



# 21<sup>ST</sup> CENTURY INFRASTRUCTURE COMMISSION REPORT



**Prepared for**  
Governor Rick Snyder

The 21<sup>st</sup> Century Infrastructure Commission's research is composed of two major works: this report titled "21<sup>st</sup> Century Infrastructure Commission Report," and a shorter executive summary, which is intended to highlight the most important elements of the full report. Both were published on Wednesday, November 30, 2016.

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# Letter from Commission Chair

Dear Governor Snyder:

On behalf of Michigan's 21<sup>st</sup> Century Infrastructure Commission, I am pleased to present to you the Commission's final report, which we are confident will serve as a 50-year vision for improving the state's infrastructure system and enhancing the quality of life for all Michiganders. A robust, reliable, and sustainably funded infrastructure system allows for healthy communities, long-term economic prosperity, and more and better jobs—providing a solid foundation for our state's future.

This report is the first of its kind in the nation to offer comprehensive recommendations across asset types: water, transportation, energy, and communications infrastructure. It provides a current assessment of Michigan's infrastructure systems, a vision for the state's future, and how we can bridge the gap between those two things. The Commission, composed of industry experts, educators, business leaders, and government officials from across the state, came together to produce a set of implementable recommendations that prioritize the health and safety of Michigan's residents. Months of research, discussions with the public, and input from outside experts have allowed us to present a plan that we are confident will improve the quality of life for all Michiganders.

This report is an important first step in improving Michigan's infrastructure, but our work is not done. For too long, we have underinvested in our infrastructure systems and treated our assets as separate entities. In order to stay at the forefront of emerging technologies and remain competitive in an increasingly global world, we must start to think of our infrastructure systems in an integrated and holistic way.

Improving infrastructure today and for future generations is a responsibility every Michigander needs to take seriously. As Michigan looks to the future, it is essential that we have the infrastructure systems to match our goals. Sound and modern infrastructure is vital to the health and well-being of the people of Michigan and will help support our growing economy in the future. Michigan's residents deserve reliable, safe, and affordable infrastructure, and we look forward to creating a 21<sup>st</sup> century infrastructure system with you.

Sincerely,



S. Evan Weiner  
Chair  
21<sup>st</sup> Century Infrastructure Commission

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# CHAPTER 1.

## Introduction



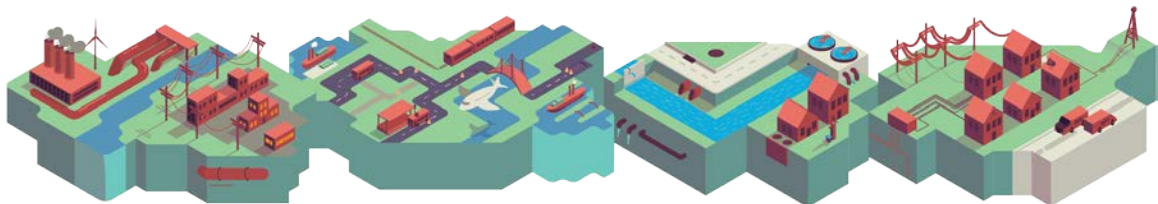


## Background

Infrastructure is the foundation of Michigan's modern economy and quality of life. When most people hear the term "infrastructure," they often think of roads or bridges; however, these assets are just pieces of a larger, more complex picture that includes water and sewer systems, drains and stormwater systems, broadband and communication systems, and electricity and natural gas networks.

Michigan's infrastructure is aging, and maintenance has been deferred for decades, leaving us in a state of disrepair. Failing infrastructure interrupts daily life, slows commerce, jeopardizes public health, pollutes the environment, and damages quality of life. This is evidenced by the condition of our current system:

- **39 percent of roads** are in poor condition (TAMC 2015)
- **27 percent of bridges** are structurally deficient or functionally obsolete (MiBRIDGE 2016)
- Water contamination in the city of Flint threatens the health and safety of its residents
- Since 2008, an average of **5.7 billion gallons** of untreated sewage flowed into Michigan waterways (MDEQ October 2016 a.)
- **64 rivers** that drain 84 percent of Michigan's Lower Peninsula tested positive for human sewage (Verhougstraete et al. 2014)
- Nearly **25 percent of beaches** experienced closures in 2015 (MDEQ May 2016)
- Approximately **130,000 (10 percent) of the state's 1.3 million septic systems** are likely experiencing operational problems (Creagh 2016)
- Property damage from flooding is increasing (Saunders 2014)
- Approximately **12 percent of the state's households** lack access to advanced broadband service (Connect Michigan 2015)
- Planned power plant retirements in the Upper Peninsula have posed challenges to balancing reliability and affordability



Without intervention—including adequate planning, management, and investment—Michigan will continue to experience infrastructure failures, leading to impacts on our public health, environment, and overall quality of life.

