

PUTTING ENERGY TO WORK



M-WERC Overview

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Mid-West Energy Research Consortium

What is M-WERC?



- M-WERC is one of America's Leading Energy, Power and Control (EPC) Industry Clusters
- Public Private Partnership Leveraging Market Knowledge of Industrial EPC Members
- Maximize Effectiveness of the Region's Leading Academic, Economic Development, Government, and NGO Organizations to Grow EPC Space
 - Innovation
 - Work Force & Talent Development
 - Public Policy
 - Strategic Collaboration
 - Market & Industry Expansion

Energy + Power + Control

<ul style="list-style-type: none">• Generation• Renewable• Fossil• Nuclear• Bioenergy	<ul style="list-style-type: none">• Transmission• Distribution• Storage• Conversion• Quality	<ul style="list-style-type: none">• Industrial Automation• Building Automation• Energy Management• Smartgrid & Microgrid• Electric Vehicles
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- Three Year Organizational Growth
 - FY11-12 - 8 to 26 Members FY12
 - FY13 56 Members to 76 Members FY14
 - FY15 ~104 Members ~ Budget \$2.5M

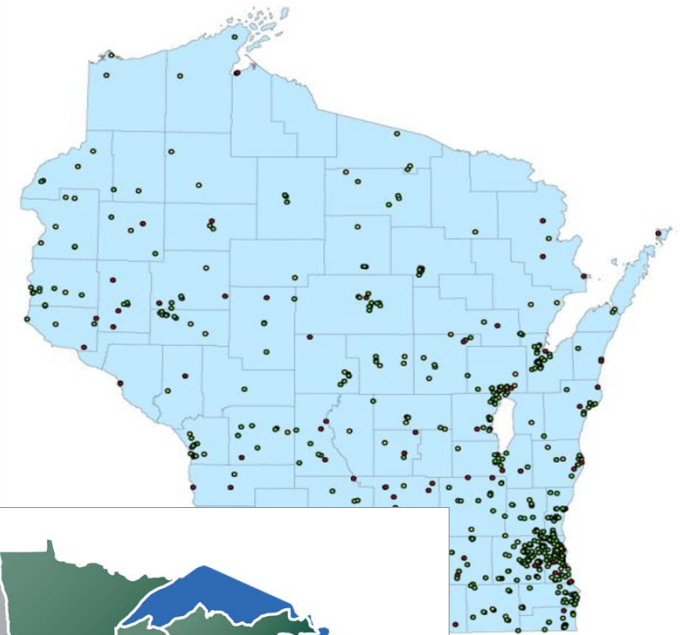
M-WERC Sponsored \$2.5M in Research \$325K in Workforce Development

Why We Started in Wisconsin



- Energy Power & Control in Wisconsin
 - 900 Companies
 - 100,000 Employees
 - Over \$38 Billion in Sales
- Expanding Collaboration in Key Technology Sectors to Companies, Universities and Partners Throughout the Midwest Region +525,000 jobs

Wisconsin Energy Power and Controls Firms



The Midwest Has Expansive Capabilities in Energy, Power & Control

M-WERC Academic Participants



We Combine the Power of Wisconsin's Top Four Engineering Research Universities with the Power of Industry and the Training Know-how of Leading Technical Colleges



Combining Technology Innovation, Workforce Development and Strategic Collaboration to Promote Industry Expansion

M-WERC Industry Participants



GREENFIRE



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Mission Areas

- **Technology Innovation**
- **Market & Industry Development**
- **Supportive Public Policy**
- **Workforce Development**
- **Development and Strategic Collaboration**

Technology Focus Areas

- Distributed Energy Resources and Systems (DERS)
- Building Energy Efficiency
- Energy Water Nexus
- Renewable Energy
- Energy Storage
- Biofuels



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Critical Deliverables & Insight Of Industry Roadmaps

- Market size and growth projections
- Customer value-based market and product segments
- Identification of competitive regions in US and the World
- Linkage to other Roadmaps and Leverage Points
- Technology “SWOT” Analysis
- Regional “SWOT” relative to Technology
- Regional GAP analysis
- Proposed Action Plans for each M-WERC Mission Area

Process to Assess Key Technology Focus Areas



Market Analysis

Opportunity Areas

- Threats Toward Real-Time, Time-of-Use Pricing
- Decline of Nuclear Power
- Increasing Flexibility
- Weak Shaving and Efficiency
- Power availability and reliability
- Alternative Energy Solution
- Shaving and Efficiency
- Renewable Energy

Product/Customer Segmentation

Reliability	Shaving and Efficiency	Power availability and reliability	Alternative Energy Solution
Backup Generator (DG) Critical Systems, Backup (DG) Automatic Transfer Switch (ATS)	Controlled Shaving (Dedicated) Energy Management Systems	Renewable (Wind, Solar, Biomass) Energy Storage (Battery, Mechanical)	Green Marketing Tax Incentives Government Incentives
Essential Safety Code	Economic Benefits From Load Management	Renewable Safety Code	Renewable Safety Code

