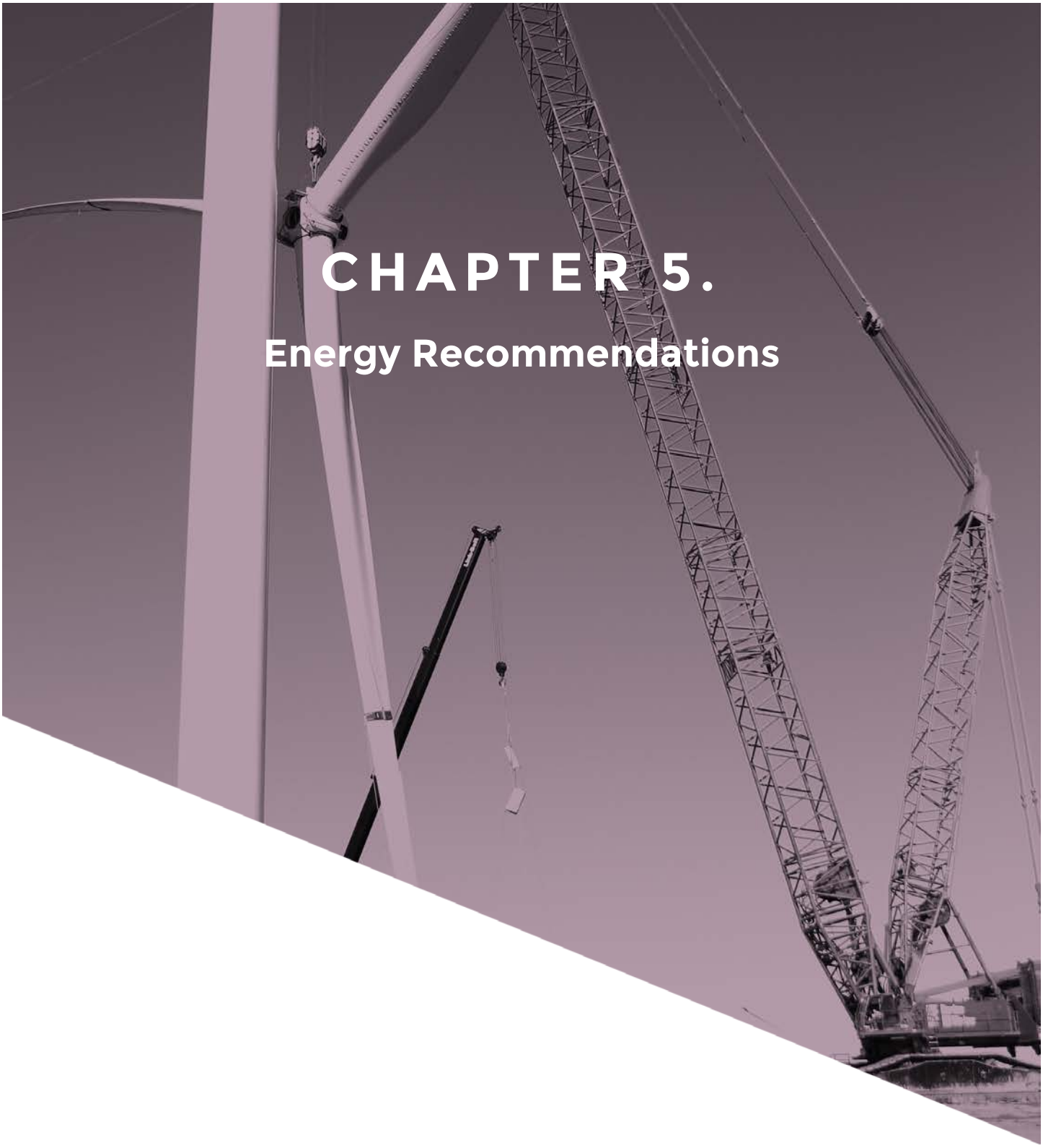


CHAPTER 5.

