



Making the Most of Michigan's Energy Future

Agenda Items		
1:00 pm	Welcome and Introductions	Katie Smith, MPSC staff
1:10 pm	Kickoff of MI Power Grid and Demand Response Group	Erik Hanser, MPSC staff
1:30 pm	Review State Energy Assessment Findings and Recommendations	Sarah Mullkoff, MPSC Staff
2:00 pm	Operations Walkthrough of Polar Vortex 2019	MISO
2:30 pm	Load Modifying Resource Communication Procedure, Rules, and Underperformance in PV 2019	MISO
3:00 pm	Break	
3:15 pm	Overview of U-20628	Katie Smith
3:30 pm	Discussion: Goals of DR Stakeholder Group and Next Steps	All
3:50 pm	Closing Statements/ February Stakeholder Meeting Overview	Katie Smith
4:00 pm	Adjourn	



MPSC

Michigan Public Service Commission



Making the Most of Michigan's Energy Future

MI Power Grid Overview: Demand Response Workgroup

Erik Hanser- MPSC Staff

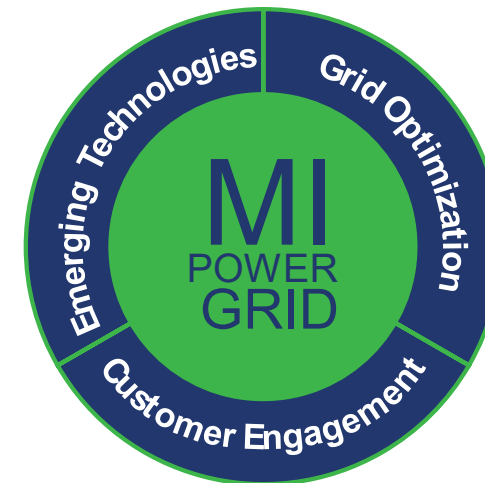


MPSC

Michigan Public Service Commission



- Focused, multi-year stakeholder initiative to maximize the benefits of the transition to clean, distributed energy resources for Michigan residents and businesses
- Engages utility customers and other stakeholders to help integrate new clean energy technologies and optimize grid investments for reliable, affordable electricity service
- Includes outreach, education, and regulatory reforms

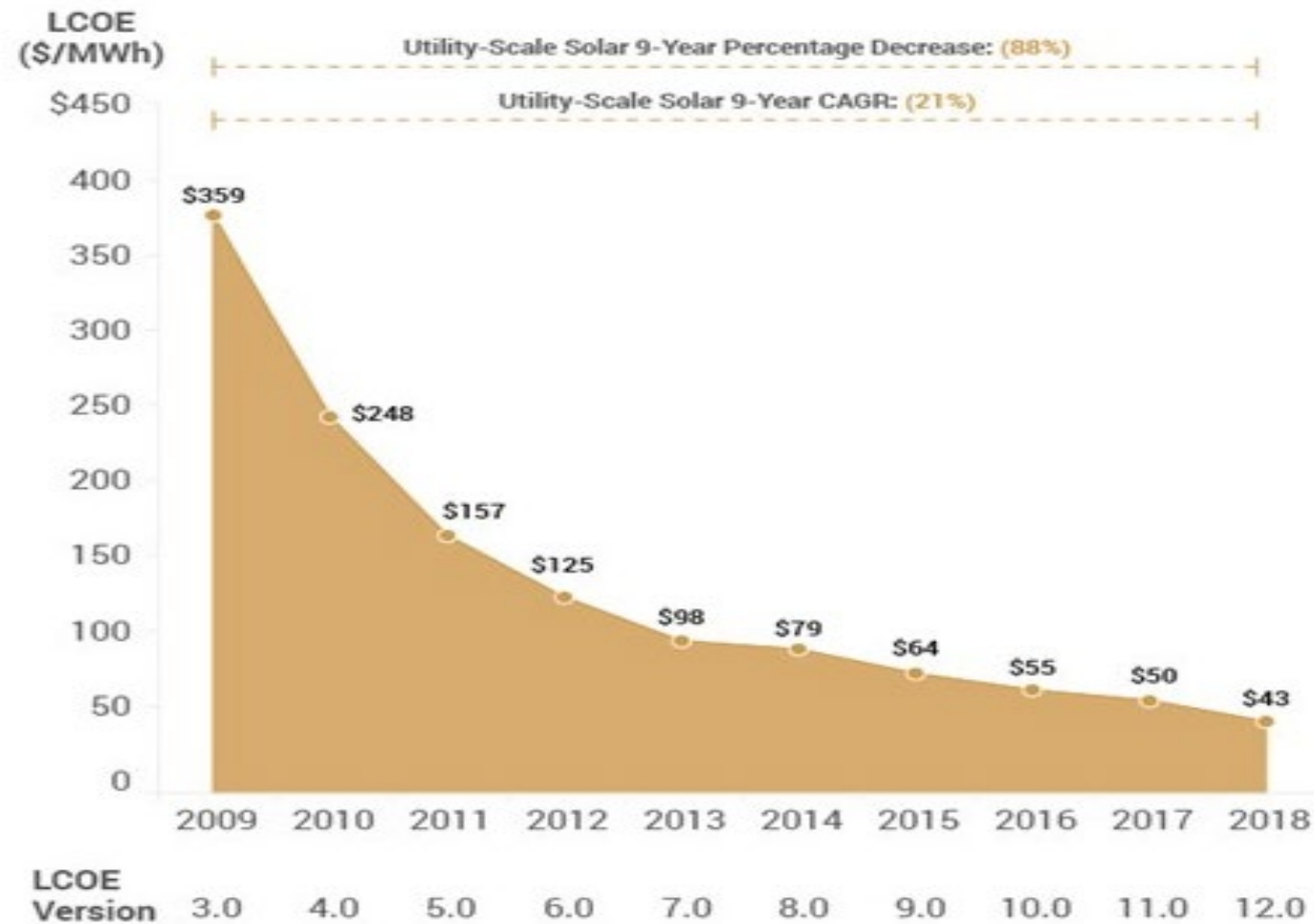


Key Drivers

- **Declining prices of distributed energy resources**
- **Changing resource mix**
- **Customer preferences for clean energy**
- **Electrification of transportation and buildings**
- **Environmental and sustainability goals**

Declining Solar Prices

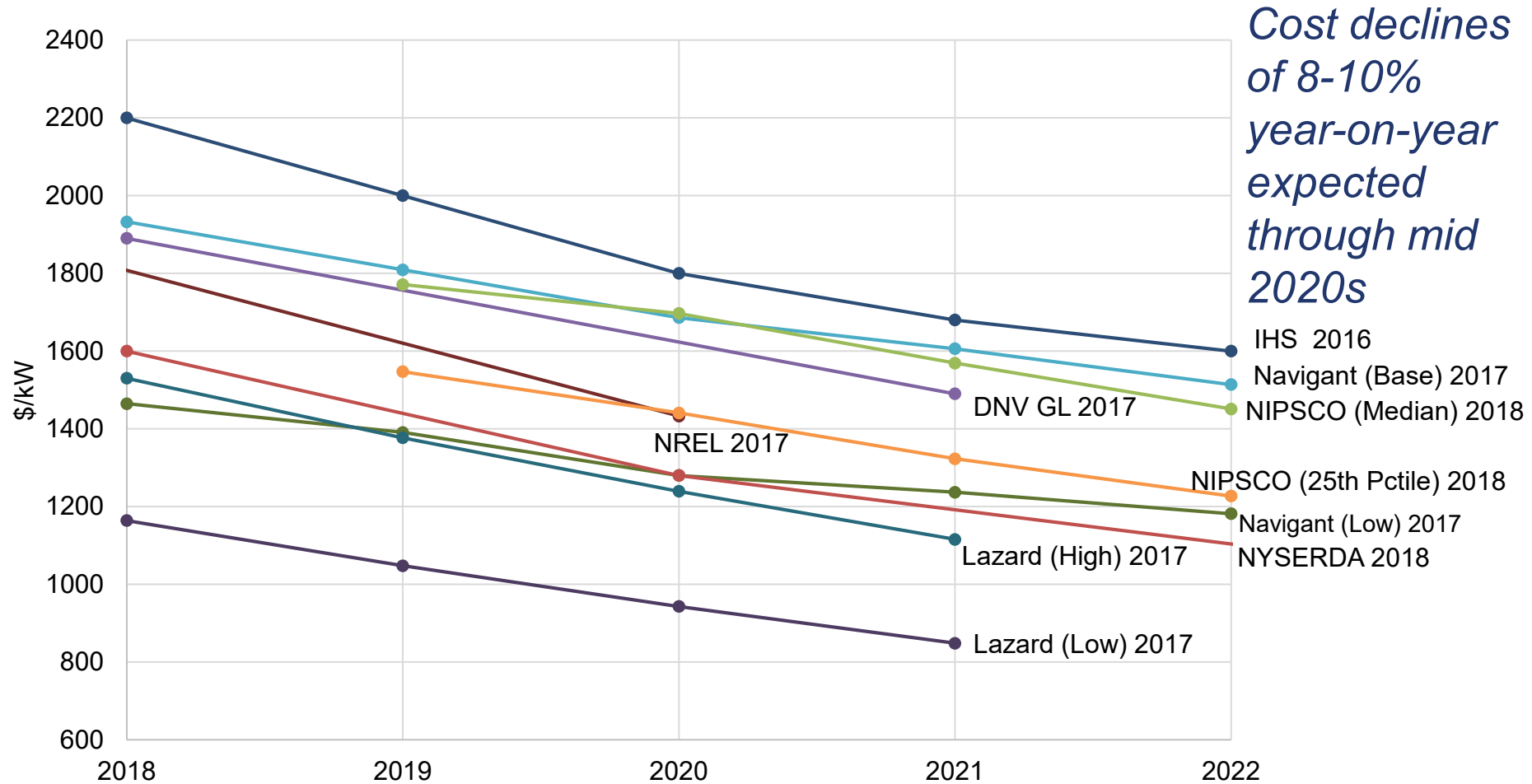
Unsubsidized Solar PV LCOE



— Crystalline Utility-Scale Solar LCOE Mean
 Source: Lazard Levelized Cost of Energy and Levelized Cost of Storage 2018

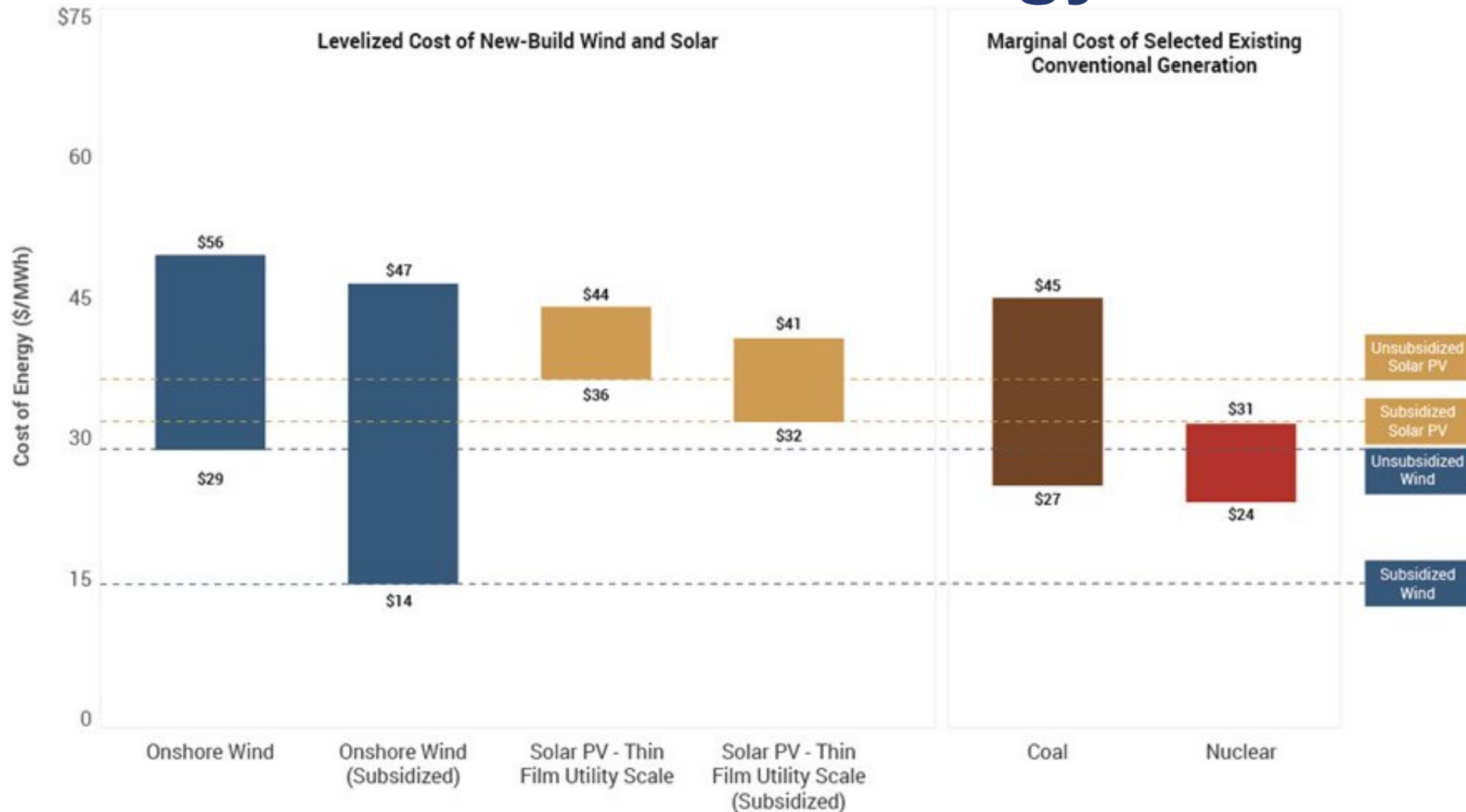
Declining Battery Storage Prices

Bulk-scale 4-hour lithium-ion battery installed cost (\$/kW)



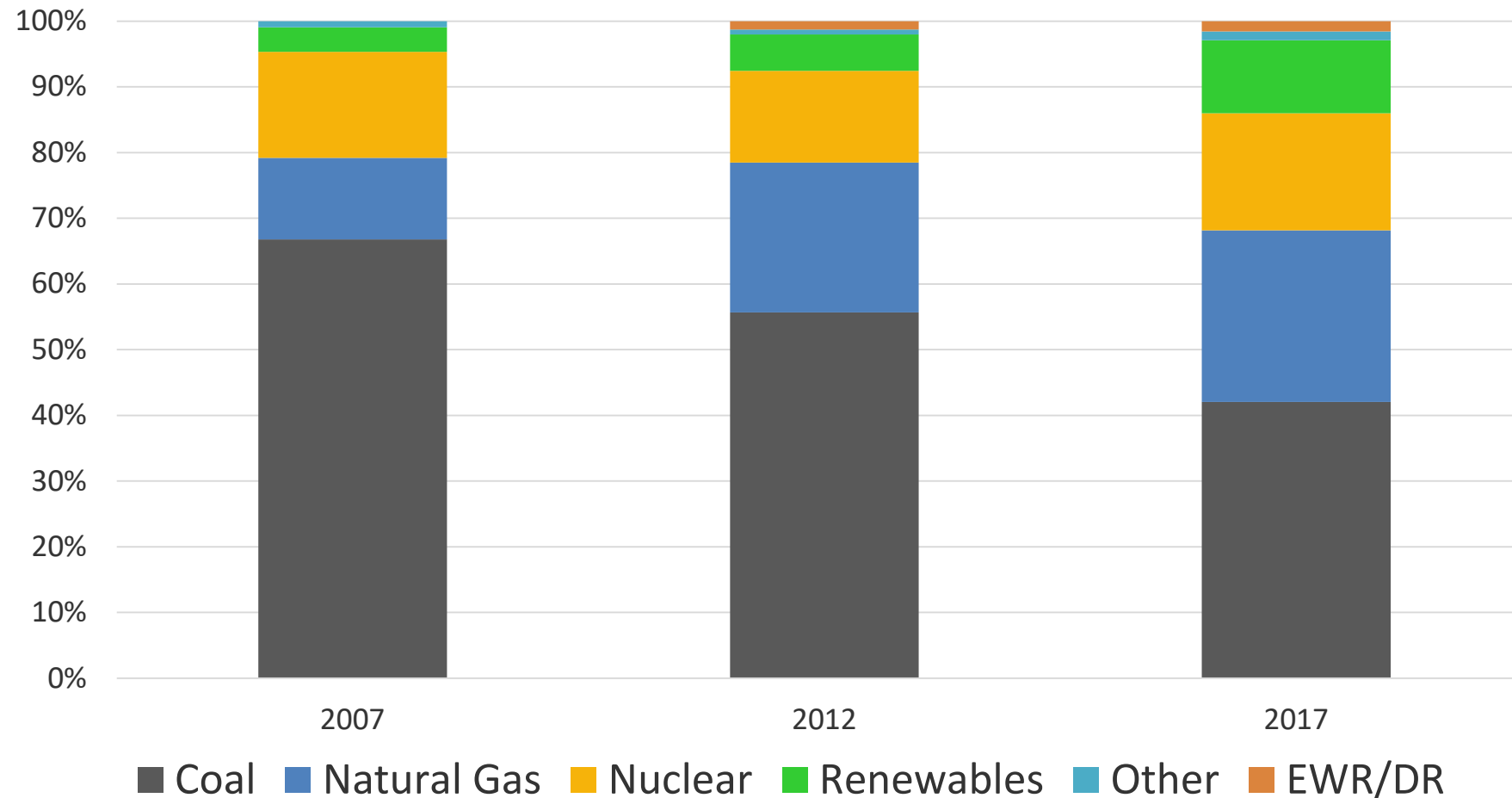
Source: Energy Storage Association Outlook October 2019

