

Effectively Selling Assessment Recommendations



IAC Student Meeting
Washington, DC
Feb. 5-6, 2009

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Purposes of an Audit

- Provide specific advice on current savings opportunities
- Educate client to help manage energy costs over long term



Selling Your Ideas Throughout the Audit Process

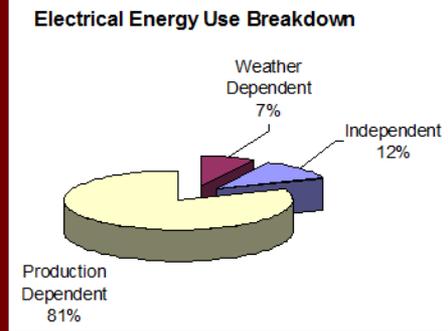
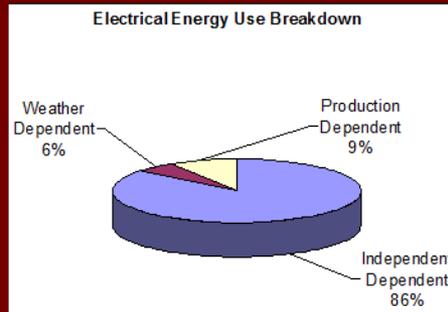
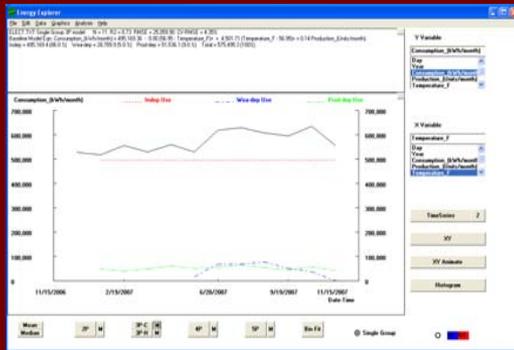
- Preparation
- Site visit
- Analysis and reporting
- Follow up

Preparation

- Thorough utility bill and equipment analysis
- Write ARs identified through utility analysis
- Discuss likely ARs in pre-assessment meeting, assign ARs to individual team members, and assemble resources (previous ARs, software, etc.)
- Identify potential savings opportunities
- Define roles within assessment team
- Selling your ideas begins before stepping foot in the plant!!

Preparation: "Pay for Lunch"

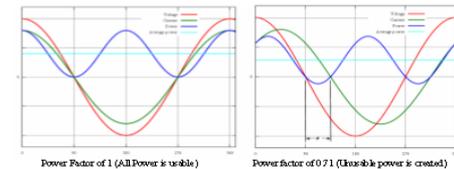
- Pre-written ARs
 - Power Factor
 - Billing Error
- LEA 1: indep 86%: lights & equipment on, no zoning, poor process control
- LEA 2: indep 12%: well controlled



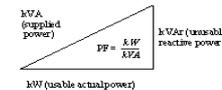
AR 5: Install Capacitors to Improve Power Factor

ARC: 2.3212.3	Annual Savings		Project Cost			Simple Payback	
	Resource	CO ₂ (tonne)	Dollars	Capital	Other		Total
Electrical Fees	None	None	\$4,640	\$6,000	\$6,000	\$12,000	31 months

Analysis
 Electrical equipment that generates inductive loads, such as motors, creates current that is not in phase with the current supplied by the electric utility. Inductive loads cause the current waveform to lag behind the voltage waveform. This causes a portion of the energy to return to the source, hence leaving less usable power for the equipment. The power associated with this unusable current is called reactive power (kVAR). Because some energy is returned to the source, a higher supply power (kVA) must be generated by the utility in order to meet equipment needs. The ratio of power consumed by equipment (kW) to total power in the electrical lines (kVA) is called the power factor. Most utilities charge for low power factor. Low power factor can be corrected by adding capacitors, which are rated in terms of kVAR.



The diagram below shows the relationship between the various types of power: supplied power (kVA), reactive power (kVAR), and actual used power (kW). The quantity of each type of power can be calculated using trigonometric relationships defined by the power triangle.