Energy Recommendations

CURRENT STATE OF MICHIGAN'S ENERGY INFRASTRUCTURE

Infrastructure systems in Michigan should enhance residents' quality of life, enable economic growth, and create a strong foundation for vibrant communities. In order to obtain efficient, reliable, and cost-effective energy systems in the 21st century, we must first understand the current reality of energy infrastructure in Michigan:

RESOURCE ADEQUACY

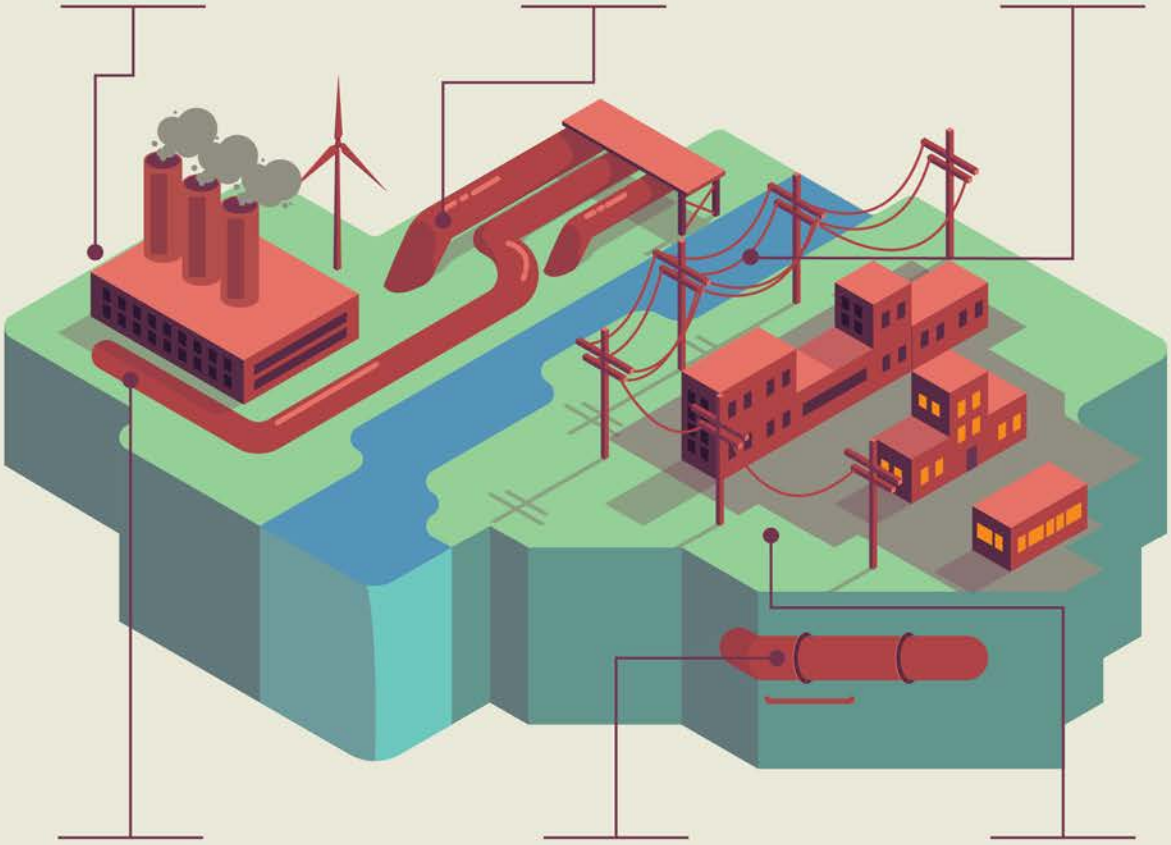
- Planned power plant retirements have raised concerns about the state having adequate electric resources to meet customers' demand.
- In 2017, much of Michigan's Lower Peninsula could fail to meet its reliability requirements by approximately **520 MW.**

CLEANER ENERGY SOURCES

- Michigan has met its goals for reducing energy waste and building renewable energy generation.
- By 2015, Michigan received **9 percent** of its electricity from renewable sources and reduced energy waste by **7 percent.**

ELECTRIC RELIABILITY

- On average, Michigan customers experience less than one outage per year, meeting the Governor's goal.
- Michigan does not meet the Governor's goal for duration of electric outages. On average, Michigan customers experience outages for more than **150 minutes** each year.



NATURAL GAS SAFETY

- Michigan has roughly **5,688 miles** of at-risk natural gas distribution pipeline.
- As of 2015, utilities have replaced nearly **700 miles** of these pipelines; however, another **6,700 miles** have been identified for replacement over the next 25 to 30 years.

