



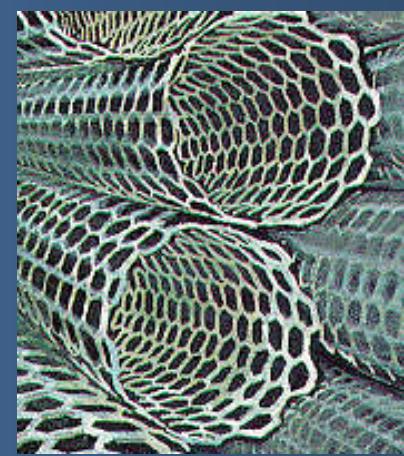
U.S. Department of Energy

Energy Efficiency and Renewable Energy

Bringing you a prosperous future where energy
is clean, abundant, reliable, and affordable

Save ENERGY Now

Brian Olsen
Industrial Projects Manager
U.S. Department of Energy,
Golden Field Office



Converging Issues

- Uncertain energy supply
- Volatile energy prices
- Climate change
- Sustainability

Energy Efficiency

- Technology available today
- Continuous improvement in energy management through adoption of new technologies and practices
- Profitable business practice



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The U.S. Department of Energy is delivering technology solutions



Partnerships

Collaborative R&D



- Energy-Intensive Process Technologies
- Crosscutting Technologies

Technology Delivery

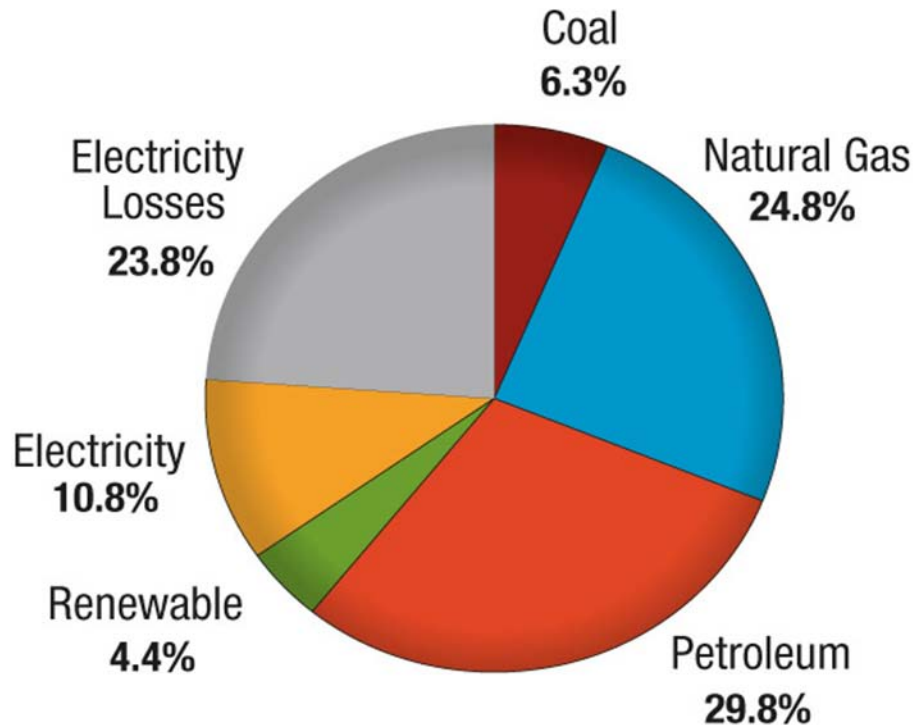


- Energy Savings Assessments
- Industrial Assessment Centers
- Training and Tools
- Publications and Information



