



2026 RESOURCE PLAN

COLUMBIA WATER & LIGHT
MAY 2026



Agenda

- Introductions
- Integrated Resource Plan Information
- Load and Power Forecasts
- Resource Options
- Existing Summer/Winter Load Balance
- Base Case
- Scenarios
- Discussion and Questions

INTRODUCTIONS

TEA
THE Energy Authority



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Project Team

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- With collaboration from the community and public input

Integrated Resource Plan (IRP) Development

- CMWL continues to conduct IRPs, as it has done historically, to ensure its resources will meet future electric demand from its customers.
- With shifting environmental and governmental regulations, increased costs for power, and limited near-term resource options, conducting this IRP is timely for near- and long-term planning.
- Public input from two meetings held in early 2026 was used to develop a proactive plan.
- Six scenarios were studied with some including community-suggested flexible natural gas, solar, and nuclear resource options.
- CMWL, TEA, and the community were instrumental in the development and completion of this IRP.

Resource Accreditation Concepts

01 Capacity

- Capacity planning focuses on ensuring the power system has sufficient maximum instantaneous output (measured in megawatts, MW) to meet peak demand.
- IRPs must ensure the grid does not fail during periods of maximum usage (e.g., hot summer afternoons or cold winter mornings).

02 Planning Reserve Margin

- The Planning Reserve Margin (PRM) is a critical utility planning metric representing the percentage of, or capacity available, above expected peak demand to ensure reliability.
 - PRM ensures sufficient capacity, with minimum targets often set to limit shortages to one day in ten years.

Resource Accreditation Concepts

03

Thermal-Based Accreditation

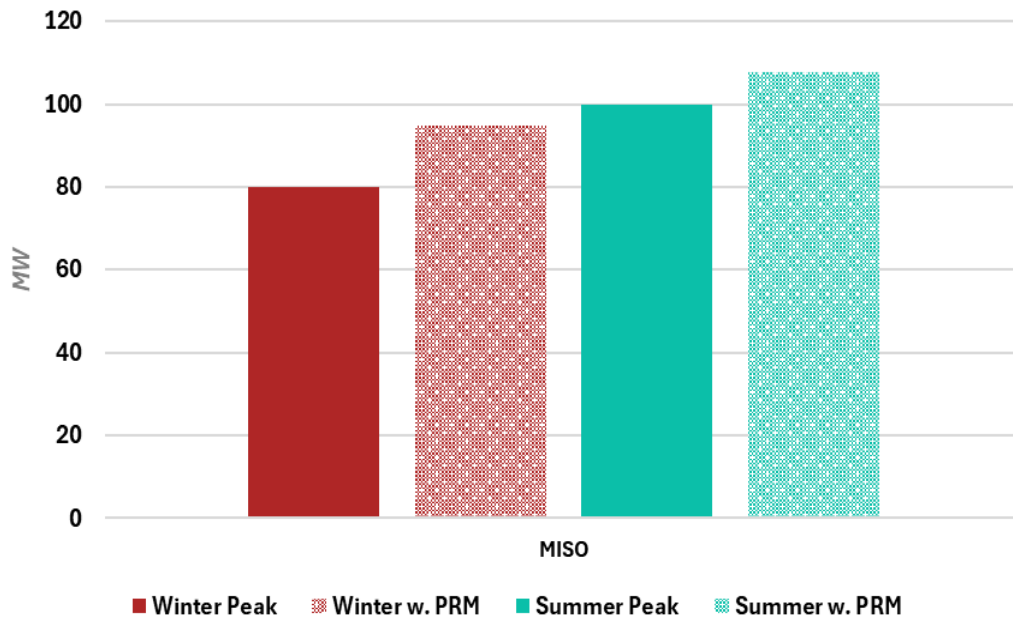
- Equivalent Forced Outage Rate Demand (EFORd): Measures the probability that a generating unit will be unavailable due to forced outages or unplanned deratings when needed to generate electricity.
 - Equivalent Forced Outage Factor (EFOF): Measures the proportion of time a generating unit is unavailable due to forced outages or unplanned deratings, regardless of whether it is needed to generate electricity.
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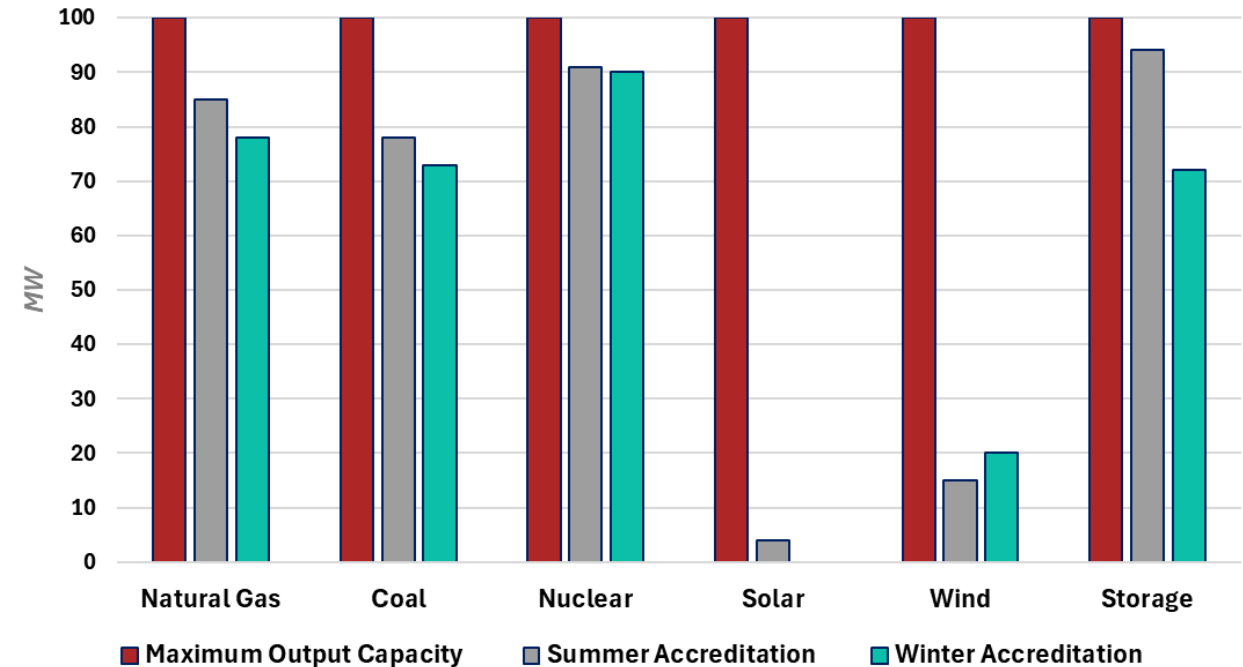
Renewable/Storage Accreditation

- Effective Load Carrying Capability (ELCC): Measures how much reliable capacity a resource contributes to peak demand, accounting for output variability and uncertainty.

Examples of impacts to
the Planning Reserve Margin vs. Peak Demand
and
Resource Accreditation to Capacity Resources
(Based on 2025-2026 MISO Planning Standards)



Load Serving Entities (LSE) are required to carry more capacity than their seasonal peak demand to help ensure reliability.



Capacity resources do not provide the same value of reliability during seasonal peak demand events, thus are accredited differently.

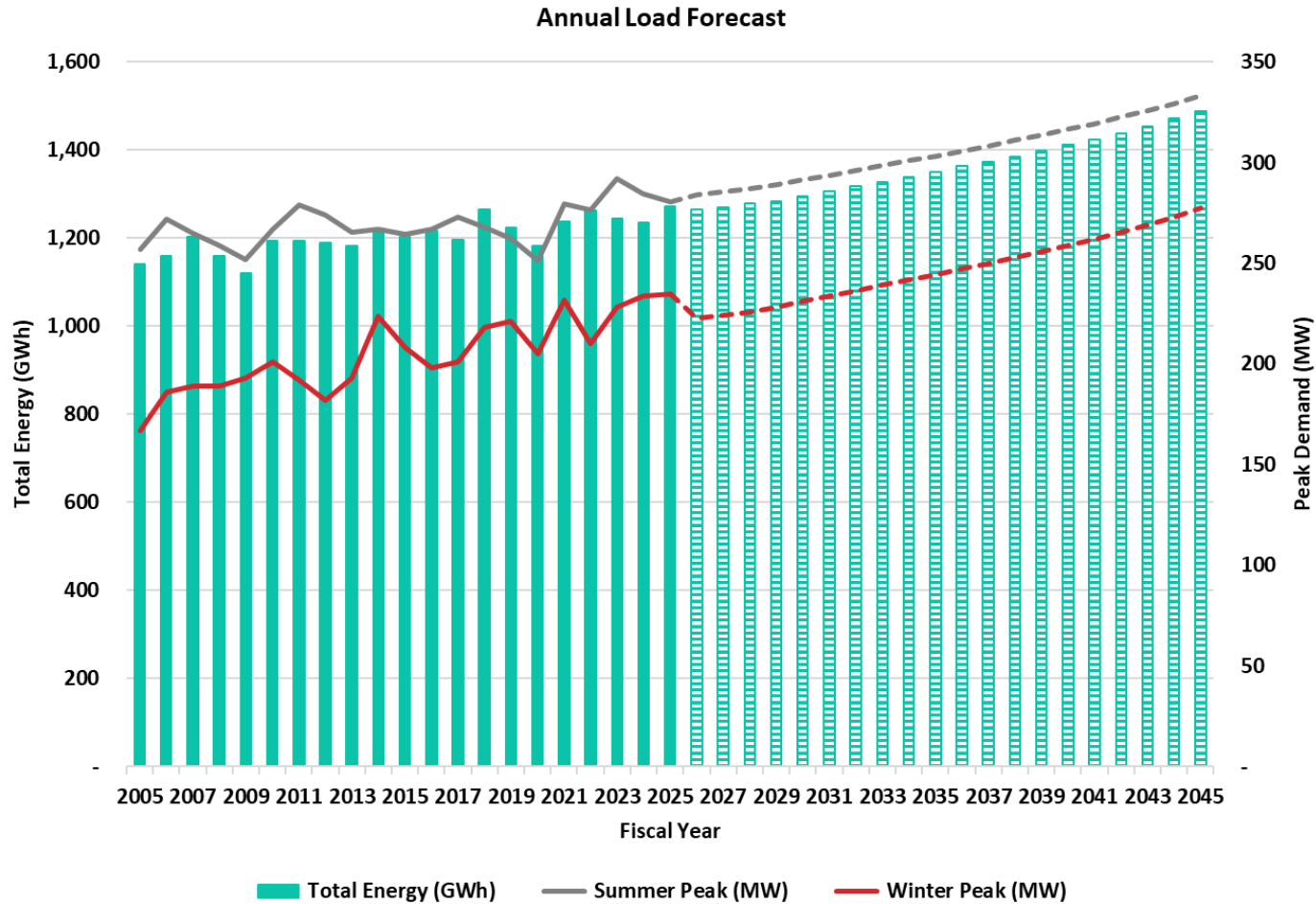
MODELING INPUTS



The IRP model is a sophisticated tool that optimizes resource choices based on a comprehensive set of inputs and assumptions. Key inputs include:

