INDUSTRIAL ASSESSMENT CENTERS

IAC Update, Spring 2016

About the IAC Program

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. A typical IAC client will receive recommendations that save them more than $47,000 annually.

Currently located at 24 of the nation's top engineering schools, the IACs combine a traditional engineering curriculum with a unique blend of hands-on experience gained through conducting assessments. Upon graduation, approximately 53 percent of IAC students obtain employment for which energy efficiency or energy management is a significant responsibility.

To sign up for an IAC assessment, please visit http://iac.university or contact your nearest center directly.

IAC Program: Quarterly Results

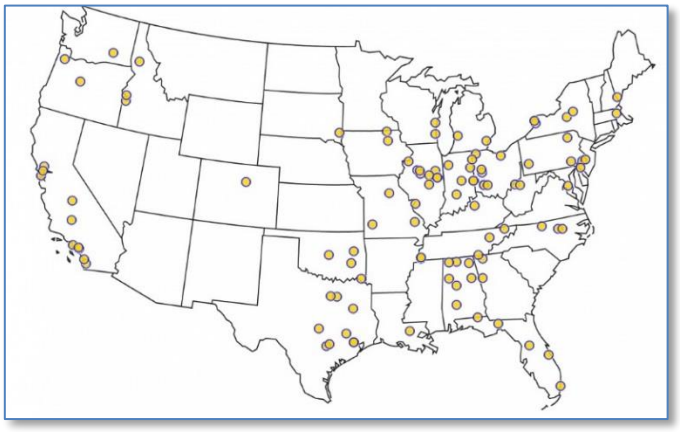
Between January and March of 2016, IACs conducted 107 assessments (Table 1). As a result, IACs made 934 recommendations that identified more than $17M in potential cost savings.

Table 1. 2016 January – March Results

Total Assessments	107
Total Recommendations	934
Total Recommended Annual Savings	
Energy Savings	22.7 M Therms
Electricity Savings	147,561,952 kWh
Generation Reduction (approx.)	16.84 MegaWatts
Natural Gas Savings	6.7 M Therms
CO_2 Reduction	0.15 Tons
TOTAL Cost Savings	$17.32 Million
- Energy Related Savings	$15.36 Million
- Productivity Savings	$1.32 Million
- Waste & Water Savings	$0.64 Million

Plants assessed were located in 29 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, 2016 Jan - Mar



A total of 455 engineering students were active in the IAC program across the 24 centers; and nearly 50 percent were new to the program this year. IACs issued 73 certificates to students so far this year. To earn a certificate, students must master a set of core skills and participate in at least six assessments.

Table 2. 2016 January – March Assessments by NAICS Industrial Category

Industrial Category (NAICS #)	Assessments
Fabricated Metal Product Manufacturing (332)	13
Transportation Equipment Manufacturing (336)	13
Plastics and Rubber Products Manufacturing (326)	11
Chemical Manufacturing (325)	9
Food Manufacturing (311)	9
Primary Metal Manufacturing (331)	8
Wood Product Manufacturing (321)	7
Machinery Manufacturing (333)	7
Computer and Electronics Manufacturing (334)	6
Nonmetallic Mineral Product Manufacturing (327)	3
Printing and Related Support Activities (323)	3
Beverage and Tobacco Product Manufacturing (312)	3
Paper Manufacturing (322)	2
Electrical Equipment Manufacturing (335)	2
All Other Manufacturing	11

IAC Program Highlights

IACs Partner with Tennessee Valley Authority

The Tennessee Valley Authority (TVA) EnergyRight Solutions for Industry (ERSI) program provides assessments of energy use and incentives for qualifying industrial clients to reduce their electricity usage. Technical assistance is available to industrial users of power to devise plant-wide, holistic approaches to energy savings.

ERSI is intended to help customers maximize efficiency, control expenses and boost their bottom lines. During 2015, directly served TVA customers reduced energy by 88.62 GWh and received approximately $7.8M in incentives as a result of their participation in the program.

