IAC INDUSTRIAL ASSESSMENT CENTERS

A Program of the U.S. Department of Energy

Beginning in 1976, the Industrial Assessment Centers (IACs) have provided small and medium-sized manufacturers with site-specific recommendations for improving energy efficiency, reducing waste, and increasing productivity through changes in processes and equipment.

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or contact your nearest center.

Cybersecurity and the IACs: Assisting Small and Medium-Sized Manufacturers

Small and medium-sized manufacturers are a critical part of our economic infrastructure because they comprise a large portion of manufacturing supply chains. From food processing and medical devices to information technology and defense systems, America's network of small manufacturing firms are responsible for adding the majority of new manufacturing jobs every year.[1] These firms are essential to the process of taking a product from concept to market. In addition, the exchange of manufacturing know-how across suppliers is essential for the diffusion of the new technologies and innovative processes that give U.S. manufacturing its cutting edge.

According to the U.S. Department of Homeland Security (DHS), small businesses may not consider themselves targets for cyber-attacks due to their small size or the perception that they don't have anything worth stealing. However, small businesses have valuable information cyber criminals seek, such as employee and customer records, bank account information and the business's finances, and access to larger networks. In some ways, small businesses are at a higher risk of cyber-attacks than larger businesses because they often have fewer resources dedicated to cybersecurity.[2] According to the most recent Verizon Data Breach Investigations Report (2018), 58% of breaches impacted smaller organizations[3] and the average cost to a small or medium-sized business from a cyber-attack ranges between $84,000 and $148,000.[4]

Executive Order 13800, "Strengthening the Cybersecurity of Federal Networks and Critical Infrastructure" built upon previous Federal cybersecurity work that called for the U.S. government to implement the National Institute of Standards and Technology (NIST) Cybersecurity Framework (CSF) created in 2014. NIST CSF includes voluntary standards, guidelines, and practices to protect critical infrastructure in government agencies and

Source: N. Hanacek/NIST

1 Small Business Administration, Frequently Asked Questions about Small Business, https://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2017-WEB.pdf.

2 https://www.dhs.gov/publication/stopthinkconnect-small-business-resources.

3 Widup, Suzanne & Spitler, Marc & Hylender, David & Bassett, Gabriel. (2018). 2018 Verizon Data Breach Investigations Report.

4 The Guardian (U.S. edition) 1/21/15.

business sectors, including the manufacturing industry. In addition, DHS recommends using the CSF for organizations in the critical manufacturing sector in "Critical Manufacturing Sector Cybersecurity Framework Implementation Guide" from 2015. The Industrial Assessment Centers (IACs) are positioned to assist small and medium-sized manufacturers in utilizing the Framework to:

1. Describe their current cybersecurity posture;
2. Describe their target state for cybersecurity;
3. Identify and prioritize opportunities for improvement within the context of a continuous and repeatable process;
4. Assess progress toward the target state; and
5. Communicate among internal and external stakeholders about cybersecurity risk.

The IACs provide cybersecurity awareness information to all their manufacturing clients. They also provide reference materials and links to available cybersecurity technical resources for clients requiring additional services. Lastly, selected IAC clients can receive cybersecurity risk assessments using the CSF approach. The goal of these assessments is to aid the client in identifying security and privacy deficiencies to the business cybersecurity infrastructure. Upon conclusion of the cybersecurity risk assessments, clients receive a mitigation plan for the risks identified.

