



Wisconsin Office of Energy Innovation

# Critical Infrastructure Microgrids For Resilience

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# A Brief History of the Office of Energy Innovation: Home of Wisconsin's State Energy Office

- 56 Energy Office (50 states 6 territories)
- Energy Policy & Conservation Act of 1975
- Each state is required, under 42 U.S.C. § 6323(e)(1), to submit an energy emergency plan that it will utilize in the case of an energy supply disruption.
- Moved in 2015 to PSCW, (ch. 16.955 Department of Administration, State Planning and Energy has been updated to Ch. 196.025(7) as of January 2018.

## Chapter 196.025(7) Information.

"(7) State energy office.

(a) The commission shall do all of the following:

1. In cooperation with the other state agencies, collect, analyze, interpret, and maintain the comprehensive data needed for effective state agency energy planning and effective review of those plans by the governor and the legislature.

2. Administer federal energy grants, when so designated by the governor pursuant to s. [16.54](#).

3. Prepare and maintain contingency plans for responding to critical energy shortages so that when the shortages occur they can be dealt with quickly and effectively.

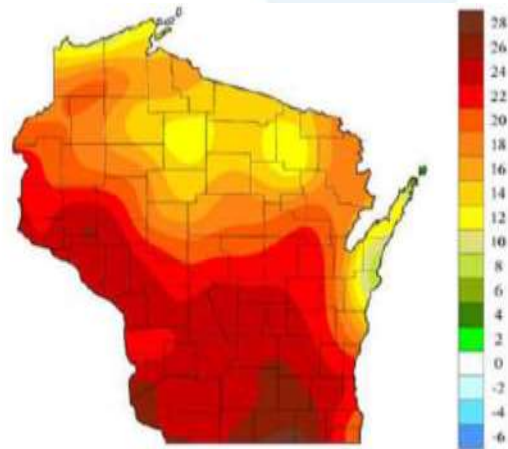
(b) The commission may provide technical assistance to units of government other than the state to assist in the planning and implementation of energy efficiency and renewable resources and may charge for those services. The commission may request technical and staff assistance from other state agencies in providing technical assistance to those units of government.



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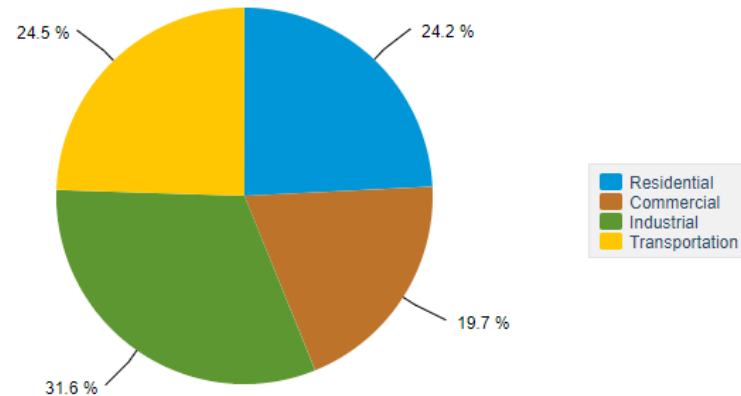
# The \$14 Billion Problem

- ❑ *Wisconsin consumes 6 times more energy than it produces.*
- ❑ *Despite a warming climate on the whole, Wisconsin will have thermal needs that are difficult to satisfy as well as more cooling load in the summer.*



Projected Change in the Frequency of 90°F Days Per Year from 1980 to 2055

Wisconsin Energy Consumption by End-Use Sector, 2019 [DOWNLOAD](#)



Source: Energy Information Administration, State Energy Data System

# A Brief History of OEI Programs Leading to Microgrids for Resilience

## ENERGY INDEPENDENT COMMUNITIES PROGRAM

“Generate **25%** of Wisconsin power and transportation fuels from **renewable resources locally** by **2025**”

- **150 Energy Independent Communities**
- **50 Communities** received grant funding for creating sustainable energy plans for government operations in **2009 and 2010**. More have since.
- **Encompasses 3.41 million people**
- **58.7%** of Wisconsin’s population

## Municipal Energy Efficiency Technical Assistance Program- MEETAP

## Petroleum Shortage Contingency Planning

## Energy Security Planning and Response

## Statewide Assistance For Energy Resilience and Reliability

## SAFER2

- **Recruit Tribes and Communities** to update emergency plans and participate in “deep-dive analysis”
- **Deep-dive components** (customized to participants’ needs and goals):
- **Wisconsin Clean Cities Alternative Fuel fleet assessment**
- **\*Micro-grid feasibility study of critical infrastructure\***