STORAGE CAPACITY

- Michigan has the most underground natural gas storage capacity of any state—**11.6 percent** of the nation's total storage capacity.

ECONOMIC DEVELOPMENT

- Despite higher-than-average industrial energy prices, Michigan has been successful in attracting new businesses. Utilities have worked to offer a variety of attractive services that help new businesses choose Michigan.

Energy is an integral part of modern day life. It powers Michigan's manufacturers, provides essential heating and cooling for homes and businesses, enables us to connect to and communicate with the global economy and world at large, and delivers countless other functions on a daily basis. Despite the crucial role energy plays in our lives, however, it is often taken for granted until its absence draws our attention. Recognizing this importance, Governor Snyder has spent considerable time during his administration developing goals related to energy, culminating in the release of his 2015 special message, *Ensuring Affordable, Reliable, and Environmentally Protective Energy for Michigan's Future*. The 21st Century Infrastructure Commission has used this work and the Governor's goals as the basis for their recommendations.

The energy sector is undergoing significant change. New technologies are a major driver of these changes as they unlock new opportunities for customers to monitor and control their energy use, make forms of renewable energy more affordable, increase the adoption of alternative fuel vehicles, and help reduce the environmental impact of energy use and production. In addition, a major shift is occurring in the nation's electric system, as many older electric generation resources are retiring due to age and stricter environmental regulations. Planned power plant retirements have raised concerns about whether there are adequate electric resources to meet customers' demand. Michigan only has to look to the recent events in the Upper Peninsula to see the impacts that power plant retirements can have on customers. When the largest power plant in the Upper Peninsula planned to retire, customers were forced to pay to prop up the plant, because shutting it down would have impacted reliability. Had it not been for efforts by the State and private partners to come to a better solution, customers would be trapped in a system that would not be adaptable, affordable, or equally reliable, and with a worse environmental outcome. This example highlights how vital it is to make smart decisions when it comes to planning for its energy future.

The following chapter outlines the Commission's recommendations to support Michigan's 21st century energy infrastructure and ensure that the sector will be built on a foundation of affordability, reliability, adaptability, and environmental protection.

The Commission's vision is that Michigan's energy system supports all our needs at reasonable prices, and that energy infrastructure generates and distributes resources efficiently fostering residents' and businesses' confidence in Michigan's long-term growth and continued success.

Recommendations Key

EP	Economic Prosperity	HE	A Healthy Environment
QS	Reliable, High-quality Service	VI	Value for Investment
0-2	Implementation Start (in years)	0-2	Implementation Complete (in years)

5.1 RESOURCE ADEQUACY

Where is Michigan today?

Michigan's risk of devastating outages is serious and growing. The MPSC's five-year electric capacity outlook, released on July 22, 2016, expressed concern that "load serving entities in the Lower Peninsula do not have adequate capacity within the state to meet reserve requirements. In addition, there is uncertainty about whether capacity supplies at the regional level will be available to fill this gap" (MPSC 2016).

> *Michigan's looming potential capacity shortfall could create reliability challenges during periods of peak demand in 2018.*

Michigan has real experience with the devastating impacts a widespread outage can bring. In 2003, the Northeast blackout resulted in the loss of power to six million Michigan residents for up to two days. Michigan's economy lost an estimated $1 billion when businesses and industrial production were forced to shut down. Detroit Metropolitan Wayne County Airport halted operations, General Motors was forced to close its warehouses, Ford Motor Company's production offices, and facilities ceased operation, and Marathon Oil Corporation's Detroit refinery lost 500,000 barrels of output (ELCON 2004).

Efforts are already underway to ensure Michigan has adequate generation and transmission capacity resources into the future. The MPSC, in cooperation with Michigan's primary regional transmission operator, the Midcontinent Independent System Operator (MISO), has filed a tariff change with the Federal Energy Regulatory Commission (FERC) that, if approved, would help resolve the state's potential capacity shortfall (MAE 2016). Legislative changes will still be necessary to fully implement and secure Michigan's energy future.

What does a 21st century Michigan look like?

Michigan ensures that its residents and businesses never experience massive power outages due to lack of electric supply. The State requires companies that provide electricity to Michigan customers to be prepared to serve customers' needs with adequate energy supplies.

How do we get there?

