



I&M-MI 2027 IRP

Technical Stakeholder Workshop #2

Welcome & Introductions



I&M Leadership Team

Andrew Williamson | VP, Regulatory and Finance
Edward Locigno | Director, Regulatory Services
Regiana Sistevaris | Manager, Regulatory Services
Jon Walter | Manager, Regulatory Innovations

I&M IRP Planning Team

Mohamed Abukaram | Director, Resource Planning Modeling Analysis
Brian Lakey | Director, Resource Planning Strategy
Christian Mitchell-Flores | Resource Planning Lead
Mark Sklar-Chik | Resource Planning Analyst Staff
Papa Yaw Owusu-Obeng | Resource Planning Analyst Principal

1898 Leadership Team

Brian Despard | Senior Project Manager

Agenda



Time (EST)	Agenda Topic	Presenter(s)
1:00 – 1:10 PM	Welcome, Introductions, & Meeting Objectives	Brian Despard (1898 & Co.) Edward Locigno
1:10 – 1:15 PM	Going-In Capacity Position Review	Brian Lakey
1:15 – 1:20 PM	Resource Modeling Parameters Review	Christian Mitchell-Flores
1:20 – 1:30 PM	Key Modeling Assumptions & Constraints	Mohamed Abukaram
1:30 – 2:30 PM	Going-In Scenarios Modeling Results	Mark Sklar-Chik
2:30 – 2:40 PM	Break	
2:40 – 3:40 PM	Deterministic Sensitivities Modeling Results	Papa Yaw Owusu-Obeng
3:40 – 3:50 PM	Break	
3:50 – 4:05 PM	Results Comparison	Mark Sklar-Chik
4:05 – 4:40 PM	Portfolio Performance Indicators & Metrics	Christian Mitchell-Flores
4:40 – 4:45 PM	Next Steps	Christian Mitchell-Flores
4:45 – 5:00 PM	Open Discussion, Final Questions, Action Items, Adjourn	Brian Despard (1898 & Co.)

Participation

Participants joining today's meeting will be in a "listen-only" mode. Please use the "Raise" function to be recognized and unmuted.

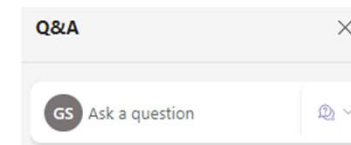
During the presentation, please enter questions at any time into the Teams Q&A feature. Questions will be addressed after each section. At the end of the presentation, we will open up the floor for additional questions, thoughts, ideas, and suggestions.

All questions and answers will be logged and provided on the IRP website. Any questions not answered during the meeting will be answered after the meeting and provided in the Q&A log posted to the IRP website.

Questions, thoughts, ideas, and suggestion related to this meeting can be provided at [IRP website](#) following this meeting.



Click the Q&A feature at the top of the Teams screen



Guidelines



Please focus questions, thoughts, ideas, and suggestions to the IRP process and the content being discussed in this meeting. Time will be taken during this meeting to respond to questions.



Please respect other participants and their views by not addressing other participants directly and not commenting on the views expressed by others.



This meeting will not be recorded or transcribed.



Any further questions or comments can be provided to [IRP website](#).

Meeting Objectives

- **Transparency:** Share the modeling inputs, assumptions, constraints, and results.
- **Evaluate Results:** Compare portfolio performance across the going-in scenarios and deterministic sensitivities.
- **Gather Feedback:** Obtain stakeholder input on the modeling results, key tradeoffs, performance indicators, and next steps.



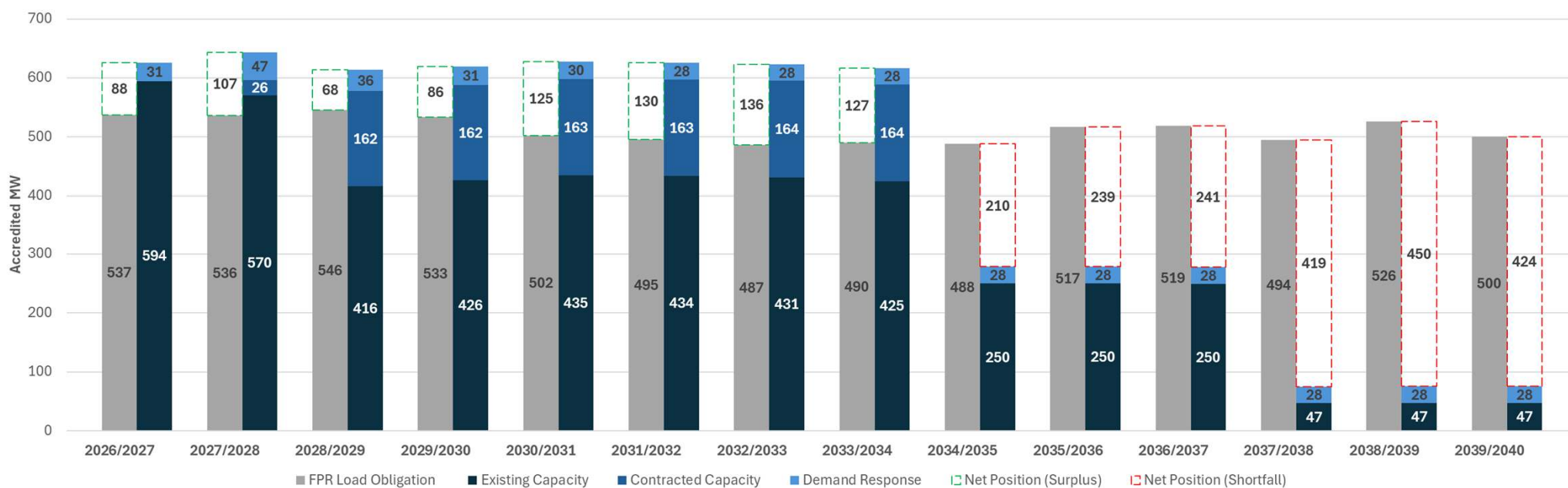
**Website where you can
send us comments**

I&M welcomes stakeholder comments and input on:

- Going-in Capacity Position
- Resource Modeling Parameters
- Key Modeling Assumptions and Constraints
- Going-in Scenario Results
- Deterministic Sensitivity Results
- Portfolio Comparisons
- Portfolio Performance Indicators and Metrics

Going-In Capacity Position

Michigan Annual Capacity Position



Generic Supply-Side Resources



Key Supply-Side Resource Option Assumptions					
Technology	Case Description	First Available Year	Useful Life (yr)	Block Size (Nameplate) (MW)	Annual Limits (MW/yr)
Base Load					
Combustion Turbine - 2x1 Combined Cycle, Carbon Capture	Frame CT, H-Class, 95% Carbon Capture	2035	30	1,077	1,077
SMR, Greenfield	1 x 300 MW BWR, FOAK	2033	60	300	600
SMR, Greenfield	2 x 300 MW BWR, NOAK	2037	60	600	600
Intermittent, Renewable and Energy Storage					
Onshore Wind, Eastern Region (Owned/PPA)	6.0 MW WTG, 117-m HH	2029	30	100	200/200
Solar PV (Owned/PPA)	150 MWac / 200 MWdc	2029	30	100	400/400
Solar PV + BESS	150MW PV, 50MW BESS	2030	30 PV 20 BESS	150 MW 200 MWh	150 MW 200 MWh
BESS; Li-Ion (4-hour)	50 MW / 200 MWh	2030	20	50 MW / 200 MWh	2030/2031: 150 MW 2032+: 200 MW
BESS; Li-Ion (6-hour)	50 MW / 300 MWh	2032	20	50 MW / 300 MWh	2 x 50MW every 1 year
BESS; Li-Ion (8-hour)	50 MW / 400 MWh	2032	20	50 MW / 400 MWh	1 x 50MW every 1 year
BESS; Iron-Air (100-hour)	20 MW / 2,000 MWh	2035	20	5 MW / 500 MWh	1 x 5MW every 5 years

Key Modeling Constraints & Compliance Treatment



Renewable Portfolio Standard

- Applied Michigan RPS compliance requirements based on net weather-normalized retail sales, including eligible Cook nuclear plant generation and REC banking within the compliance window.

Solar RPS Credit Incentives

- Qualifying solar generation receives the applicable Michigan incentive credits.

Michigan Energy Storage Target

- I&M's applicable proportional share of Michigan's statewide storage target (72.8 MW) is entered as a required quantity by the applicable compliance date. Storage remains available for economic selection above the minimum.

REC Eligibility & Purchase Framework

- Modeled qualifying REC eligibility, banking, and pricing. REC purchases are limited to 5% of the RECs used annually for RPS compliance and cannot be used after 2035.

Short-Term Capacity Market Purchases

- Applied the approved near-term PJM RPM price basis for specified delivery years, then transitioned to the long-term fundamentals forecast.

Energy Import/Export Limits

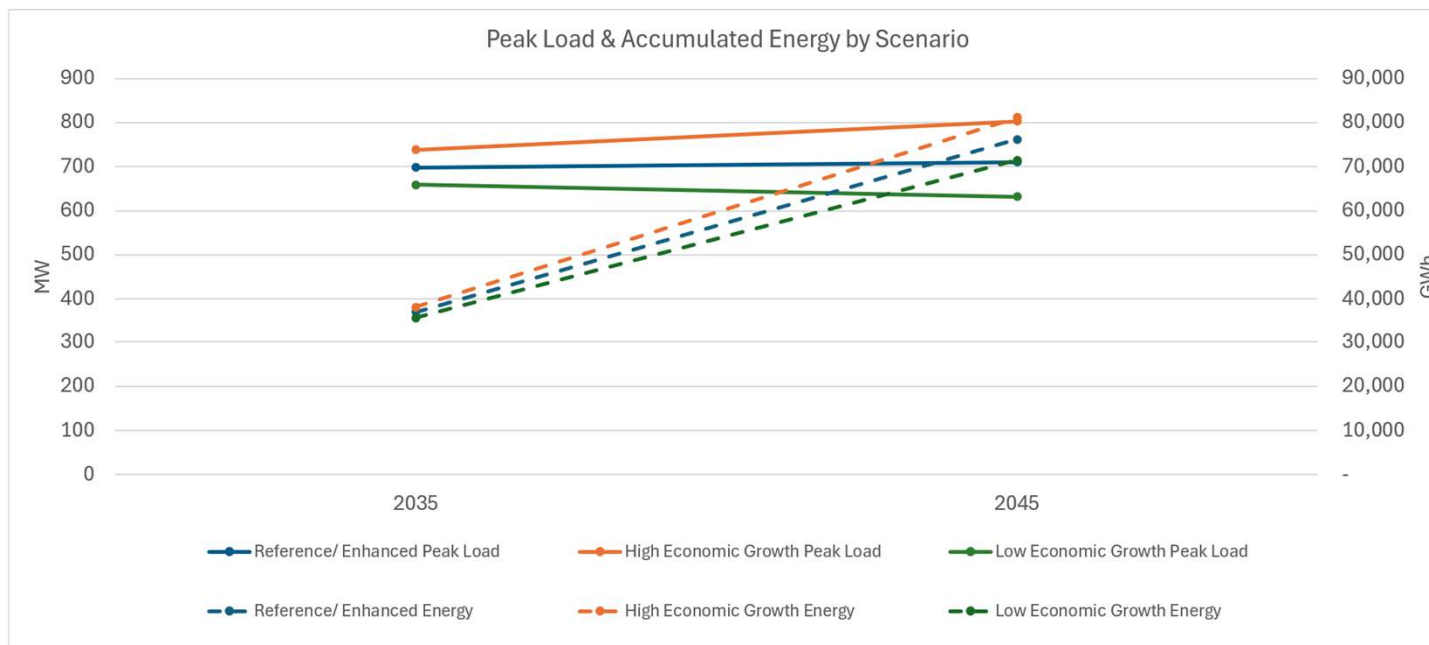
- Monitored energy imports and exports over the planning period, ensuring portfolios primarily serve the utility's energy and capacity requirements rather than relying on market purchases or pursuing merchant generation opportunities.