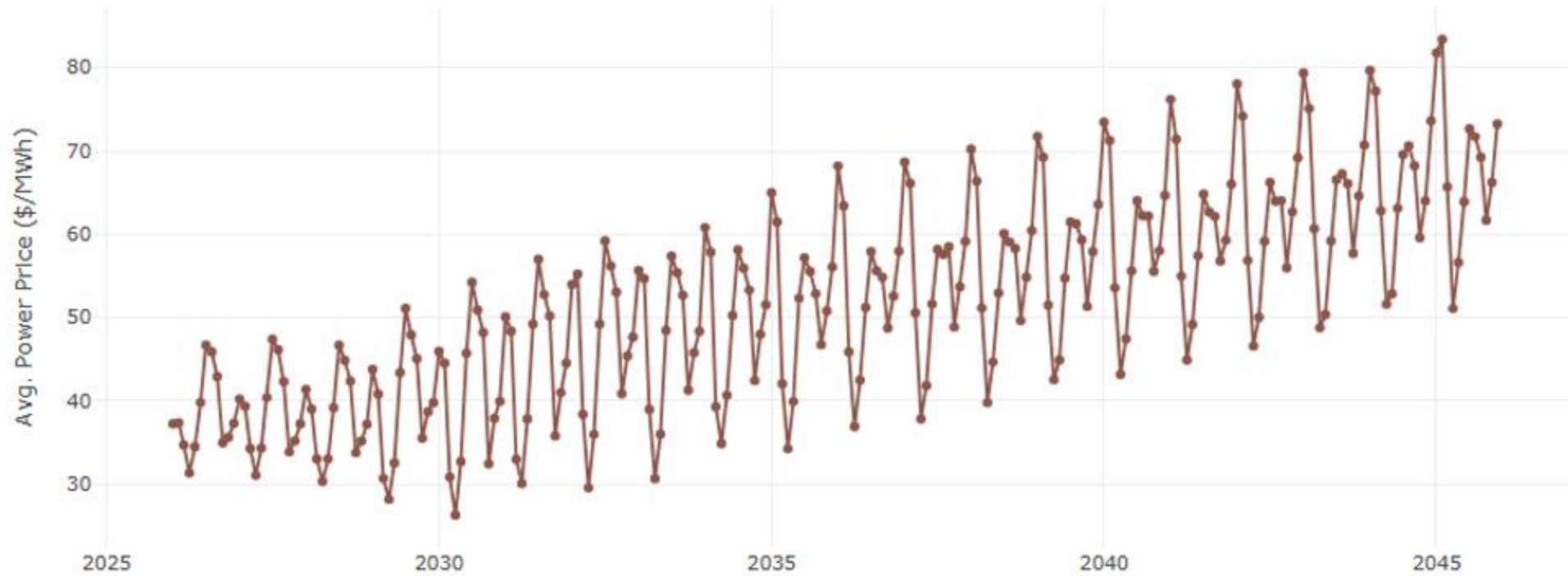
- » **LOAD FORECASTS**
- » **EXISTING RESOURCES DATA**
- » **NEW RESOURCE COSTS**
- » **FUEL PRICE PROJECTIONS**
- » **ENVIRONMENTAL REGULATIONS**
- » **RELIABILITY STANDARDS**

2026 Annual Load Forecast



Fiscal Year	Total Energy (GWh)		Summer Peak Demand (MW)		Winter Peak Demand (MW)	
	History & Forecast	YoY Change (%)	History & Forecast	YoY Change (%)	History & Forecast	YoY Change (%)
2015	1,203	-1.6%	264	-1.0%	208	-7.1%
2016	1,216	1.1%	267	1.0%	198	-4.9%
2017	1,197	-1.6%	273	2.1%	201	1.6%
2018	1,265	5.7%	268	-1.8%	218	8.5%
2019	1,225	-3.2%	262	-2.1%	221	1.4%
2020	1,182	-3.5%	251	-4.2%	205	-7.2%
2021	1,238	4.7%	279	11.2%	232	13.2%
2022	1,262	2.0%	276	-1.1%	210	-9.5%
2023	1,244	-1.5%	292	5.6%	228	8.6%
2024	1,236	-0.6%	284	-2.6%	234	2.6%
2025	1,272	2.9%	281	-1.3%	235	0.3%
2026	1,265	-0.6%	284	1.1%	223	-5.2%
2027	1,270	0.5%	285	0.5%	224	0.7%
2028	1,278	0.6%	287	0.5%	226	0.7%
2029	1,285	0.5%	289	0.7%	228	1.1%
2030	1,295	0.8%	291	0.8%	231	1.3%
2031	1,306	0.9%	294	0.8%	234	1.2%
2032	1,319	0.9%	296	0.8%	236	1.0%
2033	1,328	0.7%	299	0.9%	239	1.2%
2034	1,339	0.8%	301	0.8%	242	1.1%
2035	1,350	0.8%	303	0.8%	245	1.1%
2036	1,363	1.0%	306	0.8%	247	1.1%
2037	1,373	0.7%	308	0.8%	250	1.1%
2038	1,385	0.9%	311	0.9%	253	1.1%
2039	1,398	0.9%	314	0.9%	256	1.2%
2040	1,413	1.1%	317	0.9%	259	1.3%
2041	1,424	0.8%	319	0.8%	262	1.2%
2042	1,438	1.0%	323	1.0%	266	1.4%
2043	1,454	1.1%	326	1.0%	269	1.4%
2044	1,473	1.3%	330	1.1%	273	1.5%
2045	1,489	1.0%	333	1.1%	278	1.6%

Power Price Forecast - Average Monthly Pricing



- Increase in monthly average price swings over time, driven by growth in solar and wind generation across the MISO footprint.
 - Depressed average power prices during spring months, due to higher wind generation across MISO.
 - Peak in average pricing shifts from summer to winter months beginning in 2034.

Resource Options

Solar

Renewable generation sourced from utility-owned or contracted solar facilities.



Natural Gas

Reliable, dispatchable, and flexible capacity and energy using gas turbines or internal combustion engines.



Small Modular Reactor

Advanced nuclear technology for flexible energy generation.



Wind

Renewable energy self-generated or purchased from wind farms.

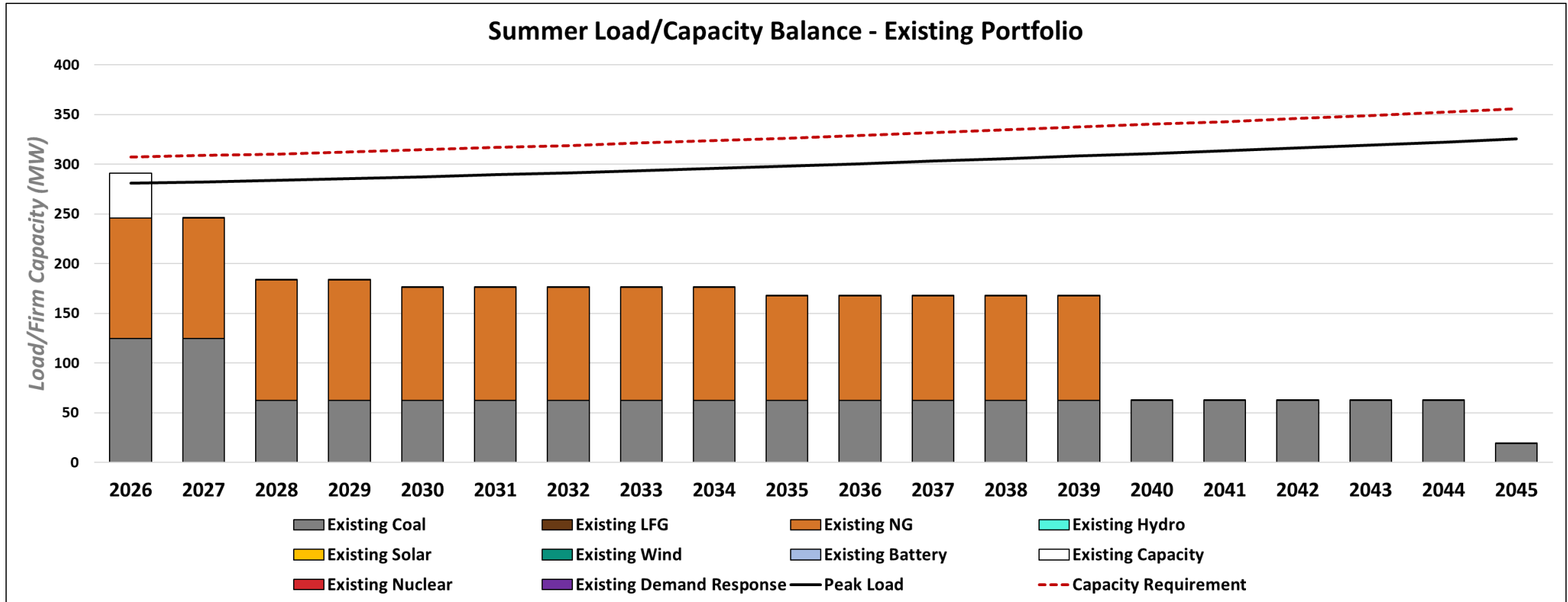


Battery Storage

Storage operated by the utility to provide capacity and energy when needed.

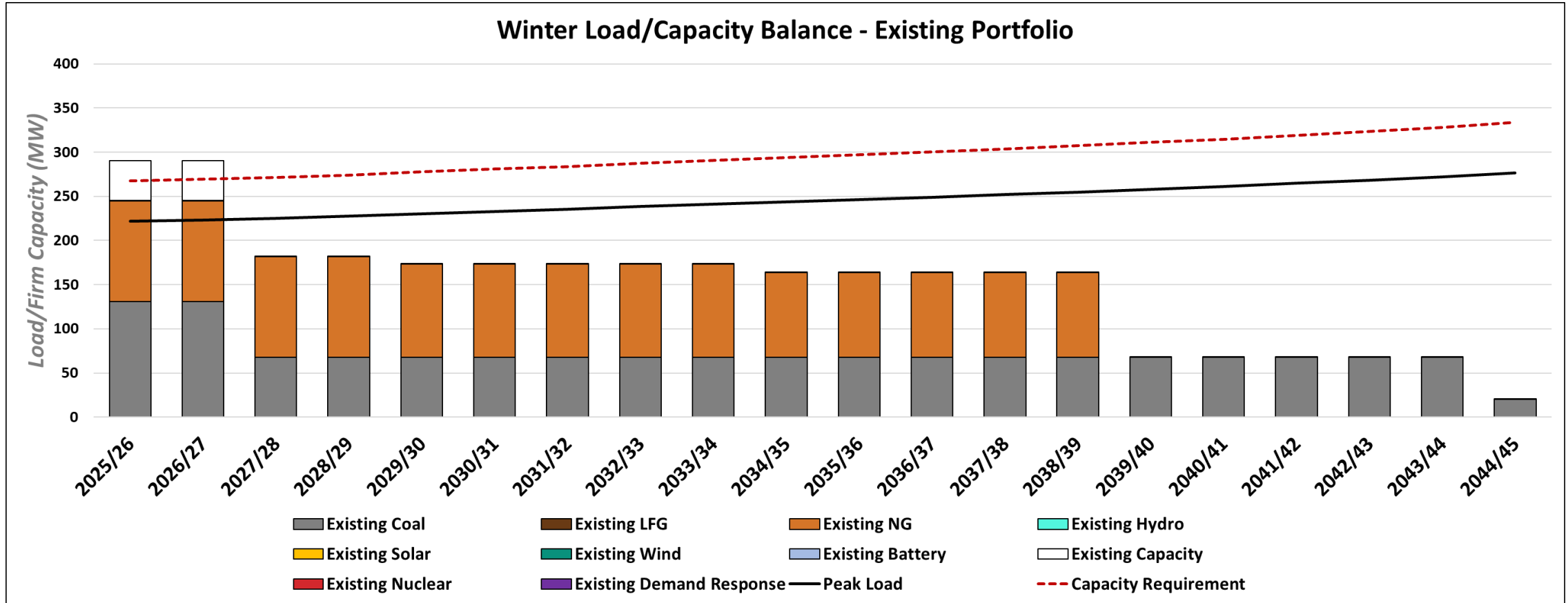


Summer Load Balance



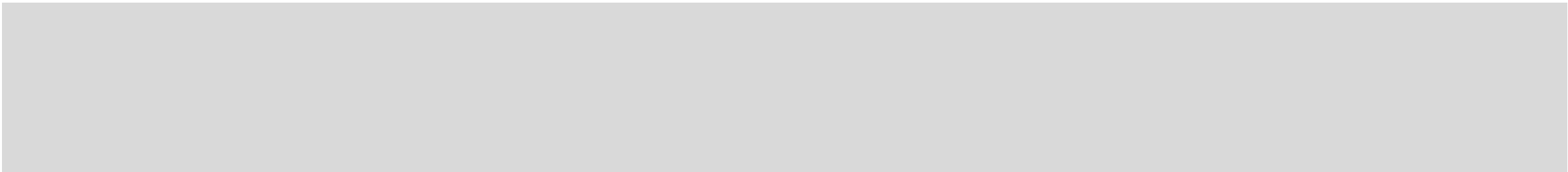
- Dynegy capacity set to expire in 6/1/2027
- Sikeston conservatively assumed to retire in 2028
- CEC 1-4, D6, and D8 are assumed to retire in 2039
- Other coal contracts have no retirement date

