr. Groneman called the meeting to order at 4:30 PM.

Roll call was taken. All members were present, except for Mr. Haley, who arrived at 4:32 PM.

Item #3 –Approval of Agenda

A motion was made to approve the Agenda, by Ms. Mulvany Henry, seconded by Mr. Wakes, and unanimously carried.

Item #4 –Board Update/GM Update

There were no updates provided.

Item #5 – IRP Objectives – Black & Veatch

Mr. Chuck Poston and Mr. Gary Wilmes, with Black & Veatch, continued the Integrated Resource Plan (IRP) presentation and discussion with the Board. (See attached PowerPoint.) Topics included:

- Forecasting firm capacity requirements, which included capacity surplus and deficit amounts, throughout the IRP planning period.

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- Alternative resources to meet firm capacity needs, such as, purchased capacity and expansion candidates.

- Focus on the preliminary results of the Base Case, which assumed operations consistent with the status quo.

- The need to add new generating facilities, beginning 2038, to meet capacity requirements.

- Economic conditions to consider prior to retiring an existing unit, including capital costs.

A layout of the project timeline with the final IRP action plan being presented to the Board on August 21st for approval. The timeline was tentative and could be adjusted.

Mr. Poston, Mr. Wilmes, Mr. Johnson, and Mr. Ferris, responded to questions and comments from the Board.

Item #6 – Economic Development Fund Proposal

Ms. Patrice Townsend, Director Utility Services, provided information to the Board regarding fund requests from Y Lofts and Cottages at Village West. She gave a recap of each request and the Board decided to have resolutions presented at the July 17th Board meeting with different award amounts then were requested by the applicants.

Mr. Johnson informed the Board of a change to the original requirements on a previously approved Economic Development fund request for Kansas City Kansas Community College (KCKCC) downtown campus. He said he would send the information to the Board for their review.

Item #7 – Adjourn

A motion was made to adjourn the Work Session at 5:57 PM by Mr. Parker, seconded by Mr. Wakes and unanimously carried.

WORK SESSION MINUTES – WEDNESDAY, JULY 3, 2023

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ATTEST:

Secretary

APPROVED:

President

BLACK & VEATCH

2024 Integrated Resource Plan

Kansas City Board of Public Utilities

July 3, 2024

Agenda

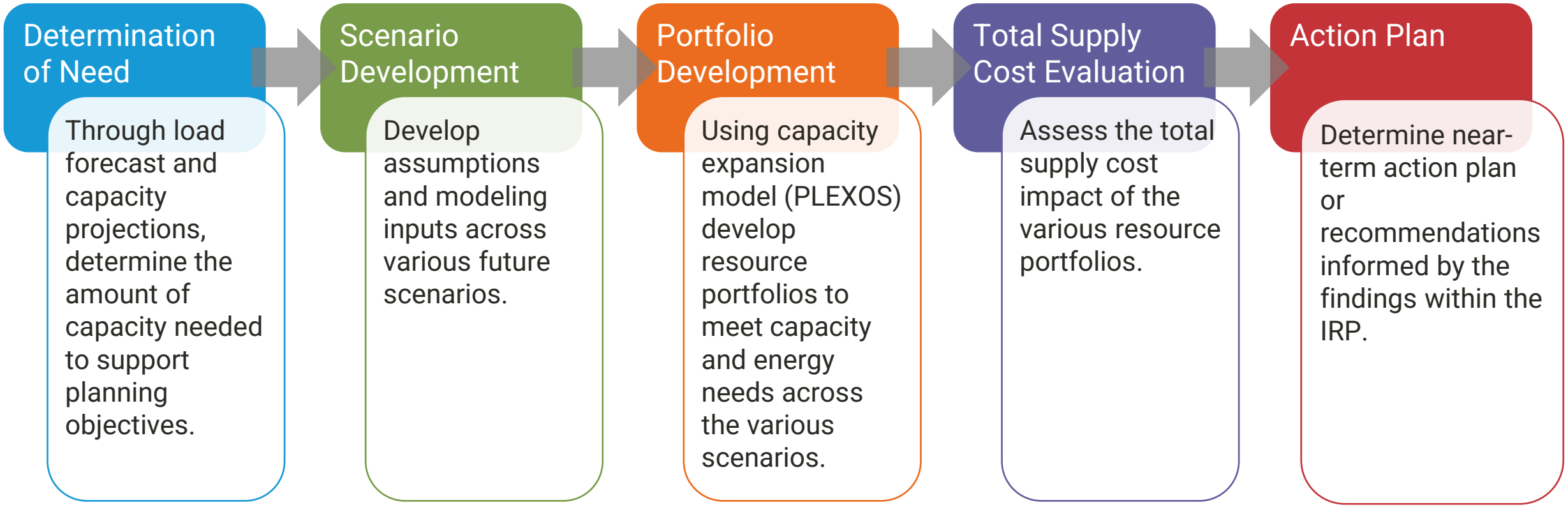
- Analytical Framework
- Base Case Capacity Requirements
- Resource Alternatives
- Capital Cost Assumptions
- Initial Base Case Results
- Project Schedule