The 21<sup>st</sup> Century Infrastructure Commission (referred to as “the Commission”) recognizes the need to ensure the health, safety and welfare of Michigan’s residents. Infrastructure planning, management, and investment that holistically acknowledges transportation, water, stormwater, energy, and communications needs is the best way to ensure protection of public health, the environment, and the state’s future economic growth.

A 21<sup>st</sup> century infrastructure system in Michigan must have resilient, adaptive, and robust infrastructure systems in both rural and urban communities. Outcome-based decision-making tools and appropriate incentives will drive the development of sound 21<sup>st</sup> century infrastructure systems. Michigan must establish regulatory and tax policies that encourage infrastructure innovation and investment, and build public confidence. In order to achieve efficiencies and support adequate investment, public and private partners at all levels must coordinate asset management and planning across infrastructure types and work together to leverage diverse, integrated, and sustainable funding.

## The 21<sup>st</sup> Century Infrastructure Commission

To address the state’s infrastructure needs, Gov. Rick Snyder created the 21<sup>st</sup> Century Infrastructure Commission, an advisory body of 27 members<sup>1</sup> that has developed a long-term vision and associated recommendations to drive Michigan toward that vision. As Executive Order No. 2016-5 states, “[s]ound and modern infrastructure is vital to the health and well-being of the people of Michigan, as well as Michigan’s economy and vibrant communities.”

The commission’s vision states:

*Michigan will lead the nation in creating 21<sup>st</sup> century infrastructure systems that will include, at a minimum, innovative technology, sustainable funding solutions, sound economic principles, and a collaborative and integrated asset management and investment approach that will enhance Michiganders’ quality of life and build strong communities for the future.*

Throughout the process of building recommendations for this report, commissioners participated in monthly meetings of the full Commission, along with biweekly meetings of asset-focused subgroups. The Commission also included technical advisors in the process to ensure stakeholder input was heard and incorporated into discussion. In order to receive input from stakeholders

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<sup>1</sup> William Moritz served the Commission in his capacity as interim director of the MDNR, but was replaced when Keith Creagh reassumed his post as director of the MDNR.

across Michigan, the group hosted six listening tour events in various locations throughout the state and regularly solicited input from the public through the 21<sup>st</sup> Century Infrastructure Commission website (for more information on the public engagement process and timeline, see Appendix B).

### EXHIBIT 1. Michigan's Infrastructure Through the Years

<b>1951</b>	Public Act 51 is enacted, which dictates how transportation revenue is distributed in Michigan based on a funding formula.
<b>1960s 1970s</b>	The federal highway program expands our transportation infrastructure; Clean Water Act leads to significant investments in wastewater collection and treatment; our state park system undergoes expansion. Michigan's largest gas storage site, Belle River Mills, becomes active in 1965. Michigan sees its greatest development in electric generating facilities ever. The Comprehensive Transportation Fund is created in 1972.
<b>1988</b>	Michigan voters overwhelmingly approve the \$800 million Quality of Life bond.
<b>1991</b>	The Michigan Telecommunications Act is enacted, establishing a state regulatory framework for telecommunications technology.
<b>1997</b>	A \$.04 increase in the state gas tax is approved to help fix the state's roads and bridges.
<b>1998</b>	The Clean Michigan Initiative bond of \$675 million was passed by voters.
<b>2002</b>	Michigan voters approve the \$1 billion Great Lakes Water Quality bond.
<b>2010</b>	Merit Network announces the award of two multimillion dollar grants to build over 2,200 miles of fiber-optic infrastructure in Michigan.
<b>2011</b>	Gov. Rick Snyder delivers a special message on infrastructure calling for a goal of increasing infrastructure investment by \$1–\$1.4 billion a year.
<b>2012</b>	Governor Snyder delivers the first of two special messages on energy. Michigan Cyber Range is inaugurated by Governor Snyder.
<b>2015</b>	The state begins taking action to resolve the Flint water crisis. Governor Snyder signs a \$1.2 billion package to improve Michigan's roads.
<b>TODAY</b>	The 21 <sup>st</sup> Century Infrastructure Commission releases a visionary plan to address Michigan's infrastructure for the next 50 years.