Winter Load Balance

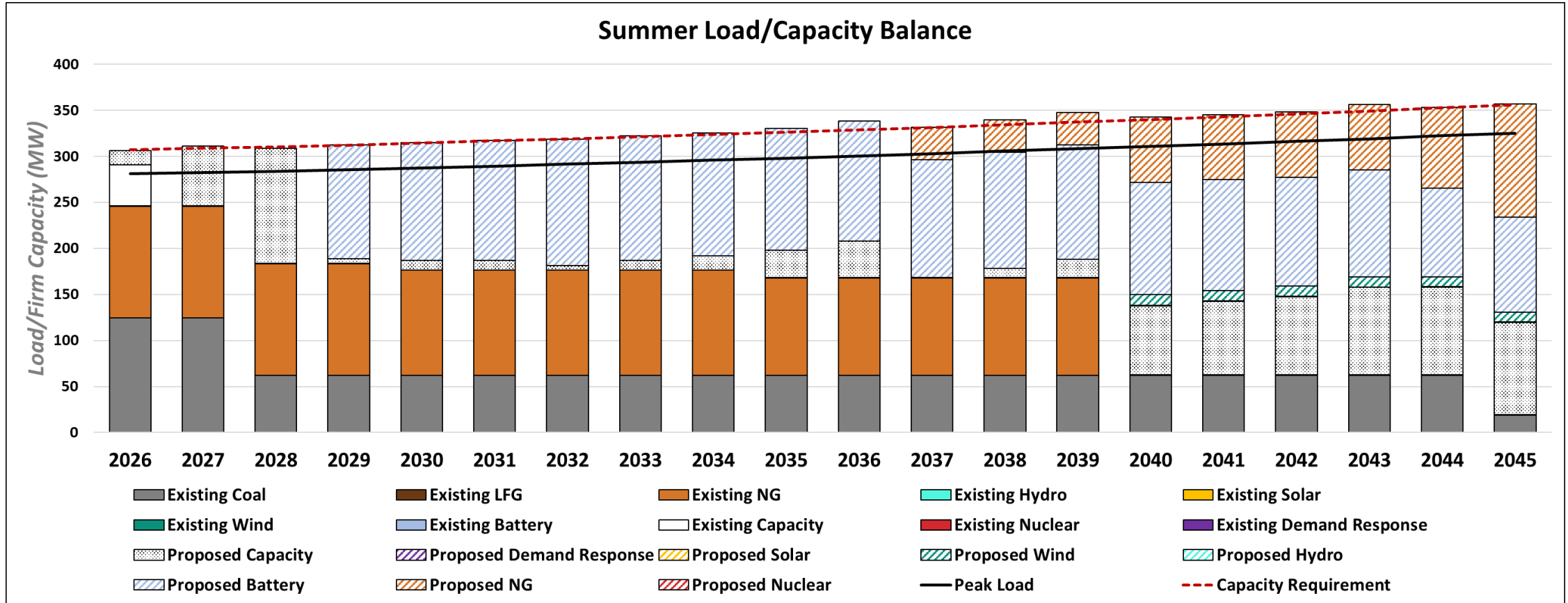


- Dynegy capacity set to expire in 6/1/2027
- Sikeston conservatively assumed to retire in 2028
- CEC 1-4, D6, and D8 are assumed to retire in 2039
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BASE CASE

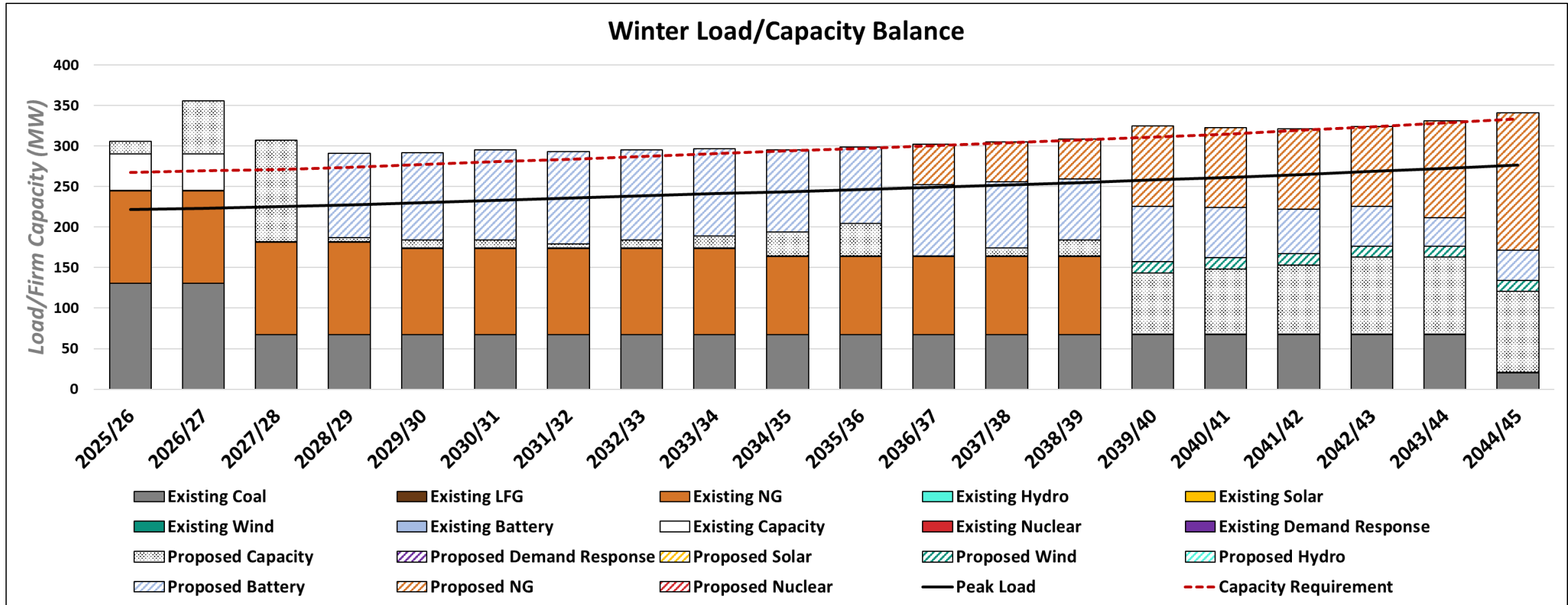


Base Case - Summer Load Resource Balance



- Base Case (no restrictions) includes bilateral capacity, 4-hour batteries, flexible natural gas, and renewables
- 120 MW wind and 30 MW solar will achieve 40% carbon-free energy by 2040

Base Case – Winter Load Resource Balance



- Base Case (no restrictions) includes bilateral capacity, 4-hour batteries, flexible natural gas, and renewables
- 120 MW wind and 30 MW solar will achieve 40% carbon-free energy by 2040

Base Case - Annual Cost Table

Costs And Revenues (\$M)		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	
	Existing Fixed Costs	\$ 31.00	\$ 30.15	\$ 20.87	\$ 20.86	\$ 21.17	\$ 21.62	\$ 22.13	\$ 22.53	\$ 23.01	\$ 23.49	\$ 24.06	\$ 24.50	\$ 25.02	\$ 25.55	\$ 23.83	\$ 24.33	\$ 24.90	\$ 25.48	\$ 26.15	\$ 7.76	
	Existing Variable Costs	\$ 31.37	\$ 31.86	\$ 15.68	\$ 15.69	\$ 15.77	\$ 16.20	\$ 16.60	\$ 16.93	\$ 17.26	\$ 15.01	\$ 15.40	\$ 15.66	\$ 15.97	\$ 16.28	\$ 9.85	\$ 9.99	\$ 10.16	\$ 10.33	\$ 10.54	\$ 8.12	
	Existing Fuel Costs	\$ 0.29	\$ 0.29	\$ 0.29	\$ 0.07	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Existing Emission Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Total Existing Costs	\$ 62.66	\$ 62.29	\$ 36.83	\$ 36.62	\$ 36.95	\$ 37.82	\$ 38.73	\$ 39.46	\$ 40.27	\$ 38.51	\$ 39.46	\$ 40.16	\$ 40.99	\$ 41.83	\$ 33.69	\$ 34.32	\$ 35.06	\$ 35.81	\$ 36.69	\$ 15.89	
	Proposed Capital Costs	\$ -	\$ -	\$ -	\$ 8.43	\$ 8.70	\$ 8.97	\$ 9.50	\$ 9.50	\$ 9.50	\$ 9.50	\$ 9.50	\$ 17.13	\$ 17.13	\$ 17.13	\$ 49.71	\$ 49.71	\$ 49.71	\$ 49.71	\$ 55.99	\$ 65.13	
	Proposed Fixed Costs	\$ 1.14	\$ 7.84	\$ 16.60	\$ 5.65	\$ 6.47	\$ 6.59	\$ 6.24	\$ 6.86	\$ 7.43	\$ 9.24	\$ 10.57	\$ 7.30	\$ 8.64	\$ 10.04	\$ 24.26	\$ 25.48	\$ 26.65	\$ 28.57	\$ 28.77	\$ 31.92	
	Proposed Variable Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 0.99	\$ 0.95	\$ 1.18	\$ 2.43	\$ 2.08	\$ 2.16	\$ 2.56	\$ 2.67	\$ 4.63	
	Proposed Fuel Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 8.45	\$ 8.05	\$ 10.14	\$ 21.15	\$ 18.03	\$ 18.71	\$ 22.06	\$ 22.77	\$ 39.74	
	Proposed Emission Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Proposed Costs	\$ 1.14	\$ 7.84	\$ 16.60	\$ 14.08	\$ 15.17	\$ 15.56	\$ 15.74	\$ 16.36	\$ 16.93	\$ 18.74	\$ 20.08	\$ 33.88	\$ 34.77	\$ 38.50	\$ 97.55	\$ 95.30	\$ 97.23	\$ 102.90	\$ 110.20	\$ 141.43		
Gross Generation Costs	\$ 63.80	\$ 70.13	\$ 53.44	\$ 50.70	\$ 52.11	\$ 53.38	\$ 54.47	\$ 55.82	\$ 57.20	\$ 57.25	\$ 59.53	\$ 74.04	\$ 75.76	\$ 80.33	\$ 131.24	\$ 129.61	\$ 132.28	\$ 138.72	\$ 146.89	\$ 157.32		
Gross Market Energy Revenues	\$ 49.03	\$ 49.20	\$ 27.82	\$ 33.35	\$ 34.36	\$ 37.35	\$ 39.59	\$ 38.86	\$ 40.22	\$ 30.82	\$ 31.78	\$ 44.07	\$ 43.89	\$ 47.31	\$ 74.63	\$ 71.87	\$ 75.09	\$ 80.33	\$ 83.62	\$ 95.71		
Net Generation Cost	\$ 14.77	\$ 20.93	\$ 25.62	\$ 17.34	\$ 17.75	\$ 16.03	\$ 14.88	\$ 16.96	\$ 16.99	\$ 26.43	\$ 27.75	\$ 29.97	\$ 31.87	\$ 33.02	\$ 56.61	\$ 57.74	\$ 57.20	\$ 58.39	\$ 63.27	\$ 61.61		
Load	Gross Market Energy Costs	\$ 47.49	\$ 48.10	\$ 47.62	\$ 54.61	\$ 57.15	\$ 62.43	\$ 67.29	\$ 66.89	\$ 71.00	\$ 73.42	\$ 76.16	\$ 78.70	\$ 80.67	\$ 83.79	\$ 86.55	\$ 89.03	\$ 93.02	\$ 96.14	\$ 99.23	\$ 104.03	
	Charges for Unmet/Unserved	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	Gross Load Cost	\$ 47.49	\$ 48.10	\$ 47.62	\$ 54.61	\$ 57.15	\$ 62.43	\$ 67.29	\$ 66.89	\$ 71.00	\$ 73.42	\$ 76.16	\$ 78.70	\$ 80.67	\$ 83.79	\$ 86.55	\$ 89.03	\$ 93.02	\$ 96.14	\$ 99.23	\$ 104.03	
Net Costs to Serve Load	\$ 62.26	\$ 69.03	\$ 73.24	\$ 71.96	\$ 74.90	\$ 78.46	\$ 82.17	\$ 83.85	\$ 87.99	\$ 99.86	\$ 103.91	\$ 108.67	\$ 112.54	\$ 116.81	\$ 143.16	\$ 146.77	\$ 150.21	\$ 154.53	\$ 162.50	\$ 165.64		
Net Cost to Serve Load (\$/MWh)	\$ 49.52	\$ 54.69	\$ 57.72	\$ 56.43	\$ 58.29	\$ 60.63	\$ 63.01	\$ 63.85	\$ 66.51	\$ 74.92	\$ 77.22	\$ 80.19	\$ 82.32	\$ 84.71	\$ 102.73	\$ 104.61	\$ 106.07	\$ 108.04	\$ 112.25	\$ 113.45		
NPV of Net Cost to Serve Load (\$)	\$1,435,816,973																					
Levelized Cost of Energy through 2045 (\$/MWh)	\$75.76																					