BLACK & VEATCH

Analytical Framework

Analytical Framework

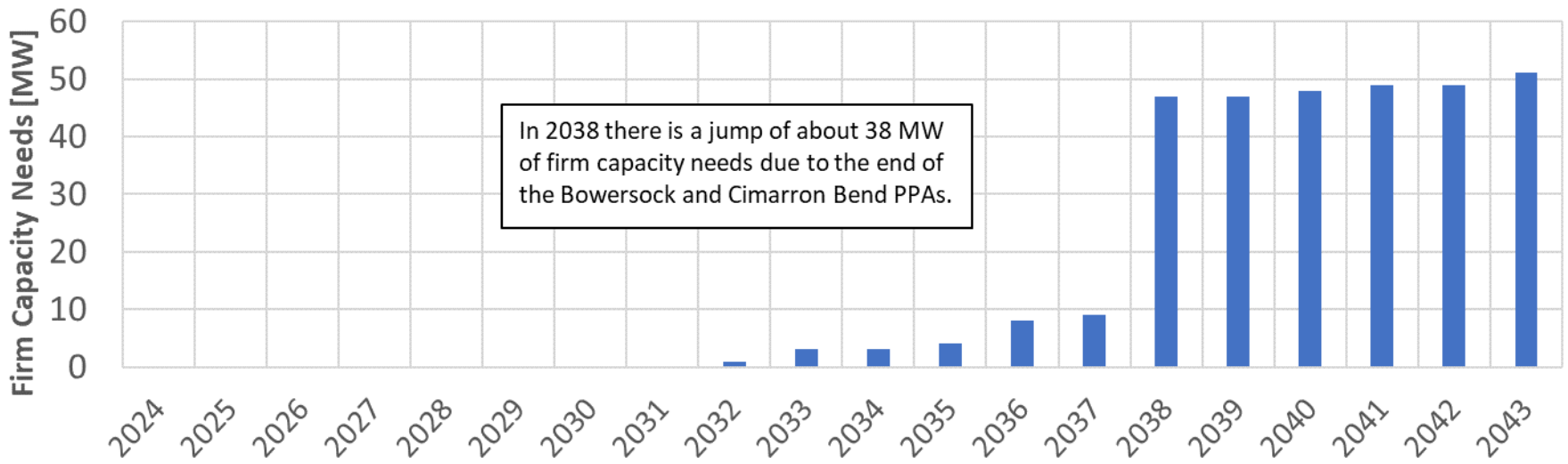
There are four phases to the IRP analysis that ultimately provides insights into BPUs strategy and near-term action plan to address its long-term resource needs.



Base Case Capacity Requirements

Forecast Firm Capacity Requirements

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Nearman Creek (1)	240.0	240.0	240.0	220.8	220.8	220.8	220.8	220.8	220.8	220.8	220.8	220.8	220.8	220.8	220.8	220.8	220.8	220.8	220.8	220.8
Nearman Creek (CT4)	81.0	81.0	81.0	74.5	74.5	74.5	74.5	74.5	74.5	74.5	74.5	74.5	74.5	74.5	74.5	74.5	74.5	74.5	74.5	74.5
Dogwood	105.0	105.0	105.0	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8	99.8
Quindaro (GT2)	43.0	43.0	43.0	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6
Quindaro (GT3)	48.0	48.0	48.0	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2
SWPA Hydro	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6
WAPA Hydro	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Bowersock Hydro	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0						
Oak Grove (G1)	1.6	1.6	1.6	1.6	1.6	1.6														
Oak Grove (G2)	1.95	1.95	1.95	1.95	1.95	1.95														
Smoky Hills Wind	3.8	3.8	3.8	3.8																
Alexander Wind	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8								
Cimarron Bend Wind	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0						
BPU Solar	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
KC BPU Total:	**609**	**609**	**609**	**571**	**567**	**567**	**564**	**564**	**564**	**564**	**564**	**564**	**560**	**560**	**523**	**523**	**523**	**523**	**523**	**522**
System Peak	487	487	488	488	489	489	490	490	491	492	492	493	493	494	495	495	496	497	497	498
System Peak + Capacity Margin (15%)	560.1	560.1	561.2	561.2	562.4	562.4	563.5	563.5	564.7	565.8	565.8	567.0	567.0	568.1	569.3	569.3	570.4	571.6	571.6	572.7
Capacity Surplus/(Deficit)	**49.0**	**49.0**	**47.9**	**9.8**	**4.9**	**4.9**	**0.2**	**0.2**	**(1.0)**	**(2.1)**	**(2.1)**	**(3.3)**	**(7.1)**	**(8.2)**	**(46.4)**	**(46.4)**	**(47.5)**	**(48.7)**	**(48.7)**	**(50.4)**