Tennessee Tech IAC student Melissa Moffet installs a data logger to measure and record electricity use of process equipment at a manufacturing facility in Tennessee.

Beginning in FY 2016, DOE announced a formal collaboration between the TVA and the IACs at the University of Alabama, Tennessee Tech University, and the University of Kentucky. As part of the collaboration, TVA personnel will forward potential assessment leads at small and medium-sized manufacturing clients to the respective IAC Directors, who will coordinate their assessment activities with ERSI managers.

Subject to client consent, this collaboration could involve joint IAC/TVA assessments, or simply sharing of IAC assessment reports with appropriate TVA district managers. Building upon a shared client base and relationships, the TVA-IAC partnership will increase the value and impacts of both partner programs for small and medium-sized manufacturing enterprises leading to increased implementation rates for IAC assessment recommendations; increased deployment of TVA technical and financial resources; and improved energy performance and overall productivity of local manufacturers.

IACs and the EPA – Working Together to Help Water Utilities Save Energy

IACs are a proven resource for energy efficiency, energy recovery, and energy management at small and medium-sized manufacturers. Now, water supply and wastewater treatment facilities are also eligible to receive IAC assessments.

Historically, IACs have identified opportunities for water savings at manufacturing clients within those for which water is a significant cost driver industries (e.g., chemicals, pulp and paper, food processing). IACs also have conducted a limited number of special assessments at water treatment facilities, simply because much of the process equipment at these facilities – motors, pumps, fans, blowers – is also found at traditional manufacturing clients.

Of the 60 IAC assessments conducted to date at these facilities, per-plant cost savings opportunities from increasing energy efficiency, waste reduction, and productivity improvements averaged almost $260,000, with more than half of those being implemented during the first year.

Under a recently launched partnership with the Environmental Protection Agency's (EPA) Office of Wastewater Management, the IACs are working closely with public and private water utilities to save and recover energy, speed implementation of new technology and best practices, and reduce the energy intensity of water treated, delivered, and reused.

Typical WWTF settling tank and clarifiers

As part of this effort, DOE is offering up to 50 IAC assessments nationally per year at no cost to industrial or municipal water supply and wastewater treatment plants. Plants meeting the following general criteria, are potentially eligible to receive an assessment:

- Water supply plant > 5 MGD
- Wastewater treatment plant > 2 MGD
- Annual energy bills between $250,000 and $2.5 million

For more information or to see if you might receive a no-cost assessment, contact your closest IAC (www.iac.university).

Professor Spotlight

University of Kentucky Receives IAC Center of the Year Award

Dr. Donald Colliver

The year's IAC Center of Excellence award was presented to the University of Kentucky and Dr. Donald Colliver, Professor in the Biosystems and Agriculture Engineering Department. Initially serving as the Assistant Director for the University of Kentucky IAC when it was selected as a program participant, Dr. Colliver assumed the Director role in 2013. The original Director (Dr. Larry Holloway) is currently serving as Interim Dean of the UK College of Engineering.

This award is particularly noteworthy, as the University of Kentucky became the first newly-selected IAC in the 40-year history of the program to ascend to the position of a top performing school – based on a number of established performance metrics – before the end of its first five-year grant.

Since its inception, the University of Kentucky IAC has conducted 48 assessments of small and medium-sized manufacturers and other facilities. On average, assessment teams made 11 recommendations and identified nearly $170,000 in savings opportunities and productivity improvements. Approximately 40 percent of these were implemented within one year of the assessment, yielding more than $2.8M per year in total savings. The University of Kentucky IAC has performed assessments on a variety of different types of facilities, with a particular focus on automotive parts supply chain, food production/processing, health care products and aluminum processing.

Fangxiao Dong and Jake Trimpe record voltage, amps, and current on an equipment display.