- Base Case (no restrictions) includes bilateral capacity, 4-hour batteries, flexible natural gas, and renewables
- 120 MW wind and 30 MW solar will achieve 40% carbon-free energy by 2040

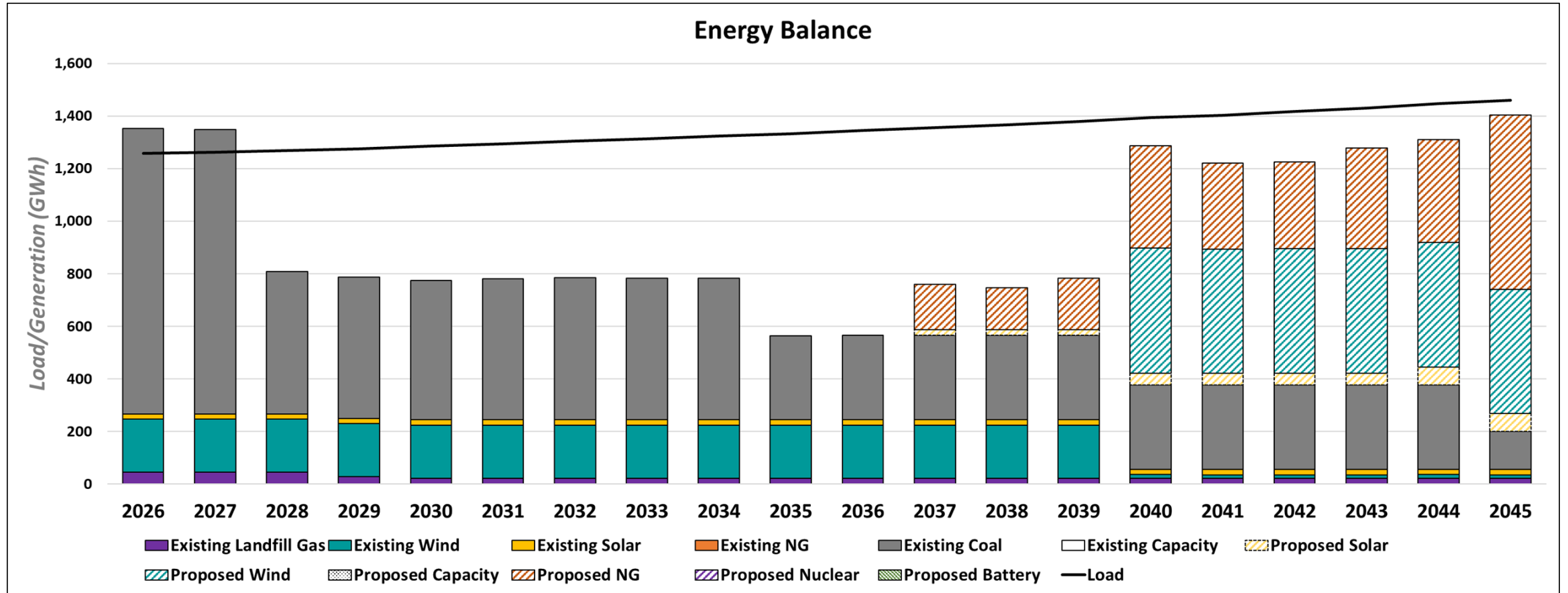
Base Case Portfolio

Base Case Portfolio - Summer Firm Capacity (MW)																						
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	
Base	Coal	125	125	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	19	
	Natural Gas	121	121	121	121	114	114	114	114	114	106	106	141	141	141	71	71	71	71	88	123	
	Nuclear																					
	Hydro																					
	Wind	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	12	12	11	11	11	11
	Solar													0.3	0.3	0.3	0.5	0.5	0.4	0.4	0.6	0.6
	Battery Storage				124	128	131	137	136	134	132	130	128	126	124	122	120	118	116	96	103	
	Bilateral Capacity	60	65	125	5	10	10	5	10	15	30	40		10	20	75	80	85	95	95	100	
	Demand Response																					
Total		306	311	309	313	315	317	319	322	325	330	338	332	340	348	342	345	348	356	353	357	

10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)
\$644	\$1,436	\$75.76

- Base Case (no restrictions) includes bilateral capacity, 4-hour batteries, flexible natural gas, and renewables
- 120 MW wind and 30 MW solar will achieve 40% carbon-free energy by 2040
- Model solves to meet Planning Reserve Margin for capacity at a 20-year cost of \$1,436M (2026\$)

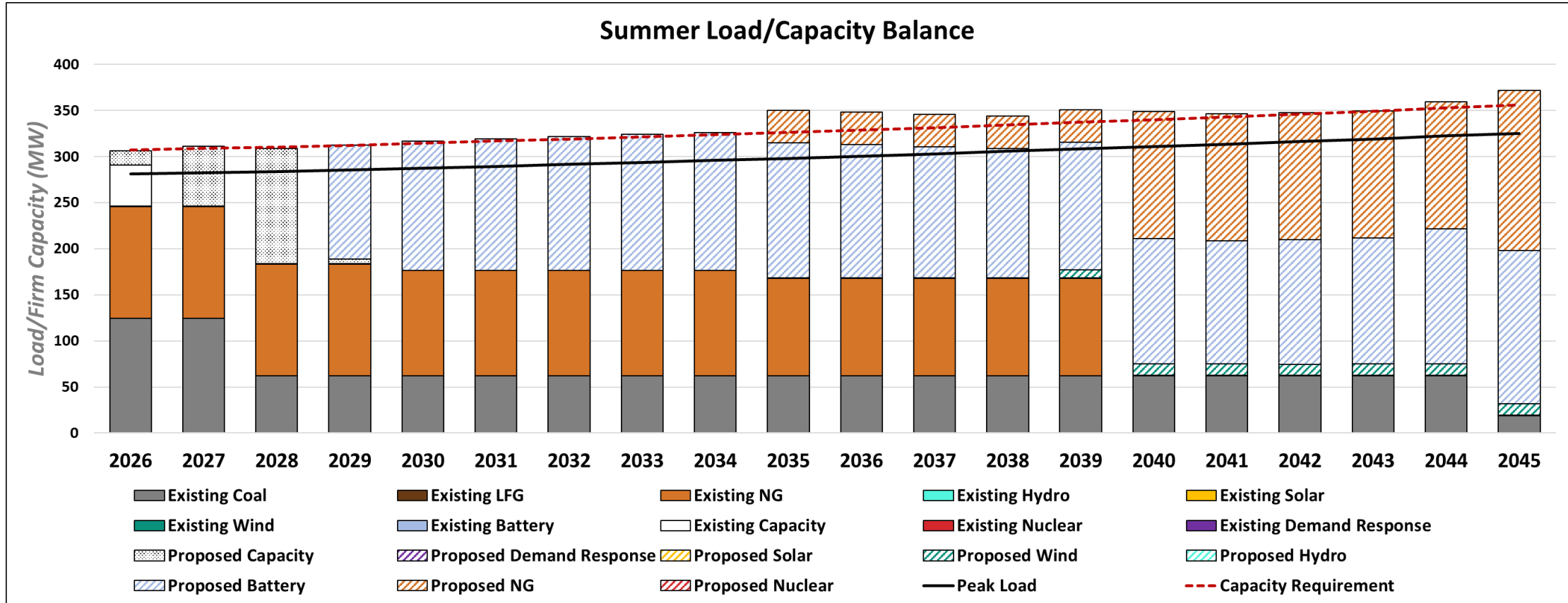
Base Case – Energy Balance



- Portfolio becomes short energy after Sikeston retirement in 2028; market assumed to serve unmet load
- Shortfall narrows as flexible natural gas and wind additions ramp up
- Existing flexible natural gas capacity remains available but is not economically dispatched

SCENARIOS

Scenario 1a – No Bilateral Capacity After 2029



Bilateral Capacity – power supply or generation contracted between two parties

- Without bilateral capacity, portfolio adds more batteries and flexible natural gas vs. Base Case
- Selected mix: batteries, flexible natural gas, and wind
- 140 MW of wind will lead to 40% carbon-free energy by 2040

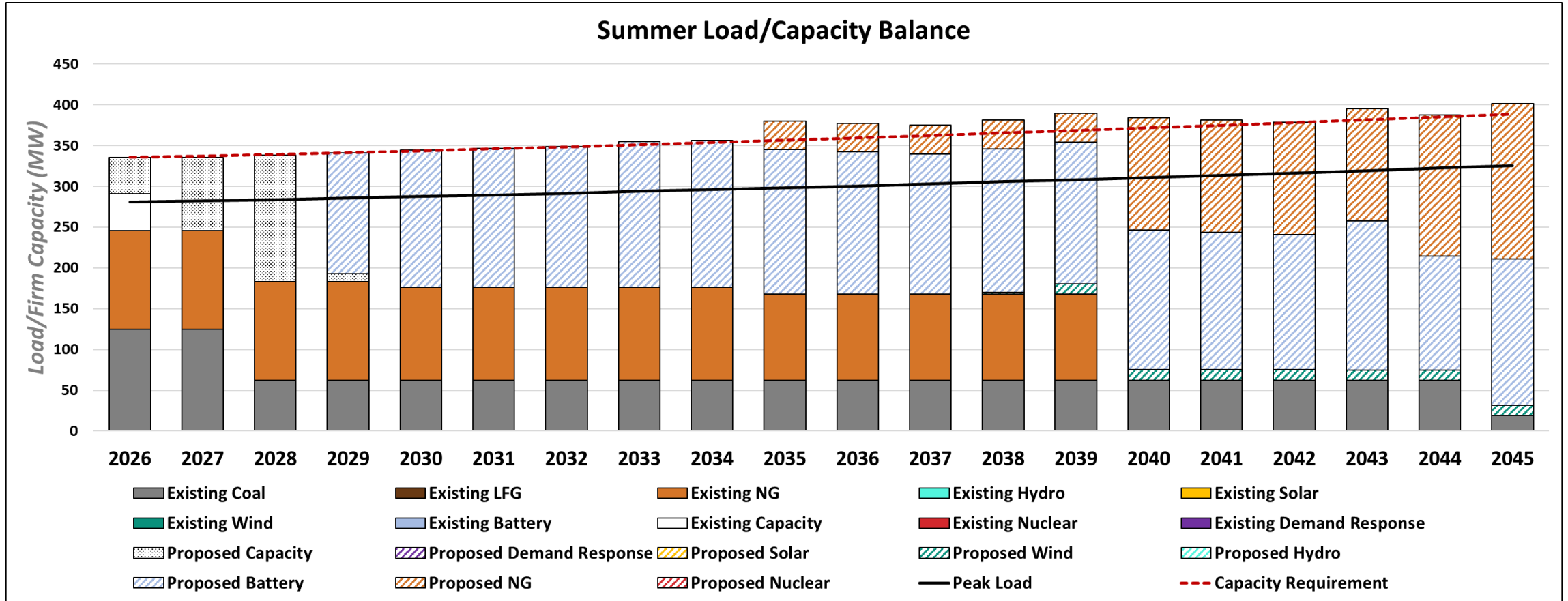
Scenario 1a - No Bilateral Capacity After 2029

Solution Comparison																					10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)		
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44				45	
Scenario 1a: No Bilateral Capacity after 2029	Coal	125	125	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	19	\$647	\$1,454	\$76.74	
	Natural Gas	121	121	121	121	114	114	114	114	114	141	141	141	141	141	138	138	138	138	138	174				
	Nuclear																								
	Hydro																								
	Wind	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	9	13	13	12	13	13				13
	Solar																								
	Battery Storage				124	140	143	145	147	149	147	145	143	140	138	136	134	135	136	146	166				
	Bilateral Capacity	60	65	125	5																				
	Demand Response																								
Total		306	311	309	313	317	319	322	324	326	350	348	346	344	350	349	346	348	349	359	372				