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# Critical Infrastructure Microgrid & Community Resilience Center Pilot Grant Program

## ▶ **The Pilot Grant Program (CIMCRC)**

design details were established by the Public Service Commission in an open meeting on April 15, 2021

## ▶ **Federally Funded** through U.S. Department of Energy by the State Energy Program

- [Program Design Memorandum](#) staff researched programs in:
- New York (NY Prize)
- Connecticut
- New Jersey
- Rhode Island
- Maryland
- Massachusetts

# Strategic Objectives

- ▶ **Energy Security:** Foster critical infrastructure security and resilience, improving the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents.
- ▶ Prioritize reliability and resilience benefits (during outages not caused by events beyond a utility's control) and benefits of avoiding major power outages (i.e. outages caused by major storms or other events beyond a utility's control).
- ▶ **Clean Energy Equity:** Help provide equitable access to the benefits of clean energy, efficiency, and preparedness by reaching broad applicant types. This includes applicants who may traditionally face barriers to adopting clean energy solutions and the benefits they provide, or whose communities may be disproportionately impacted by the negative effects of traditional fossil fuel and inefficient energy systems.

# Definitions

- ❑ **Critical Infrastructure:** Those facilities, systems, and other assets deemed vital to the public confidence and to Wisconsin. Loss or incapacity of critical infrastructure would have a debilitating impact on the state's security, public health, economy, safety, or well-being.
- ❑ **Microgrid:** A group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. A microgrid can connect and disconnect from the grid to enable it to operate in both grid-connected or island- mode.
- ❑ **Lifelines:** A lifeline enables the continuous operation of critical government and business functions and is essential to human health and safety or economic security. Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function.

# Definitions Continued

- ❑ **Level 1 or single customer:** a single Distributed Energy Resource (DER) or multiple DERs serving one customer through one meter. Example: a single facility (such as a hospital) using an on-site microgrid to provide backup power.
- ❑ **Level 2 or single customer or campus setting (partial feeder microgrid):** a single DER or multiple DERs serving multiple facilities, controlled by one meter at the interconnection point (also known as Point of Common Coupling or PCC). Example: a microgrid sited on a University campus connected to multiple buildings.
- ❑ **Level 3 or multiple customers (advanced or full feeder microgrid):** a single DER or multiple DERs serving multiple facilities or customers on multiple meters. The DER(s) may be located on a different site from the facilities or customers. While the advanced microgrid has one PCC, the individual facilities or customers within the advanced microgrid may have their own individual connections to the distribution grid.
- ❑ **Community Resilience Centers (CRC):** Facilities designed to provide emergency heating and cooling capability; refrigeration of temperature-sensitive medications, vaccines and milk from nursing mothers; plug power for durable medical equipment (to include dialysis equipment and continuous positive airway pressure machines); plug power for charging of cell phone and computer batteries; and/or emergency lighting. A CRC may also be a designated location (by the city, county, or State of Wisconsin) for the distribution of emergency services during extended grid outages. This center would not necessarily be a replacement for an emergency shelter, and should not be required to have food service capabilities, showers, or locker rooms; however, an emergency shelter that does provide these services would still be eligible to apply. A CRC can be a Level 1, 2, or 3 Microgrid (see definition of Microgrid above).



# Eligible Applicants

- ▶ Municipalities, Universities, Schools, Hospitals, and Like Entities (MUSH Market): cities, villages, towns, counties, K-12 school districts, tribes, municipal water and wastewater utilities, municipal electric utilities, municipal natural gas utilities, University of Wisconsin System campuses and facilities, Wisconsin Technical College System, public or nonprofit hospitals. 501(c)(3) nonprofits
- ▶ The Commission approves the staff identified option to establish a partnership approach for eligible applicants, wherein a Lead Applicant engages Target Partners. The Commission establishes the MUSH Market as “Lead Applicant” eligible entities; responsible for partnering with “Target Partners” described as appropriate public, private, and non-profit entities, or their subunits, with unique oversight or expertise in sectors appropriate to the project such as housing authorities, municipal utilities, and engineering firms.

