ANNUAL REPORT

Letter from Board Chair

2017 proved to be another transformative year not only for the energy power and controls industries in our region but for Midwest Energy Research Consortium as an organization. The key to our success over the past year continues to be the clear and concise vision of our leadership, the determined execution of our staff, and the strong support of the more than 90 members, partners, and supporters that make up the Midwest Energy Resource Consortium.

Our activity in 2017 evolved to focus on three core areas – strategic roadmaps and working groups, our Technology Innovation research program, and WERCbench Labs entrepreneurial start-up program. All three areas are essential to forming a solid foundation for years to come and we are excited to report on a successful year in all three fronts.

Market Insight – Roadmaps

With four industry roadmaps now complete, 2017 gave us the opportunity to develop a series of working groups to begin to take action on many of the recommendations put forward as part of the road mapping process. Please take a look at our refreshed and redesigned website to learn more about these groups and see if you may be interested in getting more involved.

Technology Innovation - Research

With more than $3 Million of research completed since we opened our doors our focus shifted with the desire of our members to develop a smaller number of sustained projects focused on cross cutting technologies. (Highlights on these projects can be found later in the report).

Entrepreneurship - Start-ups

Creating jobs, fostering new companies, and developing new technologies guided us again in 2017. The third class of graduating teams of startups completed WERCbench Labs and presented to more than 100 investors, community leaders, and corporations at our annual Demo Day in December. We are excited about the unleashed potential of our teams and look forward to training and equipping another great group as we seek talent for our next class.

I would like to extend my gratitude to Alan Perlstein for his continued guidance and oversight as CEO and Executive Director of our organization, as well as to M-WERC’s talented staff. We are proud of our accomplishments over the past year and I am excited for what 2018 has in store for M-WERC. We look forward to following our carefully crafted vision and fulfilling our mission to make the Midwest a leader in the Energy, Power, and Control industries.

Sincerely,

Marvin Klowak
M-WERC Board Chairman
Global Vice-President, Research and Development
Briggs and Stratton Corporation

http://mic.local:4567/
Technology Innovation

Throughout 2017, substantial progress was made on redefining and recasting the M-WERC Technology Innovation (TI) research program. The TI program is M-WERC’s research & development program for the Energy, Power, and Controls sector, and was the original activity on which M-WERC was formed in 2009. The program combines industry and academic insight and research capabilities to drive knowledge and technology development for its member companies and universities in the energy industry.

The efforts are guided by our Research Members, which form the TI Committee that provides oversight and direction for the program. An overhaul of the TI program was undertaken in 2017 and will be rolled out in 2018, under the “Technology Innovation 2.0” name – as a new version of our research program – first introduced at the M-WERC Technology Symposium in April, 2017. A new, key feature of the program is the introduction of “Technology Pipelines,” which will support:

- Cross-cutting technologies enabling growth in multiple industry sectors;
- A continuum of research & development with a continuous cadence of deliverables; and a small number of multi-year projects

Past projects include research on microgrids, electric machine-drive systems, charging stations, energy storage, power conversion systems, grid automation and control, advanced building automation, fiber optic current sensors, and converting waste heat to electricity.

M-WERC research funding has targeted five technology pipelines to guide activity and increase productivity. The pipeline process allows M-WERC research members to gain access to a broader technology and applied research community across a number of research institutions. The five areas of focus include:

- Energy, Power, and Control Systems Architecture
- Power Conversion Systems
- Control and Data Systems
- Energy Storage Systems
- Power Distribution and Protection

In 2018 the two initial pipelines to be worked will be Power Conversion Systems and Controls and Data Systems. A series of workshops will focus on developing a series of projects that will solve tough technical problems.

Work continues into 2018 to refine and expand the technology research program at M-WERC as we build on our success and continue to work with our Research Members.

