EXECUTIVE SUMMARY

Wisconsin's sensors and controls industry is a significant economic opportunity for job growth, having the potential to support an annual average of 44,000 jobs through 2030. Wisconsin can capitalize on this opportunity by bolstering education and training, access to capital, the innovation ecosystem, value chain build-out, and local market growth.

EXECUTIVE SUMMARY

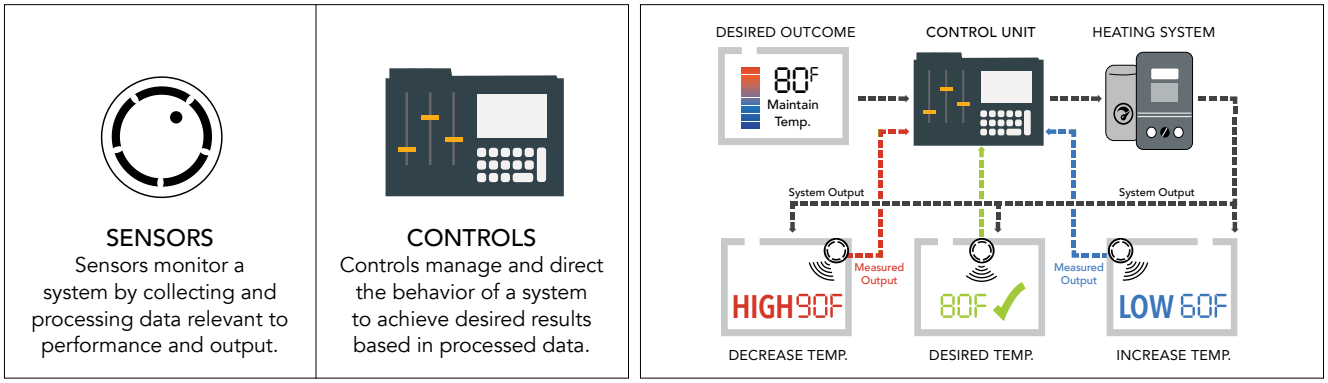
The American Jobs Project was born of two tough problems: the loss of middle-income jobs and congressional paralysis in the United States. It seeks to address these problems by taking advantage of one of the biggest market opportunities of our era—the advanced energy sector—and by doing so at the state, not the federal, level. State and local leaders who leverage the unique strategic advantages of their state to develop advanced energy economic clusters are poised to create quality jobs.

Wisconsin is faced with a growing need for skilled talent that is exacerbated by an aging workforce, out-migration, and a significant underemployed and long-term unemployed population. Efforts to foster good-paying manufacturing jobs and strengthen talent recruitment and retention could bolster the state's economy.

Extensive research and more than seventy interviews with stakeholders and experts in Wisconsin have identified sensors and controls as showing significant promise as a job creator and economic driver in the state. More than ever, advanced energy systems require extensive monitoring and operational controls to optimize production, minimize energy use, and leverage storage. Sensors and controls are hardware solutions that enable these technologies to be nimble and responsive to changing system-level conditions, such as weather patterns, available input resources, and energy demand. Wisconsin is well positioned to tap into market growth in this sector and rising demand for sensor- and control-embedded end-use technologies, such as biogas, efficiency, grid, and solar.

WHAT ARE SENSORS AND CONTROLS?

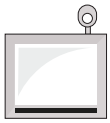
Sensors and controls are enabling hardware for efficient technologies in advanced energy production, conversion, conservation, and storage.



SENSORS
Sensors monitor a system by collecting and processing data relevant to performance and output.

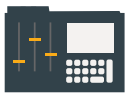
CONTROLS
Controls manage and direct the behavior of a system to achieve desired results based in processed data.

POTENTIAL END-USE APPLICATIONS



BIOGAS
Gas contaminants monitors can measure biogas compounds and unwanted contaminants to meet standards for specific applications.

EFFICIENCY
HVAC/R controllers can monitor and operate numerous HVAC/R equipment throughout a commercial building to optimize energy use.



GRID SECURITY
Remote terminal units can transmit real-time data between grid sensors and distributed control systems to enhance grid monitoring.