# Critical Infrastructure Microgrid & Community Resilience Center Grant Program

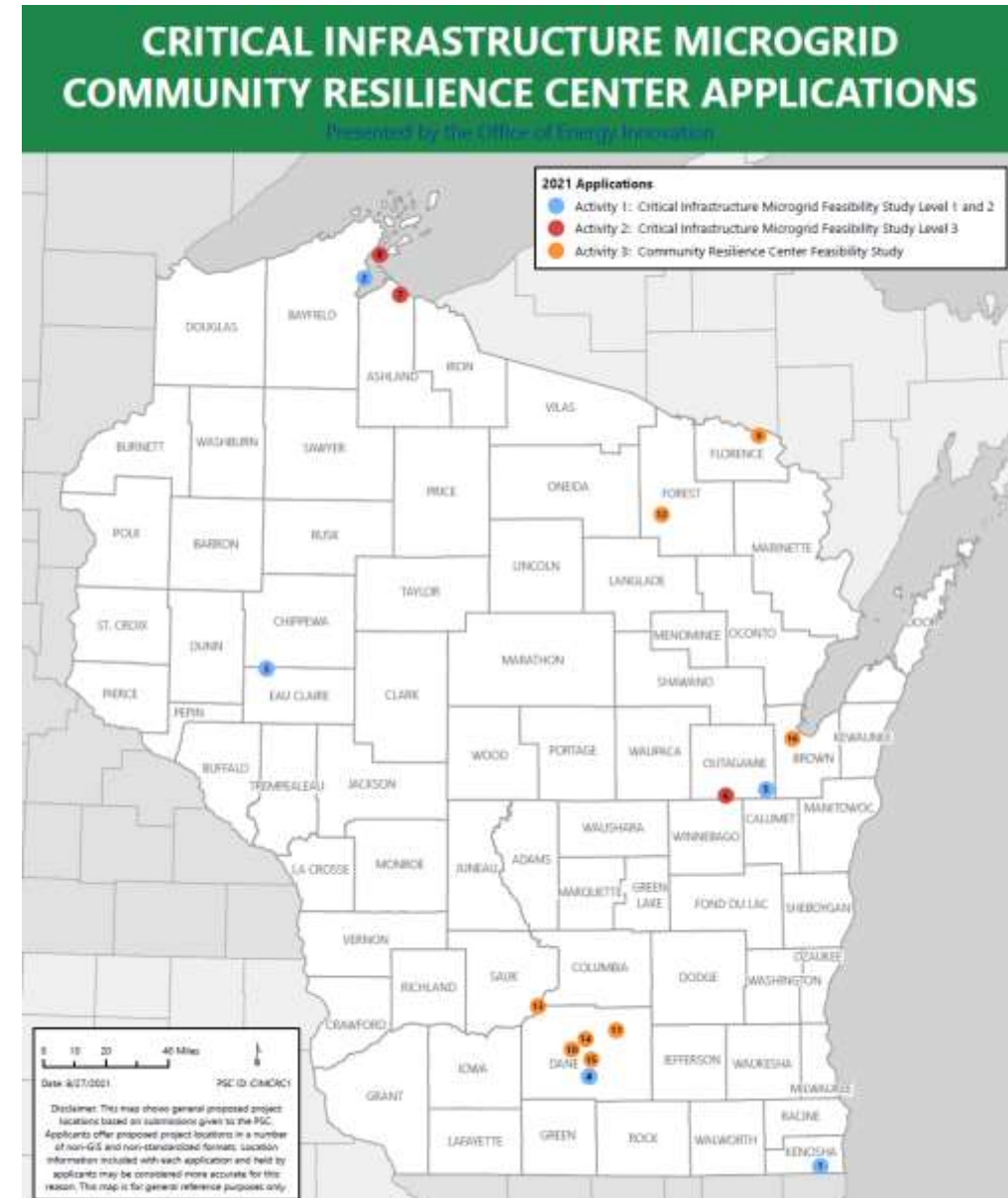
15 projects funded to study the feasibility of Microgrids for resilience across Wisconsin:

Projects include:

Hospital, Airport, Police Operations Center, Business Park, Mobile Microgrid, Mini-grid (combination of 3 microgrids), Water Treatment Facility, Wastewater Treatment Facility, and more!

\$915,000 awarded

Docket# [9705-FG-2020](#)



# City of Middleton Emergency Resilience Microgrid Study

- Energy Independent Communities (EICs) are advancing!
- 2018- OEI funded a clean energy plan study for 7 communities- Middleton was the lead.
- This installation will build on existing solar at the Police department (which also received another grant for a battery and expanded solar array in 2020).
- Concept includes installation of 5 MW of solar and utilization of 35 acres of rooftop space distributed throughout the project area.
- Extreme rainfall event in August of 2018 (12 inches in 24 hours) flooded the project area and crippled emergency services.
- Feasibility study will consider service to more than 60 businesses.

