Dr. Warren M. Heffington, Director, Texas A&M University Industrial Assessment Center

On the eve of his retirement, after 25 years of distinguished service as director of the Texas A&M University Industrial Assessment Center (IAC), Dr. Warren Heffington reflects on his time at the center and the experiences and opportunities that enabled him to help the program achieve so much success.

Dr. Warren Heffington is the founding director of the Texas A&M University IAC. The U.S. Department of Energy (DOE) Industrial Technologies Program's (ITP's) expanded the national IAC program in 1986, when Texas A&M University was one of four universities to win the competition to establish new centers. Universities participating in the DOE-sponsored program—which provides eligible small- and mid-sized manufacturing plants with no-cost energy assessments—were then, as now, under a great deal of pressure to perform well and encourage continued and lasting results among the industrial companies they served.

The Texas A&M University IAC supports industrial manufacturers within 150-mile radius of its campus in College Station, Texas. The manufacturing sector in Texas consumes more energy than that sector in any other state (almost a fifth of the nation's total), giving the Texas A&M IAC a unique opportunity to help the vast and diverse number of small-and medium-sized manufacturers remain competitive in a global manufacturing market. In addition, Texas A&M's IAC has provided excellent engineering experience in energy conservation and management techniques for students. Over the years, Dr. Heffington has taught over 250 students how to successfully apply energy-conservation techniques in real manufacturing plants.

Throughout the years, the Texas A&M University IAC has received awards from DOE and other organizations, been commended by alumni-hiring companies for producing top-notch students, and earned accolades from graduates of the program for the practical knowledge and hands-on experience they gained. The Texas A&M University IAC was the first recipient of the Center of Excellence Award in 2002, which is given annually to an outstanding IAC that has exceeded program expectations. This success is a direct result of the capable leadership of Dr. Heffington and of the work of the many talented "Fightin' Texas Aggie" and Prairie View A&M University students who have participated in the program.

Former IAC students Michaela Martin (left) and Darin Nutter (right) with Dr. Heffington (center) at the Distinguished Service Award ceremony on July 24, 2011.

Courtesy of IAC

For more than 30 years, the U.S. Department of Energy-sponsored IAC program has trained and educated college engineering students in manufacturing efficiency, helping them become the next generation of industrial energy-efficiency experts. At 24 university-based centers across the nation, IAC faculty and staff lead students in performing energy assessments at a wide range of manufacturing facilities in their area, helping companies reduce energy waste, save money, and become more economically competitive. Students in the program also receive the opportunity to interact with plant management, prepare executive-level briefings and plant-specific reports, and facilitate continuous improvement in energy management at participating facilities.

For more information, visit the *Industrial Assessment Centers* website.

When asked about the IAC program's value, many graduates will tell you they found the most worth in having the opportunity to work with so many different types of manufacturing plants. While this hands-on experience is undeniably important, Dr. Heffington identified several other aspects of the program that, in his opinion, also have lasting value. He credits the IACs with helping students develop important leadership and teamwork skills; teaching them how to respond to a contract schedule, not just a semester course schedule; and being rewarded for their work efforts with a paycheck, not just a letter grade. As he says, all of these experiences truly prepare students for the "real world."

Background

A native Texan, Dr. Heffington received Bachelor of Science and Master of Science degrees in Aerospace Engineering in 1967 and 1968 from the University of Texas at Austin, and subsequently spent five years in the U.S. Air Force as a project engineer during the Vietnam era. He then earned a Ph.D. in Engineering Sciences from the University of California, San Diego, and joined the engineering faculty at Texas A&M University in 1977. In the early 1980s he was a member of the team led by Dr. Dan Turner, also on the Texas A&M University mechanical engineering faculty, which established the Energy Systems Laboratory.

Before the Texas A&M University IAC, Dr. Heffington worked with the Institutional Conservation Program (ICP), a major energy conservation program of retrofits funded by DOE through state energy offices. Subsequently he led a team that reviewed the work of consulting engineers assessing energy conservation projects for large state-owned buildings and facilities. That review effort was part of the Texas LoanSTAR program, which stands for Loans to Save Taxes And Resources. LoanSTAR was a $100 million program providing low-interest loans to public facilities to install energy efficient retrofits. The ICP and LoanSTAR programs, which focused on energy conservation retrofits in commercial and institutional buildings were key in establishing Dr. Heffington's background in energy assessments and energy conservation. This background was fundamental for teaching students energy conservation techniques in the IAC program. His past experience also taught Dr. Heffington the importance of building a strong network of trusted consultants and partners to ensure accurate, high-quality work outputs.

In addition to leading the award-winning Texas A&M University IAC, Dr. Heffington has been recognized throughout the years with various awards. Most recently, in July 2011, DOE honored him with a Distinguished Service Award, specifically for his work with the IAC program. Dr. Heffington has also received several teaching awards that are particularly meaningful to him because they reflect his excellent work with students.

Career Highlights

When asked what his greatest challenge as an IAC director was, Dr. Heffington said "Taking students safely into plants and returning them safely to campus." He hastened to explain that the primary concern was not danger in plants, but rather the travel to and from plants. He recalled the only notable safety-related incident he experienced, which involved a student slightly burning a finger on a waffle iron during a hotel breakfast.

On a more serious note, Dr. Heffington raised another issue that all IAC directors have faced: limited funding during recent years that has made sustaining the student learning process and providing service to manufacturers difficult. Although challenging, Dr. Heffington managed to rise above these hard times by leveraging other sources of funding. This ultimately led to a close working relationship between the Texas

Courtesy of the Texas A&M IAC

The IAC program involves a mix of on-site and classroom experience. In this photo, Dr. Heffington guides his team through the post-assessment report process.