5.1.1 The Michigan Agency for Energy (MAE) and the MPSC should continue to work with MISO and other stakeholders to reform Michigan's current electric market structure by requiring all electric providers to protect their customers from massive outages due to lack of supply by securing adequate capacity resources. In addition, MAE and the MPSC should continue to collaborate with legislative partners, as needed, to ensure adequate generation and transmission capacity resources are developed.

Estimated investment needed: Covered by private sources

5.1.2 MAE and the MPSC should closely monitor all proposed solutions to the energy supply concerns in the Upper Peninsula and work with stakeholders to ensure resolution implementation by 2019.

Estimated investment needed: Covered by private sources

5.2 ENERGY WASTE REDUCTION

Where is Michigan today?

The Governor has made energy affordability a central tenet of his energy policy and has established a goal that Michigan's residential customers should spend less on their combined energy bills (electric and heat) than national averages.

> *To date, the state has met the Governor's goal for energy affordability; Michigan households' energy bills are below the national average.*

In 2014, Michigan ranked 21st in the country, with a combined annual electric/gas bill of $2,397.49 per household (U.S. EIA 2015; U.S. EIA 2016a; U.S. EIA 2016b; U.S. EIA 2016c).

However, despite the economic benefits of promoting efficient energy use and reducing energy waste, Michigan's current energy policy creates several barriers for the amount utilities can spend on their energy-efficiency programs and restricts customers' access to innovative financing programs for waste reduction efforts. This arbitrarily limits utilities' efforts to reduce energy, and restricts customers' ability to make decisions that could reduce their household energy burden.

Additionally, Michigan's current energy policy inhibits utilities from choosing energy waste reduction by not allowing utilities to decouple[14] their electric rates. Currently, utilities' revenue is tied to the sale of electricity, which creates a challenge for utilities that pursue least-cost energy-efficiency measures because these investments reduce energy consumption and, in turn, revenue. State policies currently under consideration would enable utilities to choose to reduce energy waste without jeopardizing utilities' financial health.

What does a 21st century Michigan look like?

Michigan benefits from expanded options for customers choosing energy waste reduction through on-bill financing programs. The state's utilities invest in the most cost-effective energy resources, such as energy waste reduction, instead of being limited by arbitrary caps.

How do we get there?

5.2.1 The Michigan Legislature should remove the artificial cap on how much utilities can spend on energy-efficiency programs and provide the MPSC with the ability to evaluate energy waste reduction like any other resource.

5.2.2 The Michigan Legislature should ensure that there is no financial disincentive for the use of cost-effective energy waste reduction.

5.2.3 The Michigan Legislature should remove the prohibition on on-bill financing for energy waste reduction efforts.

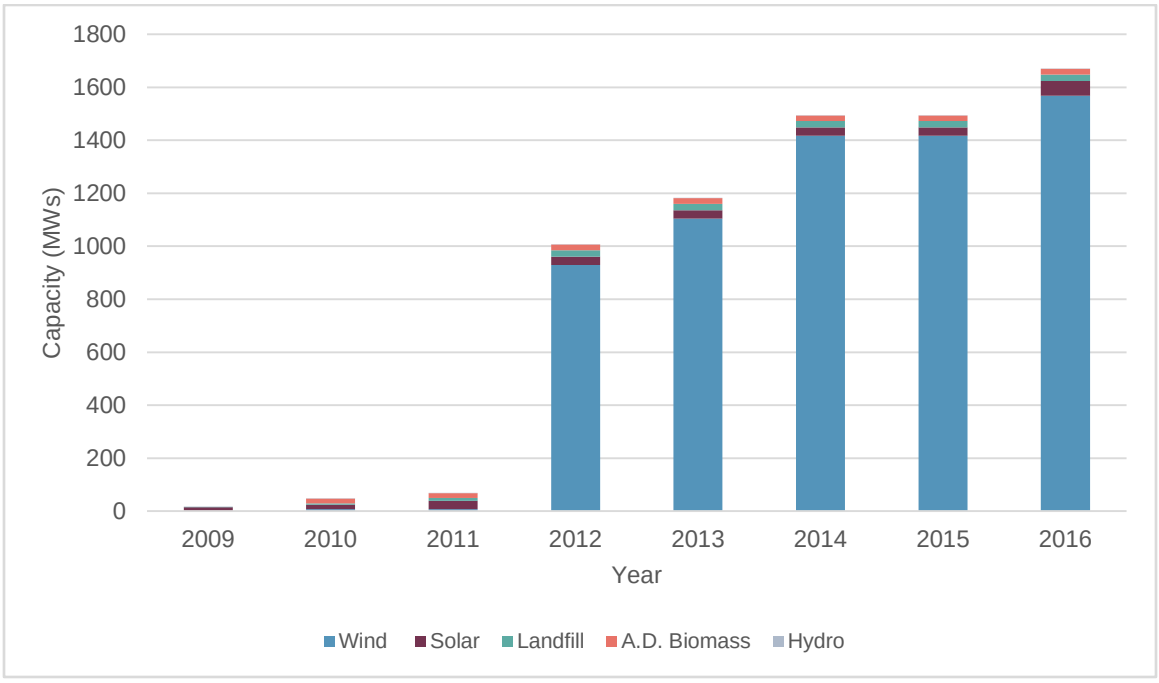
[14] Decoupling is an adjustable price mechanism that removes the link between the amount of energy sold and a utility's revenue requirement.