U.S. Industrial Sector: A Big Opportunity

32 quads or ~33% of total U.S. energy consumption



Industrial Energy Use by Fuel Type

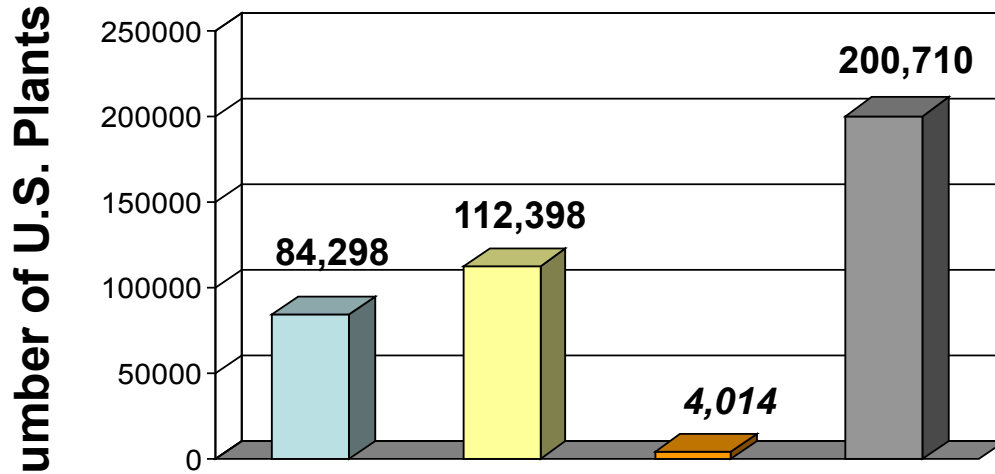
U.S. industry represents:

- 37% of U.S. natural gas demand
- 29% of U.S. electricity demand
- 30% of U.S. greenhouse gas emissions
- More energy use than any other single G8 nation
- Large opportunities for
 - Energy reduction
 - Emissions reductions
 - Fuel flexibility

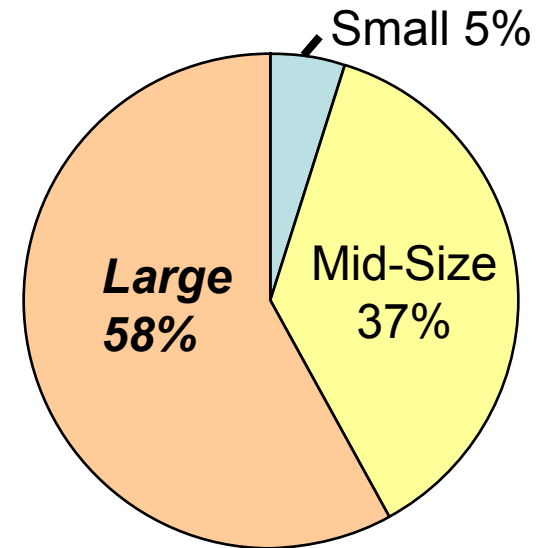


U.S. Manufacturing Sector Energy Use

U.S. Manufacturing Plants: By Size



Percent of Total Manufacturing Energy



2002 EIA MECS

Over 196,000 plants use 42% of U.S. manufacturing energy

Annual Energy Consumption (Billion Btu/yr)

Small Plants	Mid-Size Plants	Large Plants	All Plants
<25	26-500	>500	
<\$100K	\$100K-\$3M	>\$3M	

Annual Energy Consumption (\$/yr est.)

<25 26-500 >500

<\$100K \$100K-\$3M >\$3M



Why focus on energy assessments? Pressing energy supply and cost issues

“Our Energy Saving Teams will work with on-site managers on ways to conserve energy and use it more efficiently.”

**U.S. Department of Energy
Secretary Bodman
National Press Club
October 3, 2005**



Secretary Bodman at the
Caterpillar Tractor
Assessment



The program encompasses four primary technology delivery channels

- **Save Energy Now ESA Assessments**
Energy experts work with plant personnel to identify the best opportunities for energy savings at large industrial facilities
- **Industrial Assessment Centers**
No-cost assessments provided to eligible small & mid-size plants by university-based teams
- **Tools and Training**
Training in best practices and software tools to improve plant energy performance
- **Publications/Information**
Websites, newsletters, webcasts, case studies, tip sheets, technical briefs, clearinghouse, allied partners, showcases, energy events, etc.



Energy Savings Assessments

- Assessments of targeted industrial systems by Qualified Specialist using the DOE software tools
- Energy Assessment Report identifies potential energy and cost savings
- Plants are selected by DOE based on several factors, including:
 - The plant's energy consumption
 - The company's intention to include other similar plants within their company



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Principles of a Training Assessment

- Not a “fault-finding” activity but an activity that is designed to:
 - Share knowledge
 - Provide tools
 - Identify energy management best practices
 - Identify opportunities for improvement
 - Identify opportunities for replication.



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Training Assessment Strategy-Goals

Foster replication of energy management concepts by developing onsite resident expertise.