Power factor is ratio of the actual power, kW, and supplied power, kVA. The power factor can be calculated using the following relationships:

AR 12: Contact Utility Company about Billing Error

ARC: 2.8111.3	Annual Savings		Project Cost			Simple Payback	
	Resource	CO ₂ (tonne)	Dollars	Capital	Other		Total
Electrical Fees	None	None	\$2,006	None	None	None	Immediate

Analysis
 First Energy Solutions Corp supplies the facility with electrical energy based on rate FES-R798. The electrical energy charge should be the kWh sum for both meters multiplied by the specified rate. In August 2007, the utility company charged for the kWh sum for both meters. The utility company charged more than the kWh sum for both meters in December 2007. Excerpts of these two utility bills are shown below.

ARC	Resource	CO ₂ (tonne)	Dollars	Capital	Other	Total	Simple Payback
2.8111.3	None	None	\$2,006	None	None	None	Immediate

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ARC

Site Visit

- 1) Briefing and billing analysis
- 2) Facility walk-through
- 3) Lunch provided by client
- 4) IAC team meeting
- 5) On-site data collection
- 6) Analysis
- 7) Debriefing

Initial Briefing: Teamwork

- Include upper management & maintenance
- Two stories to promote teamwork
 - Client's advantage: you know this facility
 - Auditor's advantage: seen lots of facilities
 - Auditor's job: identify and quantify savings opportunities
 - Client's job: determine if ideas work within multiple constraints
- Most productive if work together

Initial Briefing: Build Credibility

- Build off of your strengths
- Ask proper questions

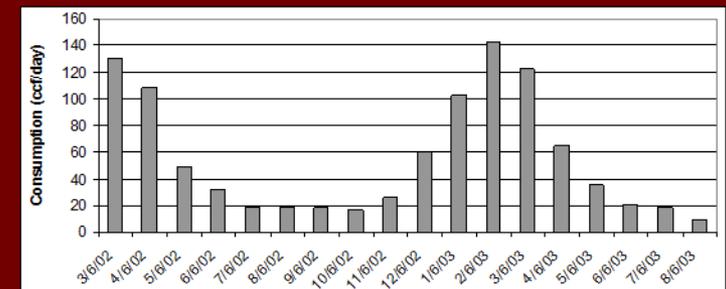
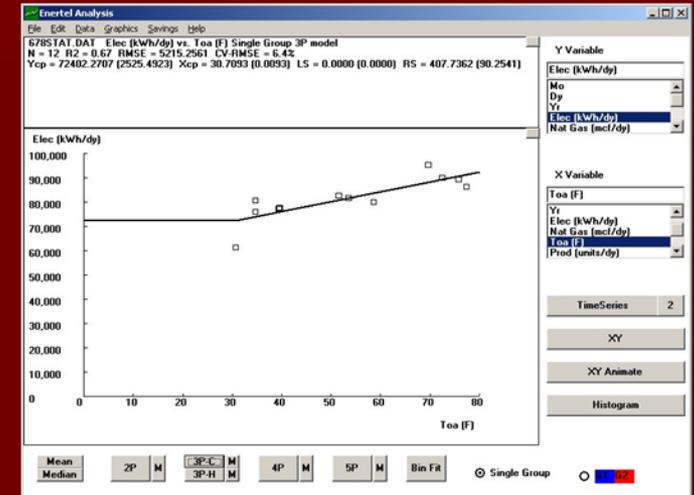
UD-IAC Approach: Rate Structure and Billing Analysis

Structure

- Explain rate structure as it relates to client
- Show client how to use rate structure to their advantage
- Show client how to use billing analysis to understand their processes and facilities
- Report billing errors and identify potential AR's

Purpose

- Develop credibility
- Lead client into discussion of processes and facilities



Facility Walk Through

- Generate list of possible savings opportunities
 - See everything but focus on energy
 - Safety
 - Stay on task
- Consolidate ideas and plan next steps
 - Prioritize savings opportunities
 - Pursue **all** opportunities you believe in
 - Write equations for quantifying savings to guide data collection effort

On-site Data Collection

- Make measurements and observations to quantify opportunities
 - Get all necessary data
- Photographs
- Talk to as many levels of personnel as possible
 - Hear all sides of the story
- Display enthusiasm about ideas...."Sell the Idea"