WERCBench Labs

M-WERC’s WERCBench Labs continued to offer opportunities for start-ups from the energy, power, and controls sector. Since 2015, we’ve attracted engineers, scientists, and programmers across varying funding stages to participate in our accelerator program.

We provide early-stage startup companies access to unique educational opportunities, mentoring, access to M-WERC members, and immersion in the eco-system of the energy sector. Each team receives an investment of $20,000, access to co-working space, and engagement with our coaches, mentors, and member companies.

The 12-week early-stage startup program once again included teams from a variety of funding stages in 2017. In addition to the $20,000 investment each team received as part of the program, teams this year also competed for $10,000 in cash as part of the annual Demo Day presentation held at the conclusion of the program.

This year’s winners of the WERCBench Labs Demo Day pitch competition included ARIS Technology, NovaMoto, and Switched Source.

Key Partner Highlights
A key factor of M-WERC’s successes in 2017 was our ongoing partnerships with a broad range of organizations in the state as well as regional and national partners. M-WERC works with a number of partners to expand our reach and grow the energy sector by coordinating with these organizations to assist M-WERC goals and objectives. In turn, M-WERC assists our partners to achieve their goals and objectives, further strengthening the energy sector in the Midwest. In 2017, key M-WERC Partners included:

- American Council on Renewable Energy (ACORE)
- BizStarts
- Clean Energy Trust
- K-12 Environmental Education Program
- Manufacturing Diversity Institute
- Midwest Energy Efficiency Alliance (MEEA)
- Missouri Energy Initiative
- Northwest Side Community Development Corporation (NWSCDC)
- RENEW Wisconsin
- Seventhwave
- The Water Council
- Tri-State Alliance
- Wisconsin Distributed Resources Collaborative (WIDRC)
- Wisconsin Energy Institute
- Wisconsin State Energy Office
- Wisconsin Technology Council

In addition, collaboration and support from elected officials on both sides of the aisle was a key component of the success of the Midwest Energy Research Consortium (M-WERC).

Throughout the year the M-WERC team successfully collaborated with local alderman, mayors, county officials, members of the State Assembly and Senate, the Governor’s office, and the Wisconsin Economic Development Corporation (WEDC).

On a national level, we continue to take an advisory role to government and non-government organizations. Our efforts included multiple visits to Washington, D.C. as well as regular correspondence and strategic outreach with members of Congress and legislative staff.

“Alan Perlstein and his team at M-WERC are doing exciting things for the State of Wisconsin and the Midwest as a region when it comes to the energy power and controls sector,” said United States Congresswoman Gwen Moore.

M-WERC’s headquarters in Milwaukee are located in Moore’s district, Wisconsin’s 4th congressional district. In September, M-WERC’s Public Affairs director Joshua Morby traveled to Washington with a group of more than 100 Wisconsin business leaders to visit our nation’s capital for the Metropolitan Milwaukee Area Chamber’s (MPACC) annual Milwaukee Night in Washington, D.C.

The trip included meetings with Senators Ron Johnson and Tammy Baldwin as well as Congresswoman Gwen Moore and their staff.

### Korean Start-Ups Project

**Korean start-ups look to M-WERC and partners for support**

Collaborative efforts with Milwaukee’s Silicon Pastures, a group of angel investors whose executive director has an office in the M-WERC building, expanded in 2017 with an international campaign that included a series of visits with delegations to and from Korea.

The effort was based on the interest from members of Silicon Pastures who are interested in mentoring and investing in early stage businesses based in our region.
The campaign identifies a series of companies in Korea that have excellent, proven technologies, but no path to enter the U.S. Working with M-WERC and its WERCBench Labs program, the collaboration allowed entrepreneurs to test the marketability of their technology innovation through a series of customer outreach exercises identifying what problems the customers actually have, and what the customer would want to buy.

Eight Korean companies traveled to Milwaukee and participated in an abbreviated, Korean version of the WERCBench Labs program. Of those, at least three of the companies are actively looking to expand into the U.S. Two of those companies are mapping a plan for distributing a Milwaukee company’s products in Korea.