Declining Prices of Renewable Energy



Source: Lazard Levelized Cost of Energy and Levelized Cost of Storage 2018

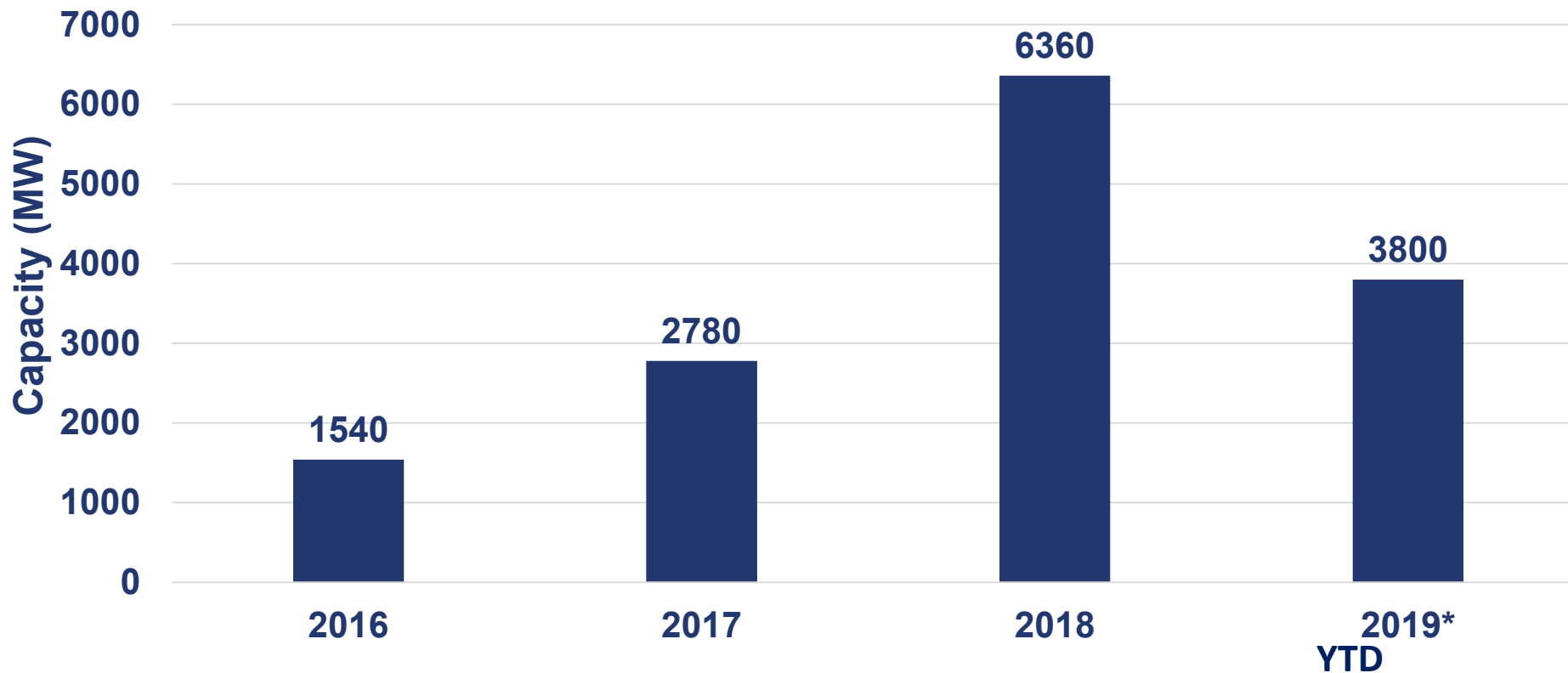
Michigan's Evolving Net Generation Mix, 2007-2017



Source: MPSC, Statewide Energy Assessment (Sept. 2019), Figure 3-17

Customer Preferences

U.S. Corporate Renewable Deals 2016-2019 YTD



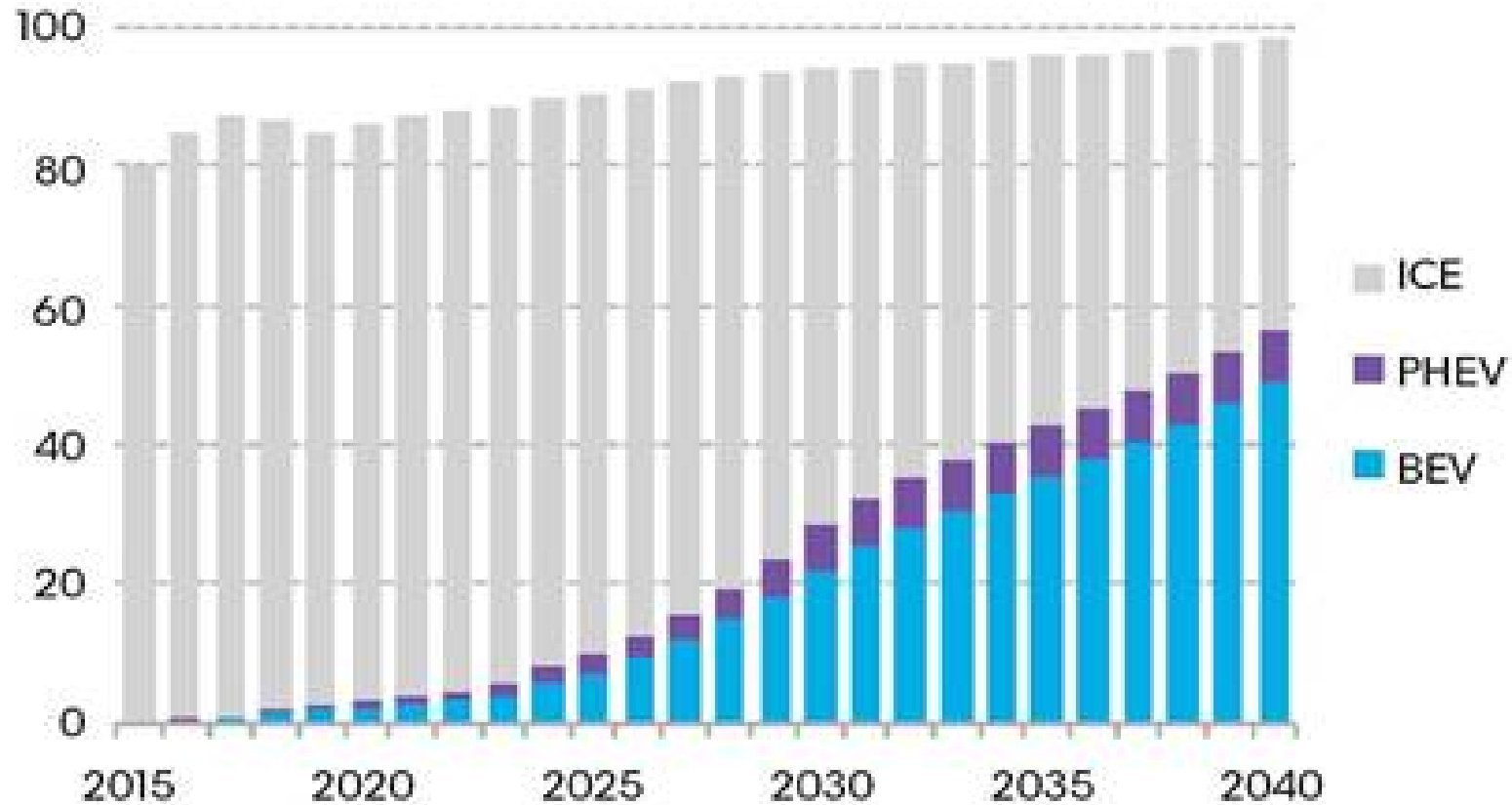
Source: Renewable Energy Buyers Alliance

*Reflects REBA data available through August 28, 2019

Electric Vehicles

Global long-term passenger vehicle sales by drivetrain

Million vehicles



Source

Source: page 2 of the “Key Findings” of Bloomberg NEF 2019 EV Outlook interactive report
<https://about.bnef.com/electric-vehicle-outlook/#toc-viewreport>

MI Utility Carbon Reduction Commitments

	2030	2040	2050
DTE	50%	80%	100%
Consumers		80%	
UPPCo	17%*		
I&M	60%		80%
NSP	80%		100%
UMERC	40%		80%

Source: utility public announcements

*UPPCO intends to meet this goal by 2021

Distributed Energy Future

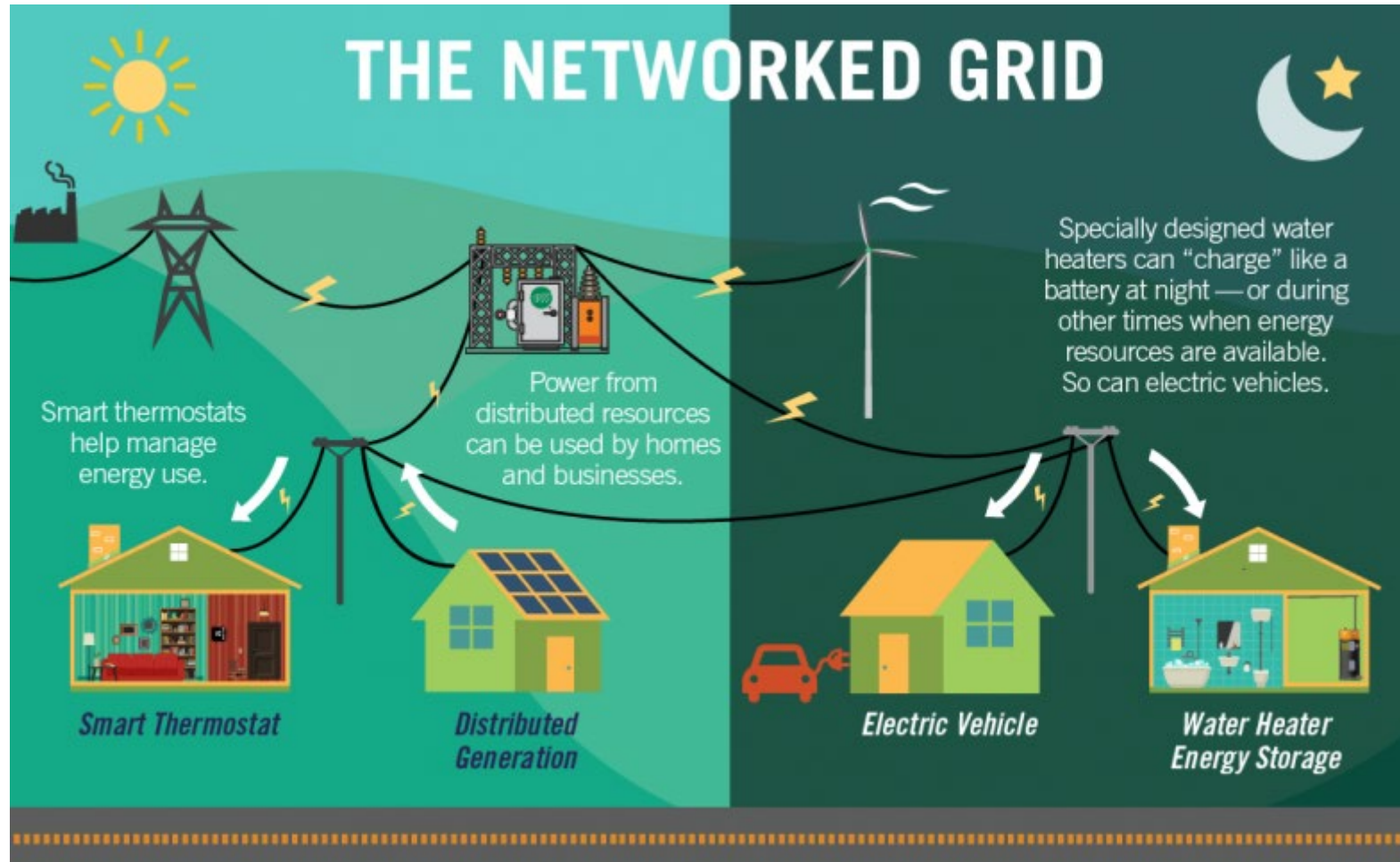
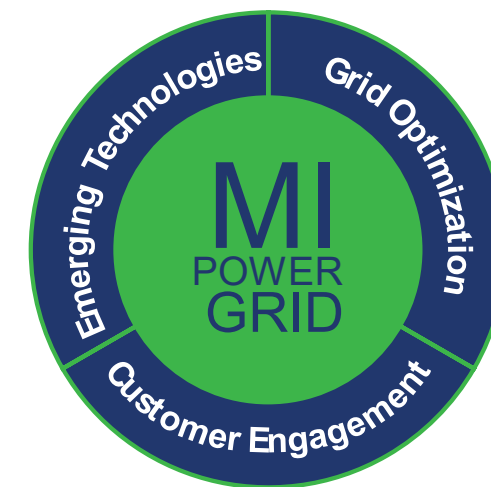


Image Source: CarolinaCountry.com

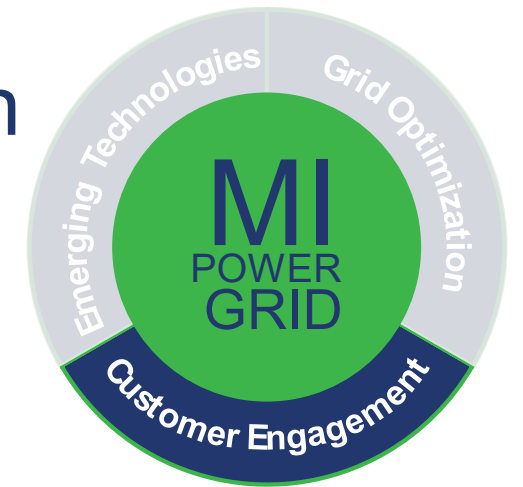
Core Areas of Emphasis

- **Customer Engagement**
- **Integrating Emerging Technologies**
- **Optimizing Grid Performance and Investments**



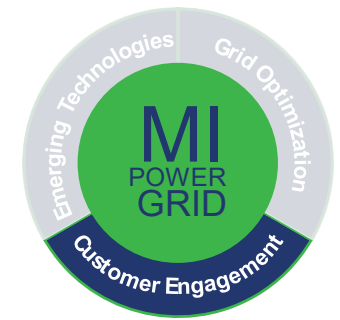
Customer Engagement

- Customer Education and Participation
- Innovative Rate Offerings
 - Time-Based Pricing
 - Distributed Generation Pricing
 - Voluntary Green Pricing
- Demand Response*
- Energy Programs and Technology Pilots*