Train the Site Lead in energy management best practices and the use of the U.S. DOE Tools. (Energy Expert)

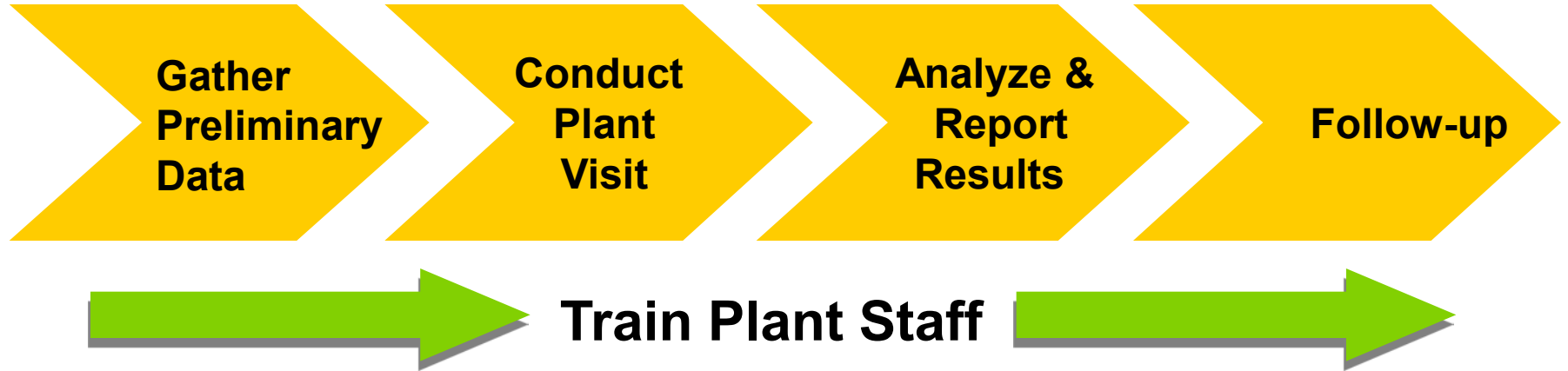
A Training-Assessment is **not** a standard industrial system assessment.

- The goal is **not** to complete a comprehensive system assessment.

- Target systems exhibit the following:
 - Significant operating costs,
 - Large loads
 - Large # of similar systems
 - Systems that have symptoms of problems.



The *Save Energy Now Energy Savings Assessment* process is well structured



- ❑ Teams are DOE Energy Experts and plant personnel
- ❑ Teams focus on fans, pumps, compressors, steam or process heating systems
- ❑ Plant personnel are trained on DOE software tools



Assessment Expert spends 3 days on site

Day 1

- Safety briefing, tour plant
- Overview of DOE Tool to plant personnel
- Agree on potential energy efficiency opportunities to investigate
- Initiate data collection for potential opportunities

Day 2

- Continue data collection
- Apply DOE tool to quantify potential opportunities
- Plant lead and expert agree on opportunity results

