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2026 Integrated Resource Plan (IRP) Update

Stakeholder Working Group Session #2

January 8, 2026

ZEELAND
Board of Public Works

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Opening Remarks and Introductions

Andrew Boatright

General Manager

Zeeland Board of Public Works

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Why Are We Here Today?

2026 IRP – Stakeholder Working Group Session #2 Discussions

- Address Questions from Stakeholder Working Group Session #1
- Discuss Structure of IRP
- Collaboration and Next Steps

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Welcome

Stewart Ramsay

Meeting Facilitator

nFront Consulting LLC

Agenda

- Safety and Meeting Guidelines
- Questions from Stakeholder Working Group Session #1
- Structure of IRP Analysis
- Collaboration and Next Steps

Safety and Meeting Guidelines

Safety

- Exits
- Muster Point: East Side of Church Street
- AED Location
- Dial “911” in Event of an Emergency

Principles to Guide Today’s Session

- Respectful Dialogue
- Questions and Comments are Public
- Transparency of Questions and Answers
- Refer to list of “Commonly Used Terms” at End of Presentation

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Questions from Stakeholder Working Group #1

Robert Mulder

Electric Power Supply and Market Operations Manager

Zeeland Board of Public Works

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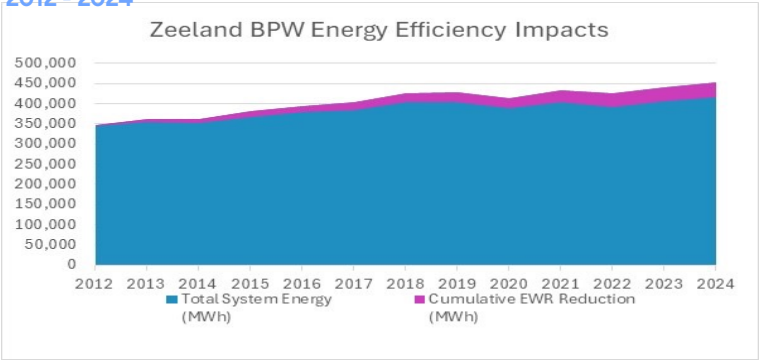
Zeeland DSM/EE Program Impacts

- Cumulative DSM/EE program impacts (2012 - 2024) represented a reduction in energy usage of 8.5% (38,582 MWh) of our 2024 total energy requirements
- With DSM/EE programs implemented, total energy requirements grew 30.6% (2.25% annually) from 2012 - 2024



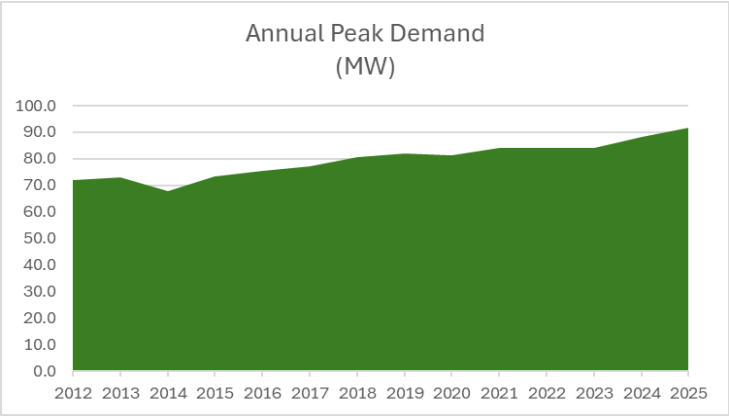
BPW DSM/EE programs to-date have primarily focused on Energy Efficiency (EE) rebates:

- Lighting Upgrades
- HVAC Equipment Upgrades
- Appliance Upgrades
- Other Related Upgrades

DSM/EE: Demand-Side Management / Energy Efficiency

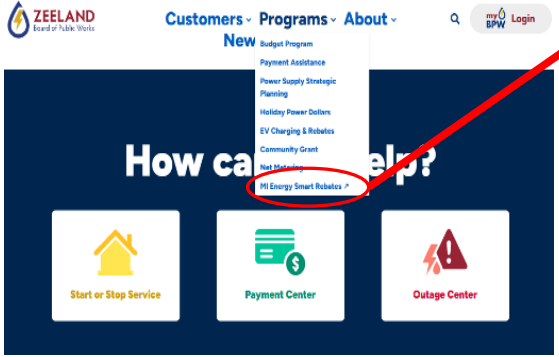
Zeeland DSM/EE Program Impacts (continued)