Debriefing

- Presentation of ARs
 - System, Savings amount, etc.
- Describe savings opportunities
 - Start general and funnel to specifics
 - Provide numbers if possible
 - The “Visual Bible”

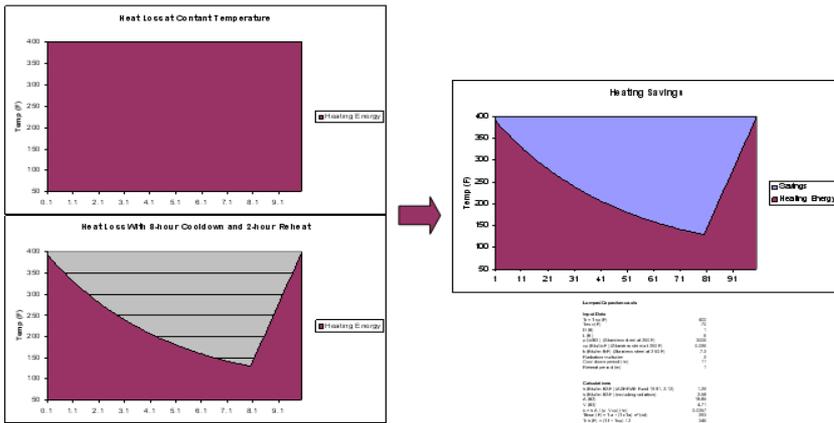


Debriefing: The "Visual Bible"

- Binder of common recommendations
- No more "waving of the hands"
- Visual cue's to inform clients
- Helps convey information to everyone present
 - Not everyone is present during the day
 - Management does not always have a technical background

The "Visual Bible": Examples

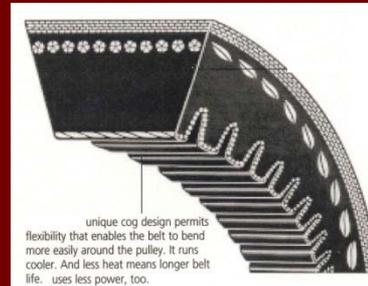
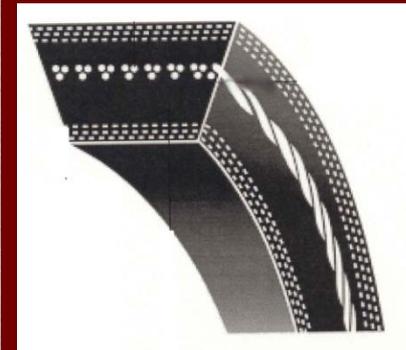
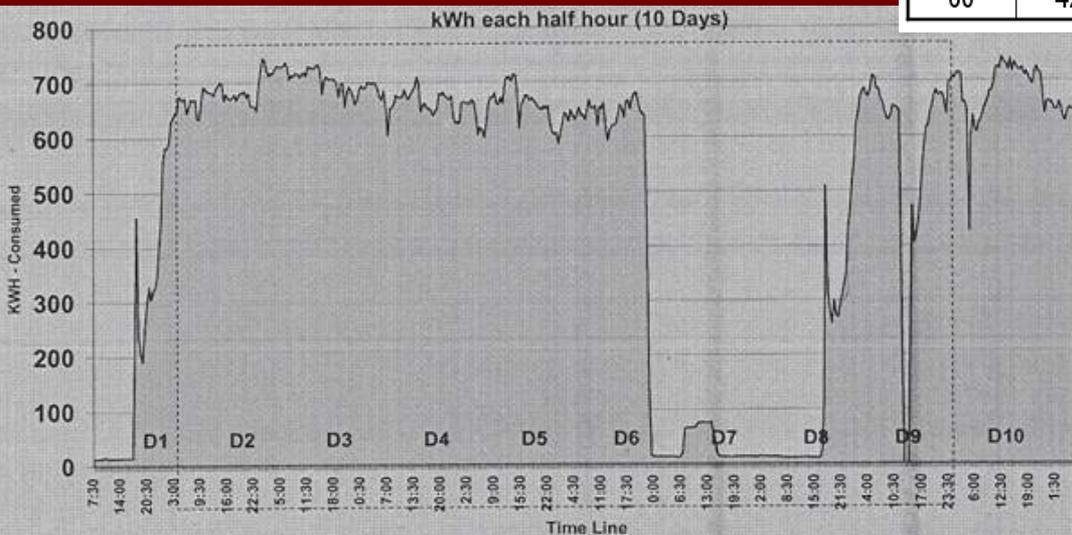
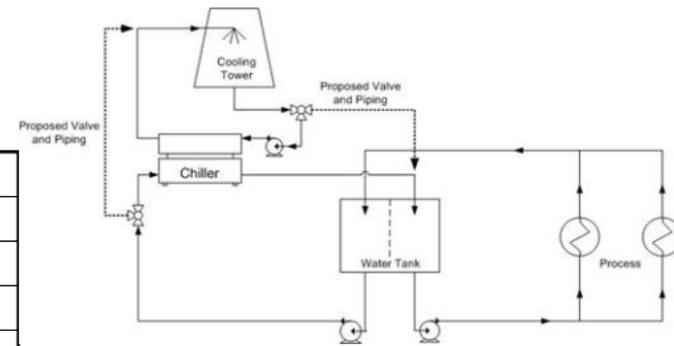
Turn Off Heat to IMM Barrels When Not in Use