Opportunity Assessment

Market Overview

are installed in every commercial and industrial required by Code and will continue to be a critical power in the foreseeable future.

their relative low cost, modularity, and readily available sources have traditionally been the most popular DG world. They are also the most polluting, air quality as limiting future applications. Recent cost increases at the a major decrease in the cost of natural gas are opening up is for microgrids that incorporate cleaner and lower cost DG

Market Data

Market Overview

Market Overview

Market Overview

Gap Analysis

Drivers of Future State

- Operate extremely well
- Natural Gas
- Common Integration of s
- Plug and Play Components

Drivers of Future State

- Extended Run Time
- Fast Alternatives
- Renewable Energy
- Systems Engineering

Action Planning

Actions

- Develop detailed insight into market opportunities, their supply chains
- Cultivate relationships with all grid-entering manufacturers
- Identify and pursue grant opportunities and development projects that support WPPC vision and strategy
- Define and articulate clear WPPC vision for microgrids and how they align technology strategy

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Mid-West Region As A National and International Leader in EPC Markets



Three Road Maps FY14/FY15

- **Distributed Energy Resources Systems (*Complete!*)**
 - CY12-CY17 Growth \$1B-\$3B
 - Key Markets: Hospitals, Campuses, Bases, Municipalities
 - Technology Gaps: System Integration, Protection & Controls
- **Energy Efficiency (*Complete!*)**
 - CY12-CY17 Growth \$149B-\$209B
 - Key Target Markets, Building Management Systems Motor Control Systems, System Integration, Building Retrofit, Self-Gen., Energy Storage
 - Technology Gaps: Embedded Intelligence, Smart Grid Interoperability, System Integration, Energy Storage
- **Energy Storage (ECD March 2015)**
- **Energy Water Nexus (Start June 2015)**



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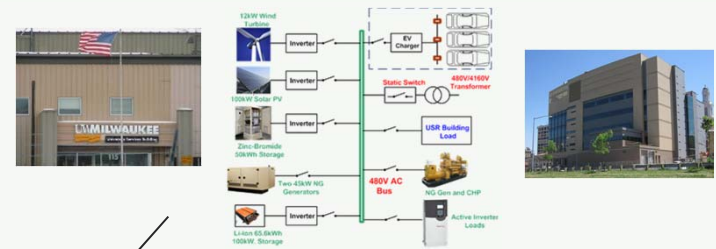
EPC Coordinated Network of Labs

National Labs and Administrations



2014-2016

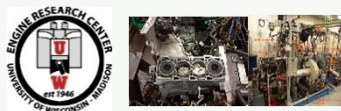
University Lab/ Capabilities Network Investments



Coordinated Microgrid
Labs
2013-2015

Partner Consortium Labs 2015-2016

UW-Engine Research



2015-2016

UWM Innovation Lab



MSOE Rapid Prototype



Marquette Mechatronics



The Nations First
Coordinated
Network of
Capabilities and
Labs
dedicated to
E-P-C

EIC



MV Power Systems
CHCP Systems
Power System Automation
2014-2017

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Introducing the M-WERC Energy Innovation Center



**M-WERC Now Controlling
Three-and-a-Half Floors;
About 70,000 square feet.**

**Can grow to Five Floors and
120,000 Square Feet.**

**Build Out In Two Stages –
Now to September of Next
Year – and Then Complete
By October 2016.**

The ENERGY INNOVATION CENTER Will:



- *Solidify M-WERC's Role As A Global Hub For EPC Research, Talent Development and Industry Growth and Expansion*
- *Assist Our Corporate Members by Providing A Unique Environment To Create And Acquire New Businesses And Line Extensions*
- *Provide A Unique Open Innovation Platform To Create, Test and License New EPC Technologies*
- *Establish A Vibrant and innovative Space To Connect and Market To The EPC Ecosystem*

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South half of 7th Floor being developed for Energy Innovation Center initial occupants

- Our initial “demonstration space” for sales.
- First wave of business start-ups, M-WERC Staff, key partners, and Business Services Providers.
- Will eventually repurpose this floor as we build out the other floors of the facility.