- Increase in peak demand from 2012 - 2025 averaged 2.3% annually with an overall increase of 27% during that period, even with the implementation and successful uptake of DSM/EE programs

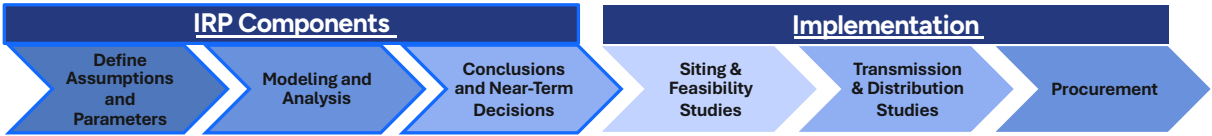


Zeeland DSM/EE Program Impacts (continued)

- BPW offers several *Energy Smart Programs* for customers, including:
  - Income-Qualified Residential
  - Commercial & Industrial
  - Residential Programs
  - Appliance Recycling
- Information and applications are available on the BPW website (zeelandbpw.com)



IRP & Resource Implementation Processes



- We are currently in the *Define Assumptions and Parameters* and *Modeling and Analysis* phases
- IRP will allow for *Conclusions* related to upcoming resource decisions
- *Near-Term Decisions* relate to future resource additions in the next ~ 5 year period

IRP & Resource Implementation Processes (continued)

Implementation involves various considerations and activities

Siting & Feasibility Studies

- Timing and Type of Resource
- Size of Resource
- Location of Resource
  - Local vs. Off-System
  - Availability of Land
  - Fuel Supply
  - Permitting

Transmission & Distribution Studies

- Ability to Deliver the Power
- Needs for New or Upgraded Power Lines
- Impacts on Grid Reliability and Resiliency

Procurement

- Owned vs. Contracted
- Competitive Solicitation
- Resource Construction / Contract Execution

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Structure of IRP

Brad Kushner

Project Manager

nFront Consulting LLC

What is an IRP Portfolio

Portfolio: A combination of energy resources and strategies that a utility evaluates to meet future electricity demand reliably, affordably, and sustainably.

- Portfolios consist of supply-side resources that are evaluated against future conditions.
  - Behind the Meter/Local resources (located within Zeeland service territory)
    - Resources that Zeeland could solely develop
  - Off-System/External resources (located outside of Zeeland service territory)
    - Resources that Zeeland could jointly develop

- Portfolios are used to compare how different resource mixes perform under various futures.
  - Allows for comparison of different pathways to identify the one that best balances cost, reliability, and risk.

Scenarios and Sensitivities

Scenarios

- **Business-As-Usual (BAU)** - Scenario assuming no change in State requirements pertaining to renewable or clean energy production are in effect throughout the IRP study period
- **Michigan Public Act 235 (PA 235)** - Scenario in which the requirements of the State of Michigan's Renewable Energy Standard and Clean Energy Standard remain in effect over the IRP study period

Potential Sensitivities

- Simulate Optimized Portfolios Under Alternative Projections of Future Variables
- Understand Cost Impacts of Future Conditions that Differ from those Assumed in the Optimization
  - Alternative load projections
  - Alternative fuel price projections and associated market prices
  - Costs for new resources (dispatchable and renewable/storage)
  - Potential changes to PA 235 renewable/clean energy requirements

MISO Planning Criteria - Update

Seasonal Planning Reserve Margin

Season	Base	RBDC[1]	Total
Though PY 2027/28			
Summer	7.9%	3.1%	11.0%
Fall	11.6%	2.0%	13.6%
Winter	18.9%	5.1%	24.0%
Spring	23.4%	1.4%	24.8%
Beginning PY 2028/29[2]			
Summer	2.3%	3.1%	5.4%
Fall	6.0%	2.0%	8.0%
Winter	5.6%	5.1%	10.7%
Spring	1.0%	1.4%	2.4%