Going-In Scenarios: Purpose & Differences



Going-In Scenario	Purpose	Differences Relative to Reference Scenario
Reference	Establish the reference portfolio under the base load forecast and delayed implementation of EPA 2024 GHG requirements (10-year delay).	Reference case. Base load forecast, base commodity prices, base market prices, and delayed environmental compliance assumptions.
High Economic Growth	Evaluate portfolio robustness under higher economic growth, electricity consumption, and peak demand.	High load forecast, higher economic activity, and corresponding commodity and market price assumptions. Environmental compliance assumptions remain delayed.
Low Economic Growth	Evaluate portfolio performance under lower economic growth, electricity consumption, and peak demand.	Low load forecast, lower economic activity, and corresponding commodity and market price assumptions. Environmental compliance assumptions remain delayed.
Enhanced Environmental Regulatory Policy	Assess portfolio impacts under current EPA 2024 GHG compliance requirements.	EPA 2024 GHG requirements modeled under the previous regulatory schedule rather than a 10-year delay. Accelerated coal retirements in PJM result in higher natural gas prices and wholesale power prices relative to the reference case. Load forecast assumptions remain unchanged.

Key Quantitative Inputs by Going-In Scenario



Category	Reference	High Economic Growth	Low Economic Growth	Enhanced Environmental Regulatory Policy
Gas Price (\$/MMBtu)	2035: 3.92 \$/MMBtu 2045: 5.22 \$/MMBtu	2035: 5.49 \$/MMBtu 2045: 7.38 \$/MMBtu	2035: 2.34 \$/MMBtu 2045: 3.07 \$/MMBtu	2035: 4.18 \$/MMBtu 2045: 5.47 \$/MMBtu
PJM Energy Market Price (\$/MWh)	2035: 37.69 \$/MWh 2045: 47.14 \$/MWh	2035: 50.49 \$/MWh 2045: 77.63 \$/MWh	2035: 28.85 \$/MWh 2045: 28.25 \$/MWh	2035: 147.41 \$/MWh 2045: 57.74 \$/MWh

Reference Scenario



Reference Scenario																			
Year	Nameplate MW											Accredited MW							
	Cook 1 Continued Operation	Cook 2 Continued Operation	Elkhart Continued Operation	Mottville Continued Operation	Buchanan Continued Operation	Twin Branch Continued Operation	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, CVR, EWR, DR, VPP	Capacity Purchase						
2026	Existing Resource included in Going-In Position*						0	0	0	0	0	0	0						
2027							0	0	0	0	0	0	0						
2028									0.52	0.27	0.45	0.78	0	0	0	0	17	0	
2029													0	0	0	0	0	30	0
2030													0	0	0	0	0	44	0
2031													0	0	0	0	0	56	0
2032													0	0	0	0	0	70	0
2033									0.52	0.27	0.45	0.78	0	0	0	0	81	0	
2034													0	0	0	0	92	0	
2035													183	0.54	0.27	0	0	103	0
2036													183	0.54	0.27	0	0	111	0
2037							183		0.54	0.27	0.45	0.77	0	0	0	0	119	0	
2038	184	212	0.54	0.27	0.45	0.78	0	0	0	0	127	0							
2039	184	212	0.54	0.27	0.45	0.78	0	0	0	50	134	0							
2040	184	212	0.54	0.27	0.45	0.78	0	0	0	50	140	0							
2041	184	212	0.54	0.27	0.45	0.78	0	0	0	50	147	0							
2042	184	212	0.54	0.27	0.45	0.78	0	0	0	50	154	0							
2043	184	212	0.54	0.27	0.45	0.78	0	0	0	50	156	0							
2044	184	212	0.54	0.27	0.45	0.78	0	0	0	50	158	0							
2045	184	212	0.54	0.27	0.45	0.78	0	0	0	100	161	0							

Purpose of Scenario:

- Establish the least-cost reference portfolio using base load, market, and environmental assumptions.

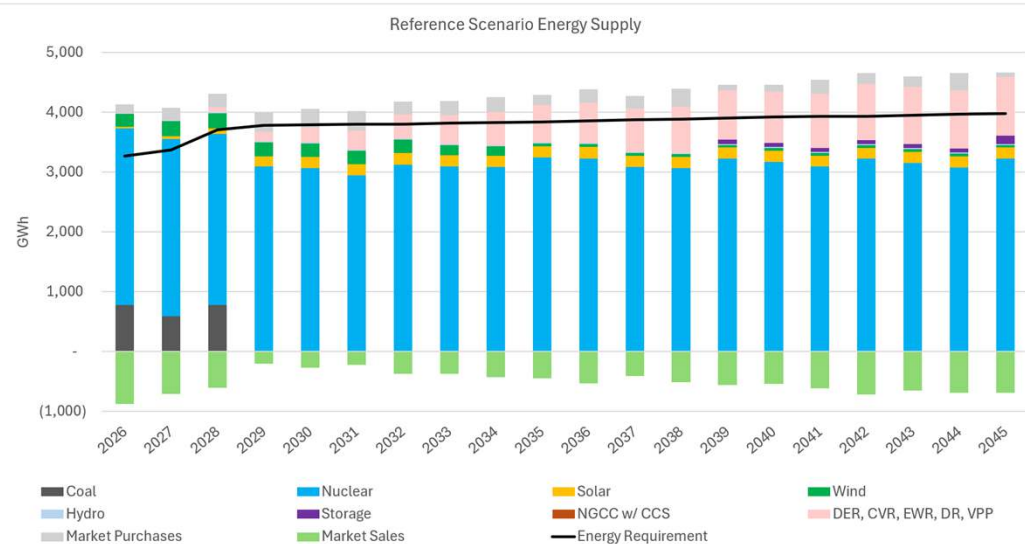
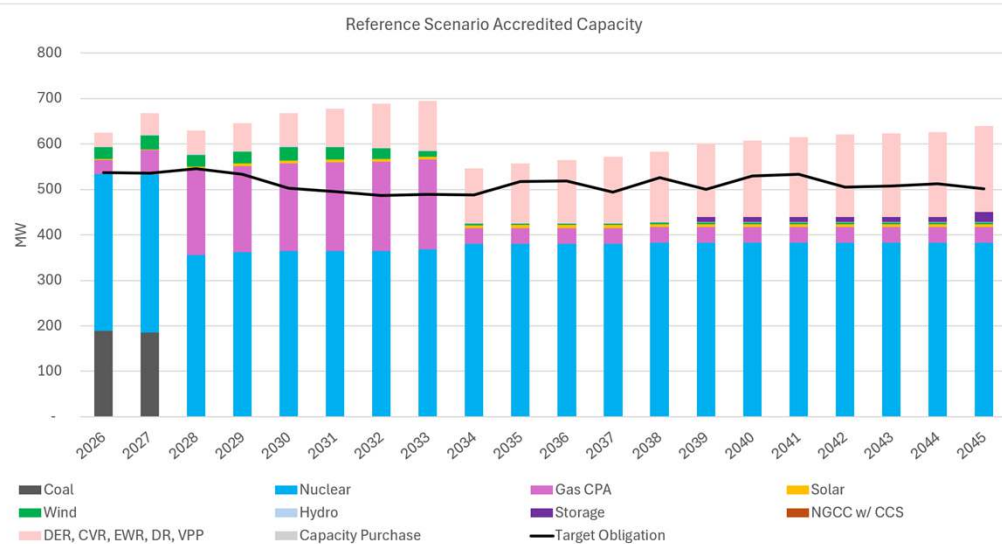
Observations through 2030:

- EWR reaches approximately 44 MW by 2030, with no supply-side resource additions.

Observations through 2045:

- Cook and hydro relicensing remain the least-cost pathway.
- 50 MW of storage is added in 2039, increasing to 100 MW by 2045 in compliance with the statewide energy storage target share (72.8 MW).
- Demand-side resources increase to approximately 161 MW by 2045, reflecting the cumulative effect of modeling annual incremental EWR savings equal to 2% of prior-year retail sales, consistent with MCL 460.1077(2).

Reference Scenario



Observations

- Cook nuclear plant and hydro resources relicensing remains the least-cost pathway
- Cook remains the largest source of accredited capacity and energy while DSM contributes significant growth in both energy and capacity
- In 2030 the Annual Energy is 3,792 GWh and peak load is 698 MW
- In 2045 the Annual Energy is 3,978 GWh and peak load is 710 MW

High Economic Growth Scenario



High Economic Growth Scenario																				
Year	Nameplate MW											Accredited MW								
	Cook 1 Continued Operation	Cook 2 Continued Operation	Elkhart Continued Operation	Mottville Continued Operation	Buchanan Continued Operation	Twin Branch Continued Operation	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, CVR, EWR, DR, VPP	Capacity Purchase							
2026	Existing Resource included in Going-In Position*						0	0	0	0	0	0	0							
2027							0	0	0	0	0	0	0							
2028									0.52	0.27	0.45	0.77	0	0	0	0	0	20	0	
2029													0	0	0	0	0	37	0	
2030													0	0	0	0	0	52	0	
2031													0	0	0	0	0	64	0	
2032													0	0	0	0	0	78	0	
2033									0.52	0.27	0.45	0.78	0	0	0	0	0	90	0	
2034													0	0	0	0	0	100	0	
2035													183	0.54	0.27	0	0	0	111	0
2036													183	0.54	0.27	0	0	0	119	0
2037							183		0.54	0.27	0.45	0.77	0	0	0	0	0	127	0	
2038	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	134	0							
2039	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	141	0							
2040	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	148	0							
2041	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	154	0							
2042	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	161	0							
2043	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	163	0							
2044	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	165	0							
2045	184	212	0.54	0.27	0.45	0.78	0	0	100	0	100	167	0							

Purpose of Scenario:

- Evaluate portfolio needs under higher economic growth, energy consumption, and peak demand.