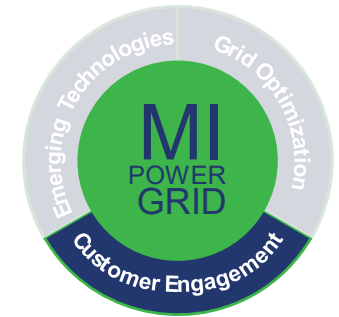
Communication Highlights

- New rate offerings and pilots
 - Communication between the distribution utility and customer even more essential
 - Utility will interact with customer more than ever before
 - Retail changes must align with changing market structure
- Customer Education/Participation
 - Key as customers become more involved and interested in managing their energy
 - Important as new rates and programs are available for customers to choose from



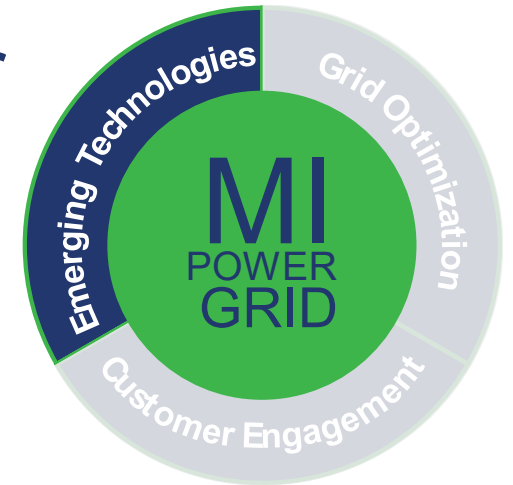
Demand Response focus

- Demand Response
 - Requires that RTO, distribution utilities/aggregators, and customers work together to achieve an outcome.
 - Experiences from Polar Vortex 2019
- This group ties into both the State Energy Assessment, U-20628, and other past and present ongoing DR activities
- Work plan includes:
 - Review of SEA findings and Polar Vortex 2019 learnings
 - DR operations, communications, and performance
 - DR wholesale/retail alignment
 - DR aggregation update, continuing discussion from U-20348



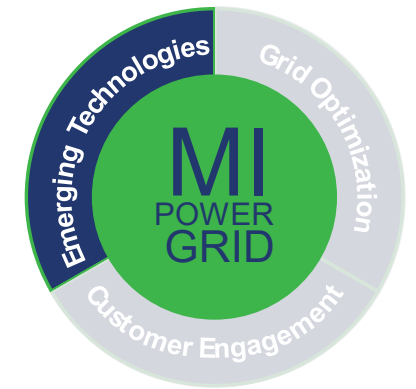
Integrating Emerging Technologies

- Interconnection Standards and Worker Safety
- Data Access and Privacy
 - Distribution System Data Access
 - Customer Data Access and Privacy
- Competitive Procurement
- New Technologies and Business Models



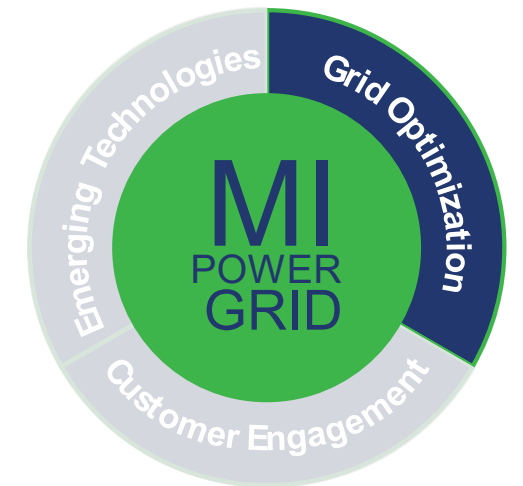
Communication Highlights

- Interconnection Standards*
 - Visibility into DERs
 - Timely interconnection queue
- Data Access and Privacy
 - Customers want to manage energy usage
 - Data privacy and cybersecurity
- New Technologies and Business Models
 - Rules above must be adaptable
 - Order 841 and changing participation models



Optimizing Grid Performance and Investments

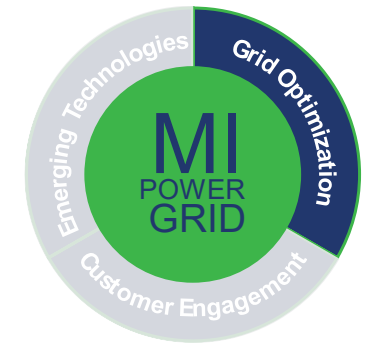
- Financial Incentives/Disincentives
- Grid Security and Reliability Metrics*
 - Service Quality and Reliability Metrics
 - Grid Security
- Advanced Planning Processes
 - IRP
 - Distribution Planning*
 - Integration of Resource/Transmission/Distribution Planning



Communication Highlights

- Grid Security and Reliability Metrics
 - Review reporting requirements
 - Added risk= more coordination and communication needed

- Advanced Planning Processes
 - Accurate forecasts of variable resources.
 - Customer preferences
 - Integration of Resource/Transmission/Distribution Planning



Timeline

October 2019 – October 2021
Rulemakings, workgroups,
collaborate on areas of focus

OCT
2019

JAN
2020

APR

JUL

OCT

JAN
2021

APR

JUL

OCT

October 17, 2019

Governor's announcement and
Commission order kicking off
MI Power Grid initiative

September 30, 2020

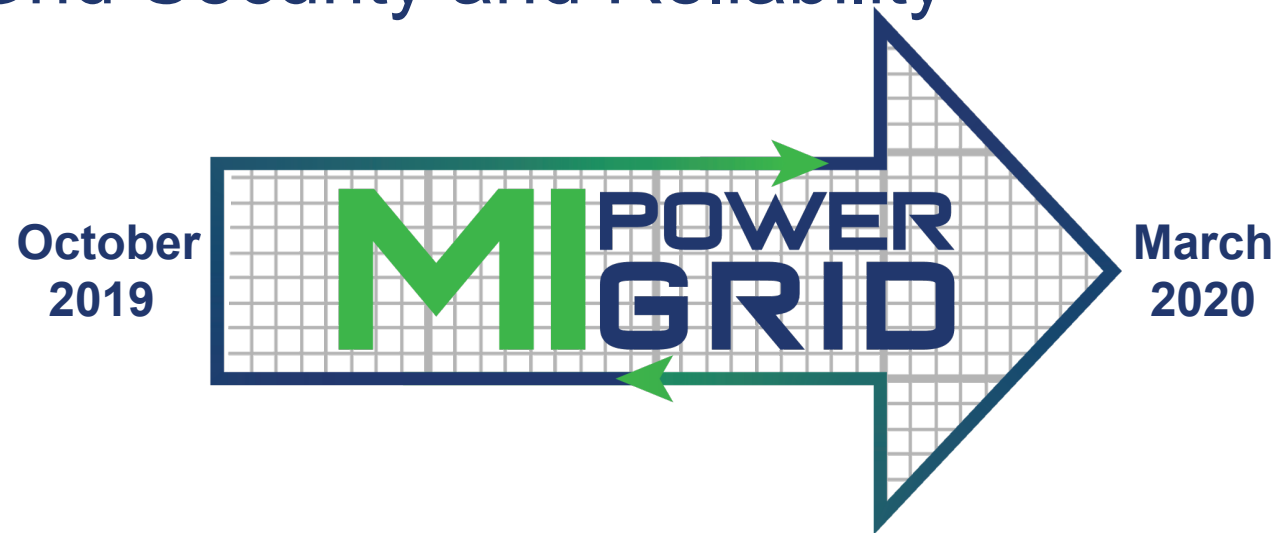
Staff MI Power Grid
status report due

Q3 2021

Final overview of actions

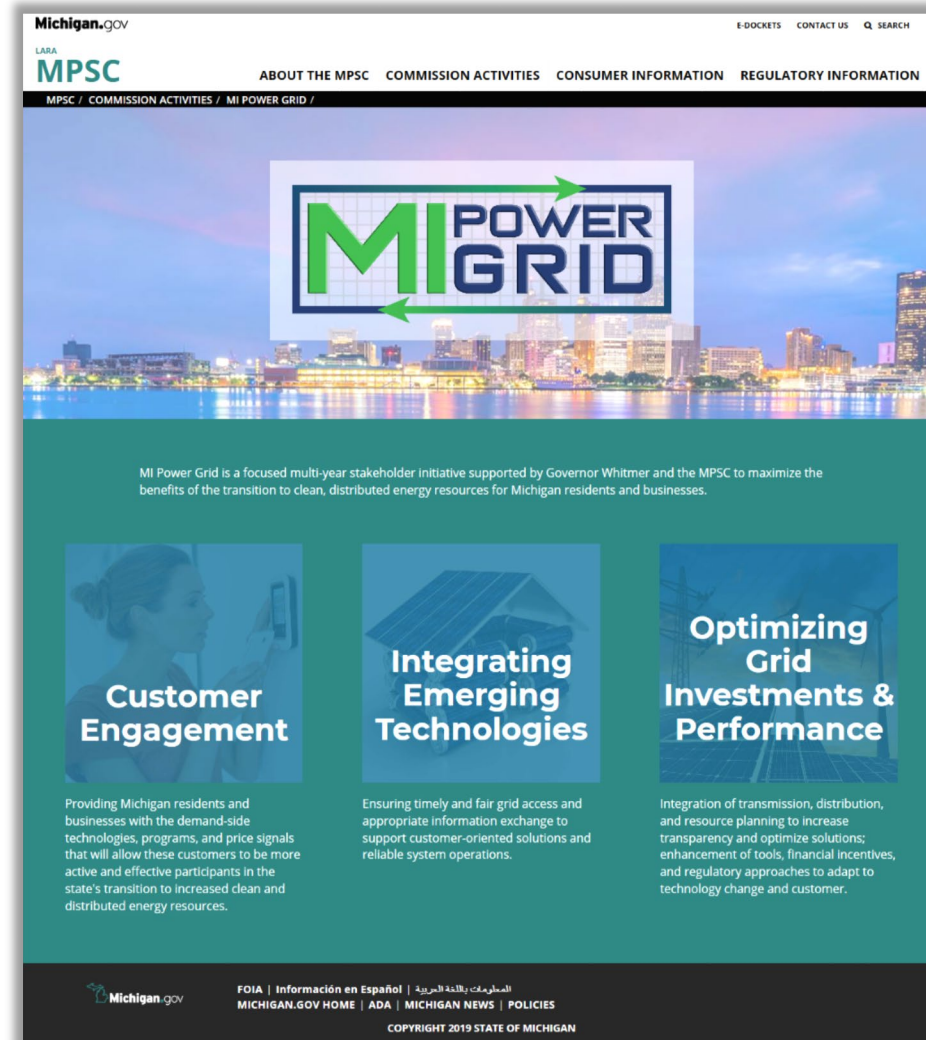
Near-term Priorities

- Interconnection Rules
- Distribution Planning
- Energy Programs and Technology Pilots
- Demand Response
- Grid Security and Reliability



How to Get Involved

www.michigan.gov/MIPowerGrid



The screenshot shows the Michigan.gov website for the MI Power Grid initiative. The page features a navigation bar with links for 'ABOUT THE MPSC', 'COMMISSION ACTIVITIES', 'CONSUMER INFORMATION', and 'REGULATORY INFORMATION'. The main content area is titled 'MI POWER GRID' and includes a descriptive paragraph and three key focus areas: Customer Engagement, Integrating Emerging Technologies, and Optimizing Grid Investments & Performance.

MI POWER GRID

MI Power Grid is a focused multi-year stakeholder initiative supported by Governor Whitmer and the MPSC to maximize the benefits of the transition to clean, distributed energy resources for Michigan residents and businesses.

- Customer Engagement**
Providing Michigan residents and businesses with the demand-side technologies, programs, and price signals that will allow these customers to be more active and effective participants in the state's transition to increased clean and distributed energy resources.
- Integrating Emerging Technologies**
Ensuring timely and fair grid access and appropriate information exchange to support customer-oriented solutions and reliable system operations.
- Optimizing Grid Investments & Performance**
Integration of transmission, distribution, and resource planning to increase transparency and optimize solutions; enhancement of tools, financial incentives, and regulatory approaches to adapt to technology change and customer.

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How to Get Involved

- Email: MIPowerGrid@michigan.gov
- Contact team leads
 - Katie Smith and Erik Hanser for this group
- Follow [@MichiganPSC](https://twitter.com/MichiganPSC) on Twitter
- Sign up for listservs
 - At bottom of Demand Response [page](#)

JOIN THE DISTRIBUTION PLANNING WORKGROUP MAILING LIST

Those interested in receiving updates on distribution planning, including opportunities for stakeholder participation, please join our Listserv.

*Email Address

Questions?

Erik Hanser

hansere@michigan.gov



Making the Most of Michigan's Energy Future

MI Power Grid Demand Response Stakeholder Meeting

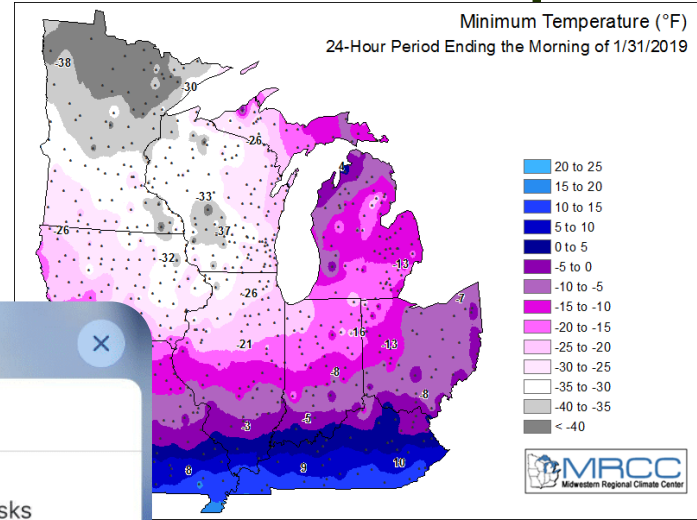
Review of Statewide Energy Assessment
Findings and Recommendations



MPSC

Michigan Public Service Commission

Statewide Energy Assessment Impetus



EMERGENCY ALERTS

Emergency Alert
Due to extreme temps Consumers asks everyone to lower their heat to 65 or less through Fri

Settings



Charge from the Governor

- Governor Whitmer requested that the Commission review the supply, engineering, and deliverability of Michigan's natural gas, electricity, and propane. The Governor requested that the Commission's review include the following:
 - Commission's infrastructure planning criteria and methodologies for distribution, transmission, and generation
 - Existing planning processes for electric and natural gas utilities and best practices for integration
 - Linkages and gaps between real-time operational reliability and infrastructure planning for long-term reliability
 - Demand response and mutual assurance protocols by natural gas utilities and opportunities for enhancement
 - Contingency risks, interdependencies, and vulnerabilities of supply and/or delivery disruptions from physical or cyber security threats and rough cost estimates of potential enhancements
 - Adequacy of Commission rules addressing customer safety, reliability and resiliency, and utility notifications
 - Evaluation of existing gas efficiency programs
 - Identification of area or types of systems most at risk

