

## Final Technical Report

**Award Number:** DE-FC36-02GO12084

**Project Title:** INDUSTRIAL ASSESSMENT CENTER PROGRAM

**Project Period:** 9/1/2002 to 11/30/2006

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## **Executive Summary**

*Provide a brief executive summary which includes a discussion of 1) a summary of the center's accomplishments; 2) how the effort contributed to energy savings in the U.S.; and 3) how the project is otherwise of benefit to the public. Note: This section can be cut and pasted into the online DOE Form 241.3 in the Description/Abstract section.*

Since 1986 the Oregon State University Industrial Assessment Center (OSU IAC) has worked to increase the energy efficiency, productivity, sustainability, and competitiveness of US manufacturers; provide engineering students an education not available in the classroom; keep engineering faculty in contact with technology and challenges in Northwest industry; and reduce dependence on nonrenewable energy resources, both imported and domestic.

### **Project Objective:**

Over the duration of this project (2002-2006), the OSU IAC worked to directly support and influence industrial decisions primarily regarding energy but also regarding sustainability and profitability through:

*Assessments & Follow-up:* The OSU IAC performed 111 Industrial Assessments in Oregon, Washington, Idaho and Nevada to help industry identify and implement opportunities to increase energy efficiency, productivity, sustainability, and competitiveness

*Workshops Seminars Forums Etc:* OSU IAC staff worked with regional peers to offer appropriate workshops and trainings as opportunities availed themselves.

*Graduating Excellent Energy Aware Professional Alumni:* As technically capable, skilled written and verbal communicators, our alumni contributed to OSU IAC influence from their positions within industry, consulting organizations, utilities, and governmental and non governmental agencies.

*Tool Development:* Analysis tools and guides originated at the OSU IAC extended our reach. The center continually worked to develop computer based analysis tools, evaluation checklists, analysis guide sheets for internal use and general sharing with industry, energy, and other professionals to assist them in efforts to improve US Industry.

### **Impact:**

Over 20 years of activity the OSU IAC has typically performed 25 Industrial Assessments a year. On average, each year of 25 assessments has resulted in implemented projects that saved industry a total of: 25.3 TBTU in annual energy and \$4.5 Million annually, with an average investment payback of one year.

Over the duration of this project, while a number of recommendations are still under consideration for implementation, those already implemented have resulted in over \$11 million in annual savings.

