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.

FALL NEWSLETTER **2019**

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SIGN UP for an assessment at **http://iac.university**

or contact your nearest center.

PROGRAM HIGHLIGHTS

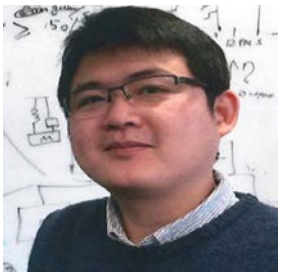
OUTSTANDING STUDENT & ALUMNI AWARDS

The Advanced Manufacturing Office sponsors annual outstanding student and alumni award competitions. The student awards honor exceptional students (undergraduate or graduate) for outstanding accomplishments in promoting the practices, principles, and procedures in energy efficiency, productivity improvement and smart manufacturing, waste reduction, water conservation, energy management, and cybersecurity. The alumni awards recognize outstanding accomplishments in promoting the practices, principles, and procedures of energy engineering in a professional or academic capacity after their IAC experience.

Information about this year's winning students and alumni follows:

Outstanding Students

- **University of Utah: Moriah Henning –** As a senior with nearly two years of experience in the IAC program, Moriah routinely demonstrated a calm and confident demeanor that made her a valuable leader and overall team member of the University of Utah IAC. In addition to her role as lead student on a number of assessments, Moriah also demonstrated critical problem solving and innovative thinking skills with respect to combined heat and power recommendations and advanced application of industrial analytics, especially compressed air systems.



- **Indiana University, Purdue University Indianapolis (IUPUI): Da-Chun Wu –** Da-Chun, or "Allen" – as he is known to his IAC colleagues – has been a member of the IUPUI IAC for nearly five years, serving as the lead student for more than a year. He has participated in almost 40 assessments, easily qualifying for an IAC Certificate of Achievement. Allen's research has been published both nationally and internationally and he has demonstrated in-depth expertise in decision making in energy management using machine learning and artificial intelligence. In addition to playing a key role as IAC operational manager and student mentor, Allen has introduced project management software and a client database and information directory to enhance long-term effectiveness at the center.

PROGRAM HIGHLIGHTS

- **Texas A&M University: Rafael Dugarte –** Rafael is a graduate student at the Texas A&M IAC. He has participated in 14 assessments, acting in a variety of capacities (including lead student), and he routinely serves as an informal mentor and trainer for other students. In fact, his willingness to lead by example has resulted in Rafael volunteering to work with engineering students at the Universidad Tecnologica of Panama conducting industrial assessments while attending school abroad. Rafael is also a strong advocate for productivity improvement. To date, he has identified $630,000 in productivity-related opportunities while conducting assessments, which by far is the highest for the center.

- **Oklahoma State University (OSU): Pragya Niraula –** Pragya served as the official lead student for the OSU IAC during a particularly challenging time – winter/spring of 2017-18 – when the center was operating under severe funding shortages. When subsequent turnover and other external factors created staffing and expertise gaps, Pragya stepped in and became the de facto lead student for an additional six months. While participating in enough assessments to earn her IAC certificate, she also served as the primary reviewer on 10 assessment reports prepared by Wichita State University, OSU's satellite center. In addition, Pragya has played a lead role in the emerging trend among IACs to incorporate more productivity-related recommendations, especially quality control improvement, into OSU's assessment reports.

Distinguished Alumni

- **University of Wisconsin, Milwaukee (2014): Arash Kialashaki –** Dr. Arash Kialashaki is a senior engineer at Lincus, Inc. – an energy engineering and consulting firm operating primarily in California and the Southwest – as well as a part-time lecturer at California State University, Chico. Since graduating, he has led a team of engineers providing energy efficiency improvement solutions to both industrial and commercial clients of a number of investor-owned utilities. In addition, Dr. Kialashaki has published numerous papers in peer-reviewed journals, presented at several national and international conferences, and remains actively engaged with many energy efficiency and engineering stakeholders.