In addition to the program in Wisconsin, 10 Korean companies participated in a similar program in Korea as part of an international trade mission with Wisconsin Governor Scott Walker, and met with Gov. Walker in September when he visited Korea.

“The connections Silicon Pastures helped us make with these Korean companies is a key differentiator for our program and our efforts to grow the energy, power, and controls market,” said M-WERC Executive Director and CEO Alan Perlstein. Foreign Direct Investment and new Exporting platforms will strengthen the energy sector and help continue Wisconsin's leadership in this important industrial cluster.

“It’s a natural complement for us,” said Teresa Esser Managing Director of Silicon Pastures Angel Investment Network. “When Korean companies expand into the U.S., they set up a new U.S. branch of their business or a new related U.S. business. These entities need angel capital and mentoring to succeed. We’re excited about the opportunity.”

**Market Insights**

With the completion of four strategic roadmaps, M-WERC shifted focus in 2017 to the continued development and growth of working groups to explore key technology growth opportunities and to bring new market insights to our members, building on the documented market insights originally identified in the four strategic roadmaps.

In 2017, the “Energy-Water Nexus Strategic Roadmap” was completed in collaboration with The Water Council of Milwaukee. This is the fourth strategic roadmap produced by M-WERC. (Distributed Energy Resources roadmap in 2013; the Building Energy Efficiency roadmap in 2014; and the Energy Storage System roadmap in 2015).
Construction & Engineering

M-WERC WORKING GROUPS

Distributed Energy/Energy Storage

M-WERC WORKING GROUPS

Energy Water Nexus

M-WERC WORKING GROUPS
Industrial Energy Efficiency

M-WERC WORKING GROUPS

Market and Industry Expansion

M-WERC COMMITTEES

Public Policy

M-WERC COMMITTEES
Seeing the efforts of these four roadmaps come to fruition has resulted in a body of knowledge being transferred to our operational working groups at M-WERC. There are now six working groups that each focus on a particular technology area to update and expand the market insights for our members. The working groups produce technical conferences, webinars and other events, as well as white paper, reports, and studies to advance each of the technology areas to our members’ benefit and to grow the energy sector as a whole in the Midwest. The six working groups are as follows:

- Construction & Engineering
A new phase of expansion and build-out at M-WERC's headquarters, known as the Energy Innovation Center, will continue into 2018. The facility is designed to co-locate companies focused on the energy sector, where efforts will now focus on the second floor of the building.

The second floor buildout activity will further the development of the Energy Innovation Center as a regional hub for the energy industries, by establishing facilities and a collaborative ecosystem for:

- Industry and academic research
- Entrepreneurs and start-up company technology innovators
- Economic development organizations
- Energy sector talent and workforce development

To support the WERCBench Labs program, an initial buildout of a second floor Lab and Prototyping space was completed in late 2017. The new space is targeted for occupancy by WERCBench Labs program participants and other tenants starting in 2018. This space allows tenants to work on their products in an area near their classes and with other entrepreneurs.

Through the establishment of this lab, and future labs to be added in the coming years, the Energy Innovation Center will enable M-WERC to support our members and the growth of the energy sector.