Scenario 1a (MW) - Difference from Base Case																					10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)		
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44				45	
Scenario 1a less Base Case Summer Firm Capacity (MW)	Coal																					\$3	\$19	\$0.98	
	Natural Gas										35	35				67	67	67	67	50	50				
	Nuclear																								
	Hydro																								
	Wind															9	1	1	1	2	2				2
	Solar													-0.3	-0.3	-0.3	-0.5	-0.5	-0.4	-0.4	-0.6				-0.6
	Battery Storage					12	12	8	12	15	15	15	15	14	14	14	14	17	20	50	63				
	Bilateral Capacity					-10	-10	-5	-10	-15	-30	-40		-10	-20	-75	-80	-85	-95	-95	-100				
	Demand Response																								
Total						2	2	3	2		20	10	14	4	3	6	1	-1	-7	6	15				

- Removal of bilateral capacity option after 2029:
 - Increases costs by \$19M (1.3%) vs. Base Case
 - Shifts from bilateral purchases to flexible natural gas after battery ramp-up

Scenario 1b - No Bilateral Capacity After 2029 + 10% Higher PRM



- Higher Planning Reserve Margin (PRM) drives additional capacity needs vs. Scenario 1a
- Incremental build primarily met with more batteries and flexible natural gas
- 140 MW of wind will lead to 40% carbon-free energy by 2040

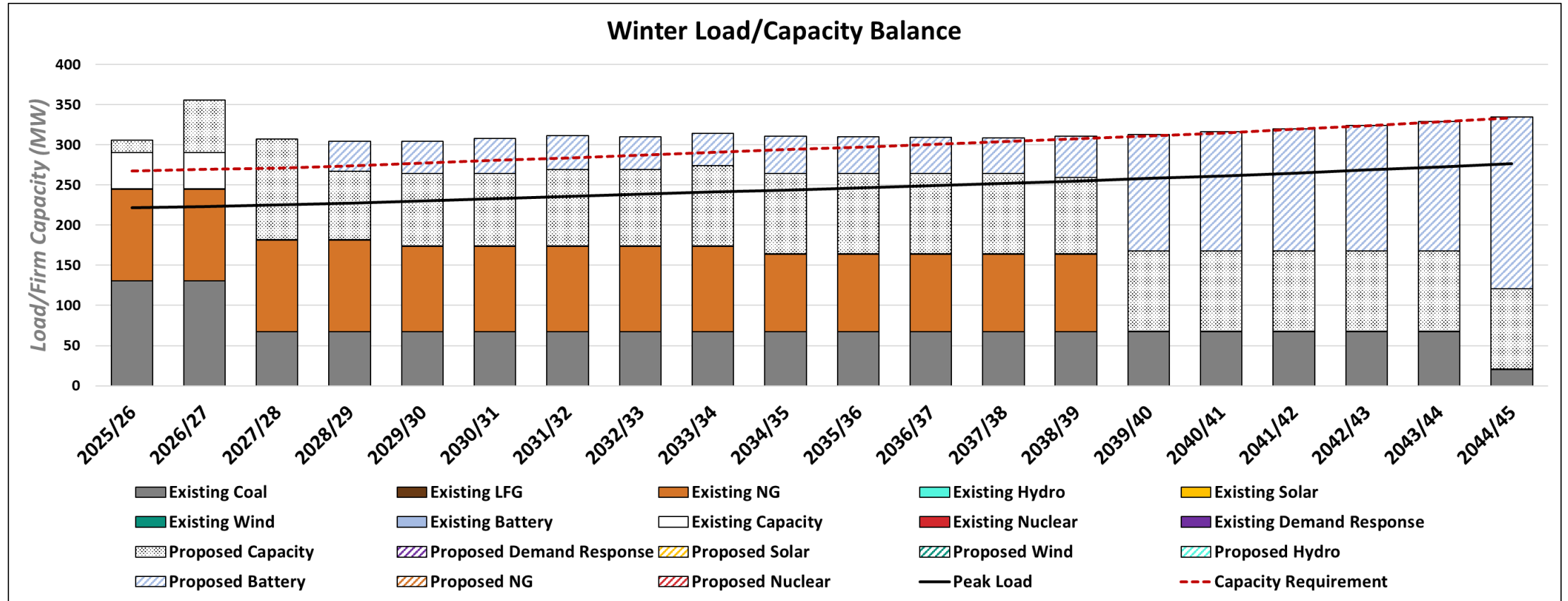
Scenario 1b - No Bilateral Capacity After 2029 + 10% Higher PRM

Solution Comparison																				10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)			
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43				44	45	
Scenario 1b: No Bilateral Capacity after 2029 +10% Higher PRM	Coal	125	125	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	19	\$670	\$1,507	\$79.52
	Natural Gas	121	121	121	121	114	114	114	114	114	141	141	141	141	141	138	138	138	138	174	190				
	Nuclear																								
	Hydro																								
	Wind	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	2	13	14	14	13	13	13	13			
	Solar																								
	Battery Storage				148	168	170	172	178	180	177	174	172	176	174	171	168	165	183	139	179				
	Bilateral Capacity	90	90	155	10																				
	Demand Response																								
Total		336	336	339	342	345	347	349	355	356	380	378	375	382	390	385	382	379	396	388	401				

Scenario 1b (MW) - Difference from Base Case																				10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)			
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43				44	45	
Scenario 1b less Base Case Summer Firm Capacity (MW)	Coal																					\$26	\$71	\$3.76	
	Natural Gas										35	35				67	67	67	67	86	67				
	Nuclear																								
	Hydro																								
	Wind													2	13	2	2	2	2	2	2				2
	Solar													-0.3	-0.3	-0.3	-0.5	-0.5	-0.4	-0.4	-0.6				-0.6
	Battery Storage				24	40	40	35	43	46	45	45	44	50	50	49	48	47	66	43	76				
	Bilateral Capacity	30	25	30	5	-10	-10	-5	-10	-15	-30	-40		-10	-20	-75	-80	-85	-95	-95	-100				
	Demand Response																								
Total		30	25	30	29	30	30	30	33	31	50	40	44	42	42	42	36	31	40	35	45				

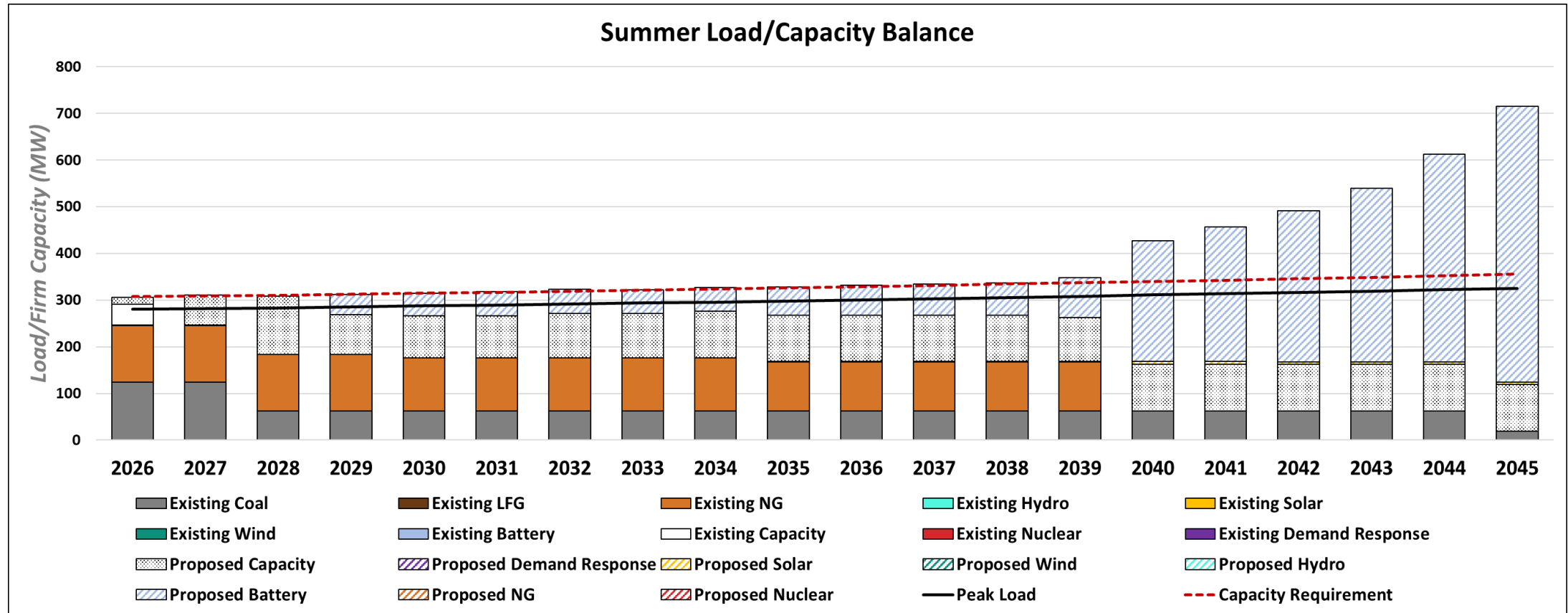
- 10% higher Planning Reserve Margin and no bilateral capacity after 2029 increases costs by \$71M (4.9%) vs. Base Case
- Higher PRM drives costs \$53M more over Scenario 1a (with typical PRM)
- Model selects batteries, wind, and flexible natural gas

Scenario 2 - Battery Tolling, Renewable PPAs & Bilateral Capacity Only



- Resources limited to battery tolling, renewable Purchase Power Agreements (PPAs), and bilateral capacity
 - No flexible natural gas or self-build resources
- Winter battery capacity value drops from >80% to about 30% by 2044 driving >700 MW of battery additions
- 240 MW solar PPA will achieve 40% carbon-free energy in 2040 but provides no winter capacity value

Scenario 2 – Battery Tolling, Renewable PPAs & Bilateral Capacity Only



- Summer battery capacity remains high (>80%) despite some decline
- Results in significant excess summer capacity, exceeding capacity requirements by 360 MW (100%)

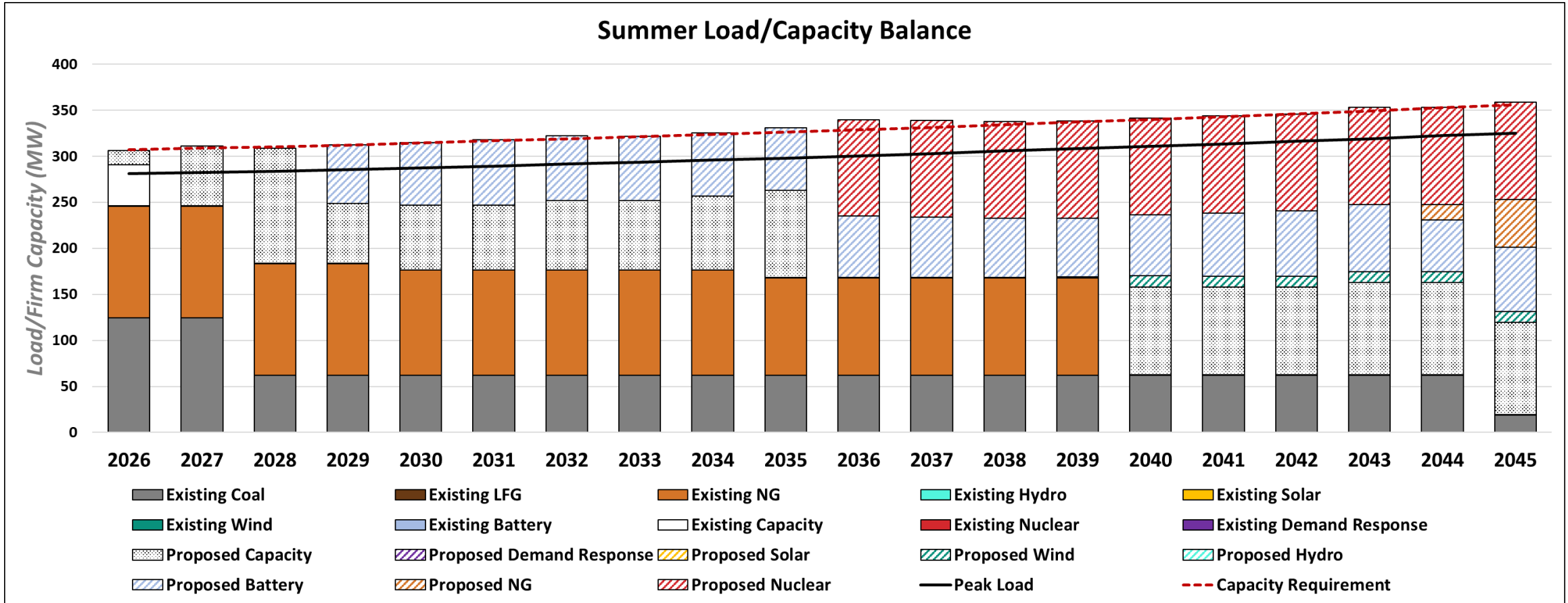
Scenario 2 – Battery Tolling, Renewable PPAs & Bilateral Capacity Only