In addition to his expertise in industrial systems, Dr. Colliver has actively pursued advances to the fields of environmentally sustainable design; analysis and simulation of building envelope performance, and analysis of the impacts of weather on building design. He has worked extensively with professional engineering societies and, in fact, served as President of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) - a global society advancing human well-being through sustainable technology for the built environment and one of the oldest professional engineering associations in the world. Dr. Colliver also was Chair of the 2003 National Engineers Week.

When not leading assessments, Dr. Colliver advances the field of energy engineering in the classroom. University of Kentucky offers a specialized IAC-based general engineering and energy assessment class in the spring semester to seniors and graduate students. According to Dr. Colliver, the course is always fully enrolled and includes a collaborative project in which students develop a complete assessment report using observations and data obtained from previous in-plant assessments. He indicates, "The students are very engaged and excited about applying the engineering principles they have learned to immediately solve real-world problems and help manufacturers save money." He is currently developing an on-line version of the assessment class as part of the graduate manufacturing systems program.

Kentucky Industrial Assessment Center Team

Left to Right, Back Row: Dr. Larry Holloway, Dr. Tom Henninger, Michael Henry, Grayson Woods, Dean Adams, Bill Williams. Front row: Shelby Detring, Hollie Staskal, Salvador Loc, Zack Lippay

Student/Alumni Spotlights

IAC Alumni Supporting Industrial Demand Side Management in Oklahoma

Franco Morelli, an alumni of the IAC at Texas A&M University, is currently an Energy Efficiency Account Manager with ICF International. His responsibilities entail supporting the demand side management program for Oklahoma Gas and Electric (OG&E), interacting with commercial and industrial clients to identify electrical grid load reduction projects.

Franco Morelli

Most projects involve capital compensation by the local utility for the installation of electrically efficient HVAC equipment; including chillers, air conditioning roof top units, variable frequency (VFD) drives for pumps/fans and geothermal source HVAC equipment. Additionally, industrial capital projects

involve the installation of VFD sourced air compressors and motors. Much of his work involves interfacing with utility customers and trade ally's, including the IAC at Oklahoma State University (OSU); working with William Kolarik to incentivize projects adopted by OSU IAC industrial clients.

One noteworthy project involved an industrial energy audit for a Hitachi plant based in Norman, Oklahoma. The facility was interested in showcasing innovative technologies as a measure to promote energy efficiency across their domain. In addition to considering efficient industrial equipment, the plant was interested in a partnership with OG&E to deliver electricity via photovoltaic. Using tools developed during his time at the Texas A&M IAC, Franco was able to produce a full electrical yield and cost analysis associated with the installation of the system.

Future work involves engineering support work for the Public Services Company of Oklahoma (PSO) and Entergy Arkansas' demand side management program, as well as involvement with the refinement of utility revenue models. Franco also serves as a Technical Account Manager for the Better Buildings, Better Plants program.

Jonathan (Jon) Gasser

As a former Kentucky IAC alum, I have the utmost respect and gratitude for the IAC experience, as it highly influenced the career that I enjoy today. As I was completing my undergraduate degree in mechanical engineering I was having a difficult time defining my career path. I decided to pursue my master's degree in mechanical engineering and fortunately the University of Kentucky had received the IAC grant that same year. My graduate advisor offered me the position of lead student and I accepted.

The best part of the program is that it gives students practical experiences in energy auditing, consulting, and project management. In the IAC program, students are given the opportunity to lead while the professors are there as support. This encourages students to improve their leadership and communication skills, all while gaining valuable technical knowledge and experiences.