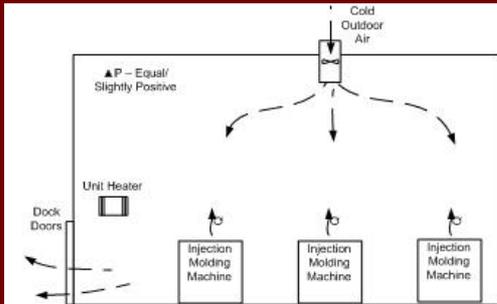
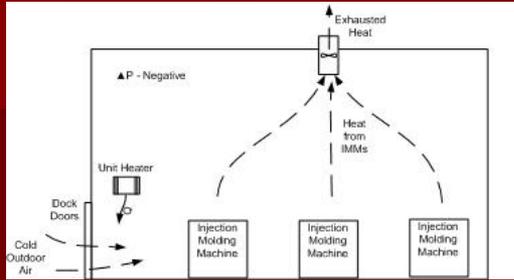
Use Cooling Tower Instead of Chiller When Possible

Fraction of year cooling tower can deliver water at T_c (Assume $T_r = 10$ F in Dayton OH)

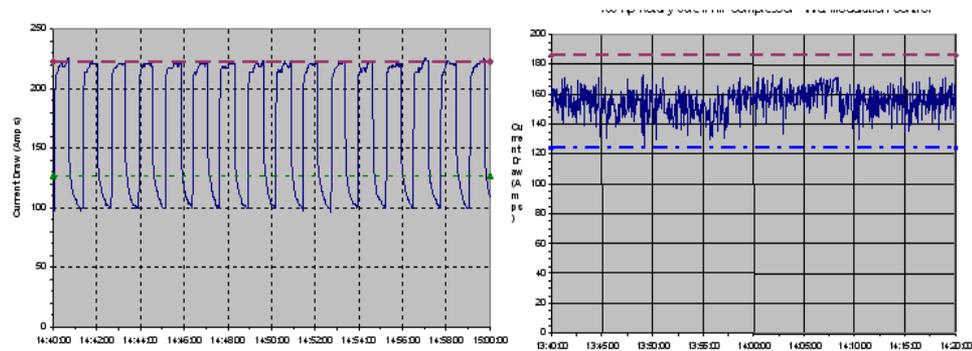
T_c (F)	T_{wb} (F)	F _{yr} (%)
75	65	72%
70	57	61%
65	50	53%
60	42	40%