Solution Comparison																						10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)	
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45				
Scenario 2: Battery Tolling, Renewable PPAs & Bilateral Capacity Only	Coal	125	125	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	19	\$672	\$1,627	\$85.82	
	Natural Gas	121	121	121	121	114	114	114	114	114	106	106	106	106	106										
	Nuclear																								
	Hydro																								
	Wind	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4				0.4
	Solar																6.0	5.5	5.1	4.8	4.8				4.8
	Battery Storage				44	48	51	51	50	50	60	63	66	68	85	258	288	324	372	445	591				
	Bilateral Capacity	60	65	125	85	90	90	95	95	100	100	100	100	100	95	100	100	100	100	100	100				100
	Demand Response																								
Total		306	311	309	313	315	318	323	322	326	328	331	334	337	348	427	456	492	539	612	715				

Scenario 2 (MW) - Difference from Base Case																						10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)				
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45							
Scenario 2 less Base Case Summer Firm Capacity (MW)	Coal																					\$28	\$191	\$10.06				
	Natural Gas													-35	-35	-35	-71	-71	-71	-71	-88				-123			
	Nuclear																											
	Hydro																											
	Wind																-12	-11	-11	-11	-11				-11			
	Solar																-0.3	-0.3	-0.3	5	5				5	4	4	4
	Battery Storage				-80	-80	-79	-86	-85	-84	-72	-67	-62	-58	-39	136	168	206	256	349	488							
	Bilateral Capacity				80	80	80	90	85	85	70	60	100	90	75	25	20	15	5	5								
	Demand Response																											
Total							1	4		1	-2	-7	2	-3		84	111	144	183	259	358							

- Limiting resource options increases costs by \$191M (13%) over the Base Case
- Higher costs driven by significant battery overbuild after 2039

Scenario 3a – Small Modular Reactors Provide 30% of Capacity



- Small Modular Reactor (SMR) addition by 2036 to meet 30% of capacity requirements
- 10-year lead time with first unit online in 2036
- 140 MW of wind will achieve 40% carbon-free energy in 2040

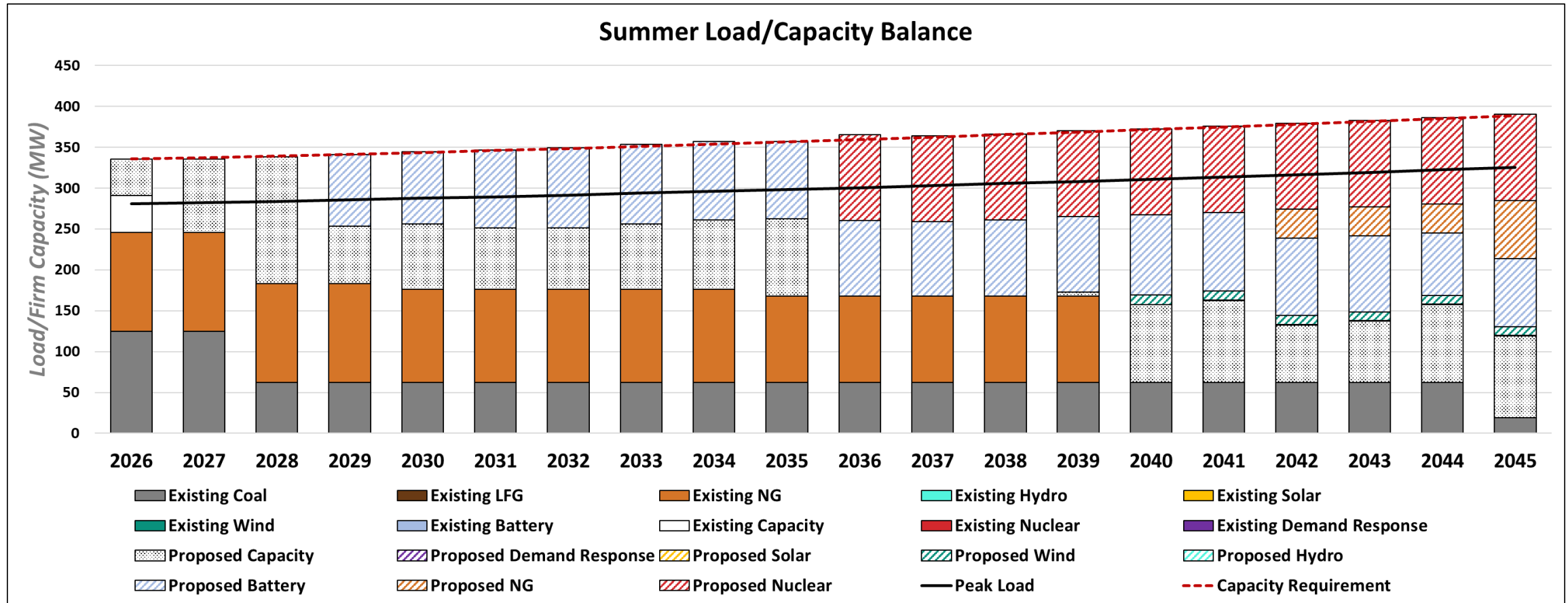
Scenario 3a - Small Modular Reactors Provide 30% of Capacity

Solution Comparison																					10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)		
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44				45	
Scenario 3a: Small Modular Reactors provide 30% of Capacity	Coal	125	125	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	19	\$624	\$1,628	\$85.92	
	Natural Gas	121	121	121	121	114	114	114	114	114	106	106	106	106	106						17				52
	Nuclear												105	105	105	105	105	105	105	105	105				105
	Hydro																								
	Wind	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.4	13	13	12	12	12	12				12
	Solar																			0.2	0.2				0.2
	Battery Storage					64	68	71	71	70	69	68	67	66	65	64	66	69	71	73	56				70
	Bilateral Capacity	60	65	125	65	70	70	75	75	80	95					95	95	95	100	100	100				100
Demand Response																									
Total		306	311	309	313	315	318	322	321	325	331	340	339	338	338	342	344	346	353	353	359				

Scenario 3a (MW) - Difference from Base Case																					10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)		
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44				45	
Scenario 3a less Base Case Summer Firm Capacity (MW)	Coal																					-\$20	\$193	\$10.16	
	Natural Gas													-35	-35	-35	-71	-71	-71	-71	-71				
	Nuclear													105	105	105	105	105	105	105	105				
	Hydro																								
	Wind															1	1	1	1	1	1				1
	Solar															-0.3	-0.3	-0.3	-1	-0.5	-0.4				-0.2
	Battery Storage					-60	-60	-59	-67	-66	-65	-64	-63	-62	-61	-60	-56	-51	-47	-43	-40				-33
	Bilateral Capacity					60	60	60	70	65	65	65	-40		-10	-20	20	15	10	5	5				
Demand Response																									
Total								1	3	-1		1	2	7	-2	-10	-1	-1	-2	-3	2				

- 120 MW of Small Modular Reactors (SMR) online in 2036 (early adoption; technology risk)
- Cost increases +\$193M (13%) vs. Base Case
- SMR displaces some batteries and flexible natural gas

Scenario 3b - SMRs Provide 30% of Capacity +10% Higher PRM



- Higher Planning Reserve Margin (+10%) drives additional capacity needs vs. Scenario 3a
- Incremental builds primarily met with more batteries and flexible natural gas
- 120 MW wind and 40 MW solar will lead to 40% carbon-free energy by 2040

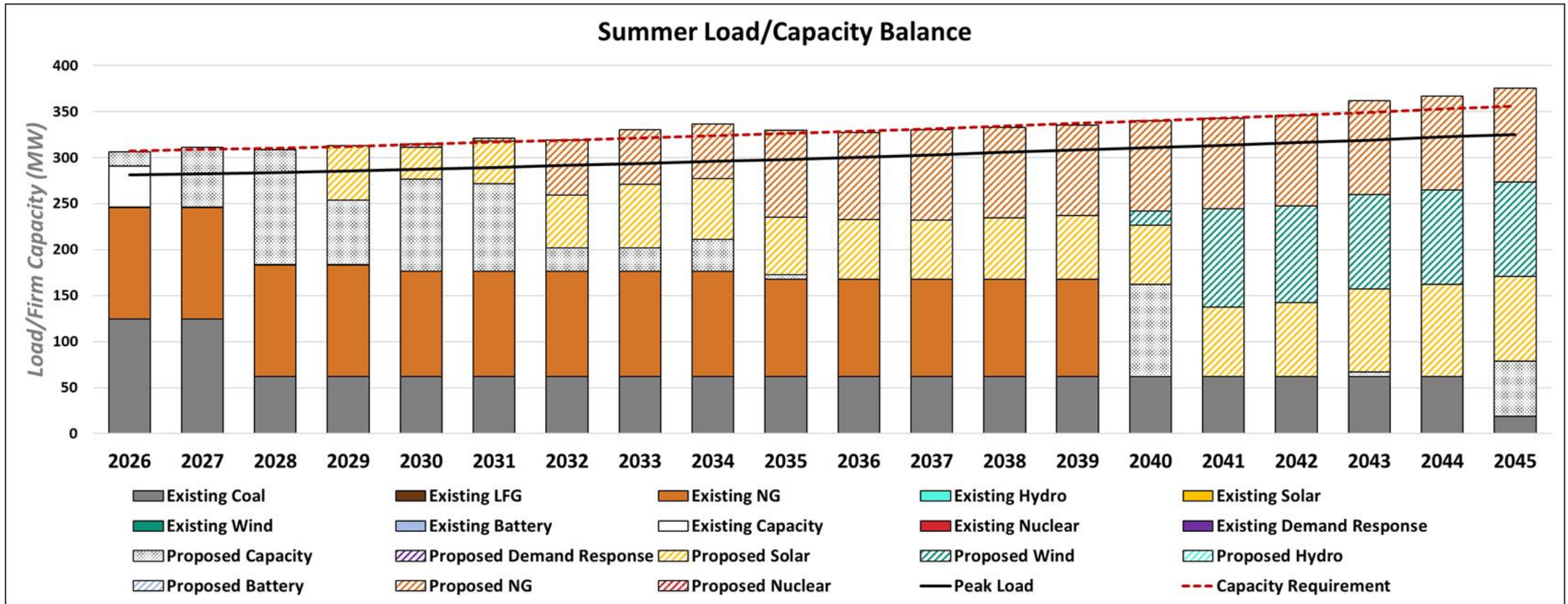
Scenario 3b - SMRs Provide 30% of Capacity +10% Higher PRM

Solution Comparison																						10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)	
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45				
Scenario 3b: Small Modular Reactors provide 30% of Capacity +10% Higher PRM	Coal	125	125	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	19	\$645	\$1,677	\$88.47	
	Natural Gas	121	121	121	121	114	114	114	114	114	106	106	106	106	106			35	35	35	71				
	Nuclear											105	105	105	105	105	105	105	105	105	105				
	Hydro																								
	Wind	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	12	12	11	11	11				11
	Solar																0.5	0.7	0.7	0.6	0.6				0.8
	Battery Storage				88	88	95	98	97	96	94	93	91	94	92	98	96	95	93	76	83				
	Bilateral Capacity	90	90	155	70	80	75	75	80	85	95				5	95	100	70	75	95	100				
	Demand Response																								
Total		336	336	339	342	345	347	350	354	357	357	366	364	367	370	373	376	380	383	386	390				