Snapshot of Events
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<thead>
<tr>
<th>Month</th>
<th>Event</th>
<th>Description</th>
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<tr>
<td>January</td>
<td>Demo Day</td>
<td>M-WERC held the second Demo Day for the WERCBench Labs early-stage startup accelerator program at the Milwaukee Public Library’s Central Library building in downtown Milwaukee. The nine teams that graduated from the program were given a chance to present their companies to more than 200 M-WERC members, investors, and stakeholders in attendance.</td>
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<td>February</td>
<td>Held at M-WERC academic member University of Wisconsin-Milwaukee</td>
<td>The energy storage technical conference drew more than 150 individuals and companies from around the United States. Participants explored advances in energy storage technologies as well as the applications and in-field installations of energy storage technologies.</td>
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<td>April</td>
<td>Technology Symposium</td>
<td>Member company Briggs &amp; Stratton hosted this unique event focused on technology-driven innovation and the power of cross-cutting technologies. During this interactive meeting, attendees were afforded the opportunity to provide feedback on the research program successes since 2009, as well as the needed enhancement and changes to overhaul the M-WERC research program, the Technology Innovation program, to be implemented in 2018.</td>
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<td>Selling Energy Efficiency Workshop</td>
<td>In addition to the Technology Symposium, M-WERC also hosted in April a first-of-its-kind workshop on selling energy efficiency. This workshop served as the kickoff for what became the first of a series of workshops later hosted by Wisconsin utilities Xcel Energy and We Energies. The workshops focused on a number of sales strategies including best practices in selling energy efficiency technologies.</td>
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<td>June</td>
<td>Smart Cities Working Group Conference</td>
<td>This conference was the kickoff event for the Smart Cities Technologies working group. The event in downtown Milwaukee focused on initial work with the City of Milwaukee and participation in the Envision: America program for Smart Cities in 2016. Officials from the City of Milwaukee, local contractors, and national service and technology providers presented the latest thinking and development on Smart Cities technologies and strategies.</td>
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<td>July</td>
<td>Members Meeting</td>
<td>This annual meeting for M-WERC was held this year at the We Energies corporate headquarters in downtown Milwaukee. The meeting provided an opportunity to review work completed to date by M-WERC working groups and gave members in attendance an opportunity to weigh in on the future direction of M-WERC in general, and development of a new Value Proposition for the organization, in particular. Four working groups convened meetings in conjunction with this event as well.</td>
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<td>September</td>
<td>Industrial Energy Efficiency Technical Conference</td>
<td>Hosted by Franklin Energy, this conference targeted small to medium sized manufacturers to provide a highly credible, cost-effective, and productive implementation of Industrial Energy Efficiency technologies and applications.</td>
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<td>October</td>
<td>Members Meeting and micro grid conference</td>
<td>As a follow-up to the first Microgrids Technical Conference held in 2016, this was a two-part event focused on microgrid development in the U.S. The first part of the event was a member meeting covering the topic at a high-level, and the second part of the event was the 2nd Annual M-WERC Microgrids Technical Conference. Several speakers from industry and academia gave time and state-of-the-art presentations on microgrid technologies and microgrid development updates in the United States. The program also featured an update on the Century City Microgrid (CCMG) project – which M-WERC plans to implement in the coming years.</td>
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**November**

**Better Buildings Challenge Conference**
Produced by the M-WERC Construction & Engineering working group in conjunction with the City of Milwaukee, this conference educated building owners and other attendees on the City’s Better Building Challenge (BBC) program to implement high-impact commercial building energy efficiency technologies. Speakers from the U.S. Department of Energy and local/regional partners in the BBC program educated attendees about the program, including focus on opportunities and recent successes in implementing high-impact energy efficiency technologies in commercial buildings.

**December**

**Demo Day**
Capping the third cycle of the WERCBench Labs early-stage startup program, 2017 saw a second Demo Day event during the calendar year. The December event featured the six graduating teams of the third cohort of the WERCBench Labs program. The teams were given the opportunity to present their businesses to a large group of M-WERC members, WERCBench Labs mentors and stakeholders, and investors. In addition to the $20,000 investment each team received as part of the program, M-WERC gave competitive awards – new this cohort – of up to $10,000 to the winners of the presentation pitch competition held as part of this Demo Day event for year three of the program.

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**M-WERC STAFF**

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**Alan Perlstein**
Executive Director and CEO

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**Elliot Berman**
Chief Financial Officer and Director of Strategic Planning
Jeff Anthony
Chief Operating Officer

John Bobrowich
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