[1]Reliability Based Demand Curve

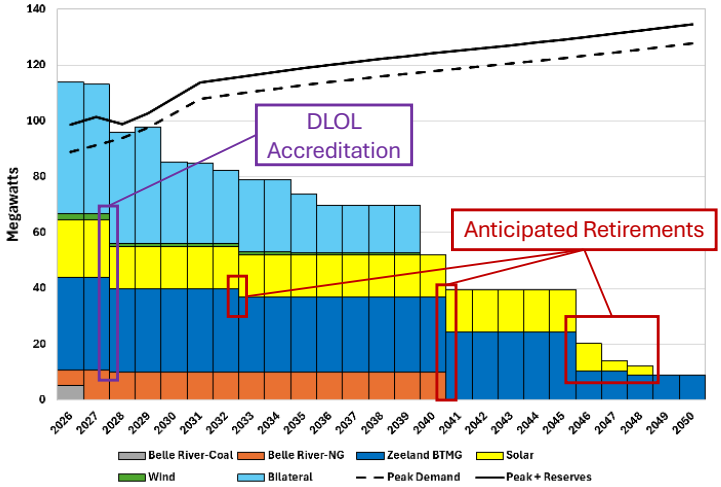
[2]Beginning Planning Year 2028/29, the MISO PRM will be based on a Direct Loss of Load (DLOL) methodology, resulting in a new set of seasonal PRM values.

Resource Capacity Accreditation Beginning PY28/29[3]

Technology Type	Summer (%)	Fall (%)	Winter (%)	Spring (%)
Coal	89%	85%	76%	72%
Natural Gas Steam Turbine	88%	85%	64%	68%
Natural Gas Combined Cycle	95%	92%	77%	78%
Natural Gas Combustion Turbine	88%	85%	64%	68%
Reciprocating Internal Combustion Engine (RICE)	87%	84%	79%	77%
Solar PV	45%	28%	19%	28%
Wind	8%	15%	23%	15%
Nuclear	94%	91%	90%	81%

[3]Zeeland currently relies on the historical performance as the basis of seasonal accreditation for its local generation facilities; Beginning Planning Year 2028/29, the accreditation will be based on a Direct Loss of Load (DLOL) methodology, resulting in a new set of accreditations.

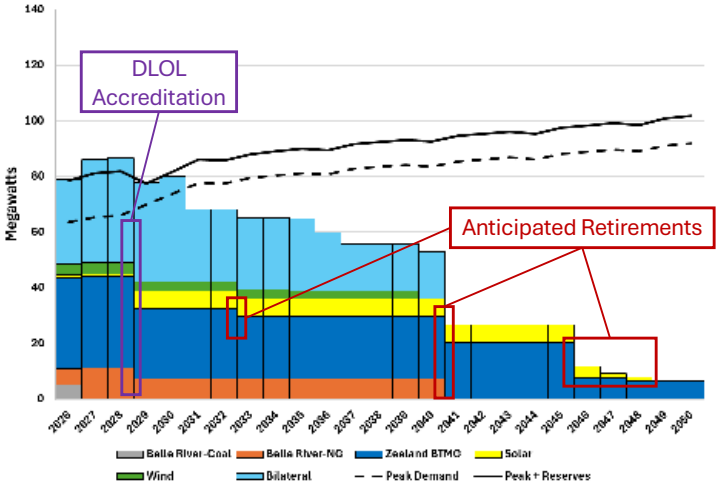
Projected Capacity Balance – Summer



Notes

- Projected to require approximately 25 MW of new capacity by 2030, and increasing to 126 MW by 2050
- Direct Loss of Load (DLOL) accreditation methodology to decrease Behind the Meter Generation (BTMG) resources
- Anticipated changes in the accreditation for solar and wind
  - As more renewables are installed in MISO, the accredited capacity to meet peak demand is diminished
- Additional capacity projected to be needed regardless of PA 235 requirements

Projected Capacity Balance – Winter



Notes

- Projected to require approximately 18 MW of new capacity by 2030, and increasing to 96 MW by 2050
- Direct Loss of Load (DLOL) accreditation methodology to decrease Behind the Meter Generation (BTMG) resources
- Anticipated changes in the accreditation for solar and wind
  - As more renewables are installed in MISO, the accredited capacity to meet peak demand is diminished
- Additional capacity projected to be needed regardless of PA 235 requirements

Capacity Transactions & Planning

BPW has been diligent about planning ahead, but compliance requirements and markets continue to evolve. These changes reinforce the need to update our IRP to best prepare for the future.