Scenario 3a (MW) - Difference from Base Case																						10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)		
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45					
Scenario 3b less Base Case Summer Firm Capacity (MW)	Coal																					\$2	\$241	\$12.71		
	Natural Gas													-35	-35	-35	-71	-71	-35	-35	-52				-52	
	Nuclear												105	105	105	105	105	105	105	105	105				105	
	Hydro																									
	Wind																									
	Solar																-0.3	-0.3	-0.3		0.2				0.2	0.2
	Battery Storage				-36	-40	-36	-39	-39	-38	-38	-37	-37	-32	-32	-24	-24	-24	-23	-20	-20					
	Bilateral Capacity	30	25	30	65	70	65	70	70	70	65	-40		-10	-15	20	20	-15	-20							
	Demand Response																									
Total		30	25	30	29	30	29	31	31	32	27	28	33	27	23	30	31	32	27	34	34					

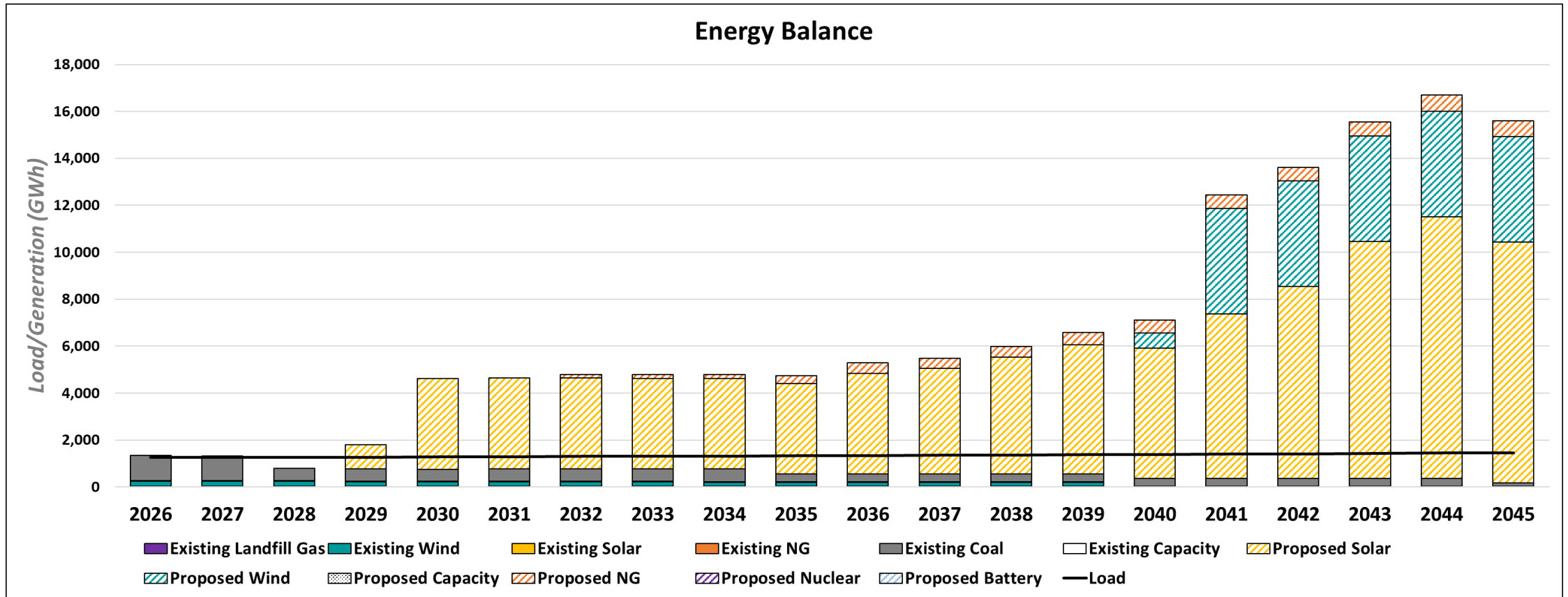
- 10% higher Planning Reserve Margin with the SMR addition increases costs by \$241M (17%) vs. Base Case
- Higher PRM drives costs \$48M more over Scenario 3a (with typical PRM)
- SMR displaces some batteries and flexible natural gas

Scenario 4 - High Gas & Power Prices



- Higher gas and power prices based on U.S. Energy Information Administration 2025 Annual Energy Outlook (EIA 2025 AEO - Low Oil & Gas Availability)
- Renewable resources are favored although the amount required is infeasible
- Flexible natural gas additions begin in 2032 despite higher gas and power costs

Scenario 4 - High Gas & Power Prices



- Overbuild of renewables drives large energy surplus vs. Base Case due to decreasing renewable capacity values
- Portfolio shifts from energy short to energy long as surplus energy is sold into the market

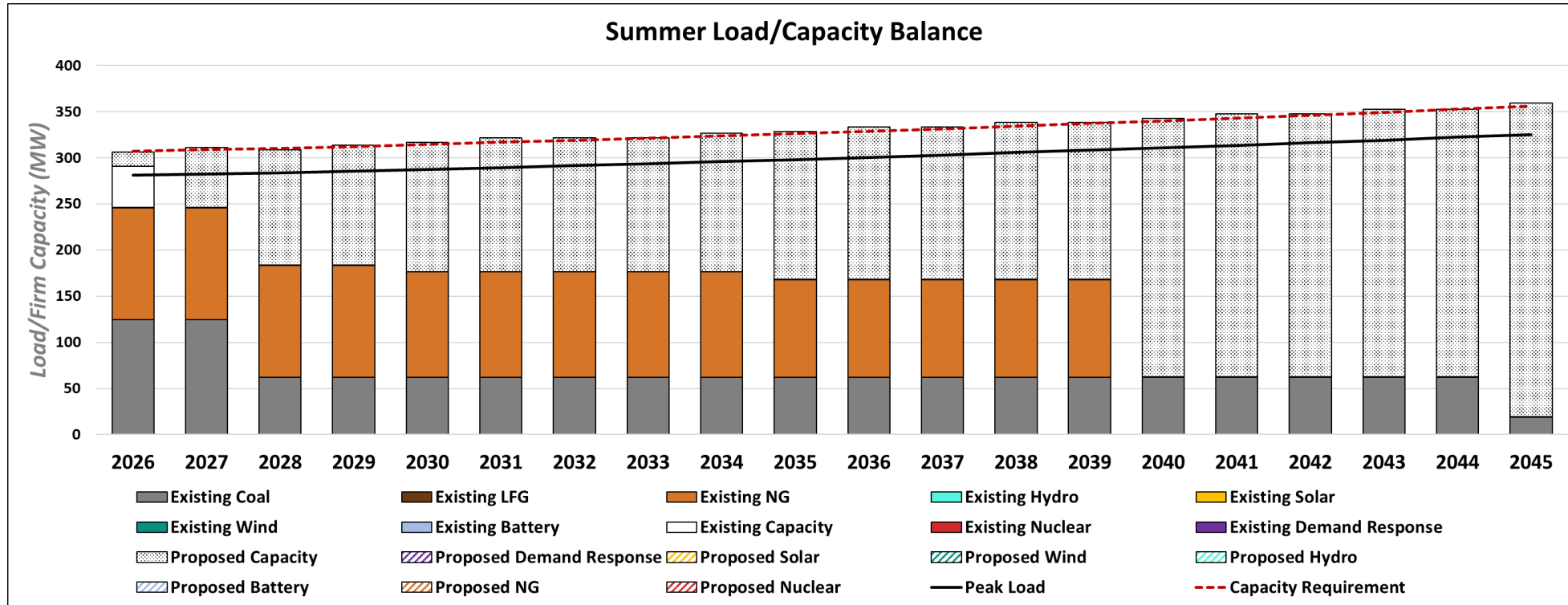
Scenario 4 - High Gas & Power Prices

Solution Comparison																						10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)	
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45				
Scenario 4: High Gas & Power Prices	Coal	125	125	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	19	\$759	\$1,373	\$72.43	
	Natural Gas	121	121	121	121	117	117	174	173	173	200	200	204	204	204	98	98	99	102	102	102				
	Nuclear																								
	Hydro																								
	Wind	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	16	108	105	103	103				103
	Solar				59	35	46	58	69	66	62	65	64	67	69	64	75	80	90	100	92				
	Battery Storage																								
	Bilateral Capacity	60	65	125	70	100	95	25	25	35	5					100			5		60				
	Demand Response																								
Total		306	311	309	313	315	321	319	330	337	330	328	330	333	336	341	343	346	362	367	376				

Scenario 4 (MW) - Difference from Base Case																						10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)	
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45				
Scenario 4 less Base Case Summer Firm Capacity (MW)	Coal																					\$115	-\$63	-\$3.33	
	Natural Gas					3	3	60	59	59	95	95	63	63	63	28	28	28	31	14	-21				
	Nuclear																								
	Hydro																								
	Wind																4	96	94	92	92				92
	Solar				59	35	46	58	69	66	62	65	64	67	69	64	75	80	90	99	91				
	Battery Storage				-124	-128	-131	-137	-136	-134	-132	-130	-128	-126	-124	-122	-120	-118	-116	-96	-103				
	Bilateral Capacity				65	90	85	20	15	20	-25	-40		-10	-20	25	-80	-85	-90	-95	-40				
	Demand Response																								
Total						4	8	11		-10	-1	-7	-12	-2	-2	-2	6	14	19						

- Higher gas and power prices favor renewables and flexible natural gas over batteries
- Model adds solar and wind based on assumed market sales of excess energy that exceed practical limits and produces an improbable lower cost at 20-years
- Costs at 10-years increased by \$115M (18%) while the 20-year costs decline by \$63M (4%) vs. Base Case

Scenario 5 – MISO Planning Reserve Auction (Do Nothing Scenario)



- Reliance on MISO Planning Reserve Auction (PRA) for all capacity
- MISO PRA is a residual auction used to secure incremental capacity needed to meet reserve requirements
- The PRA is structured for incremental deficiencies - not large blocks which may result in limited MW availability and high prices
- Pricing based on peak historic Zone 5 seasonal prices - average of \$535/MW-day
 - Spring and Fall \$720/MW-day, Summer \$667, Winter \$33
 - Near term pricing = \$16.59/kW-month (vs. \$10.05 in Base Case), escalated with CT costs

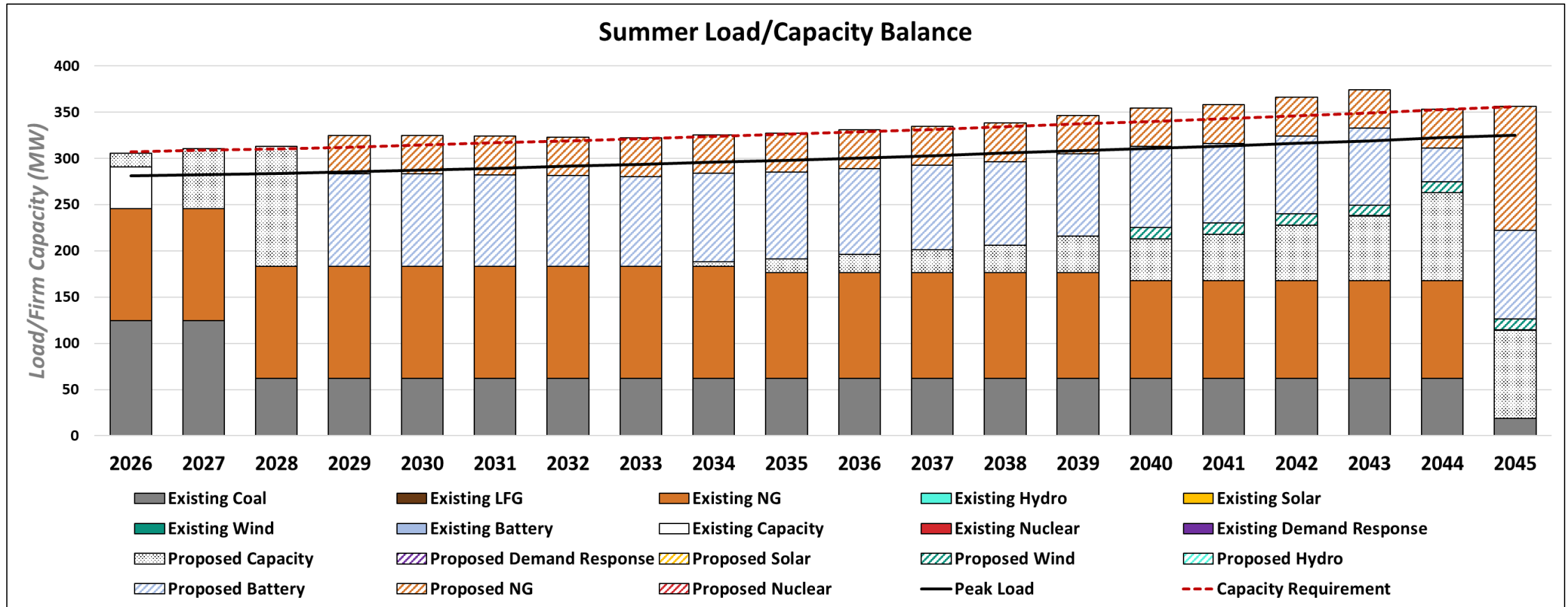
Scenario 5 – MISO Planning Reserve Auction (Do Nothing Scenario)