SOLAR
Solar tracking systems can make panels follow the sun's arc to maximize solar absorption for electricity generation.

Local End-Use Market Opportunities Can Amplify Benefits

Sensors and controls are hardware solutions for active, agile, and efficient advanced energy systems. Wisconsin can also excel in supplying and building local end-use markets that integrate sensors and controls, particularly biogas, efficiency, grid, and solar.

Biogas

Wisconsin has the potential to add over 1,300 new biogas projects, and gas contaminant monitors could be used to ensure viable output.

Efficiency

Wisconsin could save over 14 thousand GWh in electric energy, an opportunity for further deployment of smart building and energy management systems.

Grid

Wisconsin could benefit from planning for future grid needs and target Wisconsin-made, smart grid products for a secure, resilient, and efficient grid.

Solar

Wisconsin will add 249 MW of solar over the next five years, and solar tracking systems could be utilized to maximize electricity generation.

Through the sensors and controls manufacturing industry, Wisconsin can leverage its numerous strengths to take advantage of expanding opportunities, such as:

- **Capitalizing on increasing technology demand.** The sensors and controls industry is projected to grow almost 7 percent annually through 2022.
- **Growing the manufacturing industry.** At least 209 companies manufacture sensors and controls for advanced energy systems.
- **Bolstering the energy economy.** By deploying Wisconsin-made sensors and controls for safer and more efficient technologies in the state, increased local generation will divert some of the estimated $14 billion spent on imported energy into Wisconsin communities.
- **Leveraging university research expertise.** Wisconsin universities have unique research partnerships dedicated to sensing and control technologies and their end-use applications, ranging from bioenergy to grid technologies.
- **Supporting quality, local jobs statewide.** With forward-thinking solutions, sensors and controls for advanced energy could support 44,000 Wisconsin jobs annually through 2030.

To realize these opportunities, state and local leaders can pursue strategies that create a strong foundation for industry growth in sensors and controls and help Wisconsin businesses grow, innovate, and outcompete regional, national, and global competitors. In today's competitive, globalized economy, businesses are more likely to thrive in cities and states that offer a rich innovation ecosystem, provide fertile grounds for capital investment, boast a highly skilled workforce, and offer clear policy signals. By having a close network of suppliers and partners, Wisconsin companies can reap the benefits of increased productivity and operational efficiency, amplifying local job creation and economic growth.

Capitalizing on this opportunity offers real benefits for the state economy and Wisconsin residents. Annually through 2030, sensors and controls for advanced energy can support a total of 44,000 direct jobs from manufacturing and software development; indirect jobs from supplying equipment, materials, and services to manufacturers and developers; and induced jobs from spending in the local economy. This industry offers a diverse array of good-paying jobs that cater to different education and experience levels. Policymakers can support these jobs by seizing the opportunity presented by increasing global demand and overcoming barriers to industry growth.

Summary of Recommendations

The analysis presented in this report culminates in recommendations for Wisconsin's leaders based on best practices in the United States and abroad. Each recommendation identifies strategies to address barriers to industry growth or capitalize on untapped opportunities in the sensors and controls sector. Specifically, Wisconsin could target challenges in each foundational cluster element: workforce development, access to capital, the innovation ecosystem, and local market growth for sensor- and control-embedded biogas, efficiency, grid, and solar technologies. While the recommendations are intended to be complementary and would be more powerful if adopted as a package, each can also be viewed as a stand-alone option.

Workforce Development

Policy 1: Make Early College Programs More Accessible

Early college programs, also known as dual credit, enable students to earn a high school diploma while earning credits toward a degree. Wisconsin could continue to build on recent efforts to increase access to early college and facilitate entry to career pathways. Streamlining the funding process could reduce red tape, easing administrative burdens.

Policy 2: Provide a Tax Credit to Employers Hiring Apprentices

Apprenticeship programs provide valuable on-the-job skills, making them an important component of career development and workforce training in emerging industries. Employer involvement is a critical barrier to increasing the number of apprentices that can be supported by Wisconsin's exceptional apprenticeship programs. Wisconsin legislators could establish an employer tax credit for hiring youth and/or registered apprentices to increase apprenticeship participation.