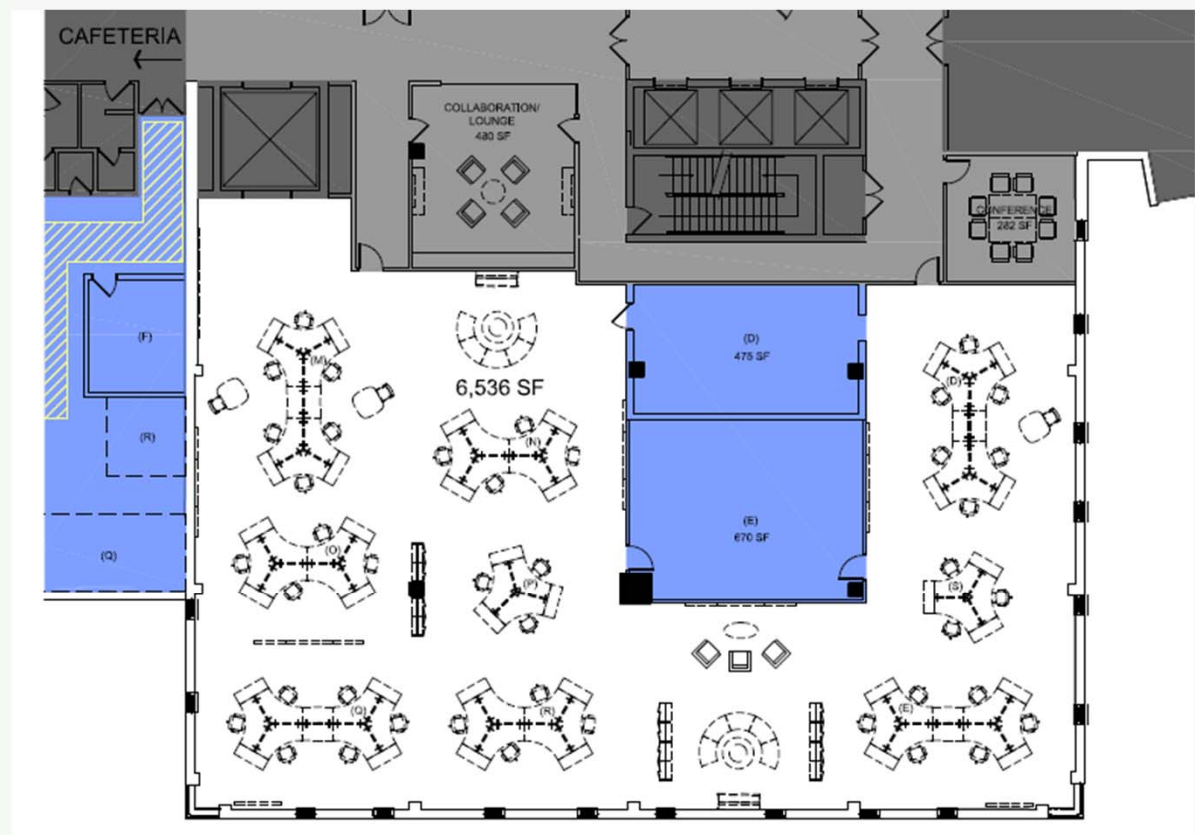
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Business Start-Ups – 2nd Floor

A **Business Start-Up Incubator** will be located within the Energy Innovation Center.

The Incubator will support new clean energy start-up companies

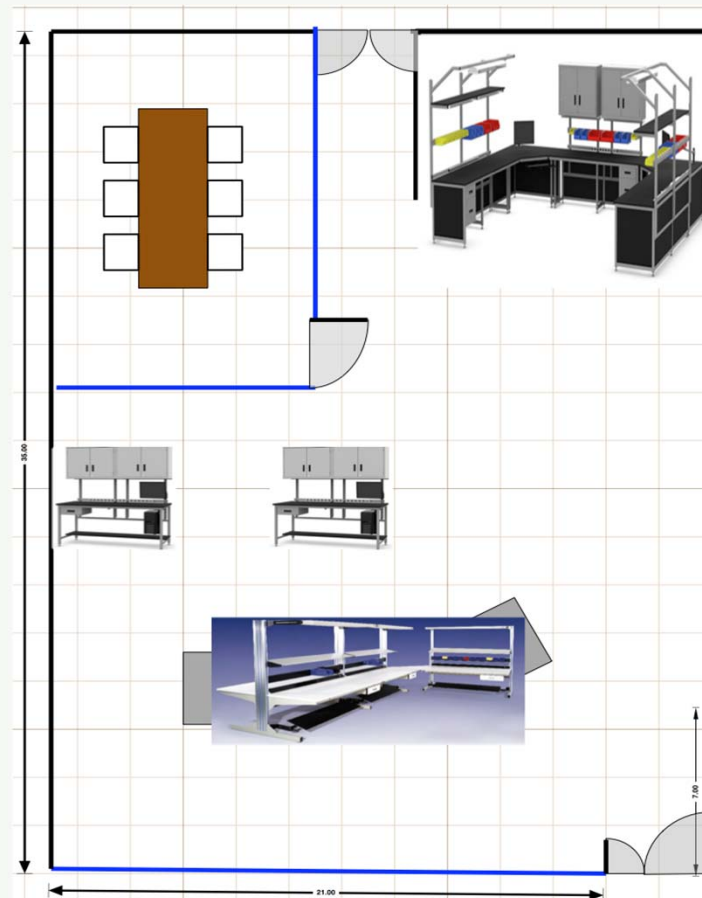
New businesses and companies embracing energy, power, automation and control



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Academic labs and Corporate Member labs will be the focus of the Third Floor.

Focusing on our members who want unique lab space, specialized research areas, or “skunkworks” collaborative working areas.



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