The "Visual Bible": More Examples

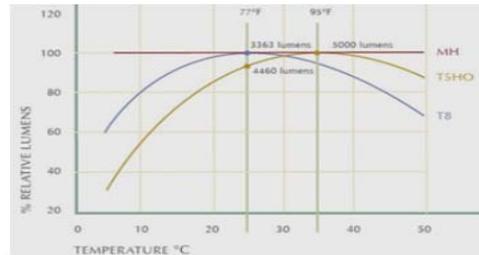


Power Characteristics of Load/unload and Modulation Control

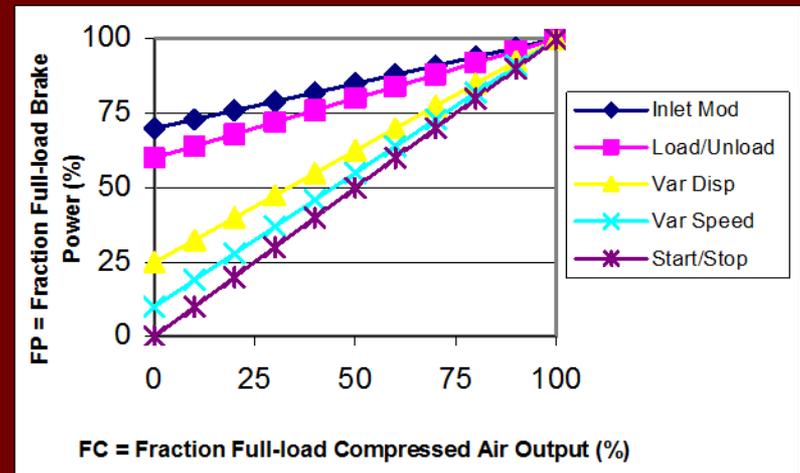


Light Output vs. Temperature

- **Metal Halide**
 - Constant output
- **T8**
 - Max at 77 F
 - 80% at 50 F and 112 F
- **T5**
 - Max at 93 F
 - 80% at 64 F and 131 F



Source: <http://www.ruudlighting.com>



Final Report

- Clients are not good technical readers
 - Sell ideas at the assessment!!
 - Don't rely on report to sell the ideas
- Write clearly and concisely
- Write ARs for everything we believe in, not just short payback or what management says they are interested in
 - Often, people in room aren't decision makers
 - Turnover
 - Weak correlation between simple payback and implementation rate

Assessment Report UD-0685



Industrial Assessment Center

A U.S. Department of Energy Sponsored Program

Assessment Date: 9-12-2003
Issue Date: 10-9-2003

Department of Mechanical and Aerospace Engineering
300 College Park, KL-311A, Dayton, OH 45469-0210
Tel: 937-229-2852 Fax: 937-229-7666
www.enr.dayton.edu/IDAC

Follow-up

- Initial phone call to answer questions
- Implementation results
 - Determine which recommendations implemented
 - Assess overall satisfaction with service
- Savings measurement and continued support

Summary

- Preparation: sets stage for everything that follows
 - Set expectations
 - Credibility
 - Build on your strengths: rate structures and billing analysis
- Site visit
 - Create “team” philosophy
 - Manage time effectively so you “bring home the bacon”
 - Communicate and sell ideas throughout assessment
 - The “Visual Bible”
- Analysis and reporting
 - Broad and thorough
- Follow up
 - Learn from feedback

Thank You!

Questions to...