Resource Alternatives

Capacity Purchases

- In the PLEXOS Expansion Planning model, a maximum of 20 MW of firm capacity can be purchased for any one year with a one-year term.

- The result of this limitation is that by 2038, actions will need to be taken to secure other sources of firm capacity.

		5% / year increase	5% / year increase adjusted for inflation*
Year	MW needed	Nominal$/kW-month	2024$/kW-month
2024	0	$7.00	$7.00
2025	0	$7.35	$7.17
2026	0	$7.72	$7.35
2027	0	$8.10	$7.52
2028	0	$8.51	$7.71
2029	0	$8.93	$7.90
2030	0	$9.38	$8.09
2031	1	$9.85	$8.29
2032	2	$10.34	$8.49
2033	2	$10.86	$8.70
2034	3	$11.40	$8.91
2035	4	$11.97	$9.12
2036	8	$12.57	$9.35
2037	9	$13.20	$9.58
2038	47	$13.86	$9.81
2039	47	$14.55	$10.05
2040	48	$15.28	$10.29
2041	49	$16.04	$10.54
2042	49	$16.85	$10.80
2043	51	$17.69	$11.06

**The long-term inflation rate is assumed to be 2.5%/year.*

Expansion Candidates

Resource Type	Max Capacity [MW]	Firm Capacity [MW]
1x0 LM6000 PF+	54.8	50.96
1x1 LM6000 PF+ DF	93.3	86.77
2x1 LM6000 PF+ DF	189	175.77
3x1 LM6000 PF+ DF	284.1	264.21
Biomass	5	4.65
Percentage of New Combined Cycle Facility	50	46.50
1x0 RICE	18.17	16.90
Simple Cycle Combustion Turbine	237	220.41
Solar Farm with Production Tax Credits (PTCs)	25	15.50
Solar Farm with Investment Tax Credits (ITCs)	25	15.50
Battery Storage (4-hr)	25	16.25
Wind Farm	25	3.75

- A mix of large/small capacity thermal, renewable, and storage resources are available within the model as potential expansion candidates.
- The model is allowed to build multiple units of the different expansion options to build up larger amounts of capacity if needed.

PF+ - Latest technology for performance and flexibility; DF – Duct Firing; RICE – Reciprocating Internal Combustion Engine

Existing Unit Retirements

Within the model, all existing fossil fuel-fired power plants are allowed to retire starting in 2028.

If economic conditions warrant retirement, the model will remove the existing unit and replace it with new generation assets.

The additional capital costs for the next 20 years that were developed in the Black & Veatch “Life Assessment Report” for the Nearman and Quindaro units have been added into the model inputs.