On-System Generation

- New on-system generation installed between 2001 – 2005 (12.0 MW)
- Existing generating capacity has been maintained (22.2 MW), but retirements are anticipated

MPPA Joint-Owned Projects & PPA's

- Belle-River Power Plant - Converted from Coal to Natural Gas in 2025 / 2026 (11.58 MW)
- AMP Fremont Energy Center - Combined Cycle Natural Gas, 2012 (7.06 MW)
- Participation in (2) Wind and (5) Solar PPA's since 2013 (Nearly 48 MW of total *installed* capacity planned)

MPPA Bilateral Transactions

- Numerous multi-year bilateral capacity transactions routinely executed through MPPA
  - Terms vary in length from 3-years to more than 10-years
  - Offtakes vary from <1.0 MW to over 20.7 MW per MISO Planning Year, based on open positions and risk management plan

Supply Side Options

Evaluate resources that are feasible for Zeeland

- *Dispatchable* - Resources that can be operated as needed by Zeeland
- *Renewable* - Solar and Wind
- *Energy Storage* - Battery Energy Storage System (BESS)

Include options that Zeeland may be able to solely develop/own as well as options requiring joint-development/participation

- Options that Zeeland may solely develop/own would be relatively smaller options
  - Higher in cost per MW and/or cost per MWh than relatively larger options
  - Likely utilized more for capacity than energy resources
  - Zeeland can develop/own without obtaining partner(s)
- Options requiring joint-development/participation would be relatively larger options
  - Lower in cost per MW and/or cost per MWh than relatively smaller options
  - Contingent on obtaining partner(s) to develop

Supply Side Options (continued)

Resource Option	Fuel Type	Approx. Nameplate Capacity (MW)[2]	PA 235 Renewable Energy Resource	PA 235 Clean Energy Resource	Resource Location[3]	Customer Survey 10/25[4]	
						General Support	Local Community Install Support
RICE	NG	2.5 - 10	No	No	Local	66%	
CT	NG	15 - 20	No	No	Local	66%	
CT	NG	300	No	No	Off-System	66%	
CC	NG	500	No	No	Off-System	66%	
CC w/CCS	NG	500	No	Yes	Off-System	66%	
SMR	Nuclear	300	No	Yes	Off-System	36%	
Large Scale PV[1]	Sun	75	Yes	Yes	Off-System	42%	
Large Scale Wind	Wind	100	Yes	Yes	Off-System	42%	
Large Scale BESS[1]	Various	100	Yes	Yes	Off-System	33%	

1 – Strong Support
2 – Somewhat Support
3 – Don't Know
4 – No Response
5 – Strongly Oppose

Notes
[1]Small scale projects may also be considered
[2]Capacity ratings are preliminary and subject to change
[3]Local resources to be solely owned by Zeeland at full capacity. Off-system resources available to Zeeland under offtake arrangements at 5 MW increments
[4]Reference Stakeholder Working Group Meeting #1; Slides 15 & 16

Supply Side Options (continued)

Resource Option	Fuel Type	Approx. Nameplate Capacity (MW)[2]	Net Heat Rate (Btu/kWh, HHV)	Construction Cost ($/kW)[2]	Fixed Operating Cost ($/kW-Yr)	Variable Operating Cost ($/MWh)	Carbon Intensity (lb./MWh)
RICE	NG	2.5 - 10	8,300	3,000	49.10	6.80	970
CT	NG	15 - 20	9,380	2,510	46.60	11.30	1,100
CT	NG	300	9,175	1,100	4.80	9.80	1,075
CC	NG	500	6,175	1,500	7.40	2.90	725
CC w/CCS	NG	500	6,790	2,700	13.00	5.50	80
SMR	Nuclear	300	10,500	11,500	150.00	1.10	0
Large Scale PV[1]	Sun	75	N/A	1,580	21.00	N/A	0
Large Scale Wind	Wind	100	N/A	1,715	42.00	N/A	0
Large Scale BESS[1]	Various	100	N/A	2,210	43.00	N/A	0