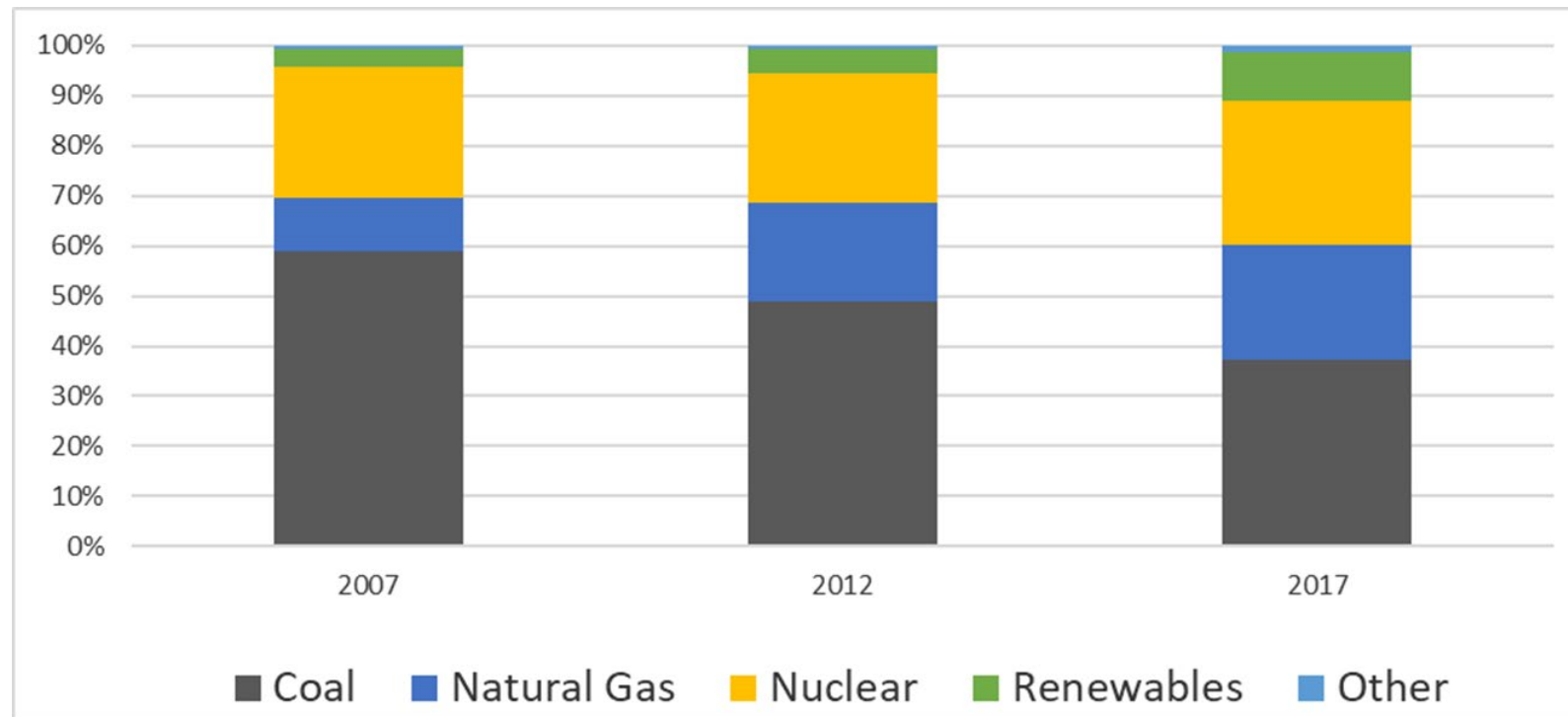
SEA Scope

The Statewide Energy Assessment investigated six separate sectors:

- Electric
- Natural Gas
- Propane
- Cybersecurity
- Physical Security
- Emergency Preparedness

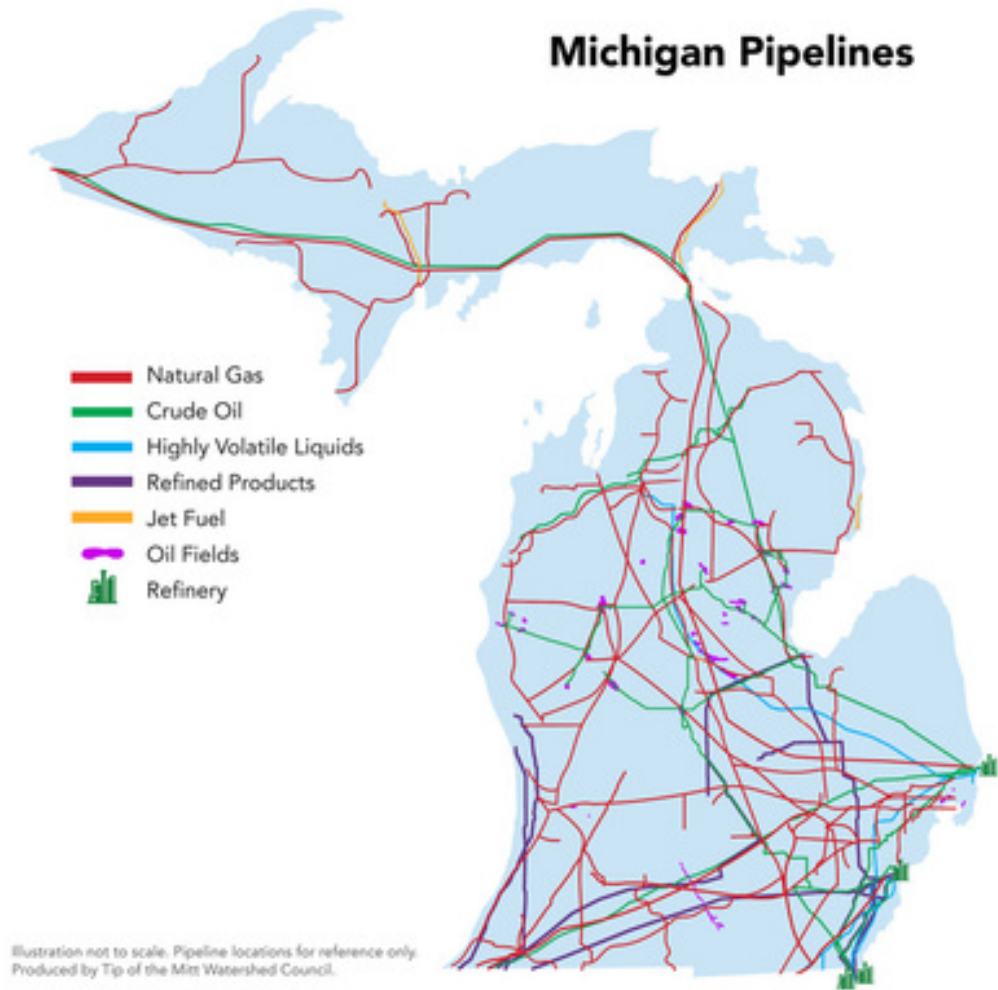
MI Energy Landscape- Electricity

Michigan's Evolving Net Generation Mix from 2007-2017



MI Energy Landscape- Natural Gas

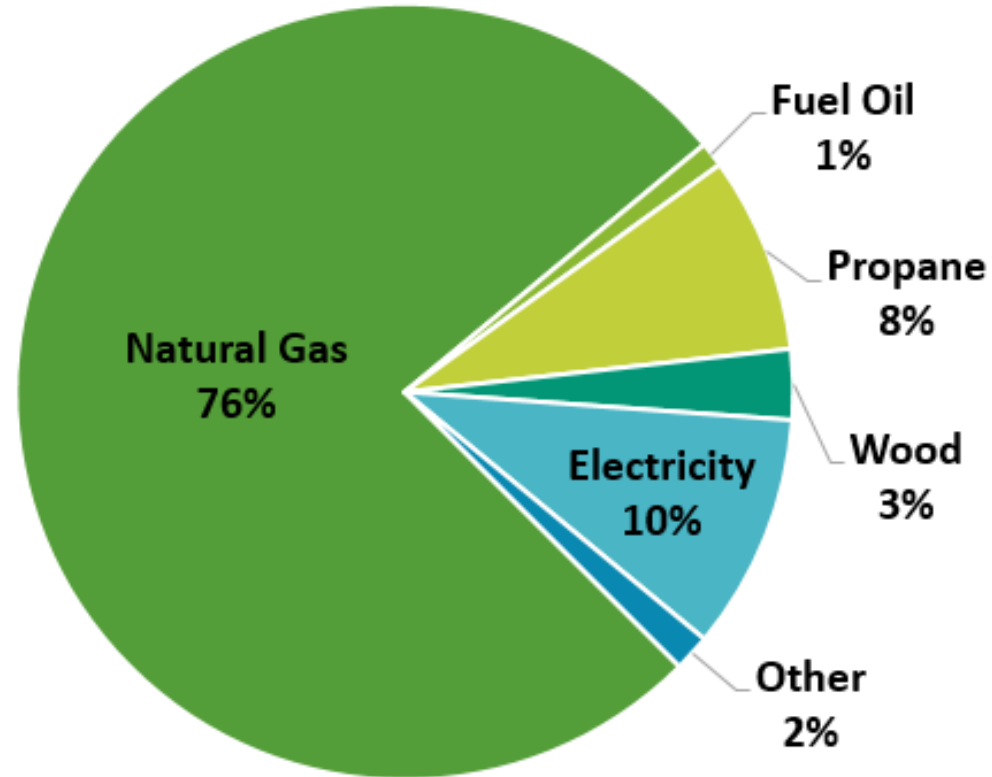
- MI is **#1** in the country for working gas storage capacity due to our unique geology
 - Michigan natural gas utilities operate **32 storage facilities** with a gas capacity of **294.92 Bcf**
- **9,215 miles** of transmission main and regulated gathering lines
- **114,865 miles** of distribution lines
- Access to diverse supplies through various pipelines including Canada, Rockies, Gulf Coast, and Eastern (Marcellus/Utica) production



Map by Tip of the Mitt

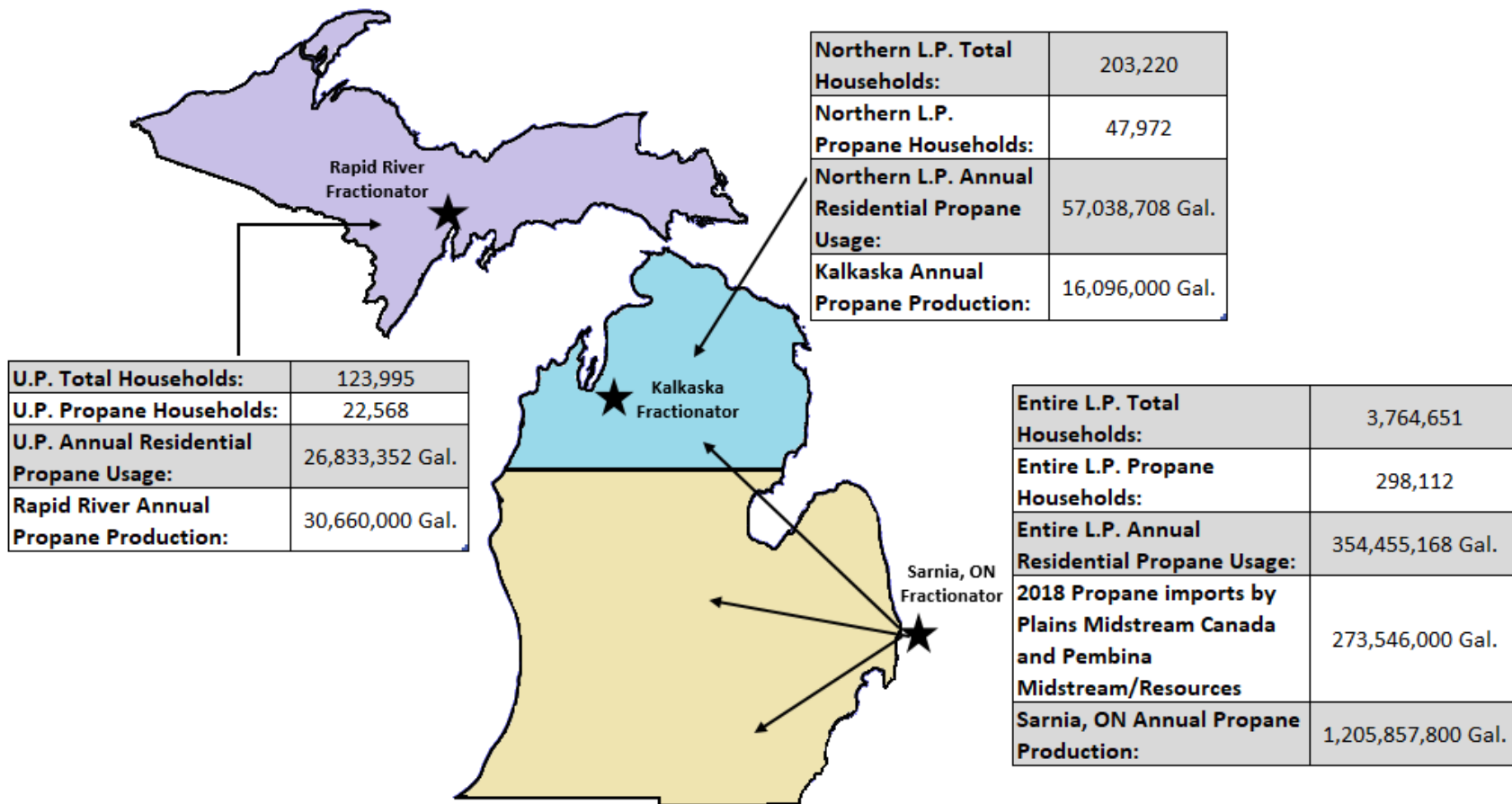
MI Energy Landscape- Home Heating

Michigan Residential Home Heating, 2017
(Percentage Share of Estimated Households)



Source: U.S. Census Bureau, 2017 American Community Survey.
Other Includes: Coal or coke, Solar Energy, Other Fuels, and No Fuels.

MI Energy Landscape- Propane



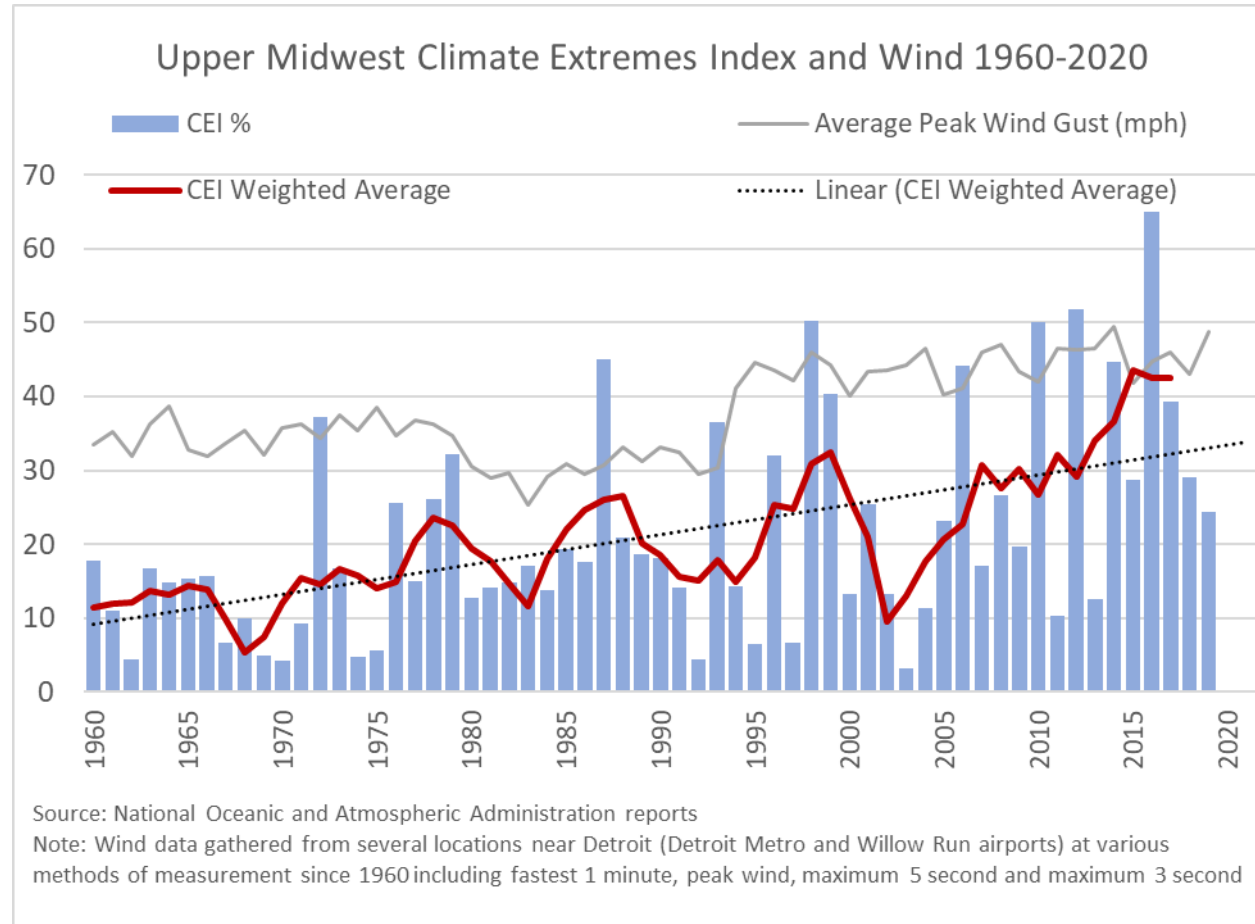
Assumptions include: An annual household usage of 1,189 gallons, Kalkaska production rate of 1,050 bpd, Rapid River production rate of 2,000 bpd, and Sarnia production rate of 114,000 bpd (95% of maximum capacity and 69% of output consisting of propane(See footnote 117)).