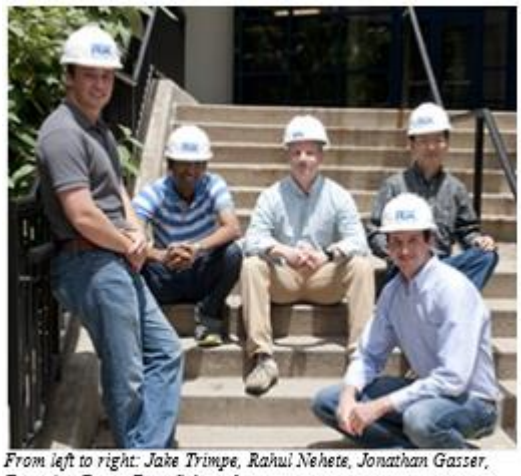
After completing my master's degree and two years as a lead student for the IAC program I accepted a job with CMTA Energy Solutions in Louisville, KY. CMTA Energy Solutions is a subsidiary of CMTA, Inc. a top 50 MEP consulting firm in the nation. Our group is an Energy Services Company (ESCO) that leads guaranteed energy savings performance contracts for state facilities and school districts.

I started in 2014 as a project engineer in a supporting role, but the IAC program gave me a tremendous head start on my career. In just two years I grew into a project manager role and was responsible for a $4.8 million energy efficient renovation project for a school district in Kentucky. I credit the IAC for playing a significant role in my early success. I look forward to continuing having a positive impact on facilities through energy efficiency and sustainable design for the duration of my career.

Jake Trimpe

For me to fully explain the professional impacts of the IAC program, I need to start at the beginning. I was at a cross roads with respect to my education and what to study when the University of Kentucky was applying to be an IAC. Fortunately, I was approached by the program director to be one of the lead students and help get it off the ground.

Being a part of the program start at UK as a lead student was a fantastic learning opportunity. I was able to apply classroom education to real life scenarios and gain experience as a leader of a 6 student team. The IAC program also provided me the immediate opportunity to begin my career. In fact, I'm working for one of the companies that our center assessed. Within months of providing our findings, I was offered a job as a site utilities engineer – they wanted to leverage the experience I had gained through the IAC to manage their site utilities. I'm living proof of the effectiveness and value of the IAC program and recommend it to any student looking for real world experience from their engineering courses.



From left to right: Jake Trimpe, Rahul Nehete, Jonathan Gasser, Fangxiao Dong, Evan Schroader

Recent IAC Client Feedback

As part of the assessment process, IACs routinely solicit feedback from their manufacturing clients, both on the assessment and the final report. A selection of recent feedback is provided below:

- Please accept our thanks for the high quality and comprehensive Energy Assessment performed by the IAC. I would especially like to recognize your department's program and its students. They should be commended for preparing one of the more thorough, professional, well-written and substantiated engineering reports that has been prepared for our company. *(University of Dayton)*

  -- Allen Francis, President, Production Paint Finishers

- The IAC team was absolutely outstanding. It was a sincere pleasure to interact with them during their visit; they were well-prepared, diligent, thoughtful guests. They offered appropriate comments and initial feedback same-day, indicating a good working knowledge of systems and opportunities. Following their visit, the bound industrial assessment arrived in professional format and with straightforward, substantive suggestions which are practical and achievable. We will enjoy implementing these improvements, and we look forward to the meaningful difference these efficiencies will make for our operating budget and our future opportunities. *(Oregon State University)*

  -- Diana Adams, Owner, Central States Business Forms

- The IAC helped us identify significant opportunities for energy savings. We're now working with an ESCO on implementing several of the recommended measures. This helps us control our operating costs and manage waste treatment rates and meet our Sustainability management System goal of becoming a zero net energy facility. *(University of Delaware)*

  -- Jim Newton, Manager, Kent County WWTP

- We truly enjoyed having the IAC team evaluate our various equipment and processes for their energy consumption and have benefited from their advice. This is a great program which is free of charge and available to any of us in the industry who are looking to become more energy efficient. The individuals were professional, knowledgeable and offered unexpected insights regarding our potential energy savings. They helped us to begin looking at the facility in different ways to ensure we are operating as energy efficiently as possible. We still have some hurdles to get over, but we are well on our way. *(Oregon State University)*

  -- Laurie Pierce, Operations Director, Olympia WA

IAC Database

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.

For Additional Information

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