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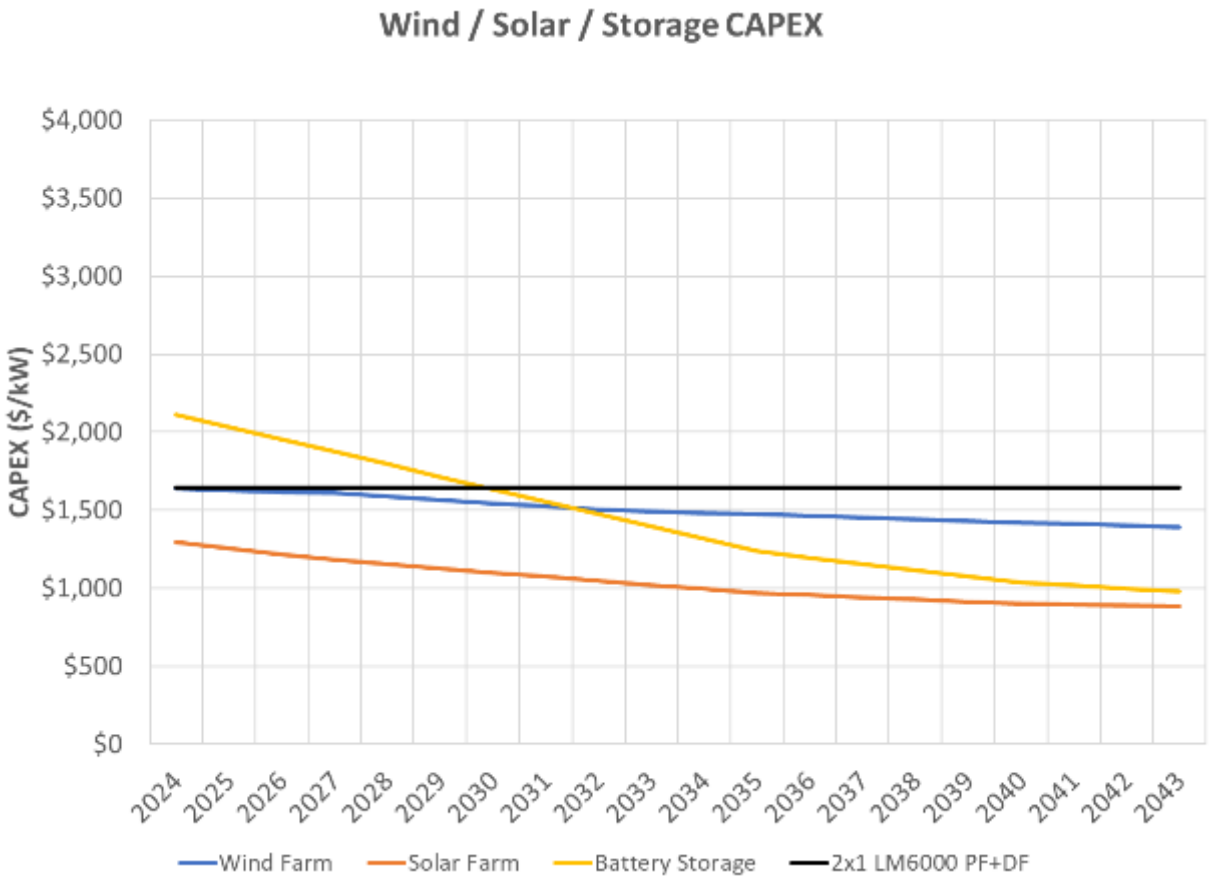
Capital Cost Assumptions