5.3 CLEANER ENERGY SOURCES

Where is Michigan today?

In 2008, Michigan established its first renewable energy standard, setting a goal of reducing energy waste and building renewable energy generation. By 2015, Michigan met these goals, receiving 9 percent of its electricity from renewable energy and reducing energy waste by 7 percent. Waste reduction has helped avoid significant costs associated with coal, natural gas, and energy production facilities while making Michiganders' homes and businesses more comfortable and energy bills more affordable. Since 2008, Michigan has met, exceeded, and maintained its mandate of 1 percent of energy waste reduction per year. However, existing law prevents utilities from spending more than 2 percent of their budget on waste reduction, even if this forces them to buy more expensive equipment instead. By reducing the amount of energy produced by coal and replacing it with cleaner renewables, natural gas, and energy waste reduction, Michigan will help promote a cleaner environment.

EXHIBIT 9. Renewable Energy Capacity by Commercial Operation Date



Source: MPSC 2016.

What does a 21st century Michigan look like?

By sustaining current efforts and investment levels related to energy waste reduction, Michigan achieves its goal of meeting 30 percent of its electric energy needs from the cleanest sources, including renewable energy and energy waste reduction, by 2025. Over the same time period, Michigan reduces harmful emissions from its electric power sector, including emissions of mercury, sulfur oxides (SOx), nitrogen oxides (NOx), and particulate matter (PM).

How do we get there?

5.3.1 The MPSC and MAE should continue to work together to ensure continued investment in energy waste reduction, meeting at least 15 percent or more of Michigan's energy needs by eliminating energy waste between now and 2025, as well as meeting any of its additional capacity needs from a combination of cleaner technologies, including renewables and natural gas.

Estimated investment needed: Covered by private sources

5.3.2 Through coordinated efforts, the MPSC, MAE, and MDEQ should continue to ensure that emissions from the electric power sector are reduced by helping utilities choose the cleanest energy sources for the future, in consideration with affordability and reliability.

Estimated investment needed: Covered by private sources

5.3.3 The MPSC and MAE should work to reduce barriers to additional cost-effective renewable energy investment by reducing barriers to interconnection, net metering, and siting.

Estimated investment needed: Covered by private sources

5.4 ELECTRIC RELIABILITY

Where is Michigan today?

Governor Snyder has made electric reliability an important part of his overall energy goals, as it is vital to the health and success of Michigan families and businesses. He has put forward two goals related to the duration and frequency of electric outages that measure reliability using two industry standard metrics—the System Average Interruption Frequency Index (SAIFI) for outage frequency and the System Average Interruption Duration Index (SAIDI) for outage duration. The Governor's goals are that Michigan residents should experience, on average, less than 1.00 outage per year,

and total combined outages should last less than 150 minutes. As calculated using the current methodology, between 2008 and 2016, the average Michigan resident experienced outage frequencies that were consistently below the Governor's goals (see Governor's Energy and Environment Dashboard).[15]

Michigan has begun improving electric reliability by making investments that provide greater insight into the cause and location of an outage through the deployment of advanced metering infrastructure (AMI) or smart meters. AMI will improve efficient deployment of line workers by alerting utilities to areas affected by an outage without relying on customers to report disruption. As of today, Michigan utilities have installed 3,544,389 smart meters, and the MPSC expects that 90 percent of Michigan customers will have a smart meter installed by 2018.