Sources: Energy Information Administration and American Community Survey.

Notes: Sarnia fractionator is jointly owned and operated by Plains Midstream and Pembina. Propane imports into Michigan may ultimately be consumed elsewhere.

The Changing Landscape Factors Driving Change

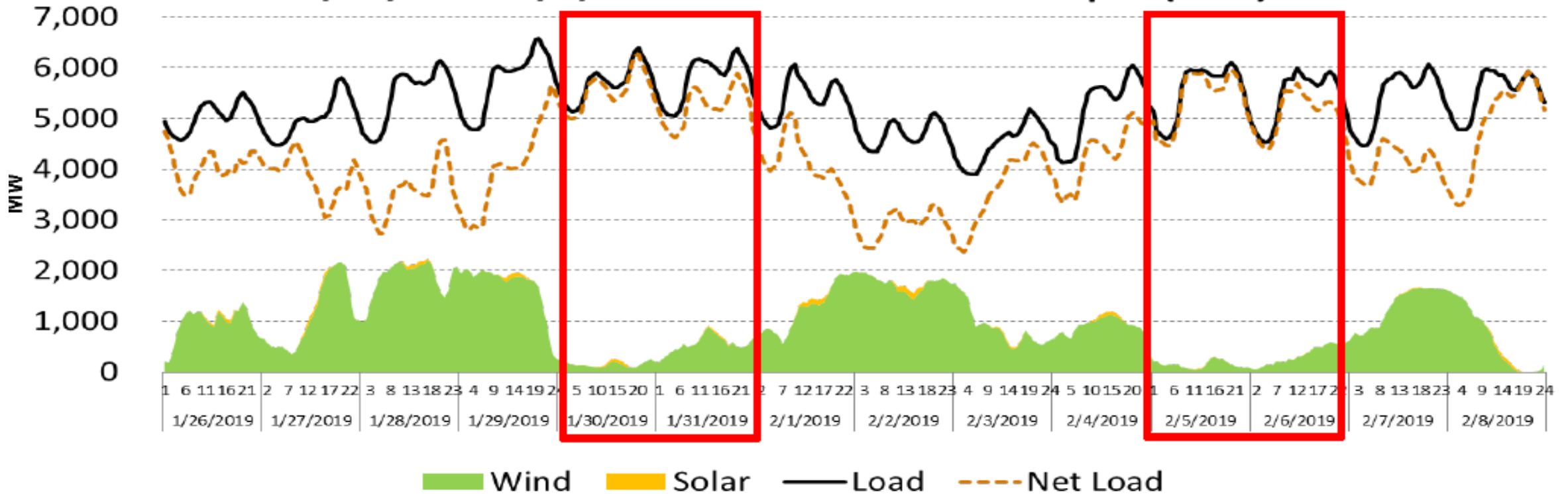
Weather and Emergency Events



The Changing Landscape- Extreme Weather Events

The Winter Challenge – Historical Example

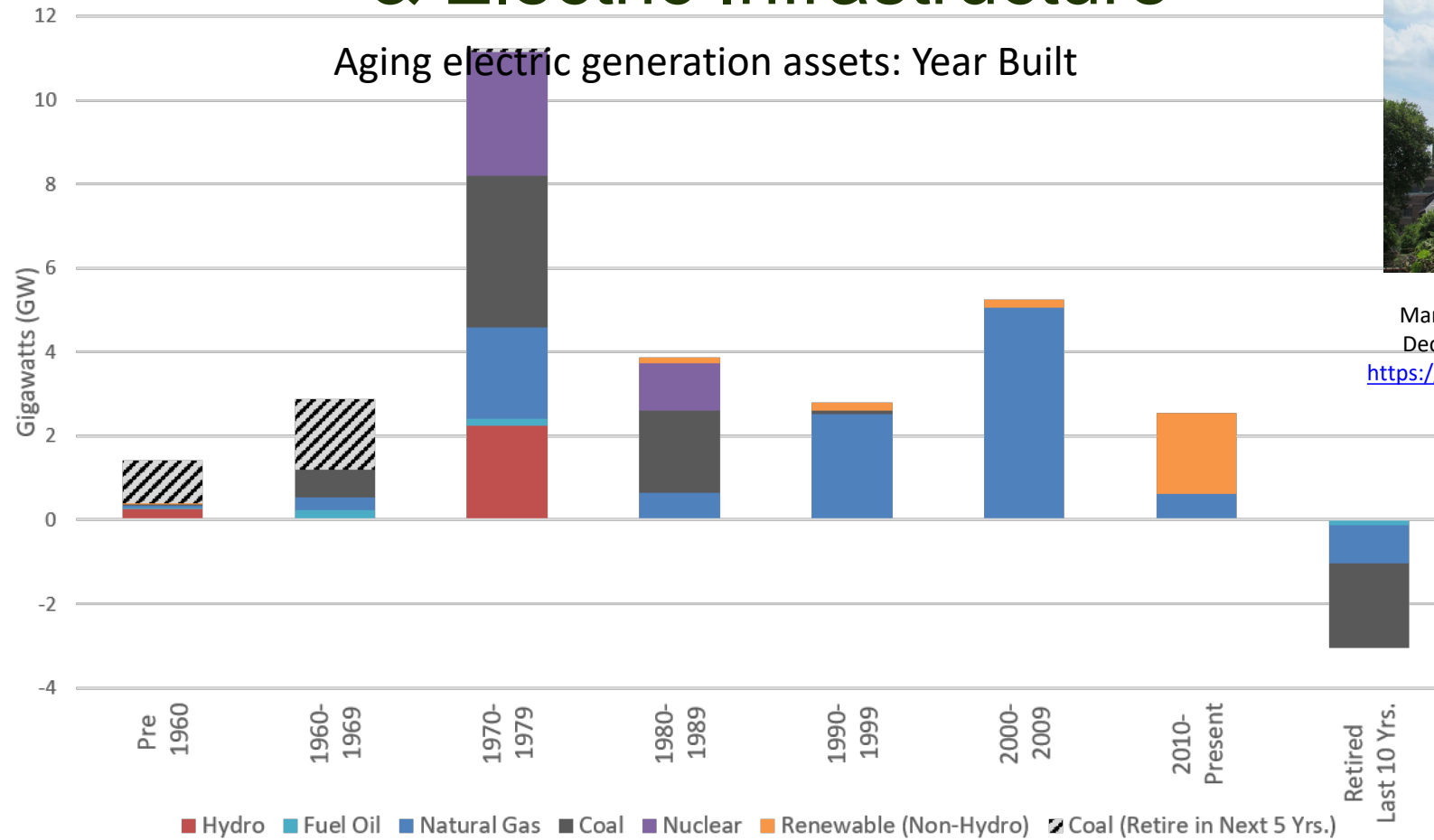
1/26/19 to 2/8/19 Renewable & Load Output (MW)



Source: Northern States Power IRP Case No: U-20599

The Changing Landscape

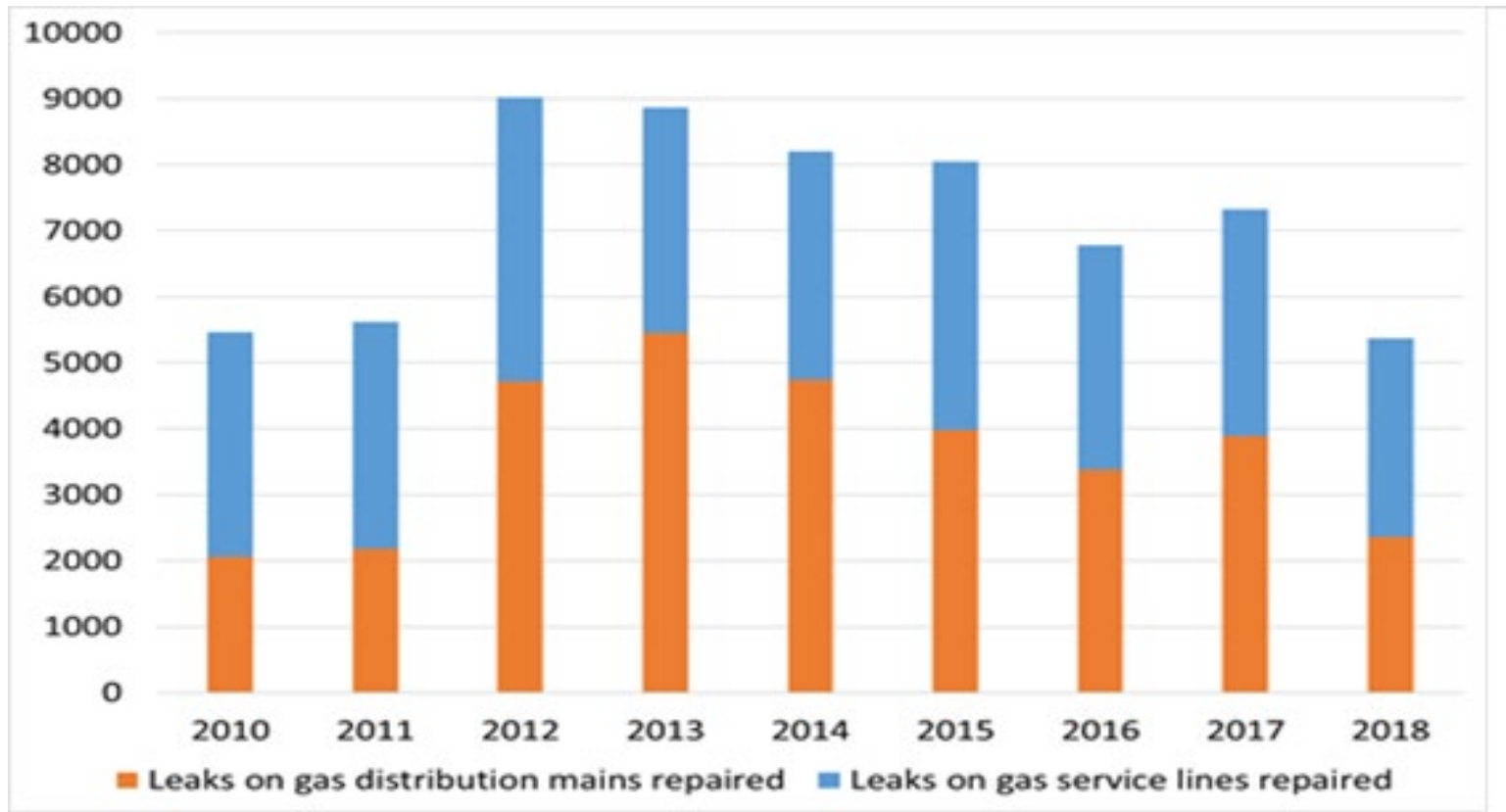
Factors Driving Change: Aging Infrastructure & Electric Infrastructure



Marysville Power Plant, Commissioned 1922, Decommissioned 2001, Imploded Nov. 2015
https://www.wikiwand.com/en/Marysville_Power_Plant

The Changing Landscape

Factors Driving Change: Aging Infrastructure Natural Gas Infrastructure



Natural Gas lines, corrosion related repairs: 2010-2018

The Changing Landscape

Factors Driving Change: Increasing Number and Severity of Cyber and Physical Attacks



<https://www.fireeye.com/cyber-map/threat-map.html>, June 25, 2019

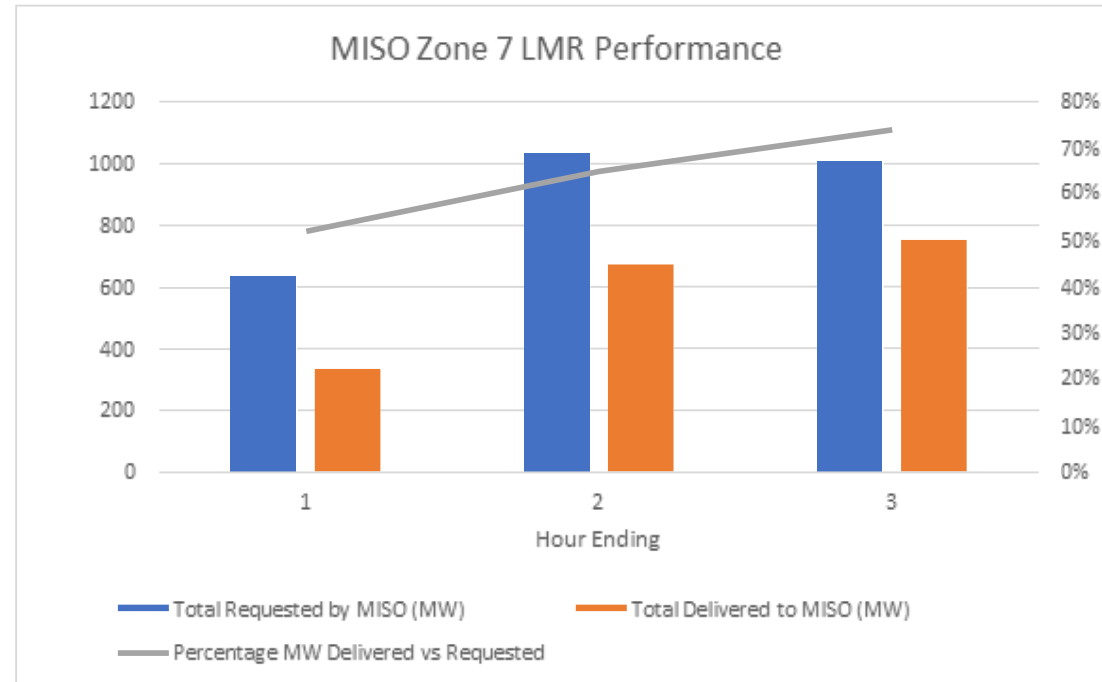
Emergency Operating Procedures and DR

MISO Notifications associated with PV 19



Emergency Operating Procedures and DR

Performance of
MISO Zone 7 on
January 30, 2019



SEA- Initial Assessment

- Systems are adequate to meet customer needs
- Unique assets help ensure reliable supply and delivery of energy
- Infrastructure is designed and operated to maintain energy supplies and deliver during emergency conditions
- Emergency events could have a high impact on the economy and well being of residents

SEA Recommendations

The SEA makes 36 Recommendations which include, among others, programmatic improvements, Commission rulemakings, updating modeling and utility tariffs, additional training, improved reporting parameters, and stakeholder engagement.

The SEA also makes 14 Observations which include enhancements at the RTOs/ISOs, interagency/departmental consultations, programmatic development, infrastructure build out, and legislative action.

SEA High-Level Recommendations

- Risk-based integrated natural gas planning
- Integrated electricity system planning
- Valuing resource diversity and resiliency
- Addressing gas-electric interdependencies
- Demand response improvements
- Emergency drills
- Cyber security standards for natural gas distribution utilities
- Propane contingency planning

SEA Recommendations for Mitigating Risks

Electric Recommendations

9.3.1.1 Electric Recommendations

- **E-1:** MI continues to expand its reliance on DR to meet reliability needs; during the PV 19, some customers did not respond to “interruptible tariffs” and found inconsistent language; recommends several improvements to DR programs
 - **E-1.1:** Review utility DR tariffs for consistency and clarity
 - **E-1.2:** Coordination among utilities, staff and stakeholders
 - **E-1.3:** Utilities should review their communication plans for efficient response to emergency events

Link to SEA Report

https://www.michigan.gov/documents/mpsc/2019-09-11_SEA_Final_Report_with_Appendices_665546_7.pdf



Michigan Statewide Energy Assessment

Final Report

September 11, 2019

Sally A. Talberg, Chairman
Daniel C. Scripps, Commissioner
Tremaine L. Phillips, Commissioner





Michigan's Statewide Energy Assessment Fact Sheet

September 11, 2019

What happened?
A combination of extreme weather and energy emergency events during January 30-31, 2019 challenged the natural gas and electric systems in Michigan. Though service was maintained, Michigan's energy supply and delivery systems were strained due to the extreme weather event dubbed Polar Vortex 19, or PV19, during which temperatures dropped below -25° F. The abnormal weather caused reduced regional power plant output and historically high natural gas demand, at the same time as an unexpected failure of critical natural gas infrastructure.

The regional electric grid operator, Midcontinent Independent System Operator (MISO), declared a system-wide (15 states) electric emergency requiring all generation to operate at maximum output.

