

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



Photo Credit: Todd McInturf/The Detroit News

gas storage facility (supplying over one third of customer needs at peak times), leading to a severe disruption of natural gas supply and deliverability.

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

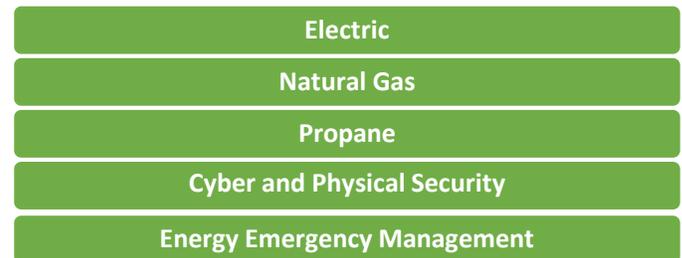
Governor Gretchen Whitmer called upon the Michigan Public Service Commission (MPSC) to evaluate whether the design of the electric, natural gas, and propane delivery systems are adequate to account for changing conditions and extreme weather events. The Governor asked the Commission to provide recommendations 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:



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.

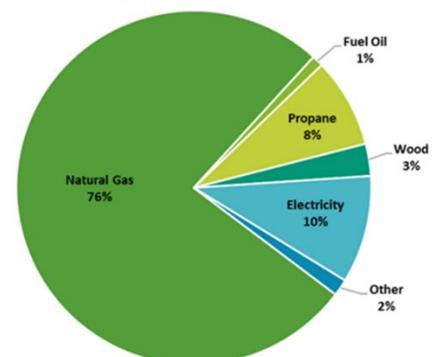
Michigan's energy position

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

Natural Gas:

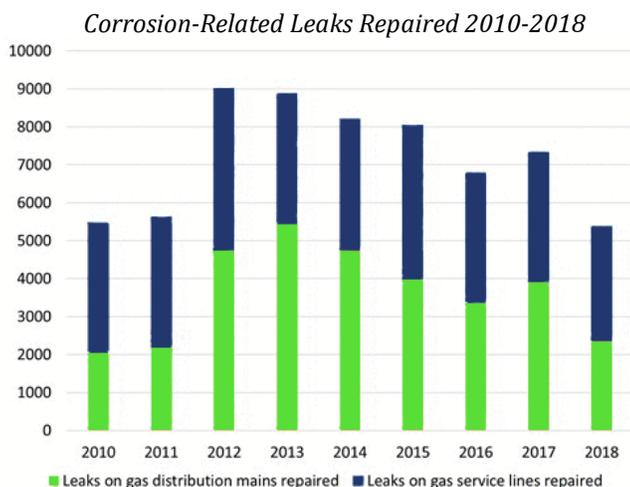
Consumption of natural gas in Michigan is greatest in the residential sector, where it is used as the primary heating fuel in more than 75% of Michigan households.

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



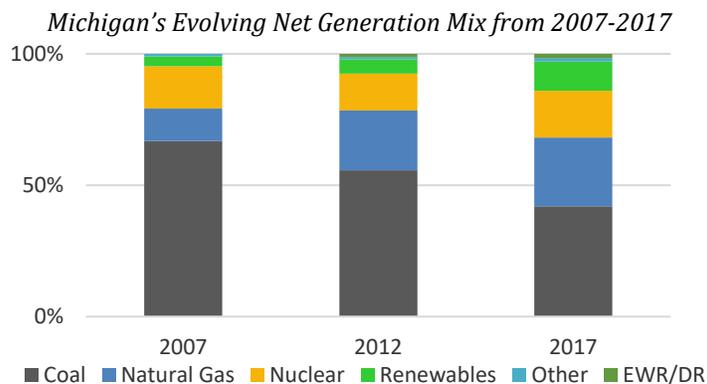
Source: U.S. Census Bureau, 2017 American Community Survey.
Other Includes: Coal or coke, Solar Energy, Other Fuels, and No Fuels.

- ✓ Michigan ranks first in natural gas storage capacity with over 50 natural gas storage fields, allowing the state to meet demand year-round with more stable supply and pricing.
- ✓ There are 9,215 miles of natural gas transmission pipeline with access to diverse supplies (Canada, Gulf Coast, Rockies, and Marcellus/Utica).
- ✓ Almost 115,000 miles of distribution pipelines support the delivery of natural gas to businesses and residents.
- ✓ Over 11,000 miles of natural gas pipeline is considered “high risk” due to corrosive materials (e.g., cast iron, unprotected steel). Since 2011, utilities have accelerated the removal of these pipelines, decreased pipeline leaks, and made other investments to improve the safety of the natural gas system.



Electricity: With generation from nuclear, natural gas, coal, and renewable energy, including a large (2,000 megawatt) pumped hydroelectric storage facility in Ludington, Michigan’s electricity supply mix ranks among the most diverse in the country.

Aging coal plants are retiring and Michigan’s energy mix is rapidly evolving to cleaner sources such as natural gas, renewable energy, and other programs that shift or cut energy demand.