Observations through 2030:

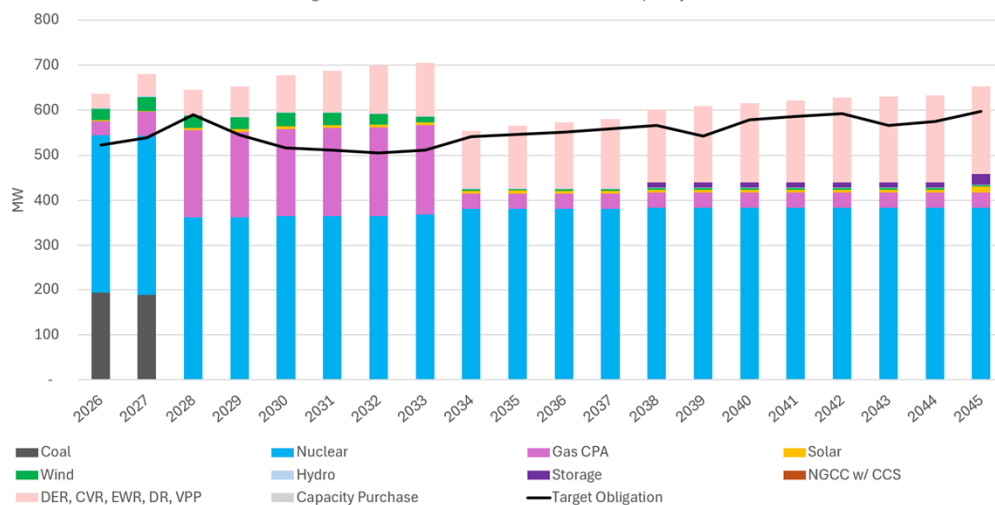
- Higher load increases demand-side resource additions to approximately 52 MW by 2030.
- Existing resources remain sufficient through 2027, with no new supply-side additions.

Observations through 2045:

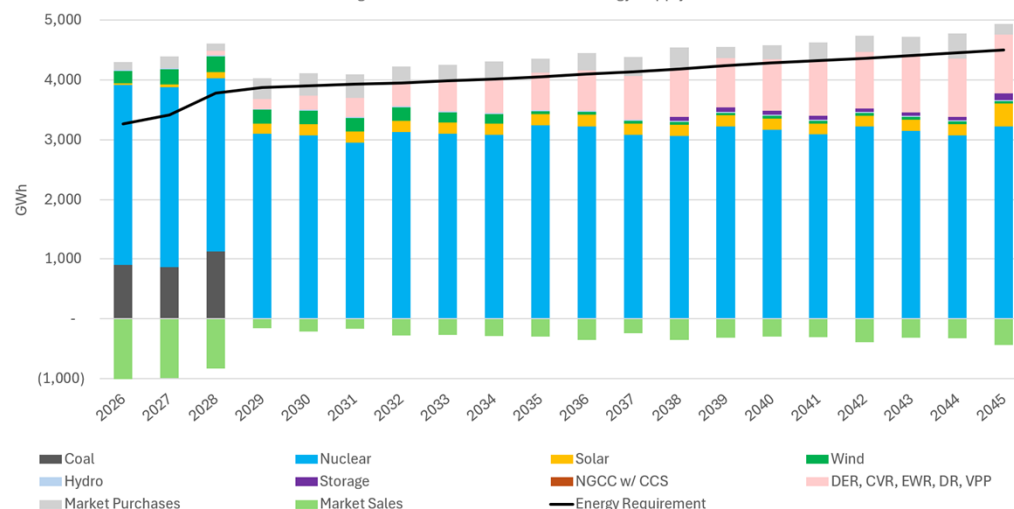
- Higher load drives earlier storage additions, with 50 MW added in 2038.
- By 2045, the portfolio includes 100 MW of solar, and 100 MW of storage in compliance with the statewide energy storage target share (72.8 MW).
- Demand-side resources increase to approximately 170 MW by 2045, reflecting the cumulative effect of modeling annual incremental EWR savings equal to 2% of prior-year retail sales, consistent with MCL 460.1077(2).

High Economic Growth Scenario

High Economic Growth Scenario Accredited Capacity



High Economic Growth Scenario Energy Supply



Observations

- Cook nuclear plant and hydro resources relicensing remains the least-cost pathway
- Cook remains the largest source of accredited capacity and energy while DSM contributes significant growth in both energy and capacity
- In 2030 Energy increased by 108 GWh relative to the base, and peak load increased 20 MW relative to the base
- In 2045 Energy increased by 521 GWh, and peak load by 93 MW.

Low Economic Growth Scenario



Low Economic Growth Scenario																			
Year	Nameplate MW											Accredited MW							
	Cook 1 Continued Operation	Cook 2 Continued Operation	Elkhart Continued Operation	Mottville Continued Operation	Buchanan Continued Operation	Twin Branch Continued Operation	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, CVR, EWR, DR, VPP	Capacity Purchase						
2026	Existing Resource included in Going-In Position*						0	0	0	0	0	0	0						
2027							0	0	0	0	0	0	0						
2028												0	0	0	0	0	15	0	
2029												0	0	0	0	0	29	0	
2030												0	0	0	0	0	43	0	
2031													0.52		0	0	0	55	0
2032													0.52		0	0	0	67	0
2033								0.52		0	0	0	79	0					
2034								0.54	0.27		0	0	0	88	0				
2035							183		0.54	0.27		0	0	0	0	99	0		
2036							183		0.54	0.27		0	0	0	0	107	0		
2037							182		0.54	0.27	0.45	0.77	0	0	0	0	114	0	
2038	184	212	0.54	0.27	0.45	0.78	0	0	0	0	121	0							
2039	184	212	0.54	0.27	0.45	0.78	0	0	0	50	127	0							
2040	184	212	0.54	0.27	0.45	0.78	0	0	0	50	133	0							
2041	184	212	0.54	0.27	0.45	0.78	0	0	0	50	139	0							
2042	184	212	0.54	0.27	0.45	0.78	0	0	0	50	144	0							
2043	184	212	0.54	0.27	0.45	0.78	0	0	0	50	145	0							
2044	184	212	0.54	0.27	0.45	0.78	0	0	0	50	147	0							
2045	184	212	0.54	0.27	0.45	0.78	0	0	0	100	148	0							

Purpose of Scenario:

- Evaluate portfolio needs under lower economic growth, energy consumption, and peak demand.

Observations through 2030:

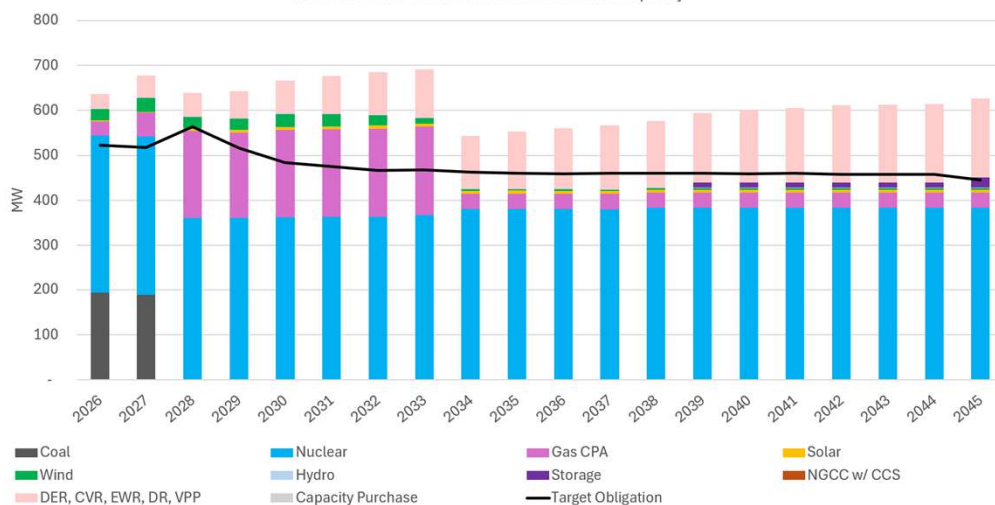
- Lower load reduces demand-side resource additions to approximately 43 MW by 2030.
- Existing resources remain sufficient, resulting in no new supply-side additions through 2030.

Observations through 2045:

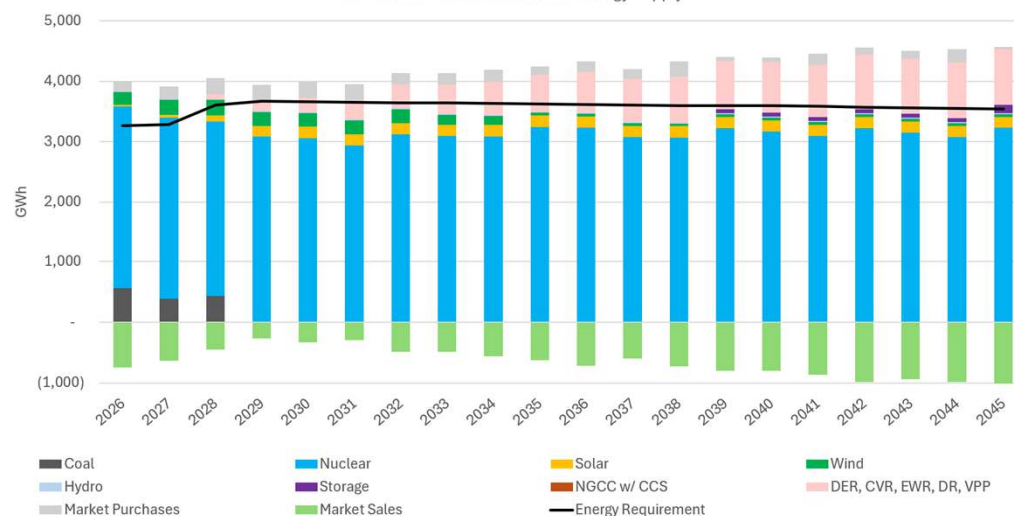
- Lower load maintains higher reserve margins and delays storage additions until 2039.
- Storage increases from 50 MW in 2039 to 100 MW by 2045, in compliance with the statewide energy storage target share (72.8 MW).
- Demand-side resources increase to approximately 148 MW by 2045, reflecting the cumulative effect of modeling annual incremental EWR savings equal to 2% of prior-year retail sales, consistent with MCL 460.1077(2).

Low Economic Growth Scenario

Low Economic Growth Scenario Accredited Capacity



Low Economic Growth Scenario Energy Supply



Observations

- Cook nuclear plant and hydro resources relicensing remains the least-cost pathway
- Cook remains the largest source of accredited capacity and energy while DSM contributes significant growth in both energy and capacity
- In 2030 energy drops by 133.3 GWh relative to the base scenario, and Peak demand decreased by 24 MW relative to the base.
- In 2045 energy decreases by 440 GWh, and Peak Demand by 78 MW.

Enhanced Environmental Regulatory Scenario



Enhanced Environmental Regulatory Policy Scenario																			
Year	Nameplate MW											Accredited MW							
	Cook 1 Continued Operation	Cook 2 Continued Operation	Elkhart Continued Operation	Mottville Continued Operation	Buchanan Continued Operation	Twin Branch Continued Operation	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, CVR, EWR, DR, VPP	Capacity Purchase						
2026	Existing Resource included in Going-In Position*						0	0	0	0	0	0	0						
2027							0	0	0	0	0	0	0						
2028							0	0	0	0	0	18	0						
2029							0	0	0	0	0	33	0						
2030							0	0	299	0	50	47	0						
2031								0.52			0	0	298	0	50	60	0		
2032								0.52			0	0	296	0	50	72	0		
2033								0.52			0	0	295	0	50	84	0		
2034								0.54	0.27		0	0	293	0	50	93	0		
2035							183		0.54	0.27		0	0	292	0	50	104	0	
2036							183		0.54	0.27		0	0	290	0	50	112	0	
2037							183		0.54	0.27	0.45	0.77	0	0	289	0	50	119	0
2038							184	212	0.54	0.27	0.45	0.78	0	0	287	0	50	126	0
2039	184	212	0.54	0.27	0.45	0.78	0	0	286	0	50	132	0						
2040	184	212	0.54	0.27	0.45	0.78	0	0	284	0	50	137	0						
2041	184	212	0.54	0.27	0.45	0.78	0	0	283	0	50	142	0						
2042	184	212	0.54	0.27	0.45	0.78	0	0	281	0	50	148	0						
2043	184	212	0.54	0.27	0.45	0.78	0	0	280	0	50	149	0						
2044	184	212	0.54	0.27	0.45	0.78	0	0	278	0	50	150	0						
2045	184	212	0.54	0.27	0.45	0.78	0	0	277	0	100	151	0						

Purpose of Scenario:

- Evaluate the least-cost portfolio under enhanced environmental regulations and associated market-price impacts.