- **Oklahoma State University (2013): Akshaya Satpute Naik –** Akshaya leads a team of engineers at Nexant, Inc. – a 500+ employee engineering and consulting firm that provides energy software, utility services, and energy and chemicals advisory services to clients on every continent. In her role as team lead, she has conducted more than 60 energy assessments for small businesses and also provided training for dozens of contracting/service provider companies related to industrial system and building envelop energy use. Akshaya spearheaded the development of an online tool to process energy efficiency projects from the application phase to final utility payment. The tool has completely changed the way Nexant provides services to its clients.

CLIENT TESTIMONIALS

Oklahoma State University

"MAX extends a big thank you to the team for an outstanding job on the energy evaluation conducted last fall at MAX Aerostructures. The comprehensive report the team provided us was instrumental in understanding the cost savings opportunity and prioritizing each project for implementation. Having the right information makes the decision to start the journey of saving energy that much easier. Great job to you and your team!!"

– Jarrod Young, Director of Quality Assurance
MAX Aerostructures

University of Missouri

"I have printed and briefly went through the review. This is a great amount of work and I am excited to thoroughly read through this and look at how we can save money on electrical consumption as well as water. I will provide some feedback/comments after I go through it completely. Thank you very much again for the diligent work you and the students have put into this. I greatly appreciate it."

– Joshua B. Youngblood,
Asst. Water Quality Superintendant - Wastewater
Nixa, Missouri, Wastewater Treatment Plant