In addition to the deployment of AMI, Michigan can do more to improve reliability by continuing to invest in the distribution system and by emphasizing ongoing efforts such as vegetation management, which keeps trees and other natural materials from contacting or damaging infrastructure assets. Michigan can also expand the metrics it uses to track reliability performance to include metrics that measure the outage experience for individual customers in order to provide a more comprehensive look into customer experience. Reliability metrics, such as customers experiencing long interruption durations (CELID) and customers experiencing multiple interruptions (CEMI), offer different ways to view the outage experience for individual customers. By incorporating these metrics into current reliability reporting, Michigan can better measure the impacts of electric outages and make more informed decisions related to improving reliability.

What does a 21st century Michigan look like?

Michigan meets the Governor's goals for reliability, continues reducing the frequency and duration of electric outages, and ensures that customers do not experience significant disruptions in their service. Michigan performs in the top half of states for the duration of electric outages and in the top quartile for the number of outages and prolonged outages (greater than three days) associated with major events that disrupt the economy and quality of life.[16]

[15] The MPSC currently collects IEEE 1366 reliability indices from the regulated utilities annually in the following dockets: U-12270, U-16066, and U-16067. These indices are weighted annually based on the number of customers served by each utility in order to calculate the average Michigan citizen's reliability experience, which is posted on the Governor's dashboard.

[16] Although SAIDI and SAIFI measure average customer reliability in Michigan, often the individual customer experiences can be disguised by these statistics. In order to ensure no customers are left behind with electric reliability goals, it is critical that measures are in place to ensure each individual customer has an expectation of high reliability.

How do we get there?

5.4.1 Michigan's utilities should take steps to expedite their response to outages and restore power to their customers in a timely manner by completing plans to deploy AMI while also evaluating additional measures, like vegetation management and other distribution investments. Smaller electric utilities that do not currently have plans to deploy AMI in their service territory should evaluate potential benefits and deploy where prudent and cost effective.

Estimated investment needed: Covered by private sources

5.4.2 The MPSC and MAE should convene a stakeholder group with the aim of establishing a performance goal for CELID and CEMI metrics and requirements in order for utilities to provide information related to these metrics, as well as their current reliability reporting.

Estimated investment needed: Covered by private sources

5.4.3 The MPSC should evaluate investments that provide greater insight into equipment condition and system loading, such as supervisory control and data acquisition, which will allow for greater insight into distribution system operation, enabling proactive maintenance to address problems prior to these issues resulting in an outage.

Estimated investment needed: Covered by private sources

5.4.4 The MPSC should evaluate proposed new capital investments through a transparent, forward-looking distribution system planning process, and monitor proposed changes to the distribution system planning process for each utility as needed on an ongoing basis.