Thomas Wenning

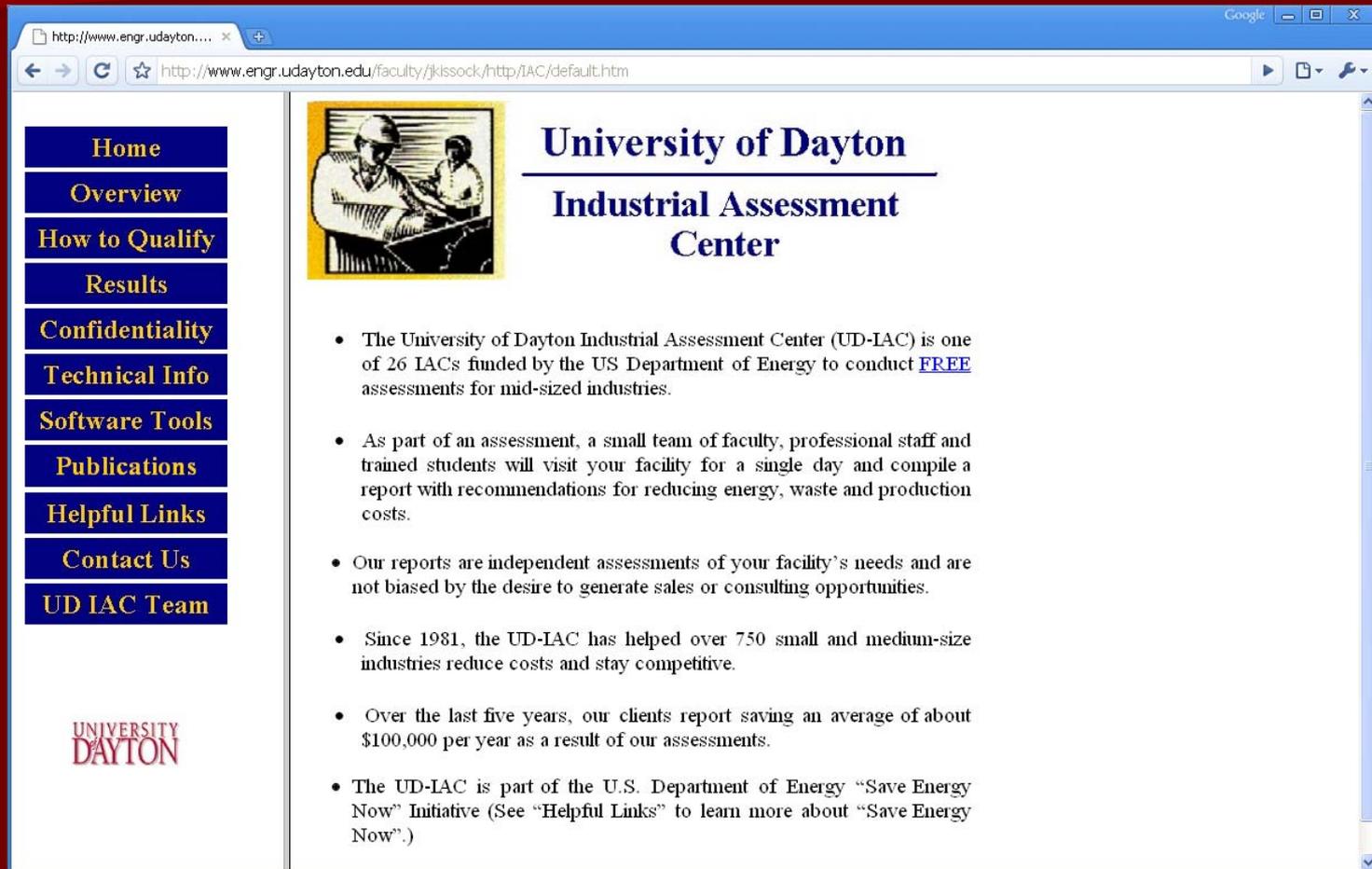
wennintj@notes.udayton.edu

937-229-3343

www.engr.udayton.edu/udiac

University of Dayton's IAC Website

www.engr.udayton.edu/udiac



The screenshot shows a web browser window displaying the University of Dayton Industrial Assessment Center (UD-IAC) website. The browser's address bar shows the URL: <http://www.engr.udayton.edu/faculty/jkissock/http/IAC/default.htm>. The website features a navigation menu on the left with the following links: Home, Overview, How to Qualify, Results, Confidentiality, Technical Info, Software Tools, Publications, Helpful Links, Contact Us, and UD IAC Team. The main content area includes a header with the text "University of Dayton Industrial Assessment Center" and a photograph of two people working together. Below the header is a list of bullet points describing the center's mission and services.

Home
Overview
How to Qualify
Results
Confidentiality
Technical Info
Software Tools
Publications
Helpful Links
Contact Us
UD IAC Team

UNIVERSITY DAYTON

University of Dayton
Industrial Assessment Center

- The University of Dayton Industrial Assessment Center (UD-IAC) is one of 26 IACs funded by the US Department of Energy to conduct [FREE](#) assessments for mid-sized industries.
- As part of an assessment, a small team of faculty, professional staff and trained students will visit your facility for a single day and compile a report with recommendations for reducing energy, waste and production costs.
- Our reports are independent assessments of your facility's needs and are not biased by the desire to generate sales or consulting opportunities.
- Since 1981, the UD-IAC has helped over 750 small and medium-size industries reduce costs and stay competitive.
- Over the last five years, our clients report saving an average of about \$100,000 per year as a result of our assessments.
- The UD-IAC is part of the U.S. Department of Energy "Save Energy Now" Initiative (See "Helpful Links" to learn more about "Save Energy Now".)