Observations through 2030:

- Elevated market prices create profitable market-sale opportunities, driving the addition of approximately 299 MW of solar and 50 MW of storage in 2030.
- The portfolio builds resources significantly earlier than other scenarios to capture energy market revenues while meeting future reliability needs.
- Demand-side resources increase to approximately 47 MW by 2030.

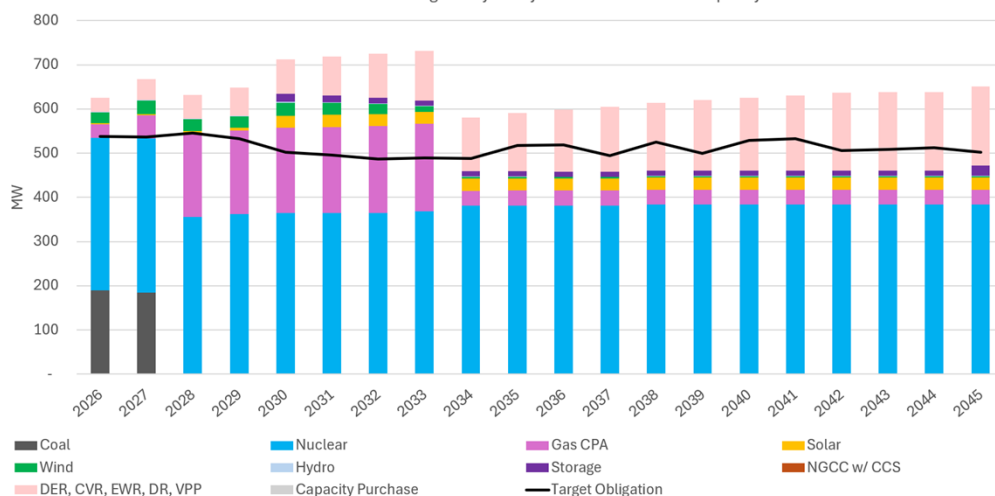
Observations through 2045:

- Solar remains in the portfolio at approximately 277 MW in 2045, reflecting modeled degradation.
- Storage increases from 50 MW in 2030 to 100 MW by 2045, in compliance with the statewide energy storage target share (72.8 MW).
- Demand-side resources increase to approximately 151 MW by 2045, reflecting the cumulative effect of modeling annual incremental EWR savings equal to 2% of prior-year retail sales, consistent with MCL 460.1077(2).

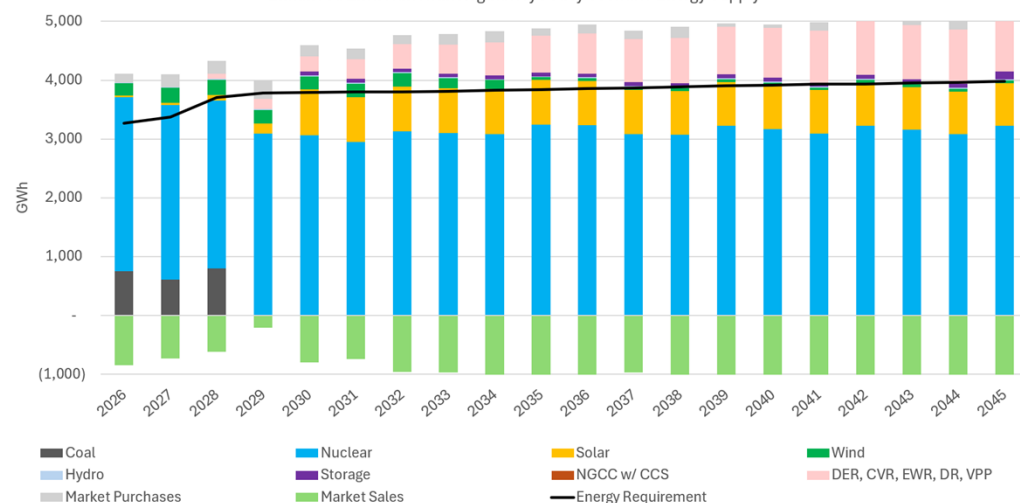
Enhanced Environmental Regulatory Scenario



Enhanced Environmental Regulatory Policy Scenario Accredited Capacity



Enhanced Environmental Regulatory Policy Scenario Energy Supply



Observations

- Cook nuclear plant and hydro resources relicensing remains the least-cost pathway
- Cook remains the largest source of accredited capacity and energy while DSM and storage contribute significant growth in both energy and capacity
- Earlier incremental resource additions increase market sales and allow the portfolio to capture value during periods of higher market prices
- Incremental resources relative to previous cases (Reference, High and Low) include additional solar generation and energy storage capacity, extending resource additions further out along the planning curve

Short Break



Deterministic Sensitivities



Sensitivities Modeling Framework

Reference Scenario

2.17% EWR Adoption	Evaluate portfolio impacts of achieving at least 2.17% annual Energy Waste Reduction savings based on prior-year Michigan retail sales.
10% DG Penetration	Evaluate portfolio impacts of distributed generation adoption at the statutory maximum level.
Extreme Weather	Assess portfolio resilience under atypical weather conditions (1-in-10-year weather events), including impacts to load, market price, resource availability, unit derates, and supply disruptions.
Hyperscaler Load	Evaluate portfolio adequacy and resource timing under accelerated large-load growth associated with hyperscale customer development within the service territory.

High Economic Growth Scenario

2.5% EWR Adoption	Evaluate portfolio impacts of achieving at least 2.5% annual Energy Waste Reduction savings based on prior-year Michigan retail sales.
15% & 20% DG Penetration	Assess the effect of higher distributed generation adoption levels.
Renewable Build Constraint	Assess the effect under renewable development constraints by reducing renewable build capability by 20% during the first six years of the planning horizon.

2.17% Energy Waste Reduction Adoption



Reference 2.17% EWR Sensitivity																	
Year	Nameplate MW											Accredited MW		EWR			
	Cook 1 Continued Operation	Cook 2 Continued Operation	Elkhart Continued Operation	Mottville Continued Operation	Buchanan Continued Operation	Twin Branch Continued Operation	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, CVR, EWR, DR, VPP	Capacity Purchase				
2026	Existing Resource included in Going-In Position*						0	0	0	0	0	0	0	0	0		
2027							0	0	0	0	0	0	0	0			
2028							0	0	0	0	0	16	0	14			
2029							0	0	0	0	0	30	0	27			
2030							0	0	0	0	0	45	0	40			
2031								0.52				0	0	0	57	0	53
2032								0.52				0	0	0	71	0	66
2033								0.52				0	0	0	83	0	78
2034								0.54	0.27			0	0	0	94	0	89
2035							183		0.54	0.27		0	0	0	106	0	100
2036	183		0.54	0.27		0	0	0	115	0	109						
2037	183		0.54	0.27	0.45	0.77	0	0	0	0	123	0	117				
2038	184	212	0.54	0.27	0.45	0.78	0	0	0	0	131	0	124				
2039	184	212	0.54	0.27	0.45	0.78	0	0	0	50	138	0	131				
2040	184	212	0.54	0.27	0.45	0.78	0	0	0	50	144	0	137				
2041	184	212	0.54	0.27	0.45	0.78	0	0	0	50	150	0	143				
2042	184	212	0.54	0.27	0.45	0.78	0	0	0	50	156	0	148				
2043	184	212	0.54	0.27	0.45	0.78	0	0	0	50	158	0	150				
2044	184	212	0.54	0.27	0.45	0.78	0	0	0	50	160	0	151				
2045	184	212	0.54	0.27	0.45	0.78	0	0	0	100	161	0	152				

EWR
0
0
14
27
40
53
66
78
89
100
109
117
124
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137
143
148
150
151
152

Purpose of Scenario:

- Evaluate portfolio impacts of increasing annual EWR savings to at least 2.17% of prior-year Michigan retail sales.

Observations through 2035:

- EWR increases by ~5 MW; DR remains around ~3 MW, while VPP declines by approximately by ~2 MW.
- No change to the supply-side expansion plan.

Observations through 2045:

- EWR increases by 4 MW, while DR declines from 6.4 MW to 4.5 MW and VPP from 6.3 MW to 4.1 MW.
- Supply-side plan remains unchanged, with 50 MW of storage in 2039 and 100 MW by 2045.

2.17% Energy Waste Reduction Adoption



Category	2035		2045	
	Reference Scenario	2.17% Energy Waste Reduction Adoption	Reference Scenario	2.17% Energy Waste Reduction Adoption
Reliability Margin	-4.52%	-3.96%	13.03%	13.07%
Market Purchases as a % of Load	4.33%	4.14%	2.01%	1.92%
Market Sales as a % of Load	11.64%	12.27%	17.35%	17.94%
NPV (\$B)			\$1.72	\$1.73

- Modest improvement in reliability and market position, with lower purchases and higher sales.
- Marginal increase in NPV, as lower DR and VPP offset part of the additional EWR cost.

2.5% Energy Waste Reduction Adoption



High Economic Growth 2.5% EWR Sensitivity																	
Year	Nameplate MW											Accredited MW		EWR			
	Cook 1 Continued Operation	Cook 2 Continued Operation	Elkhart Continued Operation	Mottville Continued Operation	Buchanan Continued Operation	Twin Branch Continued Operation	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, CVR, EWR, DR, VPP	Capacity Purchase				
2026	Existing Resource included in Going-In Position*						0	0	0	0	0	0	0	0			
2027							0	0	0	0	0	0	0				
2028							0	0	0	0	0	19	0				
2029							0	0	0	0	0	35	0				
2030							0	0	0	0	0	51	0				
2031								0.52				0	0	0	0	64	0
2032								0.52				0	0	0	0	77	0
2033								0.52				0	0	0	0	90	0
2034								0.54	0.27			0	0	0	0	101	0
2035							183		0.54	0.27		0	0	0	0	114	0
2036							183		0.54	0.27		0	0	0	0	123	0
2037							183		0.54	0.27	0.45	0.77	0	0	0	0	131
2038	184	212	0.54	0.27	0.45	0.78	0	0	0	50	140	0					
2039	184	212	0.54	0.27	0.45	0.78	0	0	0	50	147	0					
2040	184	212	0.54	0.27	0.45	0.78	0	0	0	50	154	0					
2041	184	212	0.54	0.27	0.45	0.78	0	0	0	50	161	0					
2042	184	212	0.54	0.27	0.45	0.78	0	0	0	50	168	0					
2043	184	212	0.54	0.27	0.45	0.78	0	0	0	50	170	0					
2044	184	212	0.54	0.27	0.45	0.78	0	0	0	50	172	0					
2045	184	212	0.54	0.27	0.45	0.78	0	0	100	0	100	174	0				

EWR
0
0
14
27
41
54
67
80
90
102
111
119
127
134
141
147
154
156
158
159

Purpose of Scenario:

- Evaluate portfolio impacts of increasing annual EWR savings to at least **2.5% of prior-year Michigan retail sales**.