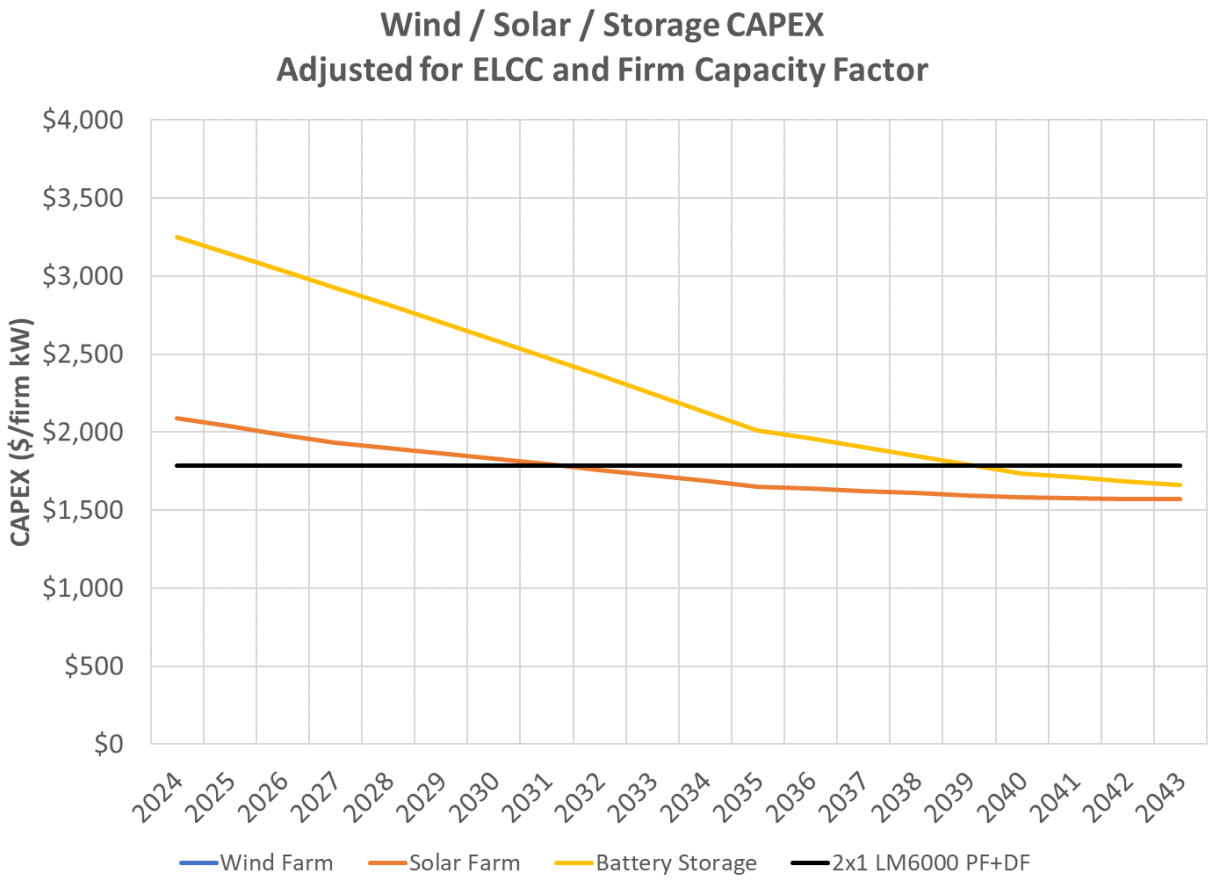
Capital Costs for New Generation

Black & Veatch assumes a long-term negative trend in capital costs for wind, solar, and storage technologies.

For modeling purposes, capital costs for thermal generation technologies are assumed to be constant in real dollar terms (2024$) during the study period.

Capital Costs for New Wind/Solar/Storage





Capital Costs for New Thermal Generation

Resource Type	Max Capacity [MW]	Firm Capacity [MW]	Capital Cost [2024$/kW]	Capital Cost [2024$/kW] Adjusted for Firm Capacity
1x0 LM6000 PF+	54.8	50.96	2,049	2,228
1x1 LM6000 PF+ DF	93.3	86.77	1,753	1,905
2x1 LM6000 PF+ DF	189	175.77	1,643	1,786
3x1 LM6000 PF+ DF	284.1	264.21	1,540	1,674
Biomass	5	4.65	4,736	5,148
Percentage of New Combined Cycle Facility	50	46.50	1,205	1,310
1x0 RICE	18.17	16.90	1,740	1,891
Simple Cycle Combustion Turbine	237	220.41	942	1,024

PF+ - Latest technology for performance and flexibility; DF – Duct Firing; RICE – Reciprocating Internal Combustion Engine

Initial Base Case Results

Planning Scenarios

- The IRP will rely on ten scenarios to assess a variety of portfolio options and market drivers to understand the impact of those potential scenarios and associated portfolios have on the BPU system.
- Scenario 1 is considered the “Base Case” and assumes operations consistent with the status quo.
- This presentation focuses on the preliminary results of the Base Case.