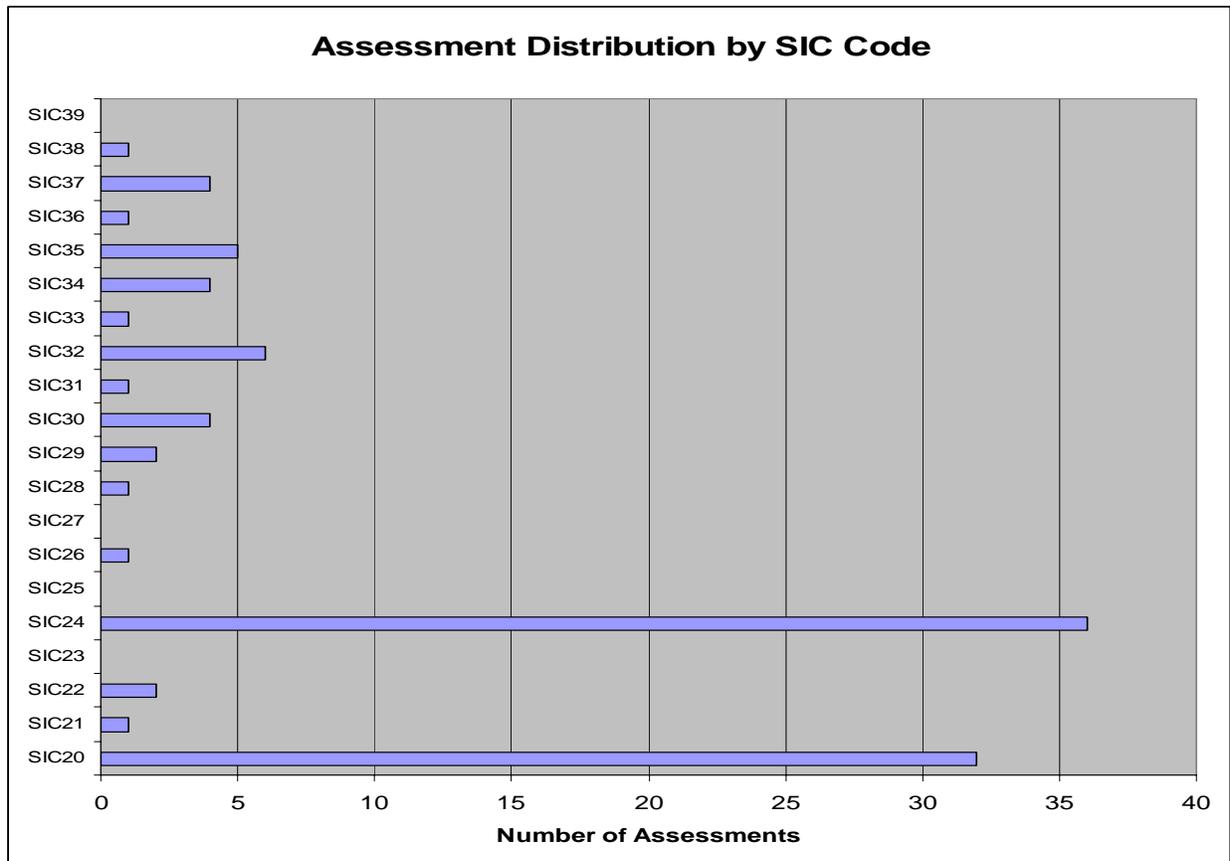
## Task Summary

*Summarize the IAC's activities by task for the entire period of funding.*

**Task 1: Conduct Industrial Assessments, to include a variety of plant types and sizes and well as coverage of the geographic area defined in the Annual Workplan Industrial Assessments:** *Provide a summary of the assessments performed over the life of the award. Include overall number of assessments, types of businesses assessed, number of ARs, and any other related info.*

Over the duration of this project period the OSU IAC performed 111 industrial assessments (OR0402-OR0511) in Oregon, Washington, Idaho and Nevada.

Following is a breakdown of the SIC codes for industrial facilities served.



Reports prepared out of these assessments included:

- 721 recommendations to reduce energy & waste costs and increase productivity
- A total of over \$39 million in recommended savings
- Over 1.3 million TBTU and \$13 million in recommended energy savings
- Over \$23 million in recommended productivity improvements
- Approximately \$2 million in recommended waste reduction saving.

**Task 2: Promote and increase the adoption of assessment recommendations and employ innovative methods to assist in accomplishing these goals.** *Provide a summary of the efforts used to promote the adoption of ARs, including any available overall adoption statistics.*

The OSU IAC strove to increase adoption of assessment recommendations by

- Continually working to improve the effectiveness of our reports  
OSU IAC reports must effectively present information and recommendations to the mixed audience our industrial clients represent. They need to be accessible to a potential non-technical financial decision maker, and still hold up to the scrutiny of a technical evaluator. To this end we modified our write-ups into two distinct sections. First we present a set of AR narratives, outlining the ideas behind our recommendations and the potential results. We strove to prepare these in a style similar to what one might find in a popular magazine. We followed these up with a calculation appendix that presents the calculation methodology for each AR and includes only the minimum narrative content required. We have found this furthers our ongoing effort to meet the needs of both audiences more completely.
- Working With Plants Ready for Change:  
During this project the OSU IAC taken on opportunities to perform assessments of facilities getting ready to make major changes so we can help them identify the most efficient approaches to consider in their designs. This allows us to take advantage of better returns available on the incremental costs of choosing more efficient solutions as they are already planning to invest at least a minimum amount. It can make report preparation more complicated but we think it is well worth it.
- Promoting Available Incentives  
Whenever we prepare recommendations we try to make sure to familiarize ourselves with implementation incentives available through utilities, the state, or other NGOs and present them to our industrial clients.
- Being Very Responsive to Industrial Client Requests  
The OSU IAC always strives to respond quickly to requests by our industrial clients including: sending extra report copies, explaining anything in the report, or helping them identify potential utility and other incentives that can help them implement our recommendations.
- Conducting 2 Week Follow-ups  
The OSU IAC has a policy of following up with clients within a week or two of sending clients our completed report. We think this helps to motivate them to read the reports more thoroughly. It also gives us a chance to answer any questions or concerns that arise and have a chance overcome issues that might otherwise create a barrier to implementation. Response to this effort has been positive. The lead students enjoy the opportunity to hear what the client thinks of the report and we are hopeful that the clients are looking the reports over more closely in response to the follow-up.