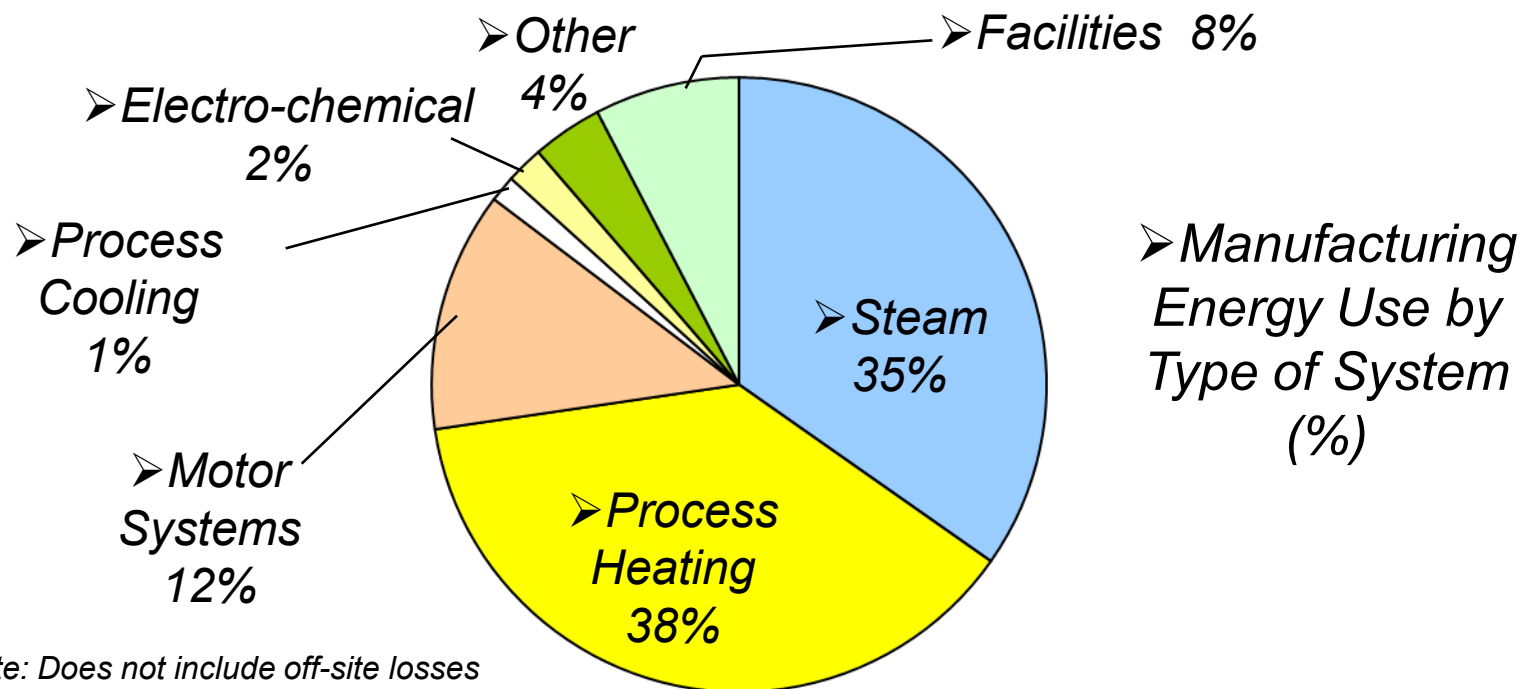
Day 3

- Wrap up tool analyses
- Plant lead and expert ensure they agree on opportunity results
- Closeout meeting in p.m. to review results



Energy Savings Teams

- Teams composed of DOE Qualified Energy Experts and plant personnel
- Teams will focus on one of five DOE efficiency tools
- Plant personnel and affiliates will be trained on DOE efficiency tools



ESA Scope

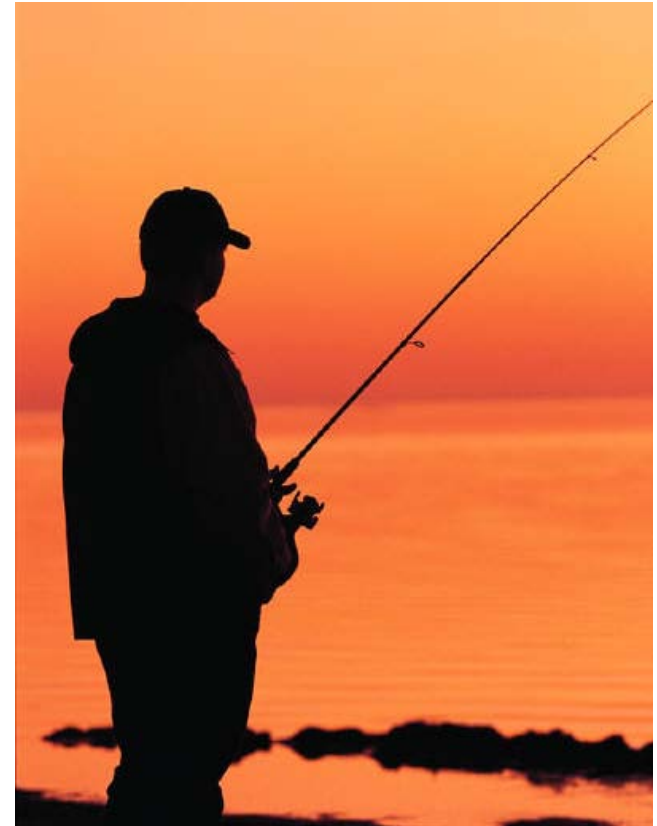
- Attempt to include some aspects of each of the major areas of focus to facilitate fundamental training, for example:
 - Boiler operations investigations
 - Combustion management
 - Flue gas temperature management
 - Blowdown thermal energy management
 - Other boiler efficiency investigations
 - Resource utilization investigations
 - Primary energy resource management
 - Turbine-PRV management
 - Condensing turbine operations
 - Steam end-use management
 - Distribution system investigations
 - Condensate and flash steam recovery
 - Steam trap management
 - Thermal insulation management.