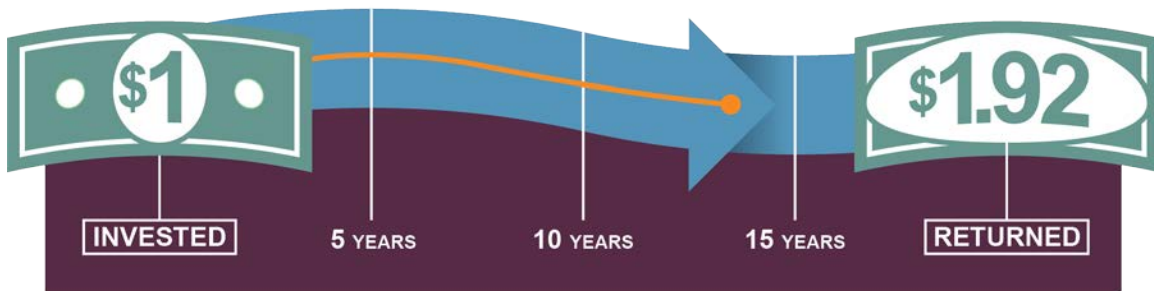
## National Infrastructure Spending

Michigan is not alone in its infrastructure challenges. Infrastructure needs abound in communities and states across the country and around the world. In 2013, the American Society of Civil Engineers (ASCE) gave America's infrastructure overall a grade of "D-plus," and reports that the nation would need to spend an additional \$3.6 trillion by 2020 to raise national infrastructure to a state of good repair. Given the recent Flint water crisis and growing concern about the condition of underground infrastructure across the state, Michigan's portion of the investment needs has likely grown significantly.

During the past decade, states across the U.S. have been cutting public infrastructure spending, causing infrastructure investment to drop from a high of 3 percent of the nation's gross domestic product (GDP) in the late 1960s to less than 2 percent in 2014 (McNichol 2016). States have not been alone in cutting spending on infrastructure; since 2003, federal spending on infrastructure has fallen by almost 19 percent, while spending by states and municipalities has dropped by approximately 5 percent (McNichol 2016).

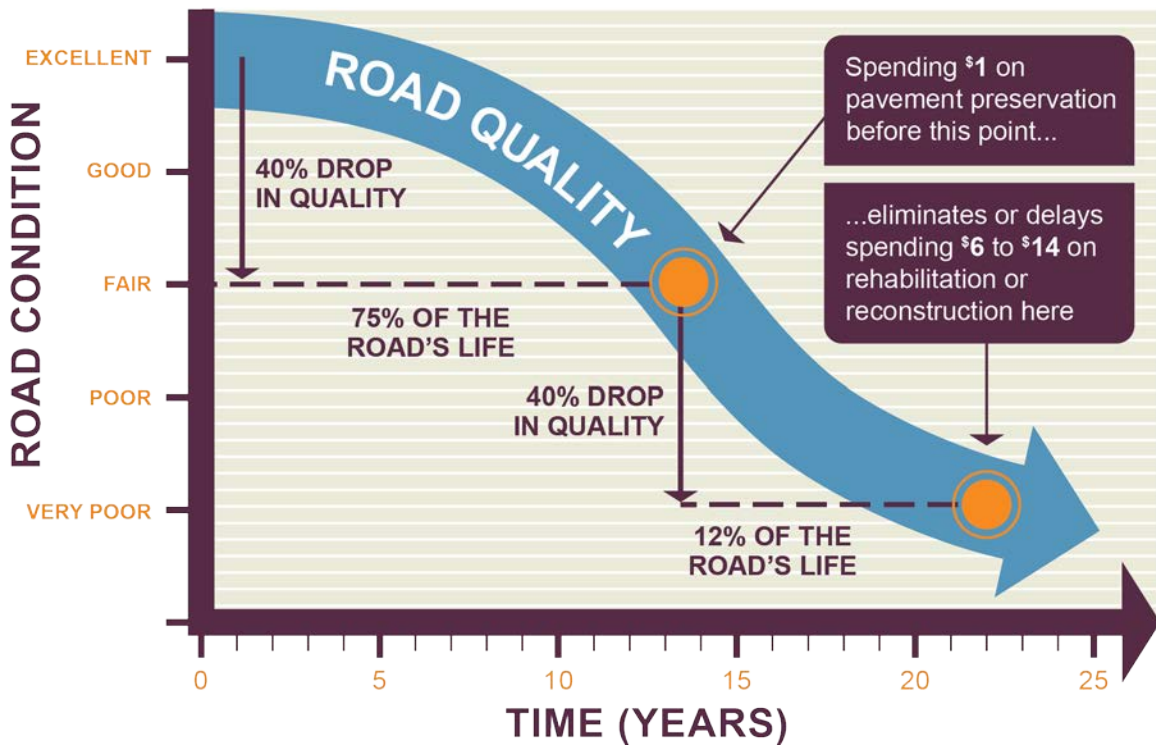
This decline in investment has emerged despite strong evidence that spending on physical infrastructure has a positive return on investment. The return on infrastructure investment is nearly twice initial spending because it is frequently less expensive to maintain existing infrastructure than it is to repair or replace it, and newly created infrastructure is far less likely to need repairs or replacements. On average, every \$1.00 spent on nonresidential construction has an economic impact of \$1.92. For transportation and power investment, \$1 returns \$4.24, while \$1 of spending on water and sewer assets returns \$2.03 in revenue (Cohen 2012).