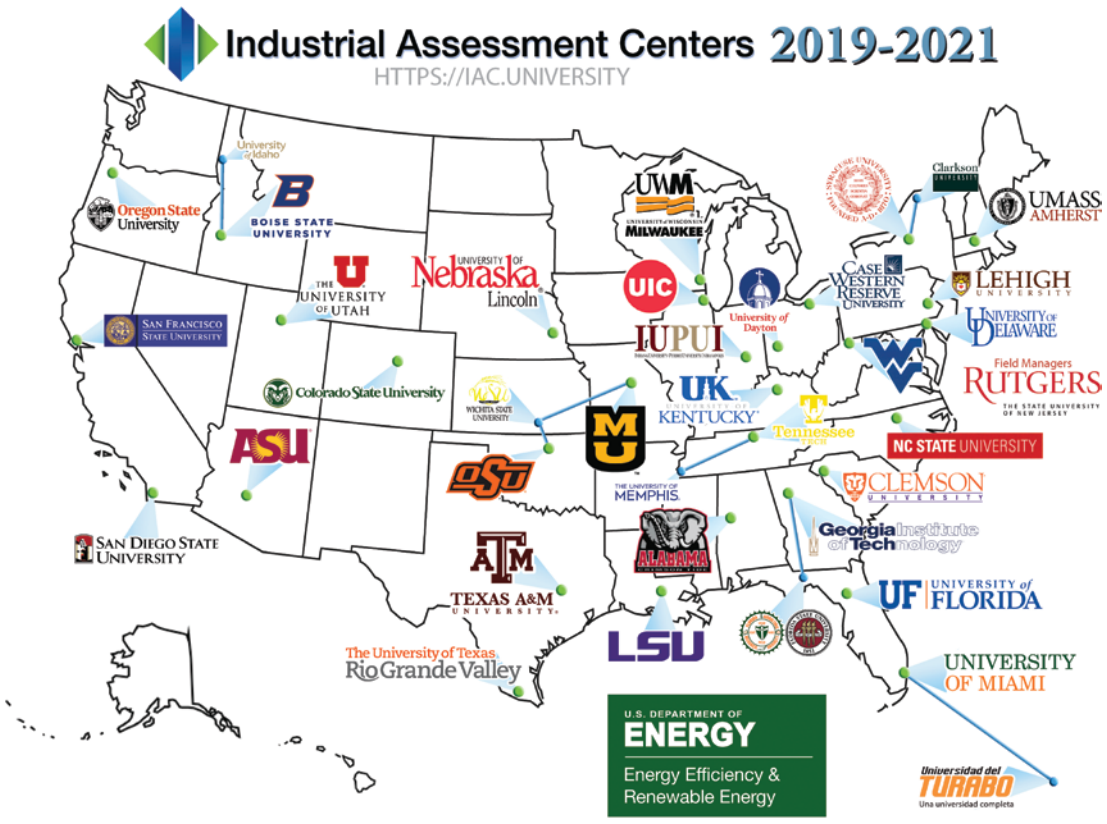
CENTER HIGHLIGHTS

IAC COLLABORATION WITH TENNESSEE VALLEY AUTHORITY

The Industrial Assessment Center at Tennessee Technological University (Tennessee Tech) identified opportunities to increase energy efficiency at the Tennessee Valley Authority's (TVA) Magnolia Combined Cycle Plant. The facility is a three-unit natural gas generating plant located on approximately 374 acres in Ashland, Mississippi. The plant is set up in a 1x1x1 combined cycle configuration, with each unit consisting of one combustion turbine generator, one steam turbine generator, and one heat recovery generator (HRSG) with selective catalytic reduction. Each HRSG has natural gas duct firing capacity to increase steam generation during peak demand. Nominal plant capacity is 920 MW.

A team of engineering students and faculty from Tennessee Tech spent two days at the plant, working with TVA engineers, and were able to identify seven opportunities for energy savings. The opportunities quantified are: 1) recover flash steam from blowdown and route through LP-turbine; 2) trim impellers on component cooling water (CCW) pumps; 3) install variable frequency drives (VFD) on cooling tower plans; 4) switch to more efficient evaporative cooling media; 5) preheat natural gas going to duct burners; 6) operate preferentially the most efficient mix of well pumps; and 7) install VFDs on mist eliminator blowers. Other discussion items listed included: 1) repair leaking butterfly valves on gas turbine compressors; 2) refurbish system for on-line cleaning of compressor inlet air filters; and 3) install on-line water wash system. ■

Tennessee Tech IAC students evaluate the performance specifications of a pumping station.



Industrial Assessment Centers are located at 31 universities across the country and funded by the U.S. Department of Energy's Advanced Manufacturing Office. Engineering students and faculty conduct energy efficiency assessments at manufacturing facilities or water treatment plants to identify savings opportunities. In addition to assisting industry with energy conservation, IAC students gain valuable practical experience in real-life manufacturing environments.

CLIENT SPOTLIGHT

KOPPERS, INC. — HUNTINGTON, WEST VIRGINIA

The IAC at West Virginia University discovered numerous opportunities to decrease energy usage and enhance corporate competitiveness for Koppers, Inc., which has a manufacturing facility located in Huntington, West Virginia. The assessment team focused on the manufacturing process as well as the energy support systems. The recommendations at this facility may serve as a template for potential savings at similar plants.

As a result of the assessment, recommendations were made for improvement in several specific areas, including:

- Replace the metal halide and high-pressure sodium fixtures with LEDs
- Repair compressed air leaks
- Improve the controls on the compressors
- Reduce compressor pressure set point
- Install smart sensor to regulate bonding oven
- Replace regular urinals with water-free urinals
- Install occupancy sensors in designated areas
- Insulate bonding oven sections

In general, the management and employees at the facility are "energy conservation" oriented and follow many good practices to save energy. For example, the plant uses synthetic lubricant for compressors, radiant tube heaters and skylights in the plant, and shuts off its compressor during weekends. The assessment team was pleased with the level of energy efficiency awareness among plant personnel and worked on identifying other ways to save energy by discussing energy efficiency opportunities. The recommendations identified by the team were discussed with plant personnel on assessment day.