Scenario 1
Base Case

Scenario 2
Co-Firing of Natural Gas at Nearman Creek 1

Scenario 3
Nearman Creek 1 Carbon Capture and Storage

Scenario 4
Nearman Creek 1 NOx Controls

Scenario 5
High Fuel Price Sensitivity

Scenario 6
Low Fuel Price Sensitivity

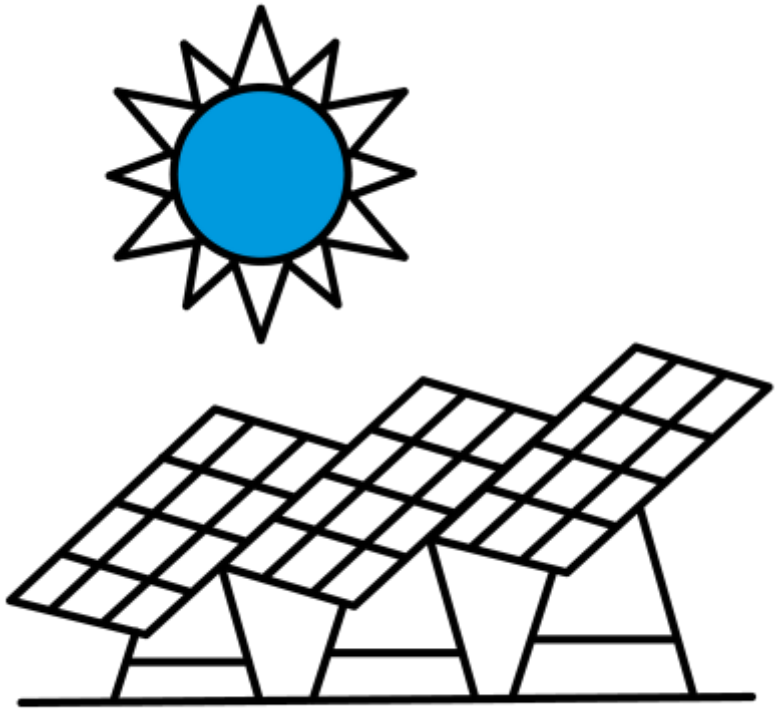
Scenario 7
High Load Growth Sensitivity

Scenario 8
High Reserve Requirement Sensitivity

Scenario 9
Net Zero Target

Scenario 10
2028 Combustion Turbines

Initial Base Case Results



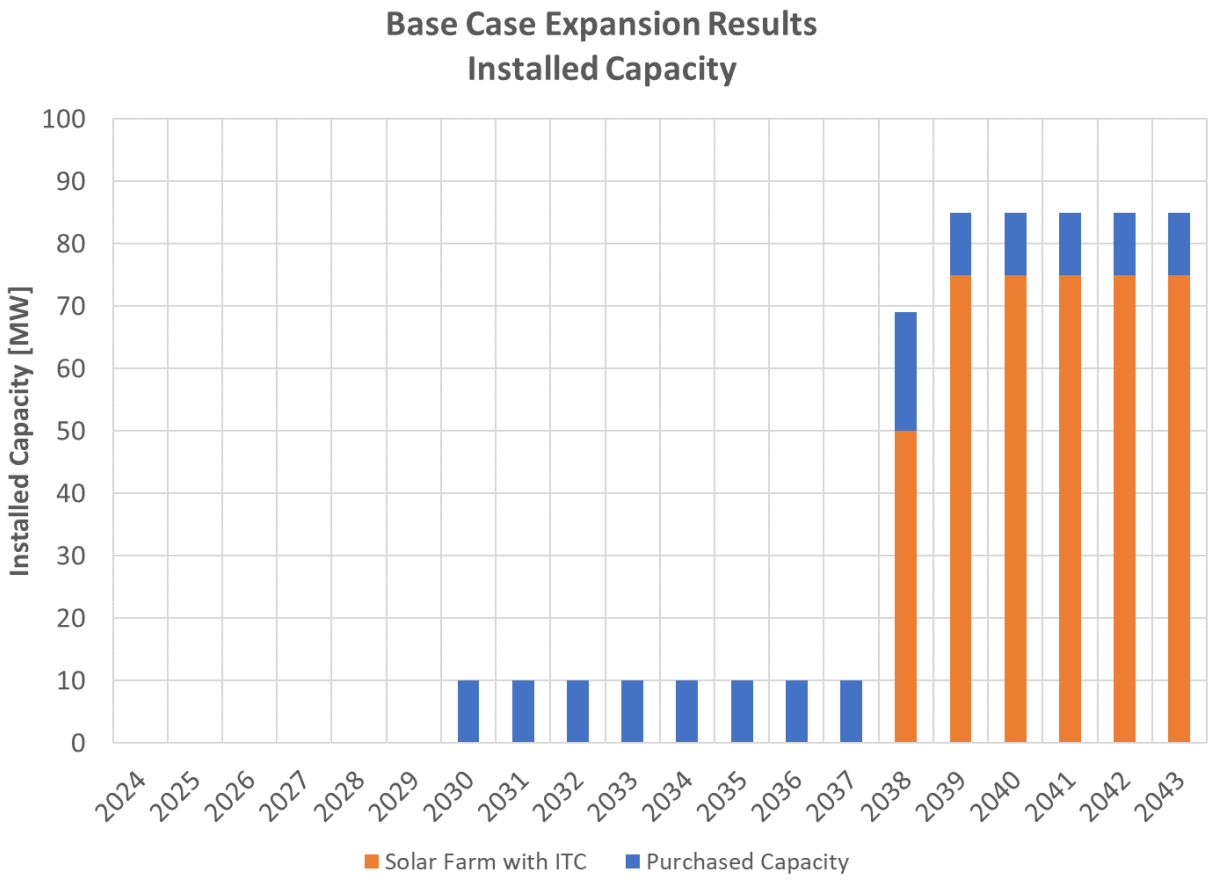
As discussed previously, in the Base Case, the need for additional firm capacity is less than 10 MW until 2038.