Michigan’s electric transmission and distribution systems are expansive. Wind and ice are the leading cause of power outages due to broken poles and trees contacting distribution wires. Many distribution poles, wires, substations and other equipment are beyond their design life and utilities are making major investments in infrastructure and maintenance to improve safety and reliability.

Coal - 1950s - 1980s
 Nuclear - 1970s

Natural gas - 1990s;

2000s - current
 coal plants replaced by
 renewable energy and
 natural gas

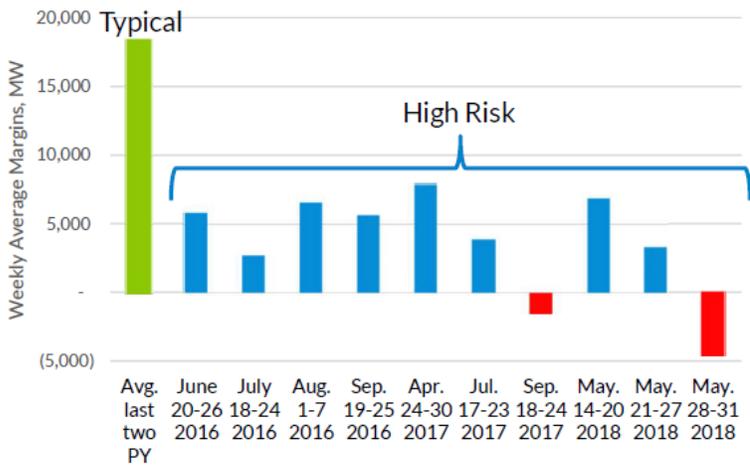
Propane: Propane is not regulated by the MPSC and supplies 8% of Michigan households for home heating (8% for the Lower Peninsula and 18% for the Upper Peninsula). Michigan ranks first in residential propane consumption among states.

In addition to the propane produced at Michigan’s two fractionators and one refinery, propane is also delivered by truck, rail and pipeline.



Aside from aging infrastructure, Michigan’s energy infrastructure could be impacted by various threats. Extreme weather events such as the December 2013 ice storm or the March 2017 windstorm (70 mph wind gusts) are increasing, causing extended power outages. With increased use of natural gas to generate electricity, our energy systems become increasingly connected, and physical or cyber security threats require vigilance to protect our energy security.

The electric system has a cushion of supplies to handle equipment failure and high demand. The chart below depicts how that cushion can be depleted, leading to the declaration of “maximum generation events” and other operational steps to avoid power shortages and blackouts. These have occurred in all seasons, not just at the traditional summer peak.



Source: MISO 2019 PY=Planning Year (June 1 – May 31)

Statewide energy assessment report findings and recommendations

The assessment determined that Michigan has sufficient and unique assets that help ensure reliable supply and delivery of energy to help meet peak demand.

Although Michigan’s energy infrastructure is designed and operated to maintain and deliver energy supplies during emergency conditions, there is an inherent risk of disruption. Such emergency events could have a high impact on the economy and well-being of Michigan residents.

To ensure reliable, resilient supplies in the future, the Commission recommends a number of actions to be taken by the MPSC, regulated utilities, policymakers, and others. Several highlights include:

Risk based, integrated natural gas planning

Undertake long-term, risk-based, integrated natural gas maintenance and infrastructure planning that includes storage, transmission, and distribution assets as well as long-term risk mitigation plans.

Integrated electricity system planning

Better integrate distribution and transmission plans as part of utility integrated resource plans to ensure truly integrated electricity system planning. This should include examining options to strengthen Michigan’s electrical connections between its peninsulas and with neighboring states.

Valuing resource diversity

Work with stakeholders to understand the value of resource supply diversity to better inform decisions related to power plant development, retrofitting, and retirement beyond traditional planning and financial analyses.

Quantifying the value of resilience

Work with stakeholders to develop a methodology to evaluate the benefits of resilience improvements to ensure that expenditures made to capture resilience improvements are reasonable and prudent.

Gas-electric interdependencies and prioritization

Identify revisions to natural gas utility curtailment procedures to prioritize home heating over electric generation.

Demand response program improvement and development

Improve customer demand response programs since some customers did not respond as expected during PV19 and utility tariffs were inconsistent.

Cyber security standards for natural gas distribution utilities

Enact rules for cyber security and incident reporting for natural gas utilities.

Expansion of emergency drills

Expand emergency drills to provide a wide range of scenarios besides outage management restoration. Communication during PV19 was confusing, inconsistent, and erratic.

Propane contingency planning

Through participation in the UP Energy Task Force, develop a formal contingency plan for the continued supply and delivery of propane or other energy alternatives in the event of supply disruptions, including a temporary or permanent shutdown of Line 5.

What’s next?

The Commission accepted the final SEA report in U-20464 and is issuing orders to take initial steps in the following dockets:

- U-20147: Distribution system planning
- U-20539 – U-20552: Gas cost recovery plans
- U-20628: Demand response tariffs collaborative
- U-20629: Electric distribution system service quality and reliability standards workgroup
- U-20630: Electric service technical standards workgroup
- U-20631: Mutual aid agreements and transmission contingency planning collaborative for natural gas
- U-20632: Natural gas curtailment procedures