Observations through 2035:

- EWR increases by ~7 MW to 102 MW, while VPP declines by 7 MW.
- No change to the supply-side expansion plan.

Observations through 2045:

- EWR increases by ~12 MW; DR, while VPP declines by ~5.7 MW.
- The additional EWR primarily substitutes for VPP; the portfolio retains 100 MW of solar and 100 MW of total storage.

2.5% Energy Waste Reduction Adoption



Category	2035		2045	
	High Economic Growth Scenario	2.5% Energy Waste Reduction Adoption	High Economic Growth Scenario	2.5% Energy Waste Reduction Adoption
Reliability Margin	-8.27%	-7.89%	-3.09%	-2.05%
Market Purchases as a % of Load	5.72%	5.30%	3.87%	3.39%
Market Sales as a % of Load	7.34%	7.96%	9.67%	10.81%
NPV (\$B)			\$1.84	\$1.85

- Modest improvement in reliability and market position, with lower purchases and higher sales.
- Modest increase in NPV, as reductions in other demand-side resources offset much of the additional EWR cost.

10% Distributed Generation Penetration



Reference 10% DG Sensitivity																		
Year	Nameplate MW											Accredited MW		DG				
	Cook 1 Continued Operation	Cook 2 Continued Operation	Elkhart Continued Operation	Mottville Continued Operation	Buchanan Continued Operation	Twin Branch Continued Operation	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, DG, CVR, EWR, DR, VPP	Capacity Purchase					
2026	Existing Resource included in Going-In Position*						0	0	0	0	0	3	0	2				
2027							0	0	0	0	0	6	0	6				
2028							0	0	0	0	0	25	0	8				
2029							0	0	0	0	0	40	0	10				
2030							0	0	0	0	0	56	0	12				
2031								0.52				0	0	0	69	0	14	
2032								0.52				0	0	0	85	0	16	
2033								0.52				0	0	0	100	0	18	
2034								0.54	0.27			0	0	0	0	112	0	21
2035							183		0.54	0.27		0	0	0	0	0	125	0
2036	183		0.54	0.27		0	0	0	0	0	135	0	24					
2037	183		0.54	0.27	0.45	0.77	0	0	0	0	0	146	0	27				
2038	184	212	0.54	0.27	0.45	0.78	0	0	0	0	0	155	0	29				
2039	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	165	0	31				
2040	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	175	0	34				
2041	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	183	0	36				
2042	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	193	0	39				
2043	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	197	0	41				
2044	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	202	0	44				
2045	184	212	0.54	0.27	0.45	0.78	0	0	0	0	100	208	0	47				

Purpose of Scenario:

- Evaluate portfolio impacts of DG adoption at **10% of the previous five-year average annual peak load**.

Observations through 2035:

- DG increases to ~22 MW, while EWR, DR, and VPP remain generally consistent with Reference.
- No change to the supply-side expansion plan.

Observations through 2045:

- DG increases to ~47 MW, while EWR, DR, and VPP remain essentially unchanged from Reference.
- Supply-side plan remains unchanged, with 100 MW of storage by 2045.

10% Distributed Generation Penetration



Category	2035		2045	
	Reference Scenario	10% Distributed Generation Penetration	Reference Scenario	10% Distributed Generation Penetration
Reliability Margin	-4.52%	-0.74%	13.03%	21.40%
Market Purchases as a % of Load	4.33%	4.19%	2.01%	1.79%
Market Sales as a % of Load	11.64%	12.56%	17.35%	19.27%
NPV (\$B)			\$1.72	\$2.73

- Significant improvement in reliability margin and market position relative to the Reference scenario.
- Significant increase in NPV, reflecting the cost of the additional DG capacity.

15% Distributed Generation Penetration



High Economic Growth 15% DG Sensitivity																		
Year	Nameplate MW											Accredited MW		DG				
	Cook 1 Continued Operation	Cook 2 Continued Operation	Elkhart Continued Operation	Mottville Continued Operation	Buchanan Continued Operation	Twin Branch Continued Operation	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, DG, CVR, EWR, DR, VPP	Capacity Purchase					
2026	Existing Resource included in Going-In Position*						0	0	0	0	0	4	0	3				
2027							0	0	0	0	0	9	0	9				
2028							0	0	0	0	0	29	0	13				
2029							0	0	0	0	0	45	0	15				
2030							0	0	0	0	0	62	0	18				
2031								0.52				0	0	0	77	0	21	
2032								0.52				0	0	0	94	0	25	
2033								0.52				0	0	0	110	0	29	
2034								0.54	0.27			0	0	0	0	124	0	32
2035							183		0.54	0.27		0	0	0	0	0	138	0
2036	183		0.54	0.27		0	0	0	0	0	150	0	38					
2037	183		0.54	0.27	0.45	0.77	0	0	0	0	162	0	43					
2038	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	173	0	46				
2039	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	184	0	50				
2040	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	196	0	55				
2041	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	206	0	59				
2042	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	218	0	64				
2043	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	224	0	68				
2044	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	231	0	73				
2045	184	212	0.54	0.27	0.45	0.78	0	0	100	0	100	240	0	79				

Purpose of Scenario:

- Evaluate portfolio impacts of increasing DG adoption to **15% of the previous five-year average annual peak load**.

Observations through 2035:

- DG increases to ~35 MW, providing additional capacity relative to High.

Observations through 2045:

- DG increases to ~79 MW.
- DR declines by ~3 MW and VPP by 3.5 MW.
- Supply-side plan remains unchanged, with 100 MW of solar and 100 MW of storage.

15% Distributed Generation Penetration



Category	2035		2045	
	High Economic Growth Scenario	15% Distributed Generation Penetration	High Economic Growth Scenario	15% Distributed Generation Penetration
Reliability Margin	-8.27%	-3.96%	-3.09%	7.64%
Market Purchases as a % of Load	5.72%	5.30%	3.87%	3.50%
Market Sales as a % of Load	7.34%	8.54%	9.67%	12.56%
NPV (\$B)			\$1.84	\$3.60

- Largest improvement in reliability margin and market position among the DG sensitivities.
- Largest increase in NPV, reflecting the highest level of DG capacity.

20% Distributed Generation Penetration



High Economic Growth 20% DG Sensitivity																	
Year	Nameplate MW											Accredited MW		DG			
	Cook 1 Continued Operation	Cook 2 Continued Operation	Elkhart Continued Operation	Mottville Continued Operation	Buchanan Continued Operation	Twin Branch Continued Operation	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, DG, CVR, EWR, DR, VPP	Capacity Purchase				
2026	Existing Resource included in Going-In Position*						0	0	0	0	0	5	0	5			
2027							0	0	0	0	0	12	0	12			
2028							0	0	0	0	0	39	0	17			
2029							0	0	0	0	0	60	0	20			
2030							0	0	0	0	0	81	0	25			
2031								0.52				0	0	0	97	0	28
2032								0.52				0	0	0	116	0	33
2033								0.52				0	0	0	132	0	38
2034								0.54	0.27			0	0	0	147	0	43
2035							183		0.54	0.27		0	0	0	0	162	0
2036	183		0.54	0.27		0	0	0	0	175	0	52					
2037	183		0.54	0.27	0.45	0.77	0	0	0	0	188	0	57				
2038	184	212	0.54	0.27	0.45	0.78	0	0	0	50	200	0	62				
2039	184	212	0.54	0.27	0.45	0.78	0	0	0	50	212	0	68				
2040	184	212	0.54	0.27	0.45	0.78	0	0	0	50	225	0	74				
2041	184	212	0.54	0.27	0.45	0.78	0	0	0	50	237	0	79				
2042	184	212	0.54	0.27	0.45	0.78	0	0	0	50	250	0	86				
2043	184	212	0.54	0.27	0.45	0.78	0	0	0	50	258	0	91				
2044	184	212	0.54	0.27	0.45	0.78	0	0	0	50	266	0	98				
2045	184	212	0.54	0.27	0.45	0.78	0	0	100	0	100	274	0	104			

DG
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Purpose of Scenario:

- Evaluate portfolio impacts of increasing DG adoption to **20% of the previous five-year average annual peak load**.

Observations through 2035:

- DG increases to ~47 MW, providing additional capacity headroom relative to High and the 20% DG case.
- No change to the supply-side expansion plan.

Observations through 2045:

- DG increases to ~105 MW.
- Supply-side plan remains unchanged, with 100 MW of solar and 100 MW of storage.

20% Distributed Generation Penetration



Category	2035		2045	
	High Economic Growth Scenario	20% Distributed Generation Penetration	High Economic Growth Scenario	20% Distributed Generation Penetration
Reliability Margin	-8.27%	-0.08%	-3.09%	12.77%
Market Purchases as a % of Load	5.72%	5.21%	3.87%	3.41%
Market Sales as a % of Load	7.34%	9.02%	9.67%	13.59%
NPV (\$B)			\$1.84	\$4.54

- Greater improvement in reliability margin and market position than the 10% DG sensitivity.
- Larger increase in NPV, reflecting the higher level of DG capacity.

Renewable Development Constraint



High Economic Growth Renewable Development Constraint Sensitivity

High Economic Growth Renewable Development Constraint Sensitivity																		
Year	Nameplate MW											Accredited MW						
	Cook 1 Continued Operation	Cook 2 Continued Operation	Elkhart Continued Operation	Mottville Continued Operation	Buchanan Continued Operation	Twin Branch Continued Operation	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, CVR, EWR, DR, VPP	Capacity Purchase					
2026	Existing Resource included in Going-In Position*						0	0	0	0	0	0	0					
2027							0	0	0	0	0	0	0					
2028							0	0	0	0	0	21	0					
2029							0	0	0	0	0	38	0					
2030							0	0	0	0	0	55	0					
2031								0.52				0	0	0	0	67	0	
2032								0.52				0	0	0	0	81	0	
2033								0.52				0	0	0	0	93	0	
2034								0.54	0.27			0	0	0	0	102	0	
2035							183		0.54	0.27		0	0	0	0	114	0	
2036							183		0.54	0.27		0	0	0	0	121	0	
2037							183		0.54	0.27	0.45	0.77	0	0	0	0	129	0
2038							184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	136
2039	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	143	0					
2040	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	150	0					
2041	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	156	0					
2042	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	162	0					
2043	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	164	0					
2044	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	166	0					
2045	184	212	0.54	0.27	0.45	0.78	0	0	100	0	100	168	0					

Purpose of Scenario:

- Evaluate portfolio impacts of reducing renewable build capability by **20% during the first six years of the planning horizon**.

Observations through 2035:

- The renewable constraint remains non-binding, with no solar or wind additions during the constrained period.
- EWR, DR, and VPP remain broadly consistent with the High scenario.
- Supply-side plan remains unchanged, with 100 MW of solar and 100 MW of storage.