Notes

[1] Small scale projects may also be considered

[2] Information is preliminary and subject to change

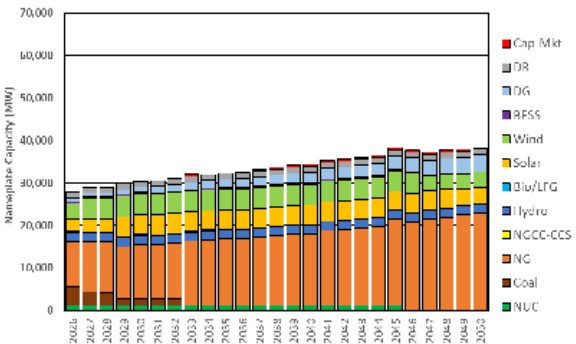
All costs are shown in 2025 base year dollars.

Market Model

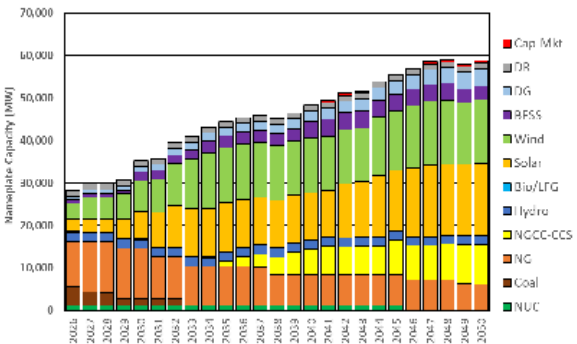
Projected Resource Nameplate Capacity Mix for MISO Zone 7 (MISO MI)

Portfolios reflect what would need to be achieved under each Scenario and do not consider certain implementation constraints

Scenario 1 – BAU (No PA 235 Considerations)



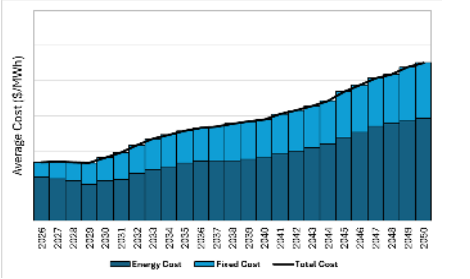
Scenario 2 - PA 235



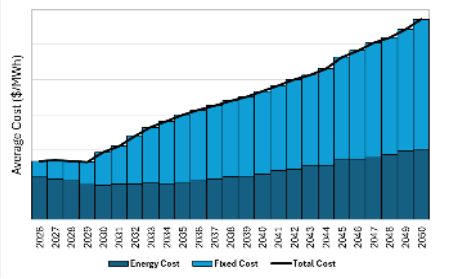
Market Model

Cost Comparison of Power Supply for MISO Zone 7 (MISO MI)

Scenario 1 – BAU (No PA 235 Considerations)



Scenario 2 - PA 235

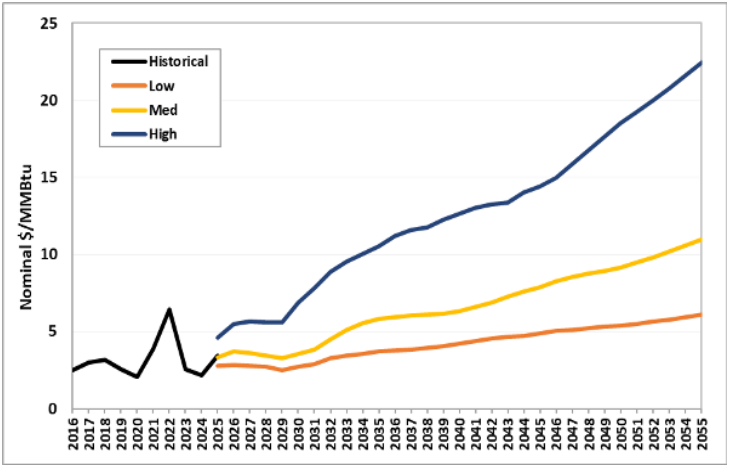


The long-term costs of power supply within MISO MI are higher under the PA 235 scenario