Estimated investment needed: Covered by private sources

5.5 NATURAL GAS SAFETY

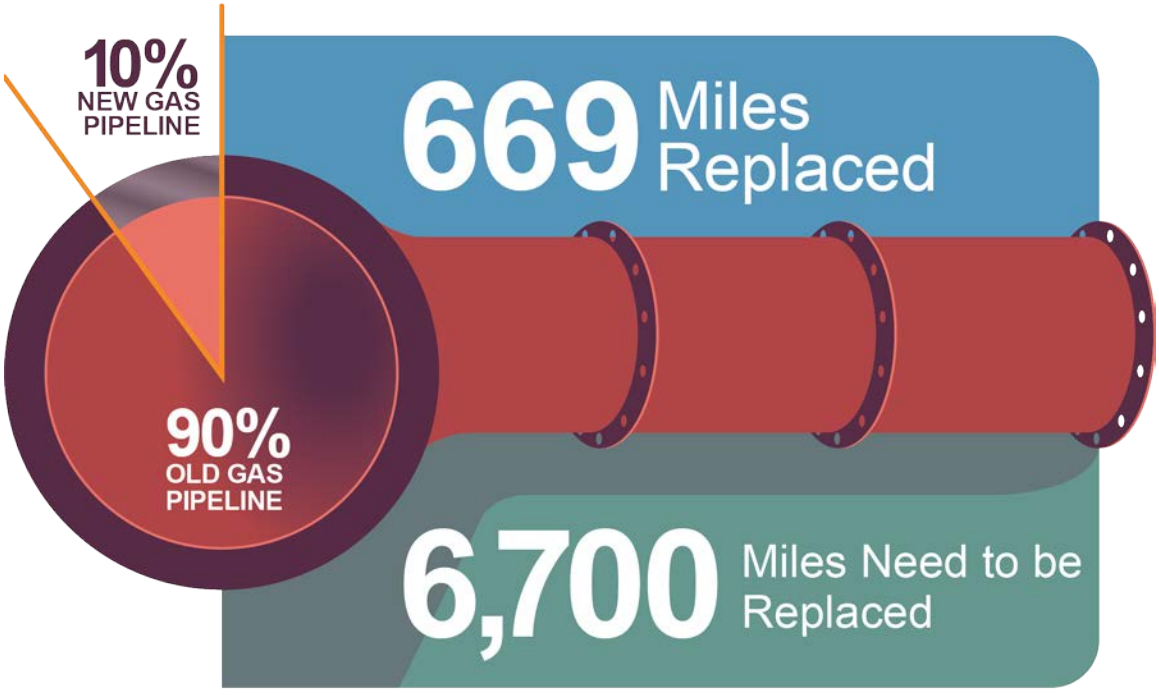
Where is Michigan today?

Many miles of Michigan's pipeline infrastructure that transports natural gas are outdated or have surpassed their useful lifespan, making them one of the State's most pressing issues regarding its energy future.

> *The federal Pipeline and Hazardous Materials Safety Administration (PHMSA) has identified roughly 5,688 miles of at-risk natural gas pipe in Michigan.*[17]

This is approximately 50 percent of all the at-risk pipe identified in PHMSA's 11-state Central Region. The MPSC approved accelerated main replacement programs for utilities beginning in 2011, work towards replacing at-risk pipe is currently underway, and Michigan's natural gas utilities are working to replace all of the at-risk pipelines in the next 25 to 30 years. As of 2015, Michigan utilities have replaced 669 miles of at-risk main distribution pipeline. However, another 6,700 miles of at-risk distribution pipeline have been identified for removal and replacement (as shown in Exhibit 10).

EXHIBIT 10. Percent of At-Risk Natural Gas Pipeline in Michigan



[17] At-risk pipe is identified as unprotected and protected bare steel, unprotected coated steel, cast/wrought iron, and copper pipe that is more susceptible to corrosion or leaks.

What does a 21st century Michigan look like?

In much the same way that the reliability of Michigan's electric grid is important, the state's natural gas system provides a vital source of energy that is used to heat millions of homes and provide electricity. Michigan's natural gas distribution system is well maintained and has received necessary upgrades that ensure safe, reliable operations.

How do we get there?

5.5.1 The MPSC should consider further accelerating plans to replace at-risk natural gas distribution pipe beyond the currently planned 25- to 30-year window by evaluating utilities' current replacement timelines. Emphasis should be placed on coordinating replacements with local investment in other infrastructure asset categories to accelerate progress and leverage investment.

Estimated investment needed: Covered by private sources

5.6 ADAPTABLE REGULATION

Where is Michigan today?

The energy sector is undergoing dramatic changes as the costs of renewable energy decline, new emerging technologies give consumers more control over their energy use, and environmental regulations force existing generation sources to curb emissions.

> *Over the past decade, Michigan's utilities have begun to transition their generation portfolios to include new, cleaner energy sources (such as wind and solar), but more can be done to ensure that the energy Michigan needs to power its future is reliable, affordable, and protective of the environment.*

Under State law, there are currently regulatory barriers and incumbent funding structures that inhibit Michigan's ability to respond to and adopt new, emerging energy technologies. It is possible that the MPSC will be able to respond to new technologies through its existing regulatory authority, but some cases may call for legislative change. One major barrier is the Certificate of Need (CON) process, which only allows utilities to seek preapproval for projects with costs exceeding $500 million and excludes renewable energy projects, emission control upgrades, and investment in energy waste reduction. Changes to the CON process are included in pending legislation before both chambers of the Michigan Legislature.

What does a 21st century Michigan look like?

Michigan's energy future is secure and its regulatory framework is adaptable, allowing the state's energy providers to pursue and adopt new and cleaner technologies.

