

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.

FALL NEWSLETTER 2017

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IAC PROGRAM HIGHLIGHTS

2017 Directors Meeting

Narrowly dodging Tropical Storm Cindy and the more than 15 inches of rain it brought to the Gulf Coast earlier this year, representatives from the Department of Energy (DOE) and the Industrial Assessment Centers (IACs) held their annual Directors Meeting in New Orleans on June 22 and 23, 2017. Each year, directors from every IAC convene to discuss center and student performance, ongoing and emerging program priorities, developments in industrial energy efficiency and productivity improvements, as well as opportunities to share lessons learned and assessment strategies. The overall goal of the meeting is to maintain and enhance IAC program performance across the nationwide network of centers.

This year's meeting was somewhat unique. It was the first time directors representing the nine new schools, selected as a result of the most recent re-compete of the IACs, joined their more experienced colleagues to discuss the many rewards and challenges associated with operating an IAC. The directors meeting traditionally includes a significant peer-to-peer and lessons learned component – whether it relates to sharing the latest developments in industrial energy efficiency technology and equipment or to best practices for conducting assessments and report writing to tips for improving the overall IAC student experience. Examples of director-led technical topic discussions included: exploring opportunities for capturing methane emissions from anaerobic ponds, improved techniques for large air leak estimation, devising energy savings from heat shields, and waste reduction from thermal densifiers.

DOE and the IAC Field Manager also discussed last year's performance, as well as emerging priorities. In particular, the 2017 IAC Directors Meeting devoted significant time to four new program thrusts:

Cybersecurity – Pat Toth, Cybersecurity Program Manager at NIST Manufacturing Extension Partnership (MEP), led a discussion on the proposed collaboration between IACs, MEP centers, and other NIST cybersecurity resources. Ms. Toth provided information on recently issued cybersecurity guidance for small business, a general overview of MEP technical assistance capabilities in this emerging area, and suggestions on ways for IACs to work with their local MEPs to better connect small and medium-sized manufacturing clients with these resources.

Wastewater Assessment Tools – Dr. Larry Moore, University of Memphis, conducted a demonstration of the Bio-Tiger tool, a spreadsheet bio-kinetic model that IACs can use to improve the performance of wastewater treatment facilities, especially with sludge management, while also saving energy. With the recent emphasis on providing technical support to wastewater partners – whether in



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<http://iac.university>
or contact your nearest center.

conjunction with the Better Plants program or the Sustainable Wastewater Infrastructure of the Future (SWIFt) initiative – IACs will be able to employ the tool to improve assessments at these facilities.

Energy Management – Mike B. Muller, Rutgers University, provided an overview of the forthcoming 50001 Ready Navigator. The 50001 Ready Navigator tool is designed to provide step-by-step guidance and useful templates to help manufacturers implement ISO 50001-based energy management, yet does not require any external audits or certifications.

Smart Manufacturing – Dr. Mike Muller, Sr., Rutgers University, highlighted the opportunity for IACs to play a critical role in the deployment of smart manufacturing technologies at small and medium-sized manufacturers, especially in the area of retrofits. He further outlined a four-step approach to develop a protocol for Smart IAC assessments, including: communication and control system infrastructure review, evaluation of existing analytics, potential project brainstorming, and prioritizing potential first steps.

Finally, the meeting concluded with a roundtable discussion – led by the directors – on how to best implement DOE priorities and achieve overall IAC program objectives for small and medium-sized manufacturers and engineering students. In this forum, topics ranged from practical recommendations for IAC website improvements and suggestions for supporting the professional development of assistant directors, to more strategic areas, such as achieving higher implementation rates for assessment recommendations through increased collaboration with states and utilities and the development of a nationally accredited energy engineering curriculum. ■

STUDENT SPOTLIGHT

Congratulations to the 2017 IAC Outstanding Student Award Winners

Each year the IAC program recognizes undergraduate and graduate students for outstanding accomplishments in promoting the practices and principles of energy engineering as it relates to energy efficiency, productivity improvement, smart manufacturing, waste reduction, water conservation, energy management, and cybersecurity. These students perform and lead on-site assessments at small- and medium-sized manufacturing businesses while gaining knowledge and skills that will help them in their future careers. Congratulations to the 2017 Outstanding Student Award winners:



Anthony Taylor
Tennessee Technological
University

Anthony graduated with a Master of Science degree in Mechanical Engineering in May 2017 from Tennessee Technological University (TTU). While at TTU, Anthony participated in 38 assessments over the course of three and a half years and was the lead student on 18 of those assessments. He also introduced new ways of using 3D printing to aid in creating tools to perform IAC assessments. Anthony also led multiple in-house trainings to educate new IAC students on various topics related to energy engineering. Anthony now works at Ingersoll Rand as a technical representative across the state of Tennessee. He credits the IAC program with giving him the skills needed to secure a job at Ingersoll Rand after graduation.