Solution Comparison																					10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)		
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44				45	
Scenario 5: Only Bilateral Capacity	Coal	125	125	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	19	\$747	\$1,635	\$86.29	
	Natural Gas	121	121	121	121	114	114	114	114	114	106	106	106	106	106										
	Nuclear																								
	Hydro																								
	Wind	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4				0.4
	Solar																								
	Battery Storage																								
	Bilateral Capacity	60	65	125	130	140	145	145	145	150	160	165	165	170	170	280	285	285	290	290	340				
	Demand Response																								
Total		306	311	309	314	317	322	322	322	327	328	333	333	338	338	343	348	348	353	353	359				

Scenario 5 (MW) - Difference from Base Case																					10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)		
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44				45	
Scenario 5 less Base Case Summer Firm Capacity (MW)	Coal																					\$104	\$199	\$10.53	
	Natural Gas													-35	-35	-35	-71	-71	-71	-71	-88				-123
	Nuclear																								
	Hydro																								
	Wind																								
	Solar																								
	Battery Storage																								
	Bilateral Capacity																								
	Demand Response																								
Total					1	2	4	3	-1	1	-2	-5	1	-2	-10		2		-3		3				

- MISO PRA-only approach increases costs by \$199M (14%) under high historic price assumptions
- Demonstrates great risk of long-term reliance on market capacity
- Adding resources provides a hedge against increased market volatility and capacity risk

Scenario 6 – CMWL Proposed Resource Additions/Retirements



- Portfolio additions/retirements creating a realistic scenario:
 - 20 MW solar - 8-year PPA (second half 2027)
 - 64 MW flexible natural gas (2029)
 - 100 MW batteries (2029)
 - Columbia existing resource retirements: D6 (2035), D8 (2040), and CEC 1- 4 (2045)

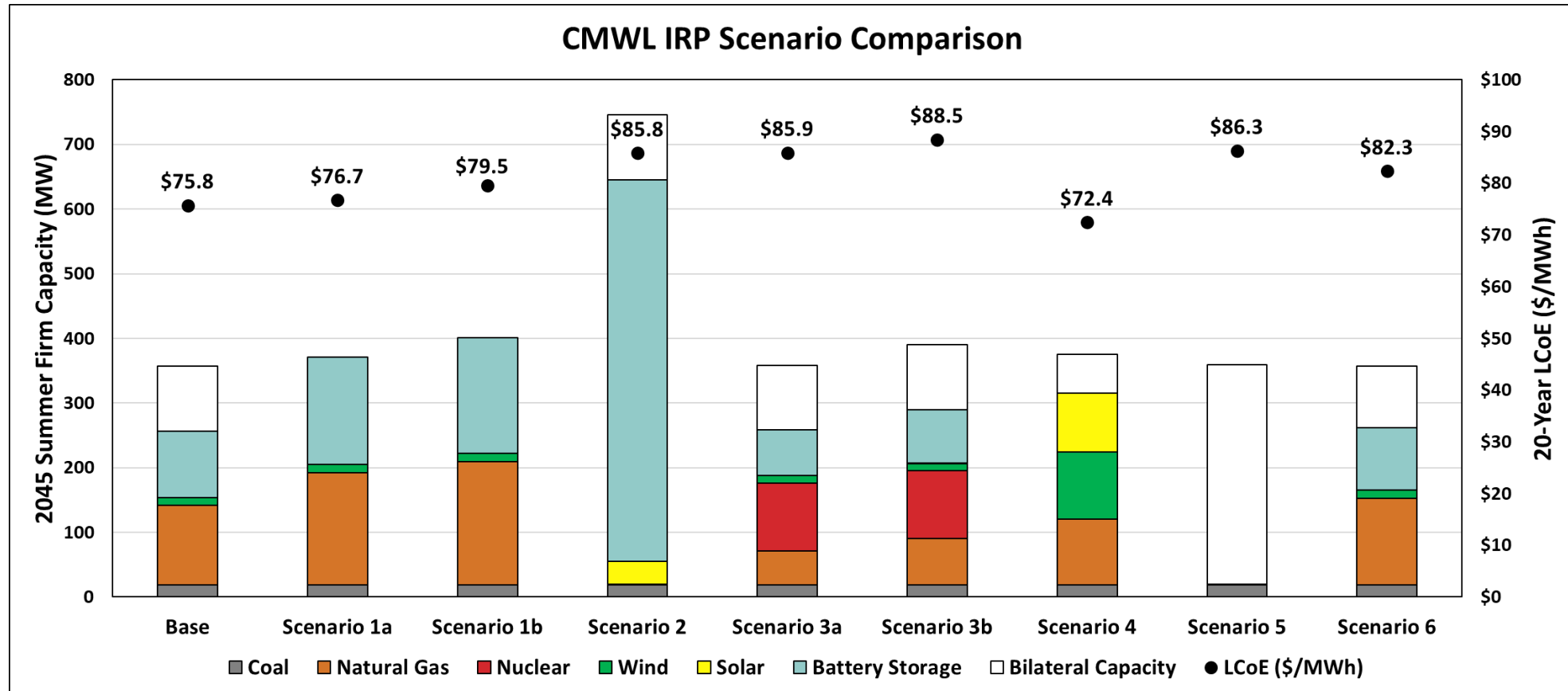
Scenario 6 – CMWL Proposed Resource Additions/Retirements

Solution Comparison																						10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)	
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45				
Scenario 6: CMWL Proposed Scenario	Coal	125	125	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62	19	\$724	\$1,560	\$82.33	
	Natural Gas	121	121	121	163	163	163	163	163	163	156	156	156	156	156	147	147	147	147	147	134				
	Nuclear																								
	Hydro																								
	Wind	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	13	13	12	12	12	12				
	Solar															0.3	0.2	0.2	0.2	0.4	0.4				
	Battery Storage				100	100	99	98	97	96	94	93	91	90	89	87	86	84	83	37	96				
	Bilateral Capacity	60	65	130						5	15	20	25	30	40	45	50	60	70	95	95				
	Demand Response																								
Total		306	311	314	325	325	324	323	322	326	328	331	335	338	347	355	358	366	375	354	357				

Scenario 6 (MW) - Difference from Base Case																						10-yr NPV (\$M)	20-yr NPV (\$M)	20-yr LCoE (\$/MWh)	
Scenario	Resource Type	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45				
Scenario 6 less Base Case Summer Firm Capacity (MW)	Coal																					\$80	\$124	\$6.57	
	Natural Gas				42	49	49	49	49	49	50	50	15	15	15	77	77	76	76	60	11				
	Nuclear																								
	Hydro																								
	Wind																1	1	1	1	1				1
	Solar																-0.3	-0.3	-0.3	-0.3	-0.2				-0.2
	Battery Storage				-24	-28	-32	-39	-39	-38	-38	-37	-37	-36	-35	-35	-34	-34	-33	-60	-7				
	Bilateral Capacity			5	-5	-10	-10	-5	-10	-10	-15	-20		20	20	-30	-30	-25	-25		-5				
	Demand Response																								
Total				5	13	11	7	5		1	-2	-7	3	-1	-1	12	13	18	19	1					

- Reflects specific portfolio additions and retirements – a more practical scenario
- Increases costs by \$124M (9%) vs. Base Case
- Resource mix includes flexible natural gas and batteries with limited renewables
- Reduces reliance and risk on market power purchases to meet capacity requirements

Scenario Comparison



20-year LCoE - Levelized Cost of Energy in \$/MWh (dollars per megawatt hour) is used for scenario cost comparisons. The total costs required to build, operate and supply energy from all resources for 20 years is divided by the total energy produced/procured.

- Base Case - No resource restrictions or forced additions
- 1a - No bilateral capacity after 2029
- 1b - No bilateral capacity after 2029 + 10% higher PRM
- 2 - Battery tolling, renewable PPAs and bilateral capacity
- 3a - SMRs provide 30% capacity
- 3b - SMRs provide 30% capacity +10% higher PRM
- 4 - High gas and power prices
- 5 - Full reliance on MISO planning reserve auction
- 6 - Specified portfolio



Capacity is short through 2045

CMWL capacity needs are driven by both summer and winter seasons and has an immediate shortfall that carries throughout the IRP study. Resource additions would alleviate the needed capacity.



Bilateral capacity may serve as bridge capacity

CMWL's short capacity position may be covered with bilateral capacity from the market in the near term until batteries can be installed. Bilateral capacity may tighten in the future as its demand grows.



Flexible natural gas is a potential option

Most scenarios include flexible natural gas additions beginning as early as 2032 and with lead times of 4 years for RICE units and up to 7 years for H-class combined cycles, procurement should begin by 2028.



Diverse portfolio helps meet capacity needs and emissions target

A combination of bilateral capacity, batteries, flexible natural gas, wind, and solar is less costly than focusing on one resource type or SMRs. These resources can be layered in as needed and when available.



Action Plan

Plan for late 2020s / early 2030s capacity needs

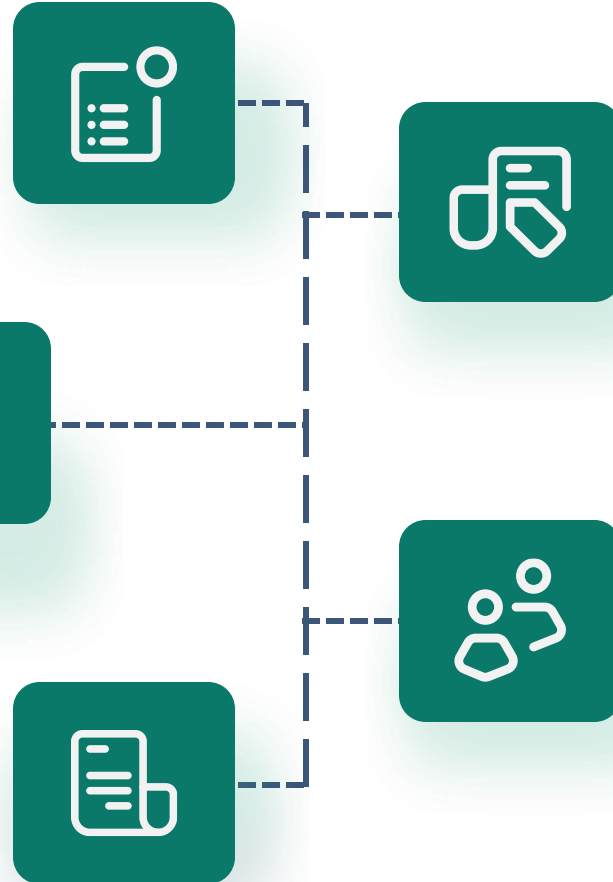
- Evaluate and execute bilateral capacity opportunities to cover capacity shortfalls
- Issue RFP for batteries for 2029-2030 installation as soon as practicable
- Monitor other resource market conditions, including availability, lead times, and costs

Consider portfolio diversity

- Evaluate opportunities to diversify the resource mix (wind, solar, battery storage)
- Monitor cost competitiveness and market trends relative to natural gas-fired resources

Monitor regulatory and market developments

- Track federal and state policies (OBBBA, FERC reserve rulings)
- Follow tax credit eligibility for renewables and storage
- Monitor availability of bilateral capacity



Once near-term plan is in place, look at long-term options

- Evaluate long lead time resources and bilateral capacity arrangements to meet capacity shortfall
- Monitor system conditions such as peak demand, energy requirements, and extreme weather for modifications to long-term plan

Refresh IRP regularly

- Update the resource plan in response to changing demand, costs, technology, and policy assumptions

Discussion and Questions



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