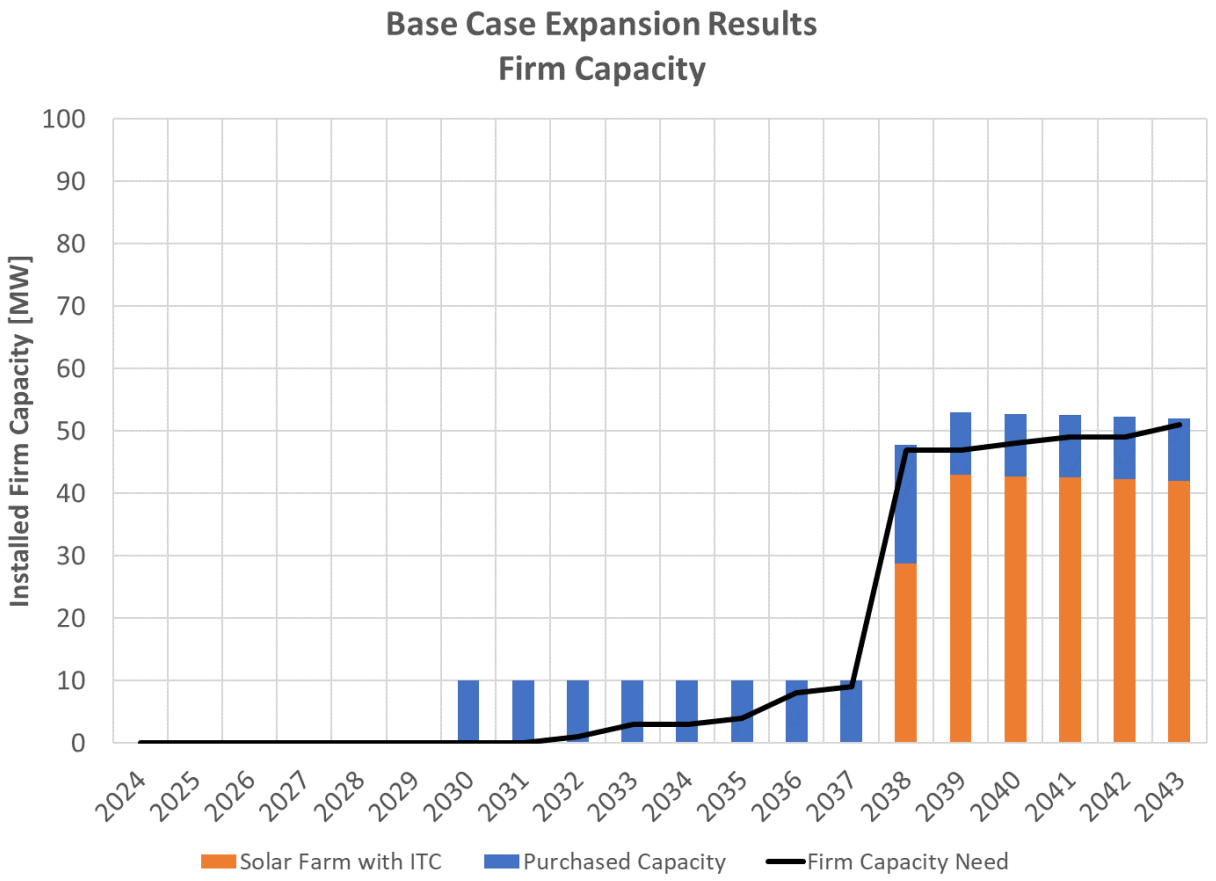
With limited firm capacity needs in the near- to medium-term, small amounts of purchased capacity is used to maintain the SPP-mandated 15% planning reserve margin, and results in no immediate investments in new generating facilities.

However, starting in 2038, the need for additional firm capacity exceeds the defined limits for purchased capacity and new generating facilities need to be added. Due to the small needs for firm capacity, the smaller capacity options are selected by the model.

With the Base Case assumptions, no existing fossil fuel-fired power plants are recommended to be retired by the model during the 20-year planning period.