**Abdul Hadi Mahmoud
Ayoub**
Indiana University – Purdue
University Indianapolis

Abdul is a graduate student in the Department of Mechanical Engineering at Indiana University – Purdue University Indianapolis (IUPUI). He has been with the IUPUI IAC for three years and served as the lead student for the last two years, participating in 33 assessments total. Abdul played a critical leadership role in managing and growing the center. His master's thesis topic is related to smart manufacturing, which complements his work with the IAC. As a leader at the IUPUI IAC, Abdul has recruited and trained 39 IAC students and has worked hard to promote the IAC at conferences and local energy seminars.

ALUMNI SPOTLIGHT

Congratulations to the 2017 IAC Distinguished Alumni Award Winners

The annual IAC Distinguished Alumni Award recognizes graduates of the IAC program who have made a significant impact through their work in energy efficiency in either an academic or professional capacity after their IAC experience. These alumni have taken the skills they learned and continue to show their dedication to the practices and principles of energy engineering.



Dr. Yogesh Mardikar

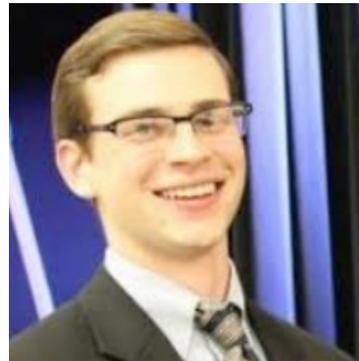
Dr. Mardikar is a graduate of the West Virginia University IAC and is now the Director of Energy Efficiency at Sieben Energy Associates, a private energy consulting firm. Under his direction, Sieben Energy Associates has completed over 75 assignments in the public and private sector resulting in over 50 million kWh and 1.2 million therms in verified energy savings. Dr. Mardikar continues to stay connected to the IAC program, including hiring several IAC undergraduates and graduates for full-time energy engineering and internship opportunities. Dr. Mardikar believes that the IAC program provides a strong foundation for energy engineers of the future.



Ayyoub Mehdizadeh Momen

Ayyoub is a graduate of the University of Florida (UF) IAC and now works as a R&D associate staff at Oak Ridge National Laboratory (ORNL). During his time at the UF IAC, Ayyoub became familiar with state of the art technologies at various physical scales of different systems. His current work involves

partnering with companies and ORNL to develop new high-efficiency building equipment, the most notable of which is the new ultra-low-energy consumption [ultrasonic clothes dryer](#).



Ian Swagerty

Ian is a graduate of the Tennessee Technological University IAC and is now an associate project development engineer at Ameresco, Inc., which offers renewable energy and energy efficiency solutions for public and private companies. Ian has been in constant contact with the IAC students at TTU since his departure from the program and has established contact between numerous students and Ameresco for potential employment and internship possibilities. In his time at Ameresco, Ian has worked on two projects, including a project that identified over \$258 million in energy efficiency and resilience opportunities for a client with the U.S. Department of Defense. This marks the largest energy savings performance contract proposal in company and government history.



John Houdek

John is a graduate of the Texas A&M University IAC and is now a facilities operations engineer at Samsung Austin Semiconductor. John is a reverse osmosis specialist in the ultrapure water treatment plant where he works in support of the semiconductor manufacturing process. The smart manufacturing, waste reduction, and water treatment skills he learned while in the IAC program enabled him to confidently transition to Samsung Austin Semiconductor and suggest improvements to reduce the site's manufacturing costs and environmental impact. John continues to stay in touch with current IAC students to discuss different career options in industry and his experience working for Samsung Austin Semiconductor.



Nicole de Leon

Nicole is a graduate of the University of Delaware IAC and is now a project development manager at Kitu Systems, Inc. Since graduating, Nicole has worked on a number of technologies and received awards for projects that introduce improved processes for facilities operations including peak load management for electric vehicle charging stations in California, introducing a combined heat and power (CHP) system to a commercial laundry facility in New Hampshire, and a critical peak pricing program for a utilities company in Washington, DC. Nicole also contributes to ongoing research associated with the University of Delaware IAC. ■

One notable assessment was in early November 2017 when they visited Hastings Utilities' Pollution Control Facility (PCF). The PCF is a wastewater treatment facility that has been in operation since 1982, with an expansion that was completed in 2003. The PCF has the capacity to treat six million gallons of water per day, so the team of five students from the NIAC had their work cut out for them. During their visit the NIAC students toured the plant, collected data, and did calculations on various pieces of equipment and installations within the facility. Their recommendations ranged from downsizing PCF's aeration blower, which aids in ammonia removal, to simpler recommendations like replacing the older exit signs with more energy-efficient LED signs. The energy and waste savings recommendations not only have the potential to help Hastings Utilities save energy and money, but could be passed on to the rate payers' utility bills, providing added benefit to the local community.