Renewable Development Constraint

Category	2035		2045	
	High Economic Growth Scenario	Renewable Development Constraint	High Economic Growth Scenario	Renewable Development Constraint
Reliability Margin	-8.27%	-7.90%	-3.09%	-2.93%
Market Purchases as a % of Load	5.72%	5.72%	3.87%	3.87%
Market Sales as a % of Load	7.34%	7.34%	9.67%	9.67%
NPV (\$B)			\$1.84	\$1.84

- Minimal change in reliability margin and market position relative to the High scenario.
- Minimal change in NPV, as the renewable build constraint remains non-binding.

Extreme Weather Risk



Reference Extreme Weather Risk Sensitivity

Reference Extreme Weather Risk Sensitivity																			
Year	Nameplate MW											Accredited MW							
	Cook 1 Continued Operation	Cook 2 Continued Operation	Elkhart Continued Operation	Mottville Continued Operation	Buchanan Continued Operation	Twin Branch Continued Operation	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, CVR, EWR, DR, VPP	Capacity Purchase						
2026	Existing Resource included in Going-In Position*						0	0	0	0	0	0	0						
2027							0	0	0	0	0	0	0						
2028									0.52	0.27	0	0	0	0	0	19	0		
2029											0	0	0	0	0	33	0		
2030											0	0	0	0	0	47	0		
2031											0	0	0	0	0	59	0		
2032											0	0	0	0	0	73	0		
2033									0.52	0.27	0	0	0	0	0	85	0		
2034											0	0	0	0	0	95	0		
2035											183	0.54	0.27	0	0	0	0	106	0
2036							183		0.54	0.27	0.45	0.77	0	0	0	0	0	115	0
2037							183						0	0	0	0	0	122	0
2038							184						212	0.54	0.27	0.45	0.78	0	0
2039	184	212	0.54	0.27	0.45	0.78	0						0	0	50	137	0		
2040	184	212	0.54	0.27	0.45	0.78	0						0	0	50	144	0		
2041	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	150	0						
2042	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	157	0						
2043	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	159	0						
2044	184	212	0.54	0.27	0.45	0.78	0	0	0	0	50	161	0						
2045	184	212	0.54	0.27	0.45	0.78	0	0	0	0	100	164	0						

Purpose of Scenario:

- Evaluate portfolio resilience under recurring extreme-weather events.
- One-week extreme-weather event every five years, with impacts on load and market prices.
- Alternating one-week outages of Cook 1 and Cook 2 during event periods.

Observations through 2030:

- DR increases from ~3.2 MW to 6.6 MW, while EWR and VPP remain relatively unchanged.
- No new supply-side addition is selected by 2035.

Observations through 2045:

- DR remains ~3 MW higher than Reference, while the broader demand-side resource mix remains relatively unchanged.
- The first 50 MW battery advances from 2039 to 2038, while total storage still reaches 100 MW by 2045.

Extreme Weather Risk



Category	2035		2045	
	Reference Scenario	Extreme Weather Risk	Reference Scenario	Extreme Weather Risk
Reliability Margin	-4.52%	-3.94%	13.03%	13.57%
Market Purchases as a % of Load	4.33%	4.33%	2.01%	2.01%
Market Sales as a % of Load	11.64%	11.64%	17.35%	17.35%
NPV (\$B)			\$1.72	\$1.74

- Modest improvement in reliability, driven by additional DR and the earlier storage addition.
- Modest increase in NPV, with market impacts concentrated in the extreme-weather years.

Hyperscaler Load



Reference Hyperscaler Load Sensitivity																																																																										
Year	Nameplate MW											Accredited MW																																																														
	Cook 1 Continued Operation	Cook 2 Continued Operation	Elkhart Continued Operation	Mottville Continued Operation	Buchanan Continued Operation	Twin Branch Continued Operation	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, CVR, EWR, DR, VPP	Capacity Purchase																																																													
2026	Existing Resource included in Going-In Position*						0	0	0	0	0	0	0																																																													
2027							0	0	0	0	0	0	0																																																													
2028							Existing Resource included in Going-In Position*						0	0	0	0	0	29	0																																																							
2029													Existing Resource included in Going-In Position*						0	0	0	0	0	50	0																																																	
2030																			Existing Resource included in Going-In Position*						0	0	0	200	0	68	0																																											
2031																									Existing Resource included in Going-In Position*						0	0	0	400	0	82	0																																					
2032																															Existing Resource included in Going-In Position*						0	0	0	500	250	96	0																															
2033																																					Existing Resource included in Going-In Position*						0	0	0	500	450	109	0																									
2034																																											Existing Resource included in Going-In Position*						0	0	0	500	800	120	0																			
2035																																																	183	Existing Resource included in Going-In Position*						0	0	0	500	800	132	0												
2036																																																	183							Existing Resource included in Going-In Position*						0	0	0	500	800	141	0						
2037																																																	183													Existing Resource included in Going-In Position*						0	0	0	500	800	150	0
2038																																																	184																			212	0.54	0.27	0.45	0.77	0	0
2039	184	212	0.54	0.27	0.45	0.78																																											0																			0	0	500	800	166	0	
2040	184	212	0.54	0.27	0.45	0.78																																											0																			0	0	500	800	173	0	
2041	184	212	0.54	0.27	0.45	0.78	0	0	0	500	800	180																																					0																									
2042	184	212	0.54	0.27	0.45	0.78	0	0	0	500	800	186	0																																																													
2043	184	212	0.54	0.27	0.45	0.78	0	0	0	500	800	188	0																																																													
2044	184	212	0.54	0.27	0.45	0.78	0	0	0	500	800	191	0																																																													
2045	184	212	0.54	0.27	0.45	0.78	0	0	0	500	800	192	0																																																													

Purpose of Scenario:

- Evaluate a portfolio under accelerated large-load growth associated with hyperscale customer development within the service territory.

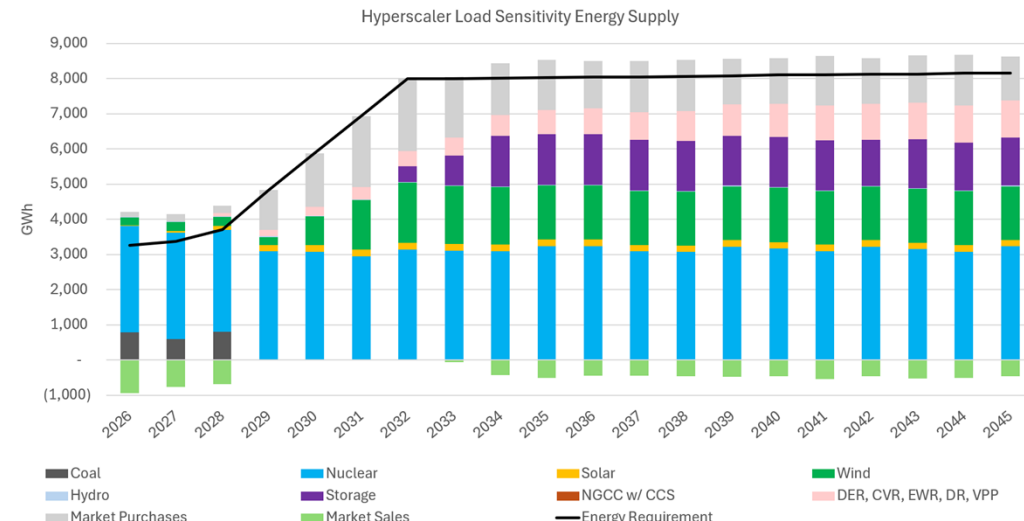
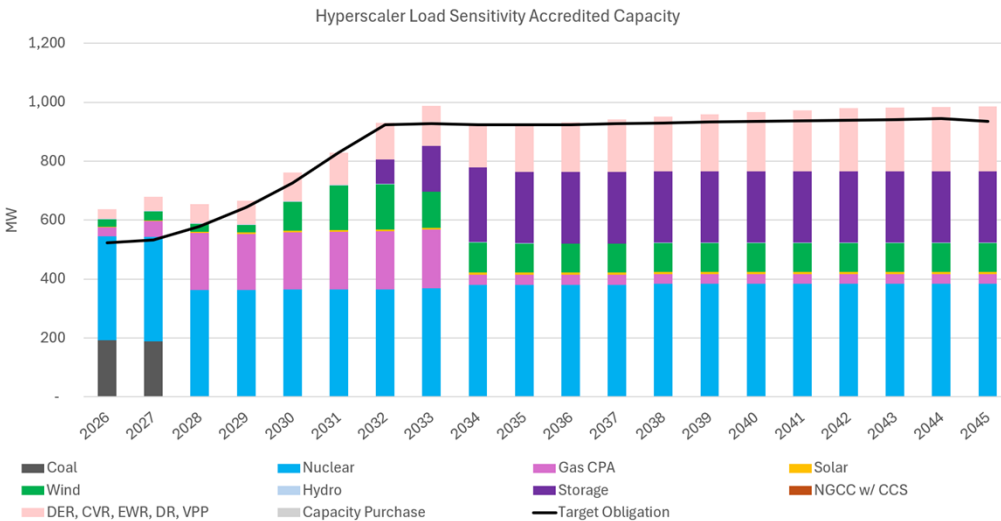
Observations through 2030:

- 200 MW Owned Wind is added.
- Approximately 68 MW of VPP and DR added
- EWR reaches approximately 41 MW by 2030, with no supply-side resource additions.

Observations through 2045:

- Cook and hydro relicensing remain the least-cost pathway.
- 800 MW of storage is added by 2034
- 300 MW of Wind PPA added in 2033
- Demand-side resources increase to approximately 192 MW by 2045.

Hyperscaler Load



Observations

- Cook nuclear plant and hydro resources relicensing remains the least-cost pathway
- Cook remains the largest source of accredited capacity and energy while wind and storage contribute significant growth in both energy and capacity
- Earlier resource additions meet hyperscaler load growth, increase market sales, and minimize energy purchases during the load ramp
- Incremental resources relative to previous cases (Reference, High and Low) include additional wind generation and energy storage capacity, extending resource additions further out along the planning curve and market sales commence after the load and energy ramp flattens out

Hyperscaler Load

Category	2035		2045	
	Reference Scenario	Hyperscaler Load	Reference Scenario	Hyperscaler Load
Reliability Margin	-4.52%	-11.40%	13.03%	-11.31%
Market Purchases as a % of Load	4.33%	17.78%	2.01%	15.21%
Market Sales as a % of Load	11.64%	6.33%	17.35%	5.72%
NPV (\$B)			\$1.72	\$4.81

- Significant load growth drops the reliability margin closer to the target,
- The most marked increase in NPV caused by significant resource additions made to meet the hyperscaler load and energy ramps

Short Break



Results Summary Comparison



Portfolios	2030								2045							
	Cumulative Capacity Additions (MW)								Cumulative Capacity Additions (MW)							
	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, CVR, EWR, DR, VPP	Capacity Purchase	Total Additions	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, CVR, EWR, DR, VPP	Capacity Purchase	Total Additions
Reference	0	0	0	0	0	44	0	44	0	0	0	0	100	161	0	261
High Economic Growth	0	0	0	0	0	52	0	52	0	0	100	0	100	167	0	367
Low Economic Growth	0	0	0	0	0	43	0	43	0	0	0	0	100	148	0	248
Enhanced Environmental Regulatory Policy	0	0	299	0	50	47	0	396	0	0	277	0	100	151	0	528