On the morning of January 30, a fire ignited at the Ray Compressor Station, Consumers Energy's largest natural gas storage facility (supplying over one third of customer needs at peak times), leading to a severe disruption of natural gas supply and deliverability.



Photo Credit: Todd McInturf/The Detroit News

The impact of these overlapping emergencies led Michigan utilities to request conservation measures and the State Emergency Operations Center to make a broad public appeal to all residents to conserve natural gas. The statewide appeal included a text message alert from the Michigan State Police.

Charge from Governor
Governor Gretchen Whitmer called upon the Michigan Public Service Commission (MPSC) to evaluate whether the design of the electric, natural gas, and propane delivery systems are adequate to account for changing conditions and extreme weather events. The Governor asked the Commission to provide recommendations on how to mitigate risk on the energy system. An initial statewide energy assessment from the MPSC was delivered July 1.

Comments were accepted and informed the final report issued on September 11, 2019.

The MPSC goal is to ensure safe, reliable energy for Michigan residents and businesses and to be prepared to alleviate impacts during future events. The Commission took this opportunity to assess the potential vulnerabilities of the natural gas, electricity, and propane systems, and to review the cyber and physical security of our energy systems and our emergency operations protocols.

Statewide energy assessment process
The MPSC formed the following specific teams:

- Electric
- Natural Gas
- Propane
- Cyber and Physical Security
- Energy Emergency Management

Over several months, each team collected data from rate-regulated and non-rate regulated energy providers and reviewed existing studies addressing system planning, risks, and best practices. The Commission hosted over 40 internal and external meetings and conference calls with a variety of stakeholders to help inform the development of the report.

Michigan's energy position
Michigan has an extensive system for supplying electricity, natural gas, and propane that is tied to regional markets.

Natural Gas:
Consumption of natural gas in Michigan is greatest in the residential sector, where it is used as the primary heating fuel in more than 75% of Michigan households.



Energy Source	Percentage Share
Natural Gas	76%
Electricity	10%
Other	2%
Wood	3%
Propane	4%
Fuel Oil	1%

Source: U.S. Census Bureau, 2017 American Community Survey. Other includes Coal or coke, Solar Energy, Other Fuels, and No Fuel.

800-292-9555 | www.michigan.gov/mpsc P.O. Box 30221, Lansing, MI 48909

Questions?

Sarah Mullkoff
mullkoffs1@michigan.gov



2019 Polar Vortex Overview

January 16, 2020

Purpose & Key Takeaways



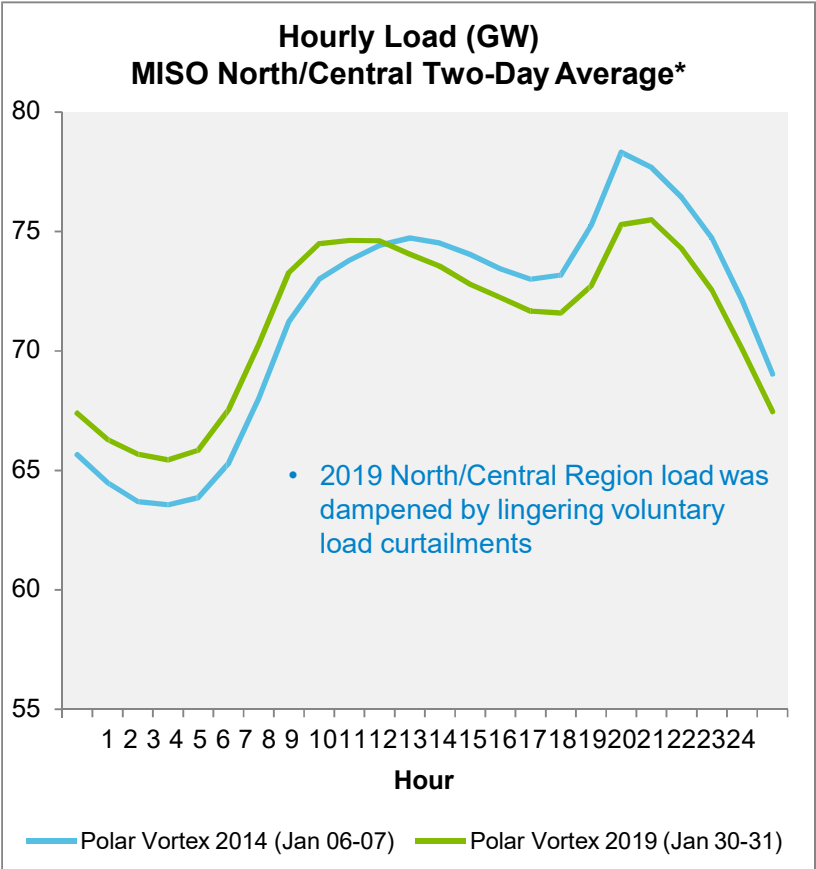
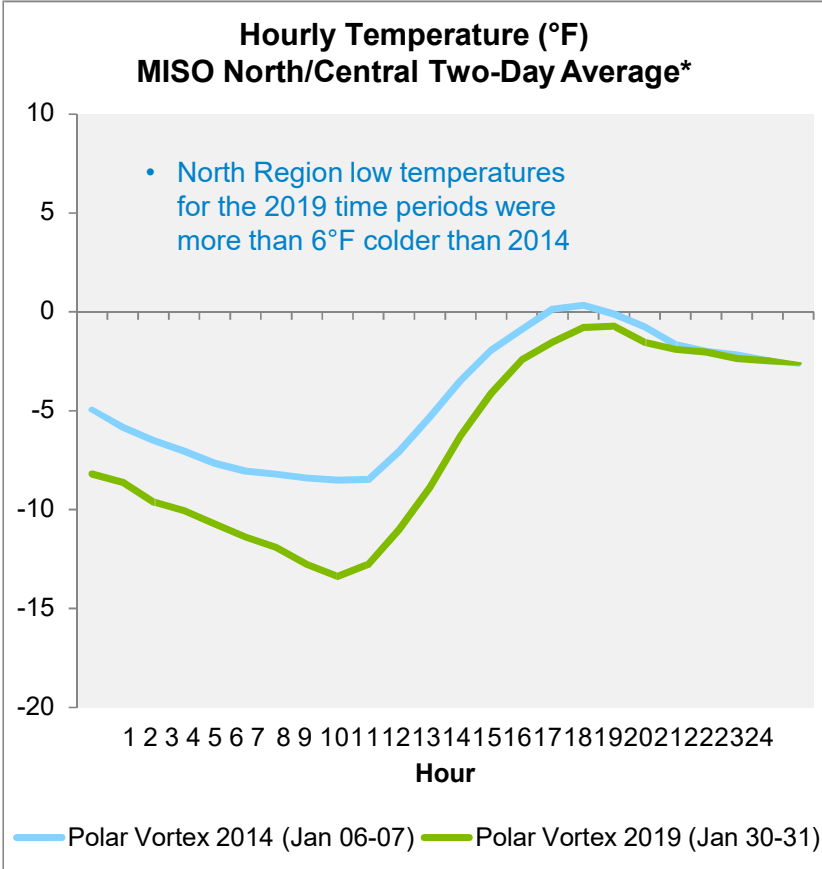
Purpose:

Summary of operations during the January 30 – 31 North and Central Region Maximum Generation Event

Key Takeaways:

- MISO and Members reliably managed operations during extreme cold, where temperatures fell below -30°F in some parts of the North and Central regions
- Resulting high load, unavailable generation, and uncertainty in both load and supply created challenges throughout the event
- Emergency procedures were implemented and maintained from early January 30 through the afternoon of January 31 to reliably manage the grid and maintain public safety
- Winter preparedness by MISO and its members ensured readiness for the extreme conditions, but, we note areas of needed improvement in load and wind forecasting, and voluntary load curtailment impacts

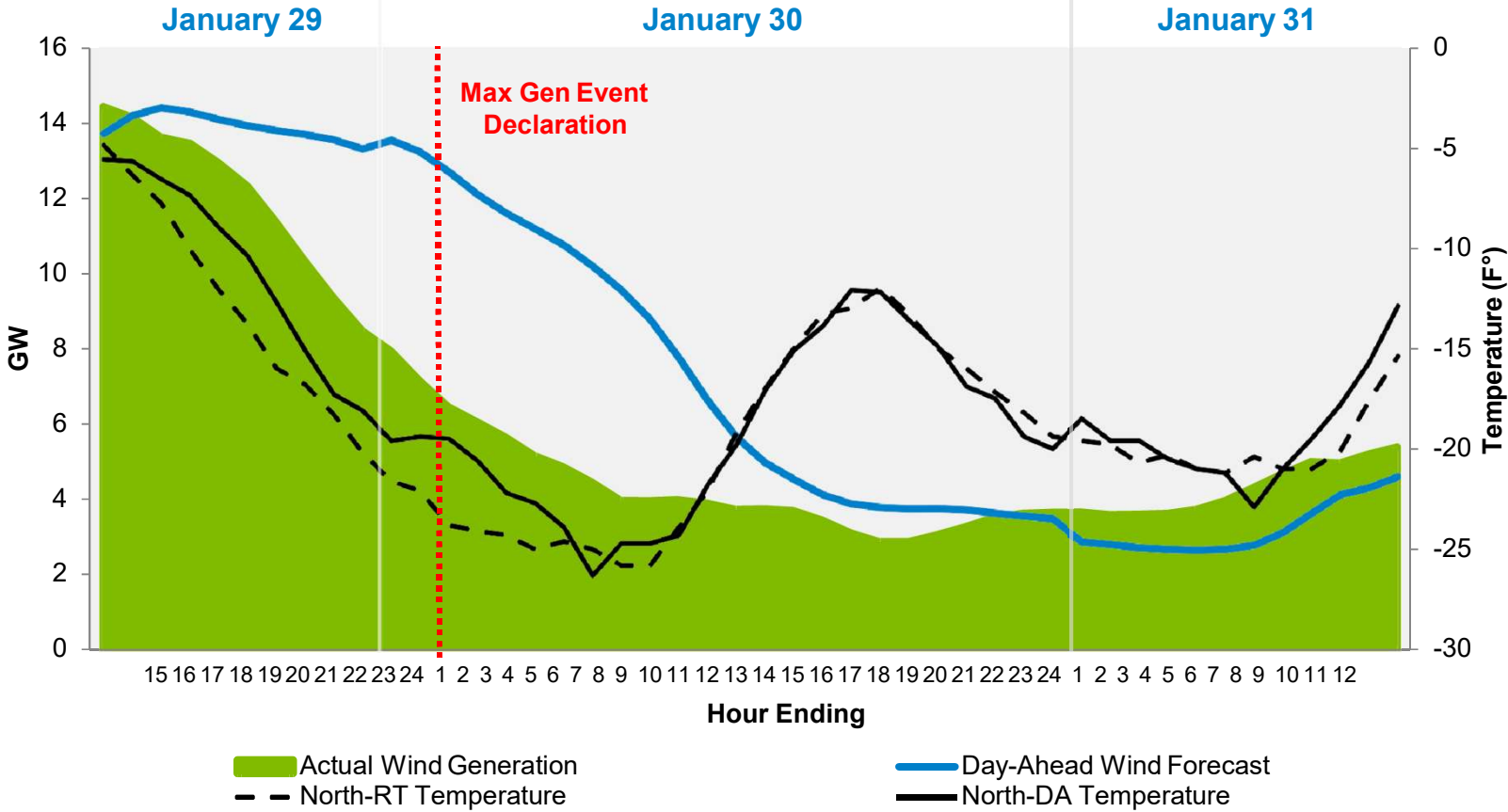
A strong arctic high pressure system brought historic cold to the North and Central Regions on January 30-31, driving temperatures below Polar Vortex 2014 levels.



*Average is for the two days listed

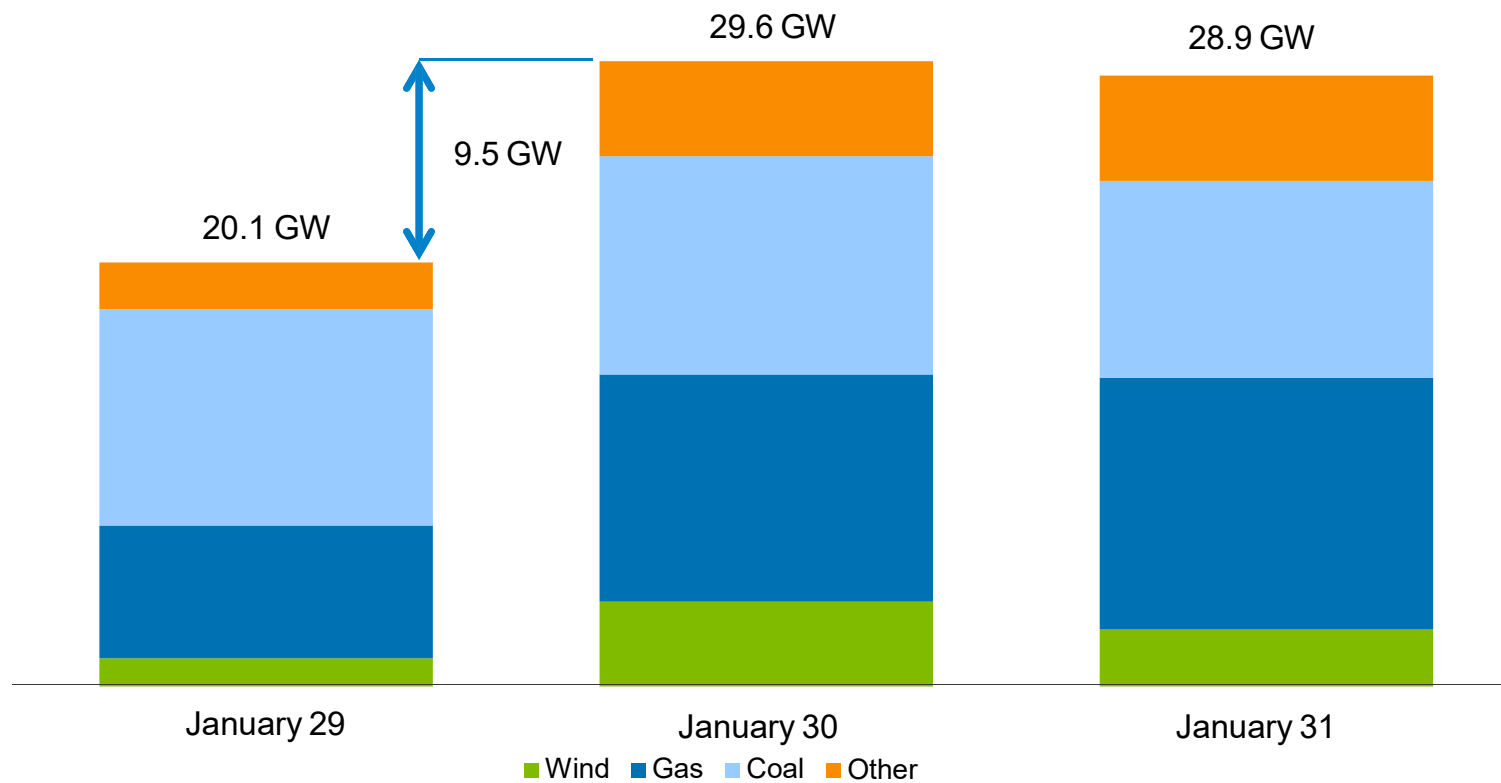


An earlier than expected drop in wind output increased risk of insufficiency for morning peak, triggering Max Gen Event Step 1a, effective for 0500 EST.



Subsequent conventional forced generation outages, load forecast uncertainty, and risk of additional outages prompted the move to Max Gen Event Step 2a/b to access LMRs.

MISO North/Central Daily Average Unplanned* Generation Outages



*Unplanned: Forced plus derates

The outage chart reflects the data as it resided in the CROW Outage system on February 11, 2019
 Wind often reported as derate over the timeperiod

Cold-related mechanical issues and fuel supply limitations affected all generation types. Unplanned outages across fuel technologies were comparable during the event.