In addition to those facilities interested in receiving cybersecurity risk assessments, the IACs are developing a suite of online and other technical resource materials through the NIST Manufacturing Extension Partnership (MEP) and other appropriate organizations to help small and medium-sized manufacturers connect with appropriate technical resources. ■

CENTER SPOTLIGHT

Georgia-North Florida IAC Identifies $400K in Potential Savings for Chicken of the Sea

In the small town of Lyons, Georgia sits a Chicken of the Sea packaging plant – the largest employer in the town with over 250 employees from over 13 neighboring counties. The plant is responsible for producing over 7 million cases of tuna per year, so implementing cost- and energy-savings measures can have a huge impact on the plant's success. Earlier this year, Chicken of the Sea partnered with the Georgia Manufacturing Extension Partnership (GA MEP) to complete a value stream map of their canning process. Through this partnership, they also applied for an energy assessment through the

Students and faculty from the Georgia-North Florida IAC take measurements on a boiler at the Lyons, Georgia Chicken of the Sea Plant. Photo Courtesy: Chicken of the Sea

Georgia-North Florida Industrial Assessment Center which is made up of students and faculty from Georgia Tech, Florida State University, and Florida A&M. The Georgia-North Florida IAC team's work complemented the efforts of the GA MEP and Chicken of the Sea by identifying a number of opportunities for the plant to save approximately $400,000 a year through a combination of low-cost investments and larger, long-term investments aimed at reducing electricity, water, and natural gas usage and improving energy efficiency. Chicken of the Sea is planning to add new equipment within the next year based on the team's recommendations. This was only the fifth assessment the Georgia-North Florida IAC team conducted and was the first facility where they made water-savings recommendations.

Among those involved in the assessment were faculty members Sinan Sinharoy and Randy Green, and students Saikamal (Sai) Srinivas and Kelly Grissom. Sai just started his final semester at Georgia Tech and Kelly has since graduated and accepted a full-time position at the Georgia MEP. Kelly described the assessment as, "a great learning experience. The assessment not only resulted in the recommendations that were made, but also seeing the best practices that Chicken of the Sea had implemented such as boiler economizers."

Kelly got involved in the IAC program through her student co-op plan at Georgia Tech's Enterprise Innovation Institute (EI2). She graduated in December 2017 with a bachelor's degree in mechanical engineering and stays closely connected to the IAC through her work with EI2 and the Georgia Tech Research Institute. She credits her involvement with the IAC program with her ability to secure the job she has currently along with another job offer she received based on her IAC experience. ■

ALUMNI SPOTLIGHT

An Interview with Dr. Yogesh Mardikar

Dr. Yogesh Mardikar

We sat down to talk with West Virginia University IAC alumnus Dr. Yogesh Mardikar for this quarter's IAC alumni spotlight.

Dr. Mardikar is currently the Senior Manager of Renewable Energy and Energy Efficiency for Walmart Energy. He was the lead student at the WVU IAC from 2005-2007. He has a bachelor of science in mechanical engineering from Pune University and a masters and Ph.D. in industrial engineering from West Virginia University. Yogesh is an ASHRAE certified Building Energy Assessment Professional (BEAP), a Certified Energy Manager (CEM), a USGBC LEED Accredited Professional for Existing Building - Operations and Maintenance (LEED AP- O&M). He is a member of the Industrial Engineering Honor Society (Alpha Pi Mu), ASHRAE, and Association of Energy Engineers (AEE). Yogesh has co-authored several publications with emphasis on energy efficiency.

Q: Can you tell us a little bit about the path that brought you to the IAC program and what drew you to it?

A: I was already involved in some of the other energy efficiency programs available at WVU, the Wood Industry Assistance program and West Virginia Industries of the Future (IOF) program, mainly focusing on wood products industry (sawmills, veneer) and large industrial plants (chemical, plastic extrusion, power, etc.). Both of these energy programs were funded by the West Virginia Development Office (WVDO) to perform energy and productivity assessments at industrial facilities in the state of WV. Under Dr. Gopala's direction, I worked as a lead student engineer performing energy assessments and engineering studies at various industrial facilities to help them save energy, improve productivity, and reduce waste. I was also responsible for leading a plant-wide energy assessment at PPG Industries over a period of 1.5 years. Between, January 2003-December 2004, I led several energy assessments under the two programs. From my frequent interactions with Dr. Gopala and the WVU-IAC team next door, I observed that the IAC projects covered a wide variety of industrial facilities within the Standard Industrial Classification (SIC) ranging from plastic products, automobile ancillary industries, steel rolling, to food-processing, to name a few. It was fascinating to learn that the energy-using systems are fundamentally the same; however, the energy used by the various production and support systems varies significantly with the production process. The IAC assessments also provide access to the tremendous data pool (limited to system energy use data only and not proprietary production data) available for conducting energy efficiency research. Several professional development organizations such as AEE consider IAC experience equivalent to a full-time employment, which is necessary for getting a CEM certification. IAC offers a perfect balance between gaining professional experience in a field that can make a significant positive impact on the environment & the bottom-line for facilities while students can continue to pursue their academic goals.