- Notes:**
- DER, CVR, EWR, DR, VPP values are accredited
 - Cook nuclear plant and Hydro Units SLR are not included in this table as all scenarios select the relicensing

Results Summary Comparison



Portfolios	2030								2045							
	Cumulative Capacity Additions (MW)								Cumulative Capacity Additions (MW)							
	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, DG, CVR, EWR, DR, VPP	Capacity Purchase	Total Additions	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, DG, CVR, EWR, DR, VPP	Capacity Purchase	Total Additions
Reference	0	0	0	0	0	44	0	44	0	0	0	0	100	161	0	261
Reference EWR 2.17% Adoption Sensitivity	0	0	0	0	0	45	0	45	0	0	0	0	100	161	0	261
Reference DG 10% Penetration Sensitivity	0	0	0	0	0	56	0	56	0	0	0	0	100	208	0	308
Reference Extreme Weather Risk Sensitivity	0	0	0	0	0	47	0	47	0	0	0	0	100	164	0	264
Reference Hyperscaler Load Sensitivity	0	0	0	200	0	68	0	268	0	0	0	500	800	192	0	1492

- Notes:**
- DER, DG, CVR, EWR, DR, VPP values are accredited
 - Cook nuclear plan and Hydro Units SLR are not included in this table as all scenarios select the relicensing

Results Summary Comparison



Portfolios	2030								2045							
	Cumulative Capacity Additions (MW)								Cumulative Capacity Additions (MW)							
	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, DG, CVR, EWR, DR, VPP	Capacity Purchase	Total Additions	Nuclear	NGCC w/ CCS	Solar	Wind	Storage	DER, DG, CVR, EWR, DR, VPP	Capacity Purchase	Total Additions
High Economic Growth	0	0	0	0	0	52	0	52	0	0	100	0	100	167	0	367
High Economic Growth EWR 2.5% Adoption Sensitivity	0	0	0	0	0	51	0	51	0	0	100	0	100	174	0	374
High Economic Growth DG 15% Penetration Sensitivity	0	0	0	0	0	62	0	62	0	0	100	0	100	240	0	439
High Economic Growth DG 20% Penetration Sensitivity	0	0	0	0	0	81	0	81	0	0	100	0	100	274	0	474
High Economic Growth Renewable Build Constraint Sensitivity	0	0	0	0	0	55	0	55	0	0	100	0	100	168	0	368

- Notes:**
- DER, DG, CVR, EWR, DR, VPP values are accredited
 - Cook nuclear plant and Hydro Units SLR are not included in this table as all scenarios select the relicensing

Portfolio Performance Indicators



Objective	Objective Description	Performance Indicator(s)	Metric(s) Description
Affordability & Cost-Effective Resource Planning	Ensure the selection of a cost-effective portfolio of supply-side and demand-side resources that minimizes long-term system costs while supporting affordable customer rates.	Near-Term Rate Impacts	Five-year compound annual growth rate of annual power supply costs
		Net Present Value of Revenue Requirement	Discounted present value of total revenue requirements over the planning horizon
		Cumulative Capital Investment	Total capital expenditures over the planning horizon
Reliability, Resource Adequacy, & System Flexibility	Ensure the electric system can reliably serve customer demand by maintaining adequate planning reserves, managing market and operational risks, and selecting a balanced portfolio of flexible and dispatchable resources.	Planning Reserves	Average planning reserve margin relative to target reserve requirements over the planning horizon
		Energy Market Exposure	Net present value and average volume exposure of market purchases and sales over the planning horizon, expressed in both cost terms and as a percentage of load
		Portfolio Diversity and Resource Flexibility	Portfolio diversity measured using the Herfindahl-Hirschman Index (HHI), along with dispatchable capacity as a percentage of company peak load
Demand-Side Management Impacts	Quantify the contribution of modeled demand-side resources, including energy waste reduction and demand response, by evaluating annual and cumulative energy savings and associated peak demand reductions.	Annual and Cumulative Demand-Side Resource Savings	Incremental annual and cumulative energy savings (MWh) and peak demand reductions (MW) attributable to demand-side resources
Environmental Compliance & Stewardship	Promote resource planning that minimizes environmental impacts, supports compliance with applicable state and federal environmental requirements, and advances long-term environmental stewardship through reductions in air emissions.	Air Emissions	Comparison of annual and cumulative air emissions, including carbon dioxide (CO ₂) and criteria pollutants (NO _x , SO ₂)

Portfolio Performance Indicator Matrix



Objectives		Affordability & Cost-Effective Resource Planning				Reliability, Resource Adequacy, & System Flexibility				
Performance Indicators and Metrics		Short Term 5-yr Rate CAGR Power Supply \$/MWh	Long Term Supply Portfolio NPVRR	Cumulative Capital Investment		Energy Market Exposure Purchases	Energy Market Exposure Sales	Planning Reserves % Reserve Margin	Portfolio Diversity	Fleet Flexibility Dispatchable Firm Capacity
Year Ref.		2026-2030	2026-2045	2026-2035	2026-2045	10 years 20 years	10 years 20 years	10 years 20 years	20 years	20 years
Units		%	\$B	\$M	\$M	NPV of Market Purchases & MWhs % of Total Load	NPV of Market Sales & MWhs % of Total Load	Average of Annual PRM %	Portfolio Diversity HHI Index (0 to 10,000)	Dispatchable Firm MW/ % of Company Peak Demand
Portfolios	Reference	5.3%	\$1.72	\$278	\$864	10-year: \$59.5M (6.5%) 20-year: \$87.4M (5.7%)	10-year: \$126.4M (12.4%) 20-year: \$232.2M (13.7%)	10-year: 13.7% 20-year: 9.2%	Firm Capacity: 3,633 (-9%) Energy: 6,623 (-25%)	20-year: 67.8%
	High Economic Growth	5.9%	\$1.84	\$283	\$1,057	10-year: \$87.5M (6.9%) 20-year: \$155.8M (6.8%)	10-year: \$151.9M (12.5%) 20-year: \$237.3M (10.1%)	10-year: 11.4% 20-year: 3.3%	Firm Capacity: 3,486 (-13%) Energy: 5,227 (-44%)	20-year: 60.3%
	Low Economic Growth	6.3%	\$1.65	\$272	\$821	10-year: \$40.1M (6.0%) 20-year: \$52.5M (5.0%)	10-year: \$115.9M (13.9%) 20-year: \$220.8M (18.8%)	10-year: 18.4% 20-year: 17.0%	Firm Capacity: 3,784 (-6%) Energy: 8,370 (-6%)	20-year: 75.3%
	Enhanced Environmental Regulatory Policy	11.4%	\$1.21	\$849	\$1,322	10-year: \$90.1M (5.2%) 20-year: \$118.1M (4.2%)	10-year: \$1043.9M (21.5%) 20-year: \$1334.6M (24.5%)	10-year: 17.9% 20-year: 13.0%	Firm Capacity: 3,523 (-12%) Energy: 6,930 (-21%)	20-year: 67.3%

Note:

The Enhanced Environmental Regulatory Policy scenario was developed assuming implementation of EPA power plant greenhouse gas regulations that were in effect at the time of analysis. Subsequent developments may have reduced or eliminated the likelihood of these requirements. Therefore, the assumptions underlying this scenario may no longer be applicable. Results are provided for reference.

Portfolio Performance Indicator Matrix

Objectives		Demand-Side Management Impacts	Environmental Compliance & Stewardship	
Performance Indicators and Metrics		Demand-Side Resource Peak Reductions & Energy Savings	Emissions	
Year Ref.		20 years	2026-2028	2029-2045
Units		Capacity Mitigated as a % of Company Peak Demand & Energy Mitigated as a % of Load	Cumulative CO ₂ , NO _x , and SO ₂ emissions in short tons	
Portfolios	Reference	Capacity: 22.6% Energy: 15.1%	CO ₂ : 3,355,991 NO _x / SO ₂ : 1,317 / 2,351	CO ₂ : 0 NO _x / SO ₂ : 0
	High Economic Growth	Capacity: 20.8% Energy: 14.2%	CO ₂ : 4,460,205 NO _x / SO ₂ : 1,749 / 3,125	CO ₂ : 0 NO _x / SO ₂ : 0
	Low Economic Growth	Capacity: 23.4% Energy: 15.6%	CO ₂ : 2,145,728 NO _x / SO ₂ : 842 / 1,504	CO ₂ : 0 NO _x / SO ₂ : 0
	Enhanced Environmental Regulatory Policy	Capacity: 21.3% Energy: 14.9%	CO ₂ : 3,380,365 NO _x / SO ₂ : 1,326 / 2,368	CO ₂ : 0 NO _x / SO ₂ : 0

Note:

The Enhanced Environmental Regulatory Policy scenario was developed assuming implementation of EPA power plant greenhouse gas regulations that were in effect at the time of analysis. Subsequent developments may have reduced or eliminated the likelihood of these requirements. Therefore, the assumptions underlying this scenario may no longer be applicable. Results are provided for reference.

Portfolio Performance Indicator Matrix



Objectives		Affordability & Cost-Effective Resource Planning				Reliability, Resource Adequacy, & System Flexibility				
Performance Indicators and Metrics		Short Term 5-yr Rate CAGR Power Supply \$/MWh	Long Term Supply Portfolio NPVRR	Cumulative Capital Investment		Energy Market Exposure Purchases	Energy Market Exposure Sales	Planning Reserves % Reserve Margin	Portfolio Diversity	Fleet Flexibility Dispatchable Firm Capacity
Year Ref.		2026-2030	2026-2045	2026-2035	2026-2045	10 years 20 years	10 years 20 years	10 years 20 years	20 years	20 years
Units		%	\$B	\$M	\$M	NPV of Market Purchases & MWhs % of Total Load	NPV of Market Sales & MWhs % of Total Load	Average of Annual PRM %	Portfolio Diversity HHI Index (0 to 10,000)	Dispatchable Firm MW/ % of Company Peak Demand
Portfolios	Reference	5.3%	\$1.72	\$278	\$864	10-year: \$59.5M (6.5%) 20-year: \$87.4M (5.7%)	10-year: \$126.4M (12.4%) 20-year: \$232.2M (13.7%)	10-year: 13.7% 20-year: 9.2%	Firm Capacity: 3,633 (-9%) Energy: 6,623 (-25%)	20-year: 67.8%
	Reference EWR 2.17% Adoption Sensitivity	5.7%	\$1.73	\$299	\$891	10-year: \$58.3M (6.4%) 20-year: \$84.9M (5.5%)	10-year: \$128.6M (12.7%) 20-year: \$240.1M (14.2%)	10-year: 13.9% 20-year: 9.6%	Firm Capacity: 3,630 (-9%) Energy: 6,622 (-25%)	20-year: 67.0%
	Reference DG 10% Penetration Sensitivity	10.9%	\$2.73	\$839	\$3,069	10-year: \$57.5M (6.3%) 20-year: \$83.9M (5.5%)	10-year: \$130.5M (12.8%) 20-year: \$246.6M (14.6%)	10-year: 16.0% 20-year: 13.4%	Firm Capacity: 3,197 (-19%) Energy: 6,626 (-25%)	20-year: 67.8%
	Reference Extreme Weather Risk Sensitivity	5.1%	\$1.74	\$280	\$861	10-year: \$63.9M (6.7%) 20-year: \$90.9M (5.8%)	10-year: \$122.2M (12.3%) 20-year: \$220.5M (13.6%)	10-year: 14.2% 20-year: 9.8%	Firm Capacity: 3,599 (-10%) Energy: 6,621 (-25%)	20-year: 67.8%
	Reference Hyperscaler Load Sensitivity	10.3%	\$4.81	\$3,238	\$3,728	10-year: \$316.8M (17.8%) 20-year: \$540.6M (17.3%)	10-year: \$104.3M (8.3%) 20-year: \$210.7M (7.1%)	10-year: -1.7% 20-year: -5.1%	Firm Capacity: 2,227 (-44%) Energy: 2,202 (-76%)	20-year: 58.6%