- System cost increase driven by the need to have renewable and clean energy resources to meet PA 235 requirements
- Resources are installed above the MISO MI capacity requirements in order to achieve PA 235 (as illustrated in the Slide 21 capacity mix)
- The higher power supply costs begin in the early 2030's, coincident with the timing of building to meet PA 235

Sensitivity Evaluations

Fuel Prices

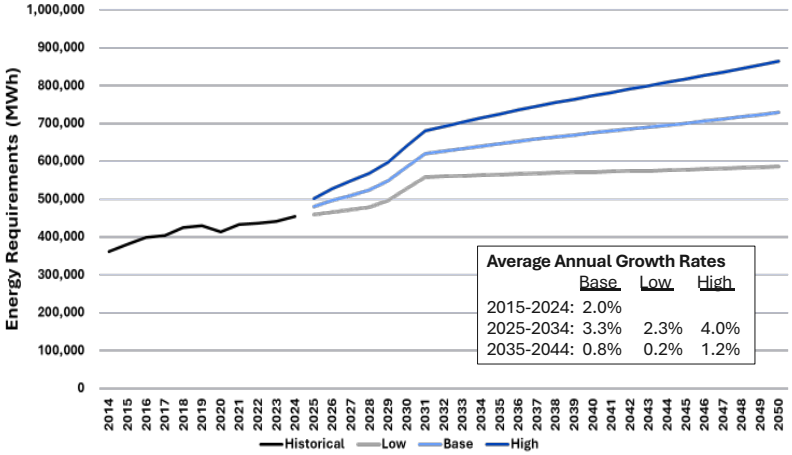


Henry Hub Price Forecast

- Low and High prices derived from AEO High/Low NG and Oil Technology cases
- Used as the underlying assumption for all Natural Gas Hub price forecasts

Sensitivity Evaluations (continued)

Load Forecast – Energy Requirements



Average Annual Growth Rates

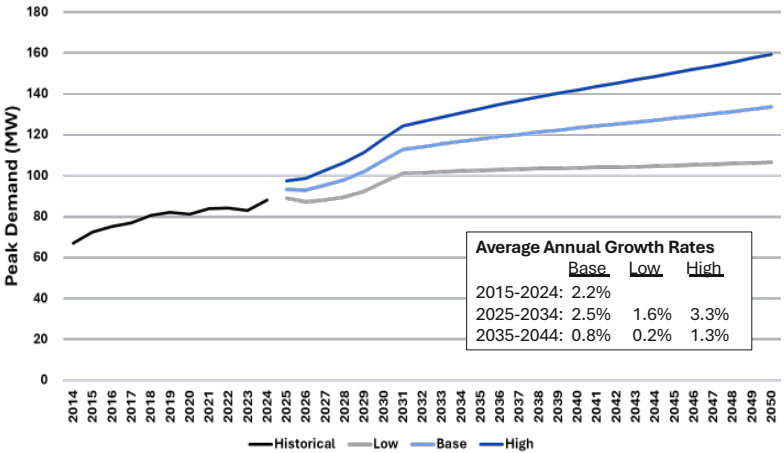
	Base	Low	High
2015-2024:	2.0%		
2025-2034:	3.3%	2.3%	4.0%
2035-2044:	0.8%	0.2%	1.2%

Methodology

- Forecast scenarios based on economic variation utilizing a 90% confidence interval
- New Load Additions kept consistent across Forecast scenarios

Sensitivity Evaluations (continued)

Load Forecast – Summer Demand



Average Annual Growth Rates

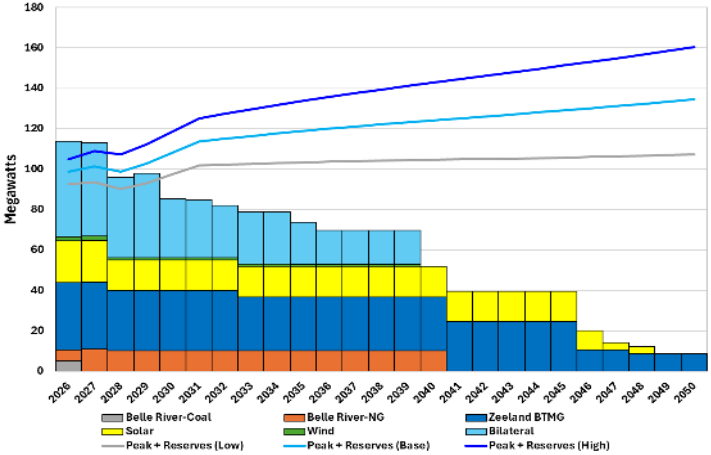
	Base	Low	High
2015-2024:	2.2%		
2025-2034:	2.5%	1.6%	3.3%
2035-2044:	0.8%	0.2%	1.3%

