



Resilience in Michigan

American Society of Civil Engineers gave Michigan's energy infrastructure a grade of D, noting:

- aging infrastructure
- higher electricity rates
- rising demand due to electrification and intermittent renewable generation
- 37% higher response time for electric interruptions

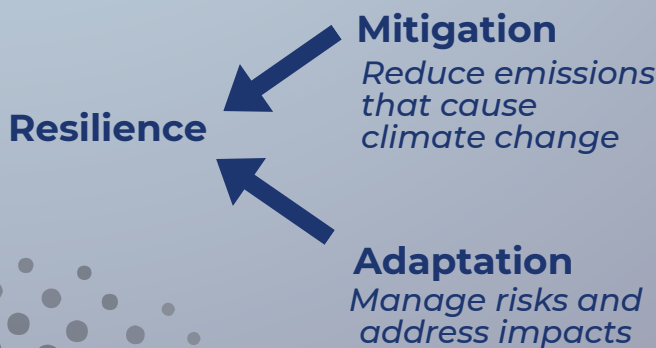
ASCE 2023 Report Card for Michigan's Infrastructure

Energy Resilience

The Problem and Its Solutions

What is resilience?

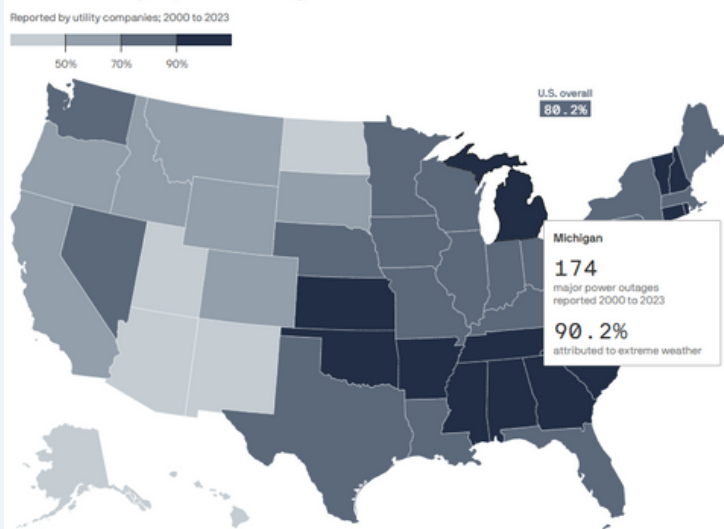
In nature, resilience is the ability of ecosystems to deal with random natural events after the fact. It is much the same for plants of a different kind: manufacturing and water and wastewater treatment plants. Industrial facilities, as well as commercial and residential buildings, all rely on energy from the grid. Thus, according to the Department of Energy, **energy resilience** is the ability to “rapidly recover from power outages and continue operating with electricity, heating, cooling, ventilation, and other energy-dependent services” like production. This fits within the broader framework of climate resilience, often characterized as shown below:



Why is resilience important?

Climate change has increasingly been demonstrated to correlate with rising temperatures, increased precipitation, and more frequent extreme weather events. Each of these factors puts a strain on the electrical grid. When combined with aging infrastructure like in Michigan, power outages become much more frequent (see figure below). This can lead to loss of production time and lost revenue for industrial facilities.

Share of major power outages attributed to extreme weather



Axios.com

Problems

Michigan industrial facilities the MSU IAC assessed in 2024 cited these weather-related issues and resulting concerns

- Employees can't come in
- Need for overtime
- Revenue loss
- Contract loss
- Restart time
- Power surges
- Rural isolation
- Asset damages
- Lack of redundancy
- Production loss

- Heat
- Hydraulic capacity
- Wildfires
- Drought
- Snowstorms/Melts
- Rain/Severe Weather
- Outages
- Wind
- Flooding



Solutions *Improve energy resiliency in your facility*

Methods to improve resiliency involve minimizing the probability of system failure and improving recovery and restoration time. Below are some of the ways to improve facility energy resilience.

Redundancy

- **Maintain excess resources**
 - Saving safety stock/buffers (finished products and raw materials)
- **Equivalent systems that run in parallel** are better than systems in series
 - One can operate if the other goes down
- Able to **ramp production up or down** to stock up or reduce energy use

Collaboration

- Risk-focused company culture
 - Employees serve multiple roles and have a variety of experience and knowledge
 - **Advanced planning for outages**
 - Strategic sourcing of materials/suppliers
 - **Agreements between supply partners** and even industry competitors to share production requirements

Flexibility

- **Shift production/operation times**
- **System/manufacturing flexibility**
 - Reconfigure how the product is made
 - Change HVAC setpoints and reduce lighting to limit energy usage so production can stay in operation
- **Material sourcing flexibility**
- Participation in interruptible demand/emergency response programs
- Install back up energy storage like generators and batteries
- Invest in on-site power generation

Additional Resources

★ [*DOE Screening Tool for Industrial Resilience*](#)

[*Michigan RRC Resiliency Toolkit*](#)

[*Addressing Barriers to Resilience in Michigan*](#)

[*Climate Resilient Pathways: Catalyzing Private Sector Action*](#)

[*Resiliencemetrics.org*](#)