Portfolio Performance Indicator Matrix



Objectives		Demand-Side Management Impacts	Environmental Compliance & Stewardship	
Performance Indicators and Metrics		Demand-Side Resource Peak Reductions & Energy Savings	Emissions	
Year Ref.		20 years	2026-2028	2029-2045
Units		Capacity Mitigated as a % of Company Peak Demand & Energy Mitigated as a % of Load	Cumulative CO ₂ , NO _x , and SO ₂ emissions in short tons	
Portfolios	Reference	Capacity: 22.6% Energy: 15.1%	CO ₂ : 3,355,991 NO _x / SO ₂ : 1,317 / 2,351	CO ₂ : 0 NO _x / SO ₂ : 0
	Reference EWR 2.17% Adoption Sensitivity	Capacity: 22.7% Energy: 15.7%	CO ₂ : 3,355,991 NO _x / SO ₂ : 1,317 / 2,351	CO ₂ : 0 NO _x / SO ₂ : 0
	Reference DG 10% Penetration Sensitivity	Capacity: 29.3% Energy: 16.2%	CO ₂ : 3,355,991 NO _x / SO ₂ : 1,317 / 2,351	CO ₂ : 0 NO _x / SO ₂ : 0
	Reference Extreme Weather Risk Sensitivity	Capacity: 23.1% Energy: 15.1%	CO ₂ : 3,355,991 NO _x / SO ₂ : 1,317 / 2,351	CO ₂ : 0 NO _x / SO ₂ : 0
	Reference Hyperscaler Load Sensitivity	Capacity: 15.8% Energy: 8.9%	CO ₂ : 3,388,595 NO _x / SO ₂ : 1,329 / 2,374	CO ₂ : 0 NO _x / SO ₂ : 0

Portfolio Performance Indicator Matrix



Objectives		Affordability & Cost-Effective Resource Planning				Reliability, Resource Adequacy, & System Flexibility				
Performance Indicators and Metrics		Short Term 5-yr Rate CAGR Power Supply \$/MWh	Long Term Supply Portfolio NPVRR	Cumulative Capital Investment		Energy Market Exposure Purchases	Energy Market Exposure Sales	Planning Reserves % Reserve Margin	Portfolio Diversity	Fleet Flexibility Dispatchable Firm Capacity
Year Ref.		2026-2030	2026-2045	2026-2035	2026-2045	10 years 20 years	10 years 20 years	10 years 20 years	20 years	20 years
Units		%	\$B	\$M	\$M	NPV of Market Purchases & MWhs % of Total Load	NPV of Market Sales & MWhs % of Total Load	Average of Annual PRM %	Portfolio Diversity HHI Index (0 to 10,000)	Dispatchable Firm MW/ % of Company Peak Demand
Portfolios	High Economic Growth	5.9%	\$1.84	\$283	\$1,057	10-year: \$87.5M (6.9%) 20-year: \$155.8M (6.8%)	10-year: \$151.9M (12.5%) 20-year: \$237.3M (10.1%)	10-year: 11.4% 20-year: 3.3%	Firm Capacity: 3,486 (-13%) Energy: 5,227 (-44%)	20-year: 60.3%
	High Economic Growth EWR 2.5% Adoption Sensitivity	6.3%	\$1.85	\$308	\$1,118	10-year: \$84.4M (6.7%) 20-year: \$146.3M (6.4%)	10-year: \$155.4M (12.7%) 20-year: \$252.1M (10.7%)	10-year: 11.4% 20-year: 3.8%	Firm Capacity: 3,413 (-15%) Energy: 5,227 (-44%)	20-year: 59.6%
	High Economic Growth DG 15% Penetration Sensitivity	14.0%	\$3.60	\$1,236	\$4,968	10-year: \$82.6M (6.6%) 20-year: \$144.8M (6.4%)	10-year: \$159.8M (13.1%) 20-year: \$268.4M (11.4%)	10-year: 13.7% 20-year: 8.4%	Firm Capacity: 2,945 (-26%) Energy: 5,238 (-44%)	20-year: 59.9%
	High Economic Growth DG 20% Penetration Sensitivity	17.1%	\$4.54	\$1,746	\$7,033	10-year: \$81.1M (6.5%) 20-year: \$141.7M (6.3%)	10-year: \$162.8M (13.3%) 20-year: \$280.3M (11.8%)	10-year: 16.4% 20-year: 12.1%	Firm Capacity: 2,762 (-30%) Energy: 5,246 (-44%)	20-year: 60.3%
	High Economic Growth Renewable Build Constraint Sensitivity	6.0%	\$1.84	\$285	\$1,060	10-year: \$87.5M (6.9%) 20-year: \$155.8M (6.8%)	10-year: \$151.9M (12.5%) 20-year: \$237.3M (10.1%)	10-year: 11.7% 20-year: 3.6%	Firm Capacity: 3,475 (-13%) Energy: 5,227 (-44%)	20-year: 60.3%

Portfolio Performance Indicator Matrix



Objectives		Demand-Side Management Impacts	Environmental Compliance & Stewardship	
Performance Indicators and Metrics		Demand-Side Resource Peak Reductions & Energy Savings	Emissions	
Year Ref.		20 years	2026-2028	2029-2045
Units		Capacity Mitigated as a % of Company Peak Demand & Energy Mitigated as a % of Load	Cumulative CO ₂ , NO _x , and SO ₂ emissions in short tons	
Portfolios	High Economic Growth	Capacity: 20.8% Energy: 14.2%	CO ₂ : 4,460,205 NO _x / SO ₂ : 1,749 / 3,125	CO ₂ : 0 NO _x / SO ₂ : 0
	High Economic Growth EWR 2.5% Adoption Sensitivity	Capacity: 21.7% Energy: 15.2%	CO ₂ : 4,460,205 NO _x / SO ₂ : 1,749 / 3,125	CO ₂ : 0 NO _x / SO ₂ : 0
	High Economic Growth DG 15% Penetration Sensitivity	Capacity: 29.8% Energy: 15.9%	CO ₂ : 4,460,205 NO _x / SO ₂ : 1,749 / 3,125	CO ₂ : 0 NO _x / SO ₂ : 0
	High Economic Growth DG 20% Penetration Sensitivity	Capacity: 34.1% Energy: 16.5%	CO ₂ : 4,460,205 NO _x / SO ₂ : 1,749 / 3,125	CO ₂ : 0 NO _x / SO ₂ : 0
	High Economic Growth Renewable Build Constraint Sensitivity	Capacity: 21.0% Energy: 14.2%	CO ₂ : 4,460,205 NO _x / SO ₂ : 1,749 / 3,125	CO ₂ : 0 NO _x / SO ₂ : 0

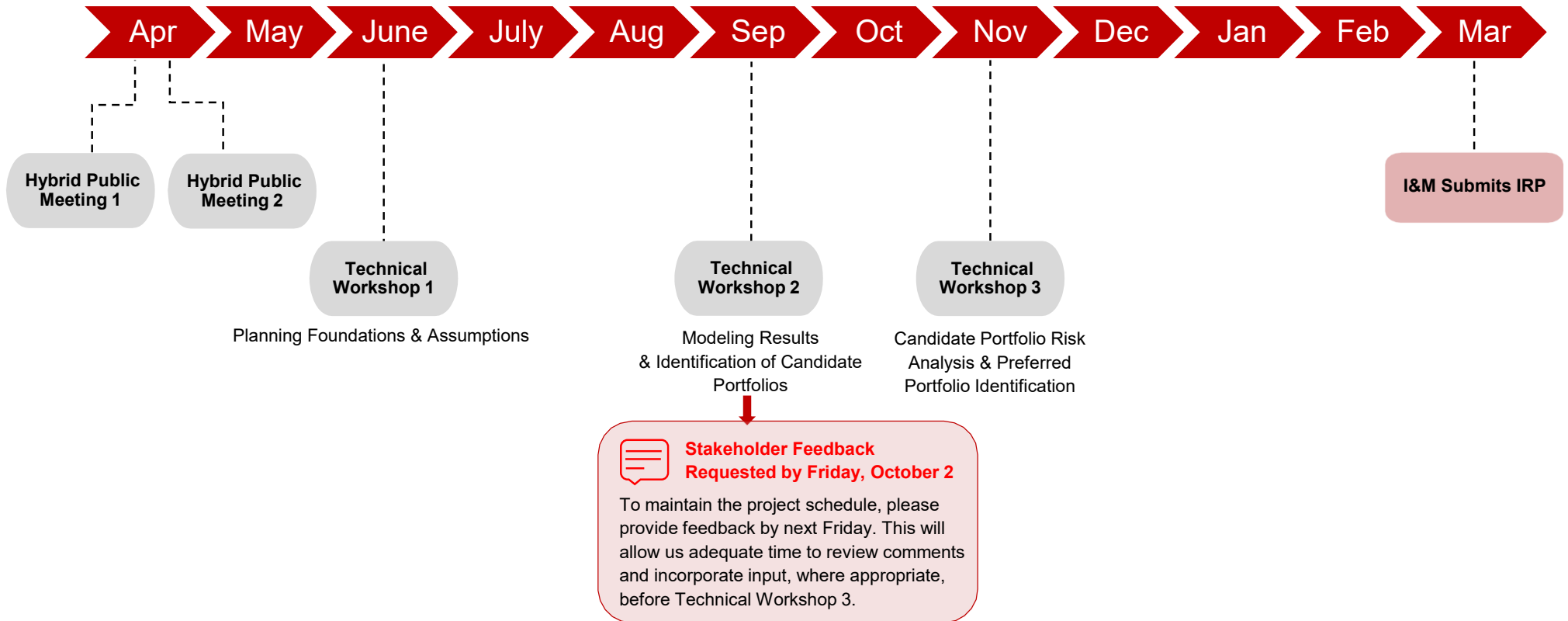
Candidate Portfolio Identification



Candidate Portfolios	Basis for Selection
Reference Scenario	Represents the central planning outlook based on potential environmental compliance timelines, reference load growth, and baseline market assumptions.
Preferred Course of Action	Identifies the portfolio that best balances customer cost, reliability, risk, and compliance targets.

Note:
The IRP team is also considering the High Economic Growth Scenario, Hyperscaler Sensitivity, and 2.17% EWR Sensitivity as potential candidate portfolios.

Stakeholder Engagement Timeline



***Draft engagement timeline is provided for preliminary planning purposes.
All dates and activities are subject to change as I&M incorporates new information.***

How to Participate & Stay Informed



MI IRP Website

How to contact the MPSC

- **Mail** (be sure to include case number):
Executive Secretary
Michigan Public Service Commission
P.O. Box 30221
Lansing, Michigan 48909
- **E-mail:** mpscefilecases@michigan.gov

Questions?