In their first year, NIAC students are gaining hands-on experience at a diverse mix of manufacturing facilities including to healthcare equipment manufacturing, food manufacturing, and refrigeration equipment manufacturing facilities. ■

CENTER SPOTLIGHT

NIAC Meets Needs of Midwest Manufacturers and Utilities Providers



University of Nebraska-Lincoln students tour the Hastings Utilities Pollution Control Facility. Photo Courtesy: Amy Roh, Hastings Tribune

The University of Nebraska-Lincoln IAC (NIAC) students have hit the ground running in their first year. In the beginning of 2017, after completing the required training, the first group of NIAC students began conducting energy assessments at small- and medium-sized manufacturers and utilities providers in the Midwest. So far, they have conducted 16 assessments and provided 86 energy savings recommendations. The NIAC has already served clients in Nebraska, Iowa, and Missouri – filling a gap in the Midwest where the next nearest IACs are in Utah to the west, Illinois to the east, and Texas to the south.

CLIENT TESTIMONIALS

University of Missouri-Columbia

“The audit process is valuable to help understand the highest areas of benefit and to allow us to get an outside perspective on the projects we should focus on. We have been able to start projects earlier by having the energy savings to justify the projects.”

– Glen Kloeppe, Project Engineer at Caterpillar (Columbia, Missouri).

Louisiana State University

“Please let the entire team know that Blast Tech is very impressed and grateful for the quality of the data provided by the students. Because the data is so thorough it allows us to determine areas of focus with very little additional input required.”

– Andre Fontova, Vice President of Commercialization at Blast Tech (Broussard, Louisiana)

IAC Program Quarterly Results July - September 2017

IDENTIFIED SAVINGS

Between July and September of 2017, IACs conducted 119 assessments (Table 1), bringing the total for the fiscal year to 484 assessments. As a result, IACs made 876 recommendations that identified nearly \$21M in potential cost savings.

	This Quarter	Annual
Energy Savings	21.4 M Therms	95.7 M Therms
Electricity Savings	208,557,917 kWh	702,588,967 kWh
Generation Reduction (approx)	23.81 MegaWatts	80.21 MegaWatts
Natural Gas Savings	1.3 M Therms	19.1 M Therms
Energy Related Savings	\$14.32 Million	\$65.23 Million
Productivity Savings	\$5.84 Million	\$10.54 Million
Waste & Water Savings	\$0.65 Million	\$4.38 Million
TOTAL Cost Savings	\$20.81 Million	\$80.13 Million

Table 1. 2017 July - September

LOCATIONS

Plants assessed were located in 28 states (Figure 1). The assessed plants represent a broad range of industries, with fabricated metals, food, transportation, and plastics and rubber being the most common (Table 2).

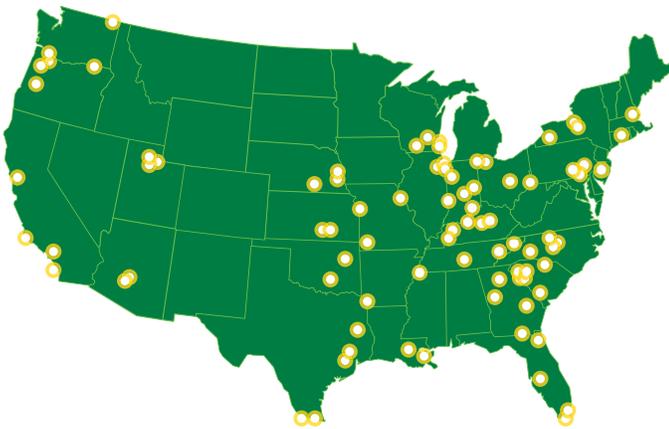


Figure 1. IAC Assessments Nationwide, 2017 Jul - Sep

PARTICIPATION

A total of 502 engineering students were active in the IAC program across the 28 centers; and more than 65 percent were new to the program this year. IACs issued 116 certificates to students for the year, the second highest annual total ever. To earn a certificate, students must master a set of core skills and participate in at least six assessments.

INDUSTRIES

Industrial Category (NAICS #)	Assessments
Fabricated Metal Product Manufacturing (332)	23
Transportation Equipment Manufacturing (336)	12
Plastics and Rubber Products Manufacturing (326)	11
Food Manufacturing (311)	15
Chemical Manufacturing (325)	7
Machinery Manufacturing (333)	7
Wood Product Manufacturing (321)	3
Primary Metal Manufacturing (331)	2
Paper Manufacturing (322)	4
Textile Mills (313)	2
Textile Product Mills (314)	2
Apparel Manufacturing (315)	2
All Other Manufacturing	15
Others	14

Table 2. 2017 July - September 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

Energy Efficiency &
Renewable Energy

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