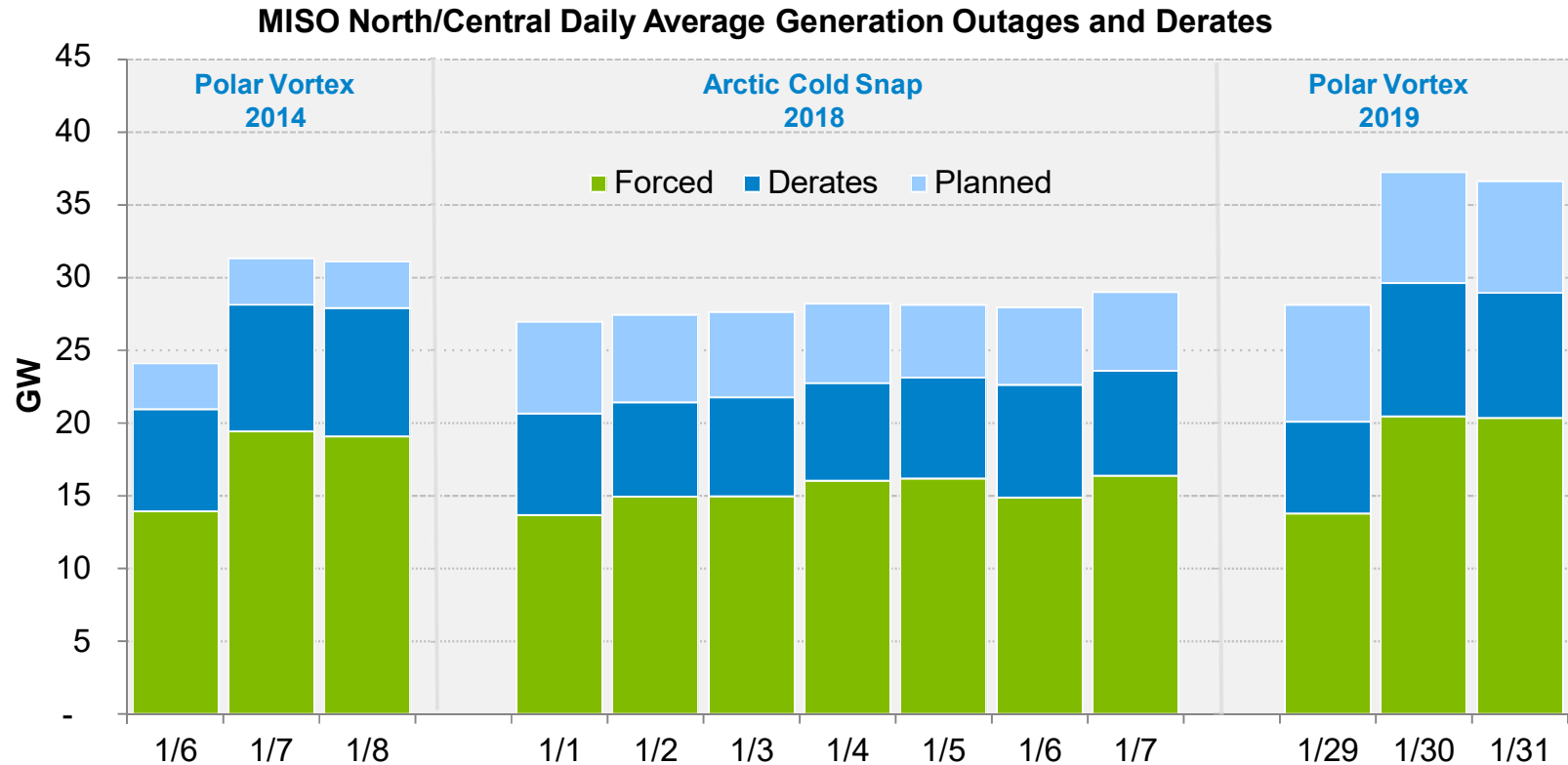
MISO North/Central Region Unplanned* Outages (GW)					
	Coal	Gas	Wind	Other	Total
Installed Capacity (PRA cleared plus uncleared internal MISO generation that qualified for the 18-19 PY)	48.4	31.9	14.2**	18.2	112.7
January 29	10.3 (21%)	6.3 (20%)	1.3 (9%)	2.2 (12%)	20.1 (18%)
January 30	10.3 (21%)	10.8 (34%)	4.0 (28%)	4.5 (25%)	29.6 (26%)
January 31	9.3 (19%)	11.9 (37%)	2.7 (19%)	5.0 (28%)	28.9 (26%)

*Unplanned: Forced plus derates

The outage data based on records reflected in the CROW Outage system on Feb 11, 2019*

**Wind installed capacity does not include wind online after 03/01/2018

Total outages were higher than previous cold weather events with approximately 25% unavailable due to unplanned outages*.



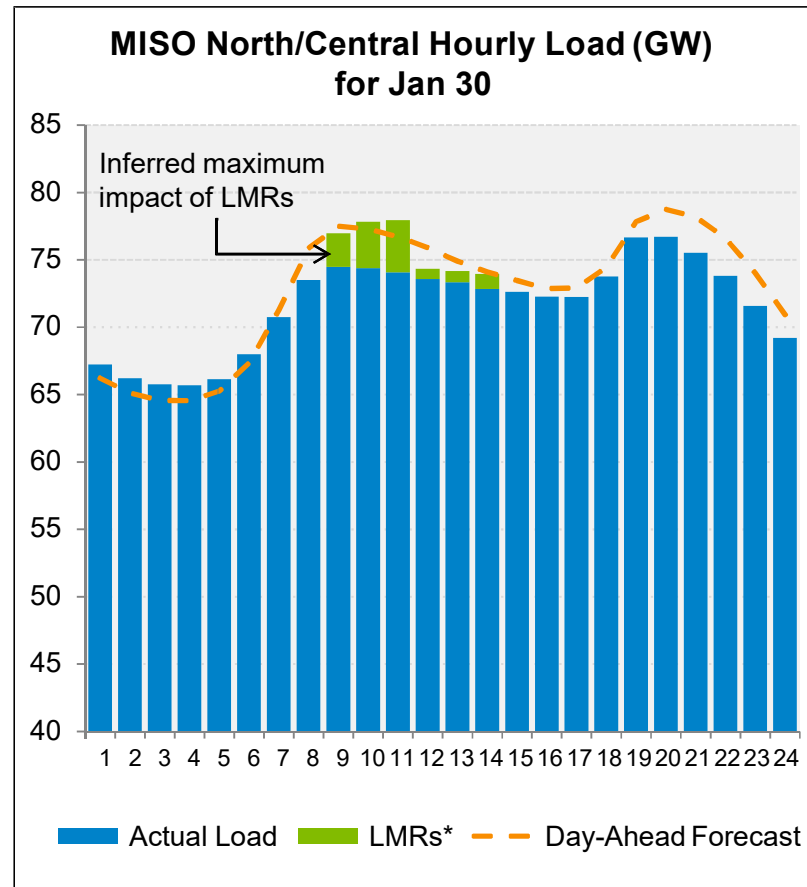
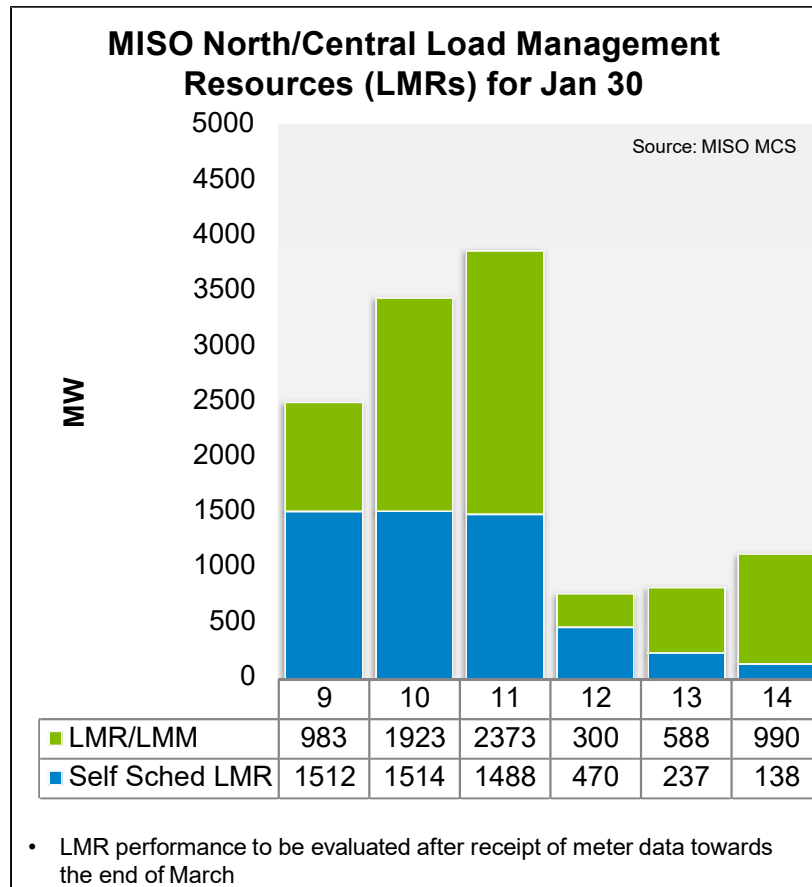
Unplanned Outages (GW)	20.1	29.6	28.9
% Unplanned[^]	18%	26%	26%

*Unplanned: Forced plus derates

The outage chart reflects the data as it resided in the CROW Outage system on Feb 11, 2019
 Wind often reported as derate over the timeperiod

[^]Percent based on PRA cleared generation plus uncleared internal MISO generation

Deployed and self-scheduled LMRs, school/business closings, and other voluntary load management across the North/Central Region aided in dampening demand below expectations.



Load Modifying Resources (LMR)

Purpose & Key Takeaways



Purpose: Review Load Modifying Resource (LMR) performance during the January 30, 2019 Emergency Event

Key Takeaways:

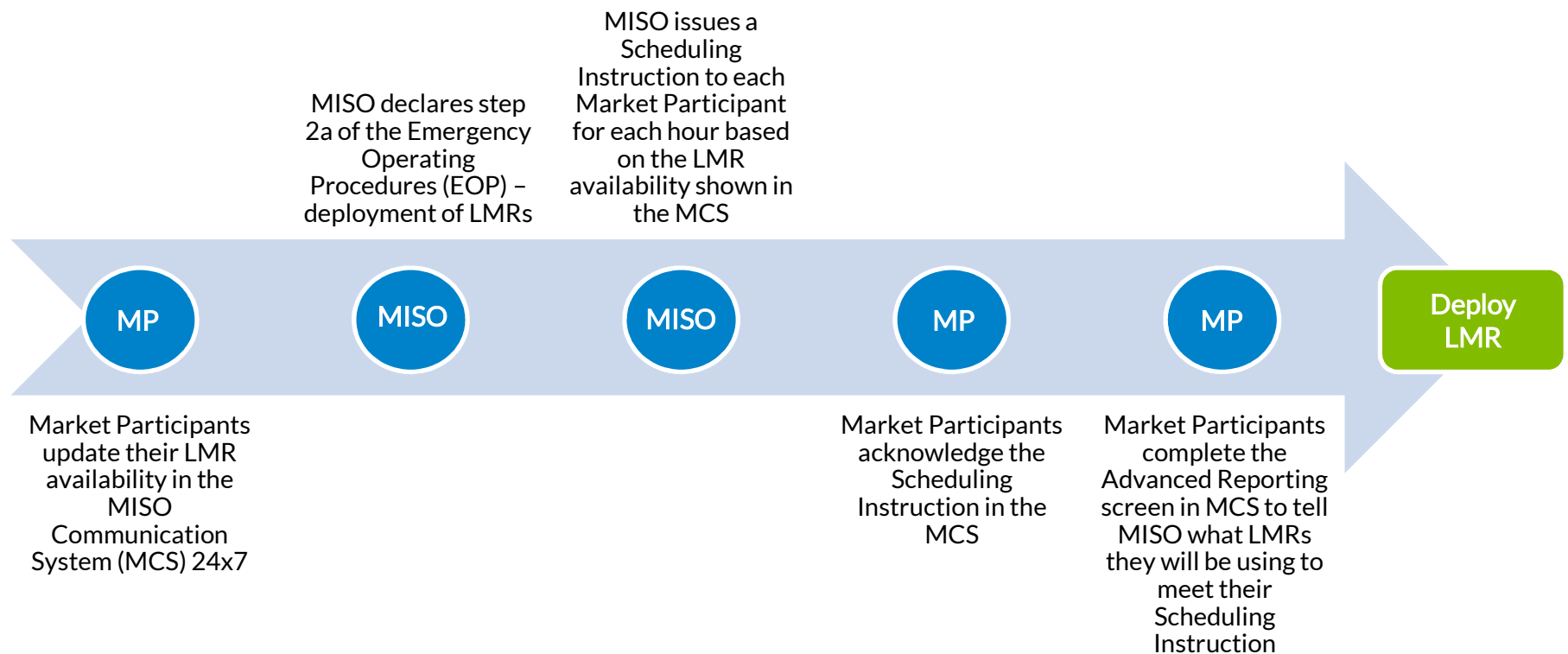
- First time MISO has deployed LMRs in North & Central Regions
- LMRs provided an average of 75% of scheduled MWs for Hour Ending (HE) 9 to 13
- Penalties assessed to LMRs based on Measurement and Verification (M&V) rather than Scheduling Instructions
- Some LMRs were also disqualified as a Planning Resource due to lack of performance during the event

Pre-RAN LMR Performance Rules

- Available for Emergencies at least during the Summer
- Available at least 5 times for Emergencies during the Planning Year
- Maximum notification time = 12 Hours
- If availability is shown outside of Summer in the MISO Communication System (MCS), LMRs are required to respond to MISO dispatch and Scheduling Instructions
- 24x7 updated LMR availability in the MCS for each operating day
- LMR performance is evaluated on an individual basis

*All rules in effect are prior to any Resource Availability & Need (RAN) approvals by FERC. New RAN rules effective June 1, 2019.

Communication Procedure: LMR Deployment



MISO LMR Underperformance on 1/30/2019

- Summary
 - MISO sent Scheduling Instructions (SI) at 6:37 EST
 - 184 LMRs deployed across the North & Central Regions
 - 131 Behind the Meter Generation (BTMG)
 - 53 Demand Resource (DR)
 - 28 Market Participants received Scheduling Instructions

Hour Ending		09	10	11	12	13
MISO Regions		North & Central			North	
Total SI Requested by MISO (MW):	(A)	2496.3	3438.2	3862.4	770.5	825.8
Scheduled by MPs to Meet SI (MW):	(B)	3488.6	4412.9	4338.2	954.0	893.0
Total Delivered by MPs (MW):	(C)	2353.5	3178.0	3325.7	846.0	866.9
MW Delivered vs Scheduled by MP:	(C / B)	67%	72%	77%	89%	97%
MW Delivered vs Requested by MISO:	(C / A)	94%	92%	86%	110%	105%

LMR Underperformance – Michigan (Zone 7)

- Summary
 - 67 LMRs deployed across Zone 7
 - 6 Market Participants received Scheduling Instructions