The following table presents the annual cost savings at Koppers, Inc. due to the implemented recommendations. ■

Assessment Recommendations	Annual Resource Savings (kWh/yr)	Total Annual Savings	Capital Costs	Simple Payback (months)
Repair Compressed Air Leaks	138,472 kWh/yr	$11,821	$180	1
Replace Metal Halide and High-Pressure Sodium Fixtures with LED	512,676 kWh/yr	$43,778	$37,964	11
Total	**651,148 kWh/yr**	**$55,599**	**$38,144**	**9**

Railroad rail joints, Koppers, Inc., Huntington, West Virginia

IAC Program Quarterly Results

Between October and December 2018, IACs conducted 99 assessments (Table 1). As a result, IACs made 655 recommendations that identified more than $11.7 million in potential cost savings.

IDENTIFIED SAVINGS

Total Assessments	99	
Total Recommendations	655	
	Total Recommended Annual Savings	**YTD**
Energy Savings	14.9M Therms	14.9M Therms
Electricity Savings	112,989,772 kWh	112,989,772 kWh
Generation Reduction (approx.)	12.90 MegaWatts	12.90 MegaWatts
Natural Gas Savings	0.3 M Therms	0.3 M Therms
CO_2 Reduction	0.09 Tons	0.09 Tons
TOTAL Cost Savings	$11.74 Million	$11.74 Million
- Energy Related Savings	$10.65 Million	$10.65 Million
- Productivity Savings	$0.73 Million	$0.73 Million
- Waste & Water Savings	$0.35 Million	$0.35 Million

Table 1. October – December 2018

LOCATIONS

Plants assessed were located in 33 states (Figure 1). The assessed plants represent a broad range of industries, with fabricated metals and food being the most common (Table 2).

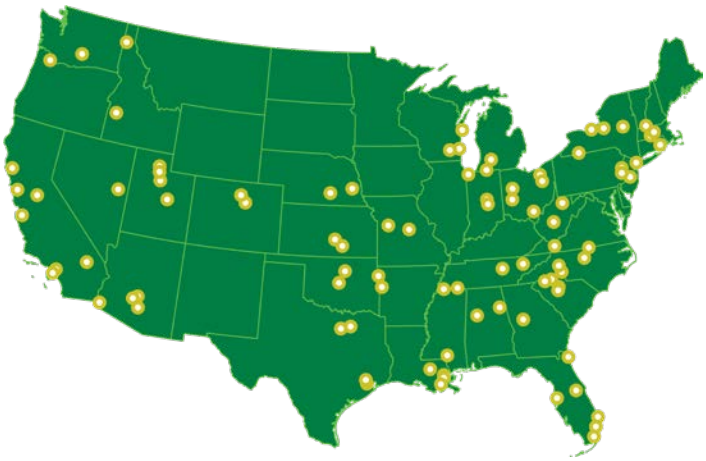


Figure 1. IAC Assessments Nationwide, October – December 2018

INDUSTRIES

Industrial Category (NAICS #)	Assessments
Food Manufacturing (311)	11
Fabricated Metal Product Manufacturing (332)	10
Plastics and Rubber Products Manufacturing (326)	8
Beverage and Tobacco Product Manufacturing (312)	8
Machinery Manufacturing (333)	8
Chemical Manufacturing (325)	7
Transportation Equipment Manufacturing (336)	6
Petroleum and Coal Products Manufacturing (324)	5
Primary Metal Manufacturing (331)	4
Paper Manufacturing (322)	4
Wood Product Manufacturing (321)	3
Computer and Electronic Manufacturing (334)	3
Electrical Equipment, Appliance, and Component Manufacturing (335)	2
All Other Manufacturing	6
Others	14

Table 2. October – December 2018 Assessments by NAICS Industrial Category

PARTICIPATION

A total of 296 engineering students were active during the quarter in the IAC program across 28 centers, and nearly 18 percent were new to the program.

U.S. DEPARTMENT OF ENERGY
Energy Efficiency & Renewable Energy

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