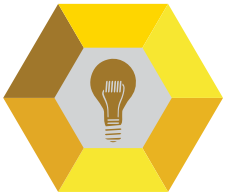
Policy 3: Retain College Graduates and Recruit Out-of-State Talent

Up to 46,000 Wisconsin jobs will be left open by 2022 due to an aging population, net loss of residents, and lack of in-migration by college-educated people. In addition to training and prioritizing Wisconsinites for in-demand jobs, Wisconsin can retain college grads and target out-of-state expertise that will bolster in-state training and hiring to fill the impending worker shortage.

Summary of Recommendations

Access to Capital

Policy 4: Expand Corporate Venture Capital
Although Wisconsin excels at seed investing, companies face a critical funding gap in the early/growth and late stages, which has been only partially met by venture capital. Because corporate venture capital can better support follow-on capital for startups across their lifecycle, Wisconsin's industry associations could market the benefits of corporate venture capital, and the state could drive the development of a corporate fund of funds that builds relationships with national venture capital firms.



Innovation Ecosystem

Policy 5: Facilitate Mentorships for Entrepreneurs
A deficit of interactions between mentors and mentees exists in Wisconsin, and many entrepreneurs lack an understanding of how to properly engage mentors. Replicating successful programs that provide curated mentor-mentee matches and guide participants through the process can increase mentorship and encourage entrepreneurial activity.

Policy 6: Develop Testbeds for Large-Scale Energy Systems
While Wisconsin has exceptional university-based research labs, there are no testbeds at a similar scale dedicated to commercialization efforts and open to entrepreneurs. Wisconsin could establish an advanced energy testbed to accelerate technology development and stimulate innovation.

Policy 7: Establish a Wisconsin Biogas Innovation Voucher Program
Despite expertise at Wisconsin universities in anaerobic digesters, technical issues and the lack of shared knowledge reduce the overall profitability of the Wisconsin biogas industry. To address this issue, Wisconsin could establish a biogas innovation voucher program to connect new projects to in-state technical resources.

Summary of Recommendations

Local Market

Policy 8: Expand the Focus on Energy Program to Include the Energy-Water Nexus
The Wisconsin water technology cluster houses deep expertise in water management that can be leveraged to optimize energy-water efficiencies. To capture greater cost savings, Wisconsin should consider expanding the Focus on Energy program to also finance projects targeting the energy-water nexus.

Policy 9: Conduct a Forward-Looking Grid Study
With the rapid evolution of technologies and recent concerns for grid security, Wisconsin has the opportunity to prepare for future grid needs. The Public Service Commission of Wisconsin, with support from political and business leaders, could conduct an exploratory grid study to ensure strategic grid buildout and regulatory reform.

Policy 10: Explore Energy-as-a-Service Model for Grid Modernization Projects
The energy-as-a-service model can allow entities to more easily finance capital-intensive innovations for grid security and resiliency. Wisconsin counties, municipalities, or large facilities could supply local demand by exploring new models to upgrade infrastructure with less upfront capital.

Policy 11: Establish a Biogas Equipment Tax Credit
Potential biogas customers face high cost barriers to installation and operation, yet existing incentives inadequately address upfront costs, prioritize certain outputs, and fail to account for health and environmental benefits. By passing a biogas equipment tax credit, Wisconsin could incentivize statewide deployment and realize energy and cost savings.

Policy 12: Clarify Legality of Third-Party Ownership of Biogas and Solar Projects
Third-party ownership can offer a lower-cost option for accessing biogas and solar projects; however, Wisconsin lacks a clear policy on whether this financing mechanism is allowed. Wisconsin could clarify its legality through legislative or regulatory means in order to reduce its dependence on out-of-state energy imports.

Policy 13: Establish Consistent Net Metering Policies
An unclear and outdated net metering policy has made it challenging for Wisconsin residents and firms to invest in distributed generation such as biogas and solar. The Public Service Commission of Wisconsin and the Wisconsin Legislature could update the policy to spur the local market.