Initial Base Case Results





Project Schedule

IRP Project Schedule

Input Development

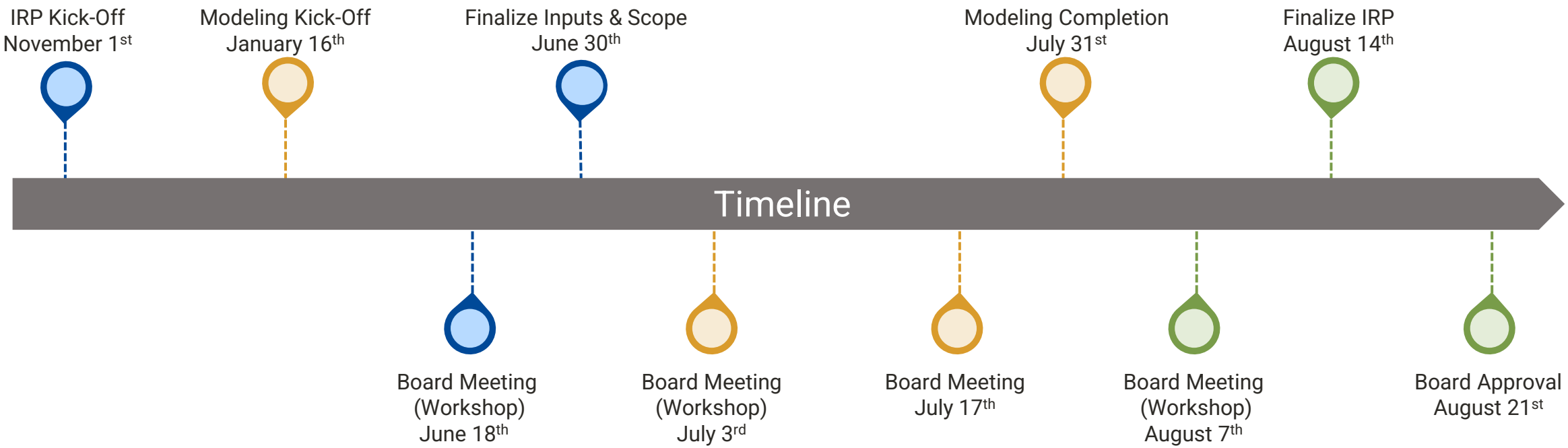
Develop inputs for load, reserve requirements, new and existing resources, and the broader market.

Modeling

Using PLEXOS and Excel-based models, complete capacity expansion, production cost, and total supply cost modeling.

Finalize IRP and Action Plan

Based on evaluation, determine near-term action plan, finalize report, and seek approval from the Board.



Board Meeting IRP Schedule

Board Meeting (Workshop) *June 18th*	Board Meeting (Workshop) *July 3rd*	Public Meeting (Regular session) *July 17th*	Board Meeting (Workshop) *August 7th*	Public Meeting (Regular session) *August 21st*
Data Assumptions & Modeling Framework	Status Update and Initial Results		Final IRP Overview	Board Approval
Presentation Contents: **KC BPU Overview** – Overview of KC BPU **Long-Term Planning Objectives** – overview of the various considerations in developing a long-term resource plan (e.g., cost, reliability, risk, sustainability, regulatory requirements, etc). **Assessment of Resource Need** – an overview of load and resources and the amount of additional capacity/energy needed to meet planning objectives. **Analytical Framework** – summary of how the evaluation will be completed (e.g., using capacity expansion, base case, overview of sensitivities) **Supply Alternatives** – summary of supply alternatives being considered to meet planning objectives. **Assumptions** – outline of main modeling assumptions **Timeline** – Key dates throughout the IRP process **Public Comments** - Written public comment period opens via email.	Presentation Contents: **Status Update** – Overview of where KC BPU is in the execution of the IRP. **Results of Evaluation for Base Case and Scenarios** – overview of results of base case analysis and/or any additional completed scenarios. **Timeline and Next Steps** – Provide overview of updated timeline and next steps. **Public Comments** - Written public comment period continues via email.	Follow-up discussion from previous Board Meetings **Will provide 2-3 page general summary** **With public comment** **Public Comments** - Report out on Public Comments that have been received.	Presentation Contents: Follow-up discussion from previous Board Meetings **Final IRP Overview** – Overview of results of IRP Analyses. **KC BPU Reference Resource Plan** – Provide overview of KC BPU's resource plan resulting from the IRP evaluations. **Action Plan** – Describe the near term (1-3 years) action plan resulting from the IRP evaluation and the reference resource plan. **Public Comments** - Wrap up on public comments that have been received and discussion of adjustments made based on those comments.	Any follow-up discussion from Board Meeting 3. **Board approval of IRP and action plan**