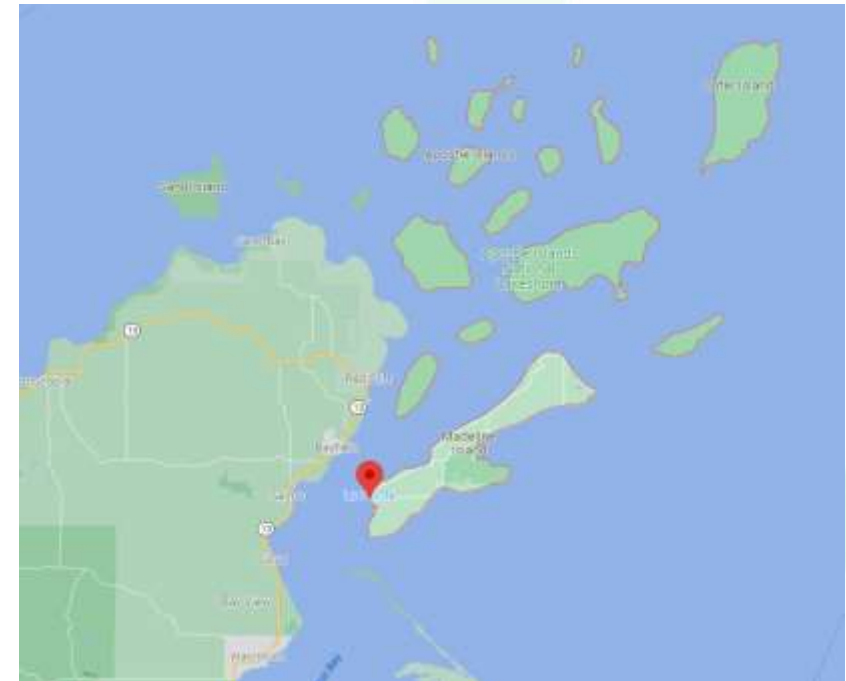
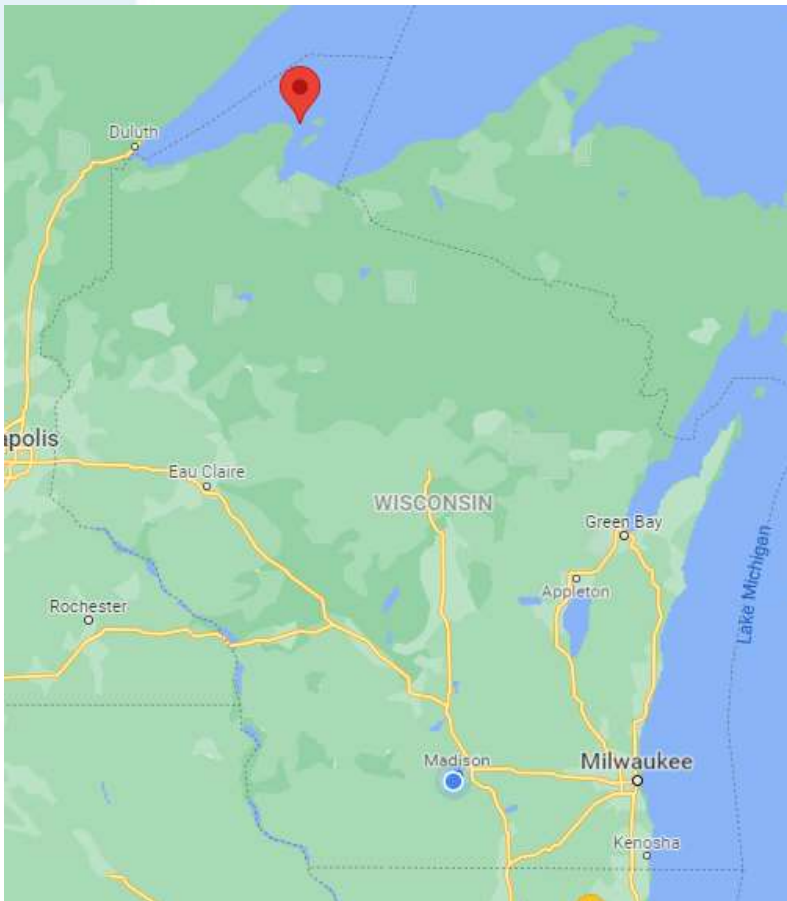


# Town of La Pointe Microgrid Feasibility Study



Level 3 Critical Infrastructure Study:

Remote community located on Madeline Island, part of Apostle Islands National Lakeshore



# Town of La Pointe Microgrid Feasibility Study



## Level 3 Critical Infrastructure Study:

Key to the project- existing DERs and propane generators- considering lithium-ion battery storage, controls, solar.



# Questions?



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