How do we get there?

5.6.1 The Michigan Legislature, in consultation with MAE and the MPSC, should act to remove the barriers in the current CON process that prevent the MPSC from weighing all large investments against alternatives and determining the impact on reliability, affordability, adaptability, and protection of the environment.

5.6.2 The MPSC and MAE should continue efforts to ensure that Michigan's regulations are adaptable in the face of new technologies. The need for regulatory changes should be evaluated as new technologies emerge.

Estimated investment needed: Will utilize existing staff resources

5.7 INFORMATION SECURITY

Where is Michigan today?

Currently, state agencies cannot serve as a clearinghouse for security information or issues related to infrastructure assets, due to the nature of Michigan's Freedom of Information Act law. Under current provisions, if information related to security is shared with the State, that information could be obtained through a FOIA request from an outside individual. This undermines the State's ability to communicate and coordinate with infrastructure owners to protect critical assets from physical and cyber threats. Without an exemption to the FOIA, the State of Michigan cannot provide needed assistance related to coordination of and response to the security of critical infrastructure assets.

What does a 21st century Michigan look like?

Michigan has well-defined systems for sharing information about critical infrastructure assets so that it can effectively plan for and communicate about physical and cyber security threats. This information sharing system enables state agencies (e.g., the MPSC and MAE) to communicate with infrastructure asset owners effectively while balancing the need for increased transparency and information sharing regarding security concerns.

How do we get there?

5.7.1 The Michigan Legislature, together with MAE and the MPSC, should revise FOIA exemptions to allow the appropriate agencies to communicate with infrastructure asset owners about physical and cyber security, and alleviate concerns related to the security of sensitive information when the State is working with infrastructure asset owners.

Estimated investment needed: Covered by private sources

5.8 BUSINESS ATTRACTION AND ECONOMIC DEVELOPMENT

Where is Michigan today?

Energy affordability and utility-provided services are vital to Michigan businesses. In many cases, energy costs and utility service offerings can be important determinants for businesses' site selection. For manufacturing and industrial companies, energy costs can make up a significant portion of their total operating costs, and energy costs must not deter companies from investing in Michigan. As of May 2016, Michigan ranked 33rd in industrial electric price affordability within the United States.[18]

Despite having electricity and natural gas prices that are higher than the national average, Michigan has had recent success in securing new business development.

> *In 2015, Site Selection magazine ranked Michigan the sixth best in the nation for new and expanded corporate facilities; in that same year, there were 217 new projects in Michigan that met the magazine's selection criteria (MEDC 2016).*[19]

However, given its industrial rates, Michigan will need to continue its efforts to retain and attract businesses through work with the state's utilities, regulators, and businesses to ensure that energy is not a limiting factor in Michigan's growth.

While price is a major consideration for businesses, it is not the only one. Many other factors can play a role in business' site selection decisions and can lead to business attraction despite higher energy prices. These aspects include utility-offered services, such as access to high-voltage

[18] Unlike in many other states where industrial energy rates are subsidized by other customer classes, Michigan law requires rates to be based on cost of service.

[19] To be included in the selection, projects must meet one of the following criteria: (a) involve a capital investment of at least $1 million, (b) create at least 20 new jobs, or (c) add at least 20,000 square feet (1,858 square meters) of new floor area.

reliability assurances, energy-efficiency offerings and incentives, dynamic rate options, and specific energy sources. Utilities are already working with the MEDC to provide prospective businesses with a quote that estimates the cost of service for a new facility and location within five days. This helps customers get a real sense of their potential energy costs and avoid hidden or unexpected costs, as well as enabling them to work with a utility service provider to generate creative ideas for meeting companies' needs.

What does a 21st century Michigan look like?

Michigan attracts new businesses and energy-intensive industries by offering competitive energy prices, flexible rate structures, and programs that help companies control their energy costs.

How do we get there?

5.8.1 The MPSC and MAE should work together with utilities and companies to expand opportunities for industrial customers to participate in programs that help them reduce energy bills, such as demand response programs.

Estimated investment needed: Covered by private sources

5.8.2 The MPSC, MAE, and MEDC should confer regularly to continue improving the factors that impact business decisions and engage stakeholders about additional opportunities for business attraction.

Estimated investment needed: Covered by private sources