Methodology

- Energy requirements translated to peak demand based on seasonal load factors
- New Load Additions kept consistent across Forecast scenarios

Sensitivity Evaluations (continued)

Load Forecast – Projected Capacity Requirements



- General timeframe for initial need for capacity to meet peak demand plus reserve margin does not change based on load forecast sensitivities.

Sensitivity Evaluations (continued)

Relaxation of Michigan Public Act 235 (PA 235)

PA 235 Requirement	Compliance	Conceptual Relaxed Compliance
Renewable Portfolio Standard (RPS)	15% through 2029 50% by 2030 60% by 2035	Vary RPS %s and/or Compliance Years
Clean Energy Standard (CES)	80% by 2035 100% by 2040	Vary CES %s and/or Compliance Years
Energy Storage Target*	2,500 MW by 2030	No Change, as not applicable to Zeeland

- Renewable Energy Credits (RECs) owned by customers that represent at least 25% of a utilities peak load ***may*** be utilized by the utility to meet the REC requirements of PA 235.

**Requirement for Michigan rate-regulated utilities in aggregate; not applicable to municipal utilities such as Zeeland BPW.*

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Questions and Discussion

Stewart Ramsay
Meeting Facilitator
nFront Consulting LLC

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Collaboration and Next Steps

Stewart Ramsay
Meeting Facilitator
nFront Consulting LLC

nFront Consulting

2026 IRP Stakeholder Meeting

SWG Meeting #1

November 18, 2025

- Discussion of Major Assumptions

SWG Meeting #2

January 8, 2026

- Review Stakeholder Feedback
- Structure of IRP Analysis
  - Power supply portfolios
  - Sensitivity evaluations

SWG Meeting #3

February 19, 2026

- Review Stakeholder Feedback
- Final IRP Assumptions
- Preliminary IRP Results
  - Power supply portfolios
  - Sensitivity

Moving Forward - Stakeholder Expectations

- Review meeting material
- Raise questions or concerns regarding the analysis
- Bring insights and suggestions to the discussions

Meeting content and dates may be adjusted to reflect further discussions needed with stakeholders. The outline above is our starting point.

Stakeholder process will provide transparency throughout the IRP process and allow Zeeland to learn what is important to our customers.

In Closing…

Questions and comments can be sent to:

irp@zeelandbpw.com

Meeting summary and other materials will be posted and made available at:

https://zeelandbpw.com/power-plan/

ZEELAND Board of Public Works

nFront Consulting

Any questions we haven't answered today?

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Thank You!

We would like to hear from you about your experience at this session.

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Commonly Used Terms

Term	Definition	Term	Definition
AEO	Annual Energy Outlook	**MW**	Megawatt (1,000 kW)
BESS	Battery Energy Storage System	**MWh**	Megawatt-Hour (1,000 kWh)
BTMG	Behind the Meter Generation	**NG**	Natural Gas
BTU	British Thermal Unit	**PA 235**	Public Act 235 (State of Michigan)
CC	Combined Cycle	**PTC**	Production Tax Credit
CCS	Carbon Capture Sequestration	**PRM**	Planning Reserve Margin
CT	Combustion Turbine	**PV**	Photovoltaic
DLOL	Direct Loss of Load	**PY**	Planning Year
DSM/EE	Demand-Side Management/Energy Efficiency	**RICE**	Reciprocating Internal Combustion Turbine
HHV	Higher Heating Value	**RBDC**	Reliability Based Demand Curve
ITC	Investment Tax Credit	**REC**	Renewable Energy Credit
kW	Kilowatt	**SMR**	Small Modular Reactor
kWh	Kilowatt-Hour	**UCAP**	Unforced Capacity
MISO	Midcontinent Independent System Operator	**Wind**	On-Shore Wind