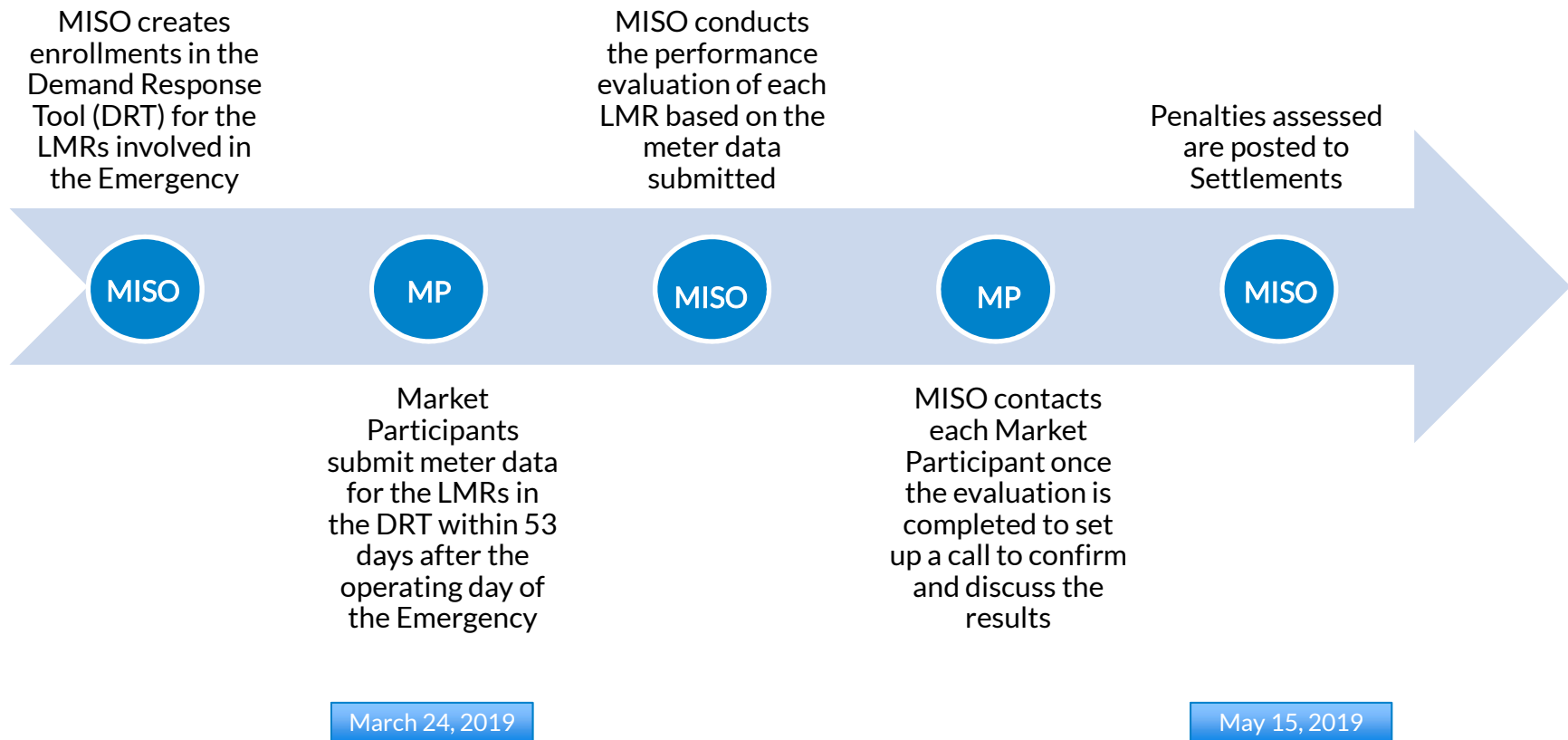
Hour Ending		09	10	11
Zone 7 - MICHIGAN				
Total SI Requested by MISO (MW):	(A)	632.1	1031.7	1003.6
Scheduled by MPs to Meet SI (MW):	(B)	1035.1	1433.5	1431.1
Total Delivered by MPs (MW):	(C)	331.5	668.2	747.4
MW Delivered vs Scheduled by MP:	(C / B)	32%	47%	52%
MW Delivered vs Requested by MISO:	(C / A)	52%	65%	74%

LMR Underperformance – Eastern Wisconsin / Upper Michigan (Zone 2)

- Summary
 - 22 LMRs deployed across Zone 2
 - 5 Market Participants received Scheduling Instruction

Hour Ending		09	10	11
Zone 2 – EASTERN WISCONSIN & UPPER MICHIGAN				
Total SI Requested by MISO (MW):	(A)	226.0	278.3	296.3
Scheduled by MPs to Meet SI (MW):	(B)	246.5	299.8	316.3
Total Delivered by MPs (MW):	(C)	148.4	224.9	236.6
MW Delivered vs Scheduled by MP:	(C / B)	60%	75%	75%
MW Delivered vs Requested by MISO:	(C / A)	66%	81%	80%

Communication Procedure: LMR Post Event Evaluation



*Dates are examples using January 30th as the Operating Date of the Emergency Event

LMR Penalties – Tariff Summary

- LMRs are penalized for underperformance compared to their M&V criteria per the following formula:
 - Underperforming MW * (HE LMP + HE DDC_Rate)
- Penalty revenue for each hour is allocated to all Market Participants with load in the Local Balancing Authorities (LBAs) that required the use of an LMR during the Emergency on a Market Load Ratio Share basis
- MISO reviews LMR underperformance to determine if the LMR should be disqualified as a Planning Resource for the remainder of the Planning Year

*LMP = Locational Marginal Price

*DDC = Day-Ahead Deviation Charge

LMR Penalties Assessed

1. Assessed \$1,900,000 in penalties for underperformance
 - Revenues redistributed on a Load Ratio Share basis to the LBAs in the Emergency Area.
 - Load Ratio Share determined for each hour of the Emergency on Jan 30th
2. Additional \$900,000 in penalties assessed due to the disqualification of 18 LMRs (approximately 360 Zonal Resource Credits) for the remainder of the Planning Year
 - Revenues redistributed on a Load Ratio Share basis by Resource Zone
 - Load Ratio Share determined by LSE PRMR / Zone PRMR

*Penalties are for all of MISO North & Central Regions

Acronyms

- BTMG – Behind the Meter Generation
- DDC – Day-Ahead Deviation Charge
- DR – Demand Resource
- FSL – Firm Service Level
- HE- Hour Ending
- LBA – Local Balancing Authority
- LMP – Locational Marginal Price
- LMR – Load Modifying Resource
- LSE – Load Serving Entity
- MCS – MISO Communication System
- MP – Market Participant
- M&V – Measurement & Verification
- PRA – Planning Resource Auction
- PRMR – Planning Reserve Margin Requirement
- RAN – Resource Availability & Need
- SI – Scheduling Instruction

Appendix

MISO continued to monitor conditions and update communications accordingly during the event.



Extreme N/C cold drove high load, a sudden and unexpected drop in wind generation, forced outages, and uncertainty, which required the declaration of the Maximum Gen Event.

MISO Classic (North/Central Regions)	2014		2018	2019			
	01/06 -21°/-11°F	01/07 -13°/-10°F	01/17 -2°/-3°F	01/28 2°/10°F	01/29 -20°/4°F	01/30 -26°/-10°F	01/31 -21°/-8°F
Integrated Peak Load (GW)	79.9	76.7	73.7	70.4	74.3	76.7	75.1
Average Daily MISO Wind	7.2 GW	2.0 GW	12.0 GW	12.9 GW	12.9 GW	4.3 GW	4.7 GW
Gas Price* (\$/MMBtu)	\$13.17	\$7.39	\$3.91	\$3.13	\$4.23	\$7.42	\$5.09
Average Daily RT LMP (\$/MWh)	\$97.74	\$225.83	\$40.90	\$25.53	\$26.92	\$107.90	\$49.29
Max Daily NSI (Import)	4.3 GW	-2.1 GW	3.4 GW	7.1 GW	9.0 GW	13.7 GW	7.8 GW
Cold Weather Alert					Called on Jan 25	for Operating Days Jan 29 – Feb 01	
Max Gen Event Step 1a			Step 1				
Conservative Operations							
Max Gen Event Step 2a/b			Step 2				
Max Gen Event Step 1b/c							
Max Gen Alert							
Max Gen Warning							

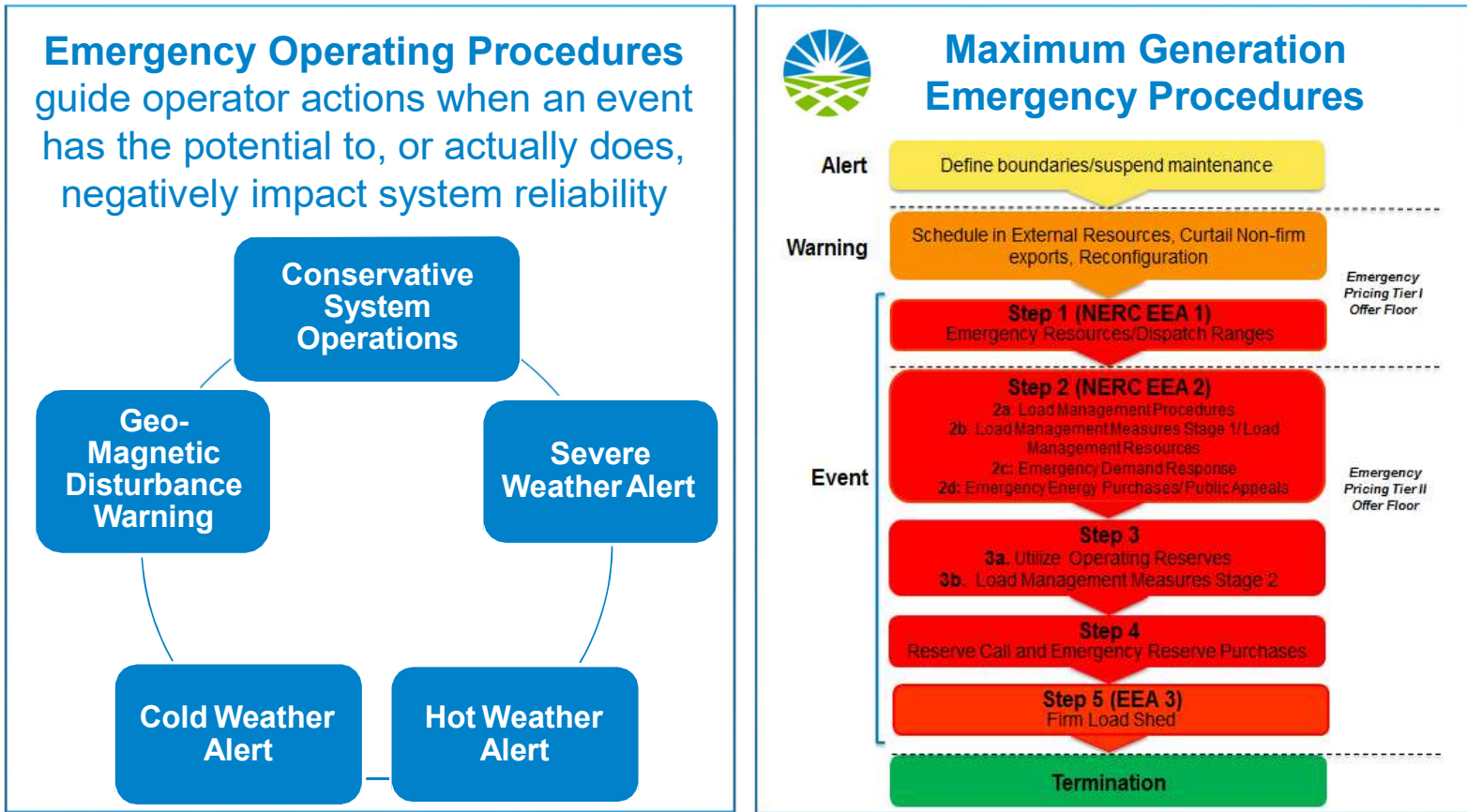
- Temperatures are daily low values for North and Central Regions
- LMP is calculated as an average of Hubs in the North and Central regions
- * Chicago City Gate Gas Price

Shading indicates declaration was active during that day

Data Source: Real-Time Operations, Market Analysis, and MISO Website



MISO's operating procedures ensure reliability and gain access to additional resources during extreme situations.





Making the Most of Michigan's Energy Future

Break



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Making the Most of Michigan's Energy Future

U-20628 OVERVIEW

MPSC STAFF – KATIE SMITH



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U-20628 - What is it?

- Commission Order commencing a collaborative to consider issues related to implementation of effective demand response tariffs and efficient deployment of load-modifying resources.
- It was prompted by the final SEA report.
- Filed in September of 2019.



STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

* * * * *

In the matter, on the Commission's own motion, to)
commence a collaborative to consider issues related)
to implementation of effective electric demand)
response tariffs and efficient deployment of)
load-modifying resources.)

Case No. U-20628

At the September 11, 2019 meeting of the Michigan Public Service Commission in Lansing,
Michigan.

PRESENT: Hon. Sally A. Talberg, Chairman
Hon. Daniel C. Scripps, Commissioner
Hon. Tremaine L. Phillips, Commissioner

ORDER OPENING DOCKET

Who should be involved?

- Consumers Energy
- DTE Energy Company
- Michigan Electric and Gas Association member utilities
- RTO's
- DR Providers
- Customer Advocates
- MPSC Staff
- Other interested stakeholders



U-20628 - What needs to be done?

- Review
 - SEA report regarding LMRs
 - DR tariffs for consistency and clarity
 - Notification and penalty provisions
 - Communication
 - Testing
 - Improvements for future LMR performance.
- Discuss
 - Improvements to LMR participation
 - Improvements to LMR performance
 - Any other issues related to DR



U-20628 - What was Ordered?

THEREFORE, IT IS ORDERED that:

A. The Commission Staff shall form a collaborative group that includes representatives from Consumers Energy Company, DTE Energy Company, Michigan Electric and Gas Association member utilities, and other interested stakeholders, to review electric utility demand response tariffs and the optimal deployment of load-modifying resources as discussed in this order.

B. The Commission Staff shall file in this docket a report of findings and recommendations no later than July 31, 2020.

Page 3
U-20628

Goals and Recommendations

- Staff Report July 31, 2020.
- Recommend any needed improvements to DR tariffs.
- Identify how utilities have been and can coordinate with the Staff, customers, the RTO, and other stakeholders.
- Identify what would help the utilities maximize the capacity value of their DR resources in the wholesale markets.

Questions?

KATIE SMITH

smithk72@Michigan.gov



Making the Most of Michigan's Energy Future

Discussion

Goals of DR Stakeholder Group and Next Steps



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Goals of DR Stakeholder Group

- Establish a collaborative group of utilities, RTOs DR providers, customer groups, and individuals
 - Need your input on:
 - Customer needs
 - DR capabilities
 - Identifying performance, communication, or problems
 - Creating solutions
- Builds on existing initiatives and reports
 - [SEA](#) and Polar Vortex 2019 learnings
 - DR [framework](#)
 - DR Potential [Studies](#)

Goals of DR Stakeholder Group

- 1) Review and discuss SEA report findings
 - Particularly LMR performance in PV 2019
- 2) Review utility tariffs to ensure DR participation, performance, communications, and testing
- 3) Align wholesale/retail DR offerings and emergency operations
 - Maximize capacity value of DR resources in wholesale markets
- 4) Discuss other DR issues as appropriate, with a focus on reliability and resilience

Outline of Stakeholder Meetings

- 1) Review and discuss SEA report findings
 - Particularly LMR performance in PV 2019
 - 2) Review utility tariffs to ensure DR participation, performance, communications, and testing
 - 3) Align wholesale/retail DR offerings and emergency operations
 - Maximize capacity value of DR resources in wholesale markets
 - 4) Discuss other DR issues as appropriate, with a focus on reliability and resilience
- Will primarily align with objectives listed in U-20628
 - These goals will roughly align with the content of stakeholder meetings in Jan., Feb., March, and April
 - MPSC Staff report and recommendations due July 31, 2020
 - Any immediate feedback on these goals?

Opportunities for Feedback

- Discussion items at each meeting
 - Come with questions, opinions, and suggestions!
- Formal Feedback Requests submitted to Staff after each meeting as needed
 - Including before Staff finalizes their Report.
- Written feedback in U-20628 once Staff report is finalized
 - Similar to past DR stakeholder meetings

Feedback for today

- Any particular items you wish to discuss at future stakeholder meetings?
- Are we missing anything you want to make sure gets covered?
- Do you have a unique perspective on Polar Vortex 2019 to share?
- Any reactions to the content presented today?

Sneak peak of presenters!

DTE Energy[®]



voltus



Sneak peak of topics!

Operations and Communications

- February 19th
- PV 2019 operations
 - Utility, customer, DR aggregator perspective
 - Underperformance of Zone 7
- DR/LMR communications
 - Current utility/ARC procedure
 - Barriers experienced in PV 2019
- Needed improvements?

Retail/Wholesale Alignment

- March 17th
- RTO DR offerings and utility DR tariffs
 - DR products and registration
 - M&V methods and performance requirements
- Testing requirements
 - 2019 changes to LMR availability and testing
 - Utility plans for compliance
- Needed improvements?

Next Steps

- Staff will send out the slides and recording from today's meeting
 - Posted on DR group [website](#)
- Staff will finalize February 19th agenda and send out to listserv
- Staff will work with presenters to ensure all components of U-20628 are addressed
 - Including any additions as these meetings continue
- Staff will consolidate any feedback received and update stakeholders in February
 - Feedback will not be posted, simply summarized in aggregate

Questions, Comments, or Feedback?

Contact

Katie Smith SmithK72@michigan.gov and

Erik Hanser HanserE@michigan.gov



Making the Most of Michigan's Energy Future

Adjourn



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