EXHIBIT 2. Return on Infrastructure Investment



Not only are there sizable economic arguments for infrastructure investment, there is also a case to be made for making infrastructure improvements sooner rather than later. As shown in the example in Exhibit 3, deferring infrastructure investment will actually make a project more expensive, as the costs of infrastructure repair and or replacement increases as infrastructure quality declines.

EXHIBIT 3. Road Condition and Preservation



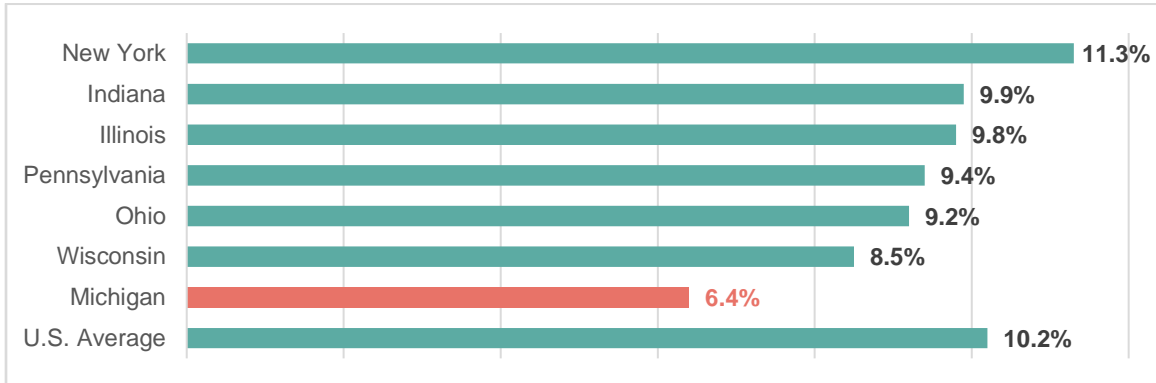
Source: AASHTO and TRIP 2009.

Current investment in infrastructure varies significantly by state. The share of a state's budget devoted to capital spending can vary greatly based on factors such as geographic size, population density, and the age of existing infrastructure. Several large states with small populations—Alaska, North Dakota, and South Dakota—spent more than 10 percent of their budget on capital expenses in 2013.

*At the other end of the spectrum, however, three states—California, Vermont, and Michigan—spent less than 4 percent of their budgets on infrastructure.*

As shown in Exhibit 4, Michigan's average annual investment of 6.4 percent between 2010 and 2014 positions the state at the bottom of the spectrum nationally; this is partially a result of our unwillingness to identify and fund needed investments (Deloitte 2016). In fact, from 2002 to 2013, Michigan had the third largest decline in state and local infrastructure spending as a share of GDP (McNichol 2016).

#### EXHIBIT 4. State and Local Capital Spending Comparison



Note: Percent of total expenditure, annual average 2010-14.  
Source: Deloitte 2016.

## Purpose

The purpose of this report is to give policymakers and the public an overarching view of Michigan's infrastructure needs, as articulated by the Commission. The report identifies the need for a statewide asset management system and Michigan Infrastructure Council (Chapter 3), and makes specific recommendations in four key areas of infrastructure: communications (Chapter 4), energy (Chapter 5), transportation (Chapter 6), and water (Chapter 7). Funding challenges and opportunities are described in Chapter 8.

This report is not an operational plan, nor does it suggest a specific funding package. Instead, it outlines the challenges and opportunities facing Michigan's infrastructure system, identifies key recommendations for action, and provides a menu of short-term needs and long-term goals for consideration by policymakers and the public.

Recommendations are numbered according to the chapter in which they appear, and then by topic area. Where feasible, the Commission identified the anticipated investment needed for each recommendation in this report, and potential public or private funding sources. Several recommendations developed by the Commission are for consideration by the Michigan Legislature, and out of deference to the legislative process, the Commission did not attach cost figures to any legislative recommendations.

Finally, policymakers and the public should recognize that this report is part of a larger process to set the foundation for Michigan's future, articulated by Governor Snyder in his 2016 State of the State address, during which he also created the 21<sup>st</sup> Century Education Commission and the Building the 21<sup>st</sup> Century Economy Commission. The recommendations outlined in this report will provide job opportunities for Michigan's workforce, including engineers, skilled construction trades, and other skilled infrastructure occupations. The Commission encourages the Building the 21<sup>st</sup> Century Economy Commission to fully review and assess how this report's recommendations can be folded into their vision for Michigan's economic future.