- 9 to 12 Month Follow-up Implementation Calls  
As specified in the work plan, the OSU IAC followed up with clients to find out what had been implemented or was in the process of being implemented

Over the duration of the project, implemented recommendations have already resulted in over \$11 million in annual savings with a number of projects still pending that could contribute further to that number.

**Task 3: Promote the IAC Program and enhance recruitment efforts for new clients and expanded geographic coverage.** *Describe efforts to promote the IAC program and expand the reach of the center.*

The OSU IAC has used the following approaches to promote assessments:

- Coordinating with utility and other regional partners to find clients.
- Mailings and phone calls to potential industries
- Maintenance of a web site that includes an opportunity to request assistance
- Encouraging word-of-mouth referral by our industrial clients and others
- Integration with the OSU Engineering Marketing Program: working with the OSU Engineering Director of Marketing to explore how to create better visibility for the OSU IAC both within the University and throughout the region

**Task 4: Provide educational opportunities, training, and other related activities for IAC students.** *Summarize education, training and other any other activities for the students. Include overall number of students that participated during the course of the award.*

The OSU IAC used the following approaches to develop the skills of students working at the IAC:

- New Student Orientation  
All new students go through a “New student orientation” and are given a copy of a Walkthrough checklist prepared by Assistant Director, Joe Junker in cooperation with Chris Milan of the Bonneville Power Administration.
- Direct Mentorship  
A significant portion of student training currently came in the form of direct Mentorship with Joe Junker, the Assistant Director or Greg Wheeler the Director. This was bolstered by mentorship of newer students by more experienced students, and a review process that allowed students to read each other’s work and offer feedback before forwarding it to either of the above.
- Group Training  
Additional training came in the form of presentations during regular weekly meetings. These were presented by the Director, Assistant Director, or an experienced student that had shown a level of mastery over the subject being presented.

- Distributed Responsibility  
The OSU IAC worked to give as much responsibility for the success of the center to students as we possible. As new students showed initiative and reliability we strove to motivate their increased personal development with increased pay and increased duties such as becoming a report lead, technology lead, utility analysis lead, marketing lead, etc. We feel this helped greatly in their professional development.
- OSU Mechanical Engineering Graduate Seminars  
Assistant Director, Junker made presentations on the IAC and energy efficiency to the OSU engineering community at Mechanical Engineering Seminars.

**Task 5: Coordinate and integrate Center activities with other Center and IAC Program activities, DOE's Industrial Technologies programs and other EERE programs.** *Summarize the integration activities with other centers, the ITP program, state programs, etc.*

Director, George Wheeler, and Assistant director Joseph Junker, have received certification in U.S.DOE Best practice tools including; PSAT, PHAST, and AIRMASTER. The OSU IAC collaborated regularly with the Oregon Department of Energy, and Washington State Energy Extension (formerly the Washington State Energy Office).

**Task 6: Other tasks or special projects, as needed, and as determined by DOE to be advantageous to the program and in furtherance of IAC Program goals.** *Briefly describe any other special projects or tasks performed for DOE under the award.*

The OSU IAC regularly responded to U.S.DOE requests. For example the OSU IAC

- Presented on the Save Energy Now Program: Greg Wheeler presented the SEN program at a 3 hr SW Washington Executive Manufacturers Forum on Jan 18<sup>th</sup>, 2006
- Contacted 57 LEUs (Large Energy Users) to obtain up-to-date contact information for SEN promotions in Summer & Fall 2006.
- Assessed 5 plants that were unsuccessful applicants for SEN assessments in Spring and Summer of 2006.
- Assumed temporary lead of a project to offer Compressed Air Qualified Specialist training to IAC staff in 2003
- Tested and used the Steam System Assessment Tool in 2002