Q: How did your involvement in the IAC directly and/or indirectly help you secure and succeed in your past and current positions?

A: The data driven hands-on approach of conducting energy assessments is well-cultivated at the WVU-IAC. The IAC prepares aspiring engineering graduates with the necessary energy auditing skills including exposure to extensive site data collection strategies, effective interpersonal skills, detailed engineering analysis, project design and costing, and technical report writing skills. My tenure at IAC-WVU has helped me acquire great leadership and managerial skills from leading several energy assessments for prominent industrial facilities. The IAC program had prepared me well and had served as a leg-up for my professional career in the field of energy efficiency and sustainability.

Q: Have the companies you worked for actively sought to hire IAC students?

A: We have consistently sought IAC graduates for full-time energy engineering and internship opportunities from nearby programs like West Virginia University; University of Oklahoma; University of Illinois, Chicago; University of Dayton, OH; and Boise State University. It has been my experience that energy engineers affiliated with the IAC program possess sound energy engineering fundamentals and are well prepared

for taking on professional assignments at the onset of their professional career. Several such IAC engineering graduates have successfully participated in numerous energy efficiency assignments and have demonstrated their professional energy engineering capabilities.

Q: Can you talk a little bit about some examples of energy management changes you have helped Walmart implement and how that has helped the company be more competitive?

A: The Walmart Energy team is determined to reduce our company's carbon footprint and continues to strategize, develop, and implement energy efficiency measures throughout its fleet of more than 5,000 stores. Walmart has successfully completed several lighting, HVAC, and refrigeration system upgrades to date, including interior and exterior LED lighting retrofits, glass door additions, anti-sweat heater optimization for refrigerated cases, and HVAC system replacements/optimization. The Walmart Energy team has a renewed focus on refrigeration system efficiency. Currently, several energy reduction measures for refrigeration systems are being developed and simultaneously deployed at Walmart stores while improving comfort conditions and shelf-life of the products. Our robust M&V program ensures that the energy saving measures are installed correctly per the intent and will continue to save energy throughout the useful life of the equipment. Walmart continues to make progress towards aspirational goals of achieving 50% of their energy from renewable sources by 2025 and eventually 100% by targeting both onsite and offsite renewable energy projects. The energy efficiency initiatives help Walmart achieve Every-Day-Low-Cost goal while providing Every-Day-Low-Price products to its customers.

Q: Do you credit the IAC program with helping you get to where you are today?

A: Absolutely, the IAC program offers a sound framework for creating value to industrial facilities throughout the US. This thought process of providing value to the clients is deeply ingrained at WVU-IAC and is manifested from deploying a streamlined energy auditing process, use of extensive data collection strategies and state-of-the-art instrumentation, and a client-focused approach. The ability to listen and understand the customer/client pain-points and being able to devise timely and cost-effective energy saving strategies supported by factual data is a key to one's success in the energy efficiency business. WVU-IAC does it all so well that its graduates are ready to begin and succeed in their professional career. The WVU-IAC offered me a once-in-a-lifetime opportunity to work under the guidance of an esteemed energy professional, Dr. Gopala. Many thanks to the IAC program. ■

CLIENT TESTIMONIALS

Syracuse University

Syracuse University

"Overall, very impressed with their dynamics as a team and would highly recommend their services to any commercial/industrial customer in New York state."