A&M University IAC and the national Manufacturing Extension Partnership, which operates in Texas as Texas Manufacturing Assistance Centers (TMAC). Dr. Heffington has built a bridge with TMAC that has led to the cooperation on two projects to serve Texas manufacturers. This win-win relationship has resulted in Texas A&M University IAC students having the opportunity to learn about lean productivity projects that are the strength of TMAC, and in TMAC engineers learning about energy assessments at manufacturing plants.

Dr. Heffington's impact on the Texas A&M University IAC leaves a long and proud legacy. He developed processes, created curriculum, built partnerships with local organizations, and helped educate students who became highly skilled and well respected workers. However, this was not a one-way relationship. The IAC had a similarly positive effect on Dr. Heffington. Among the things he is most proud of from his time as the IAC's director are his students, who he describes as professional, competent, and ethical. He explained, "Some of them have made their livings using the knowledge and experience they gained from the IAC, and some have said their work with the IAC has changed the direction of their professional lives."

IAC Graduate Workforce Statistics:

- 62% go on to careers where they have energy or energy-efficiency responsibilities
- 50% have productivity improvement responsibilities
- 38% have waste minimization responsibilities

IAC Success

When asked what differentiates his program at Texas A&M University from the other IACs, Dr. Heffington spoke of how he and his colleagues were early proponents of increasing the professions' understanding of utility rate schedules, a topic they emphasized in their curriculum. In the past, cost savings from energy conservation projects were calculated using a blended utility rate. Dr. Heffington and staff at the Texas A&M University IAC agreed with others in the field who felt that to be accurate, the cost of demand needed to be separated from the cost of electrical energy. To do so, the Texas A&M University IAC led the field in using marginal rates—the costs of the last kilowatt of demand and kilowatt-hour of energy purchased—in savings calculations. Texas A&M University was one of the first IACs to take this approach, which allowed the program to provide their industrial clients with a more accurate picture of the energy and cost savings that could be achieved if energy efficiency projects were implemented.

Courtesy of the Texas A&M IAC

Dr. Heffington and a group of Dr. Heffington's Texas A&M University IAC students participating in an assessment.

Dr. Heffington believes that the real-world experience provided to students through the IAC program has enabled graduates to achieve great success in their post-IAC careers. In the mid to late 1990s, the Texas A&M University IAC performed pioneering work with a satellite center at Prairie View A&M University. During this time, approximately 18 Prairie View students worked alongside Texas A&M University students to accomplish the IAC mission in the Houston area. Prairie View students benefited from hands-on experience conducting energy assessments and the Texas A&M University IAC students benefited from interactions with students at a sister university. Dr. Heffington remembers the Prairie View students fondly and notes their success in the program. He mentioned that at least one student is still working in the plant/utility area on the Texas coast and that another went to Detroit Edison for many years before returning to Texas.

Highlight on Curriculum

Dr. Heffington is widely recognized for his positive impact on training and curriculum development.

At Texas A&M University, Dr. Heffington helped develop courses that are specifically identified with the university's Energy Systems Laboratory, which is associated with its Mechanical Engineering Department. The Energy Systems Laboratory has one of the premier energy conservation-based programs in the world. Some conservation-based courses are offered to undergraduates, for example, courses on building envelopes and air conditioning, but most are at the graduate level. One course about industrial energy management directly pertains to the IAC. Not only has Dr. Heffington taught this course several times, but he regularly incorporates students' lessons learned into its curriculum

This highlights one thing that Dr. Heffington believes makes the IACs so incredibly valuable to students—gaining first-hand experience conducting industrial energy assessments. He says that the assessment visits are what set the IAC program apart from the other opportunities students might have through internships or different programs. The IAC program involves students in every stage of the assessment process, from identifying projects and gathering data, to making engineering calculations and writing recommendation reports.

One of Dr. Heffington's memorable experiences as IAC director occurred on the plant floor of a meat processing facility. On this particular assignment, Dr. Heffington and his student team noticed a worker moving ground meat with a large, very clean, shovel from a bin onto a conveyor line. It didn't take long for Dr. Heffington and the students to realize he was dropping a significant amount of product on the floor every few shovels. The spilled meat, of course, immediately became waste that had to be sent to disposal. Although not specifically energy related, Dr. Heffington knew that the loss of so much expensive product was a major liability to the company's bottom line, and that his team could help find a solution to the problem. When meeting with the plant manager later that day, he offered to have his students run an analysis on the amount of product being lost. The manager agreed, but also sent someone to speak to the worker. By the time the IAC student went back to the plant floor to gather data, the worker had already made significant adjustments to improve the efficiency with which he was working, resulting in the immediate reduction of unnecessary waste.

Conclusion

The success of any IAC is fully dependent on its director. A good director will make for a strong, results-oriented center, as is the case at the Texas A&M University IAC that flourished under Dr. Heffington's leadership. His contributions have made a lasting impression on the center, his students, and the IAC program as a whole.

Dr. Heffington shared the following advice for any incoming IAC director, *"To be successful, select your students wisely, have high expectations, respect them, and don't micromanage them. They will solve their own problems and make you look very good."*

The Ripple Effect:

"Dr. Heffington has left a valuable heritage on his students...who are [now] having an impact on the conservation practices of their respective businesses."

Jim Eggebrecht
Former Student and Current Teacher
Texas A&M University IAC

Additional Information

ITP website: *www.eere.energy.gov/industry/*
IAC forum website: *www.iacforum.org*
Texas A&M IAC website: *www1.mengr.tamu.edu/IAC/*

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