– Rick Ponzi, Facilities Manager at TAM Ceramics (Niagara Falls, NY)

University of Missouri – Columbia

"Thank you and your professional students for the collaborative time auditing and understanding our facility which provided excellent assessment recommendations to reduce operating costs and the subsequent CO2 emissions. I would be interested in a follow-up that shows expected annual savings from what we have done or expect to complete by year-end."

– Vince Gochenauer, Plant Manager at Silgan Containers (Mount Vernon, Missouri)

IAC Program Quarterly Results January-March 2018

*Note: metrics delayed by one quarter. Metrics source: IAC Database

IDENTIFIED SAVINGS

Between January and March of 2018, IACs conducted 82 assessments (Table 1). As a result, IACs made 583 recommendations that identified more than $11M in potential cost savings.

	This Quarter	Annual
Energy Savings	14.3 Therms	28 M Therms
Electricity Savings	104,857,371 kWh	192,570,681 kWh
Generation Reduction (approx)	11.97 MegaWatts	21.98 MegaWatts
Natural Gas Savings	1.2 M Therms	3.3 M Therms
CO2 Reduction	0.09 Tons	0.02 Tons
Energy Related Savings	$9.15 Million	$18.18 Million
Productivity Savings	$1.87 Million	$2.3 Million
Waste & Water Savings	$0.52 Million	$0.96 Million
TOTAL Cost Savings	$11.54 Million	$21.45 Million

Table 1. January-March 2018

LOCATIONS

Plants assessed were located in 27 states (Figure 1). The assessed plants represent a broad range of industries, with food, plastics and rubber products, transportation, and fabricated metals being the most common (Table 2).

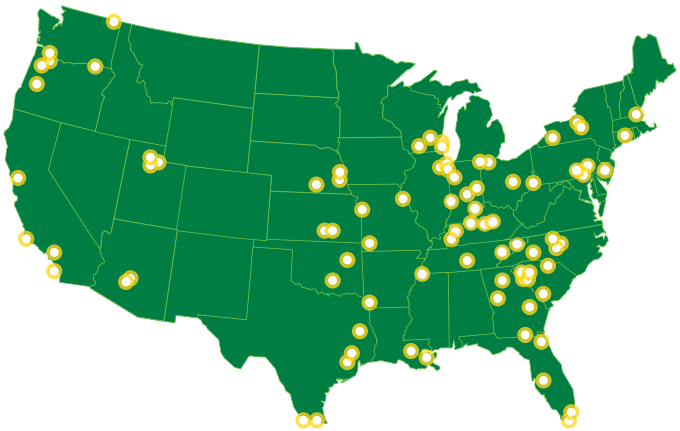

Figure 1. IAC Assessments Nationwide, January-March 2018

PARTICIPATION

A total of 252 engineering students were active during the quarter in the IAC program across the 28 centers; and roughly 20% were new to the program. IACs issued 20 certificates to students for the quarter, bringing the total issued for the year to 73. To earn a certificate, students must master a set of core skills and participate in at least 6 assessments.

INDUSTRIES

Industrial Category (NAICS #)	Assessments
Food Manufacturing (311)	11
Plastics and Rubber Products Manufacturing (326)	9
Transportation Equipment Manufacturing (336)	8
Fabricated Metal Product Manufacturing (332)	6
Wood Product Manufacturing (321)	4
Machinery Manufacturing (333)	4
Nonmetallic Mineral Product Manufacturing (327)	4
Electrical Equipment and Appliances (335)	4
Furniture and Related Product Manufacturing (337)	3
Textile Mills (313)	3
Chemical Manufacturing (325)	3
Beverage and Tobacco Product Manufacturing (312)	2
Primary Metal Manufacturing (331)	2
Printing and Related Support Activities (323)	2
Paper Manufacturing (322)	2
Computer and Electronic Manufacturing (334)	2
All Other Manufacturing	7
Others	6

Table 2. January-March 2018 Assessments

More information on the services and results of assessments performed since 1981 can be found in the IAC database located at https://iac.university/#database.

U.S. DEPARTMENT OF ENERGY
Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

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