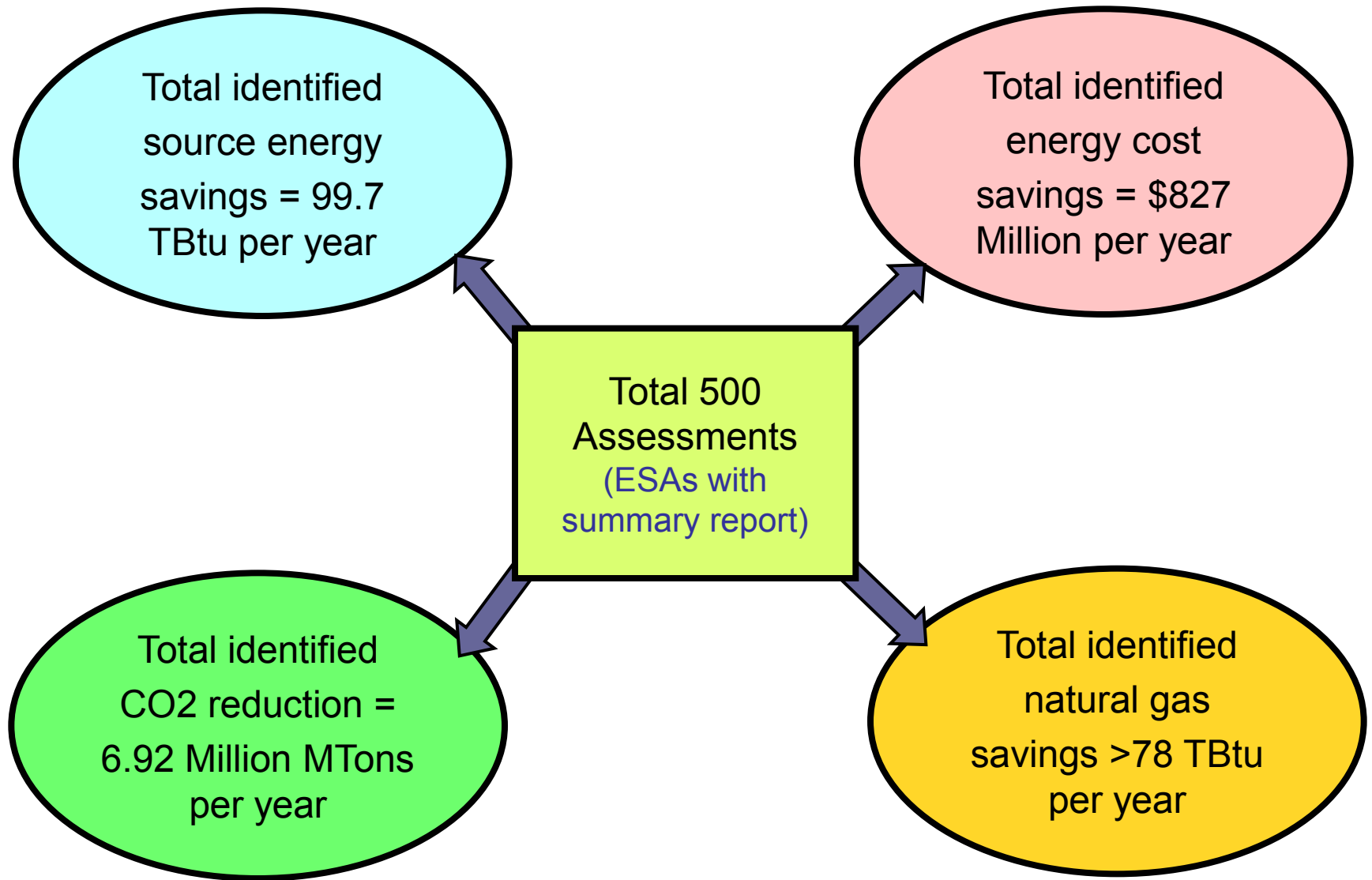
Technology Replication

**Give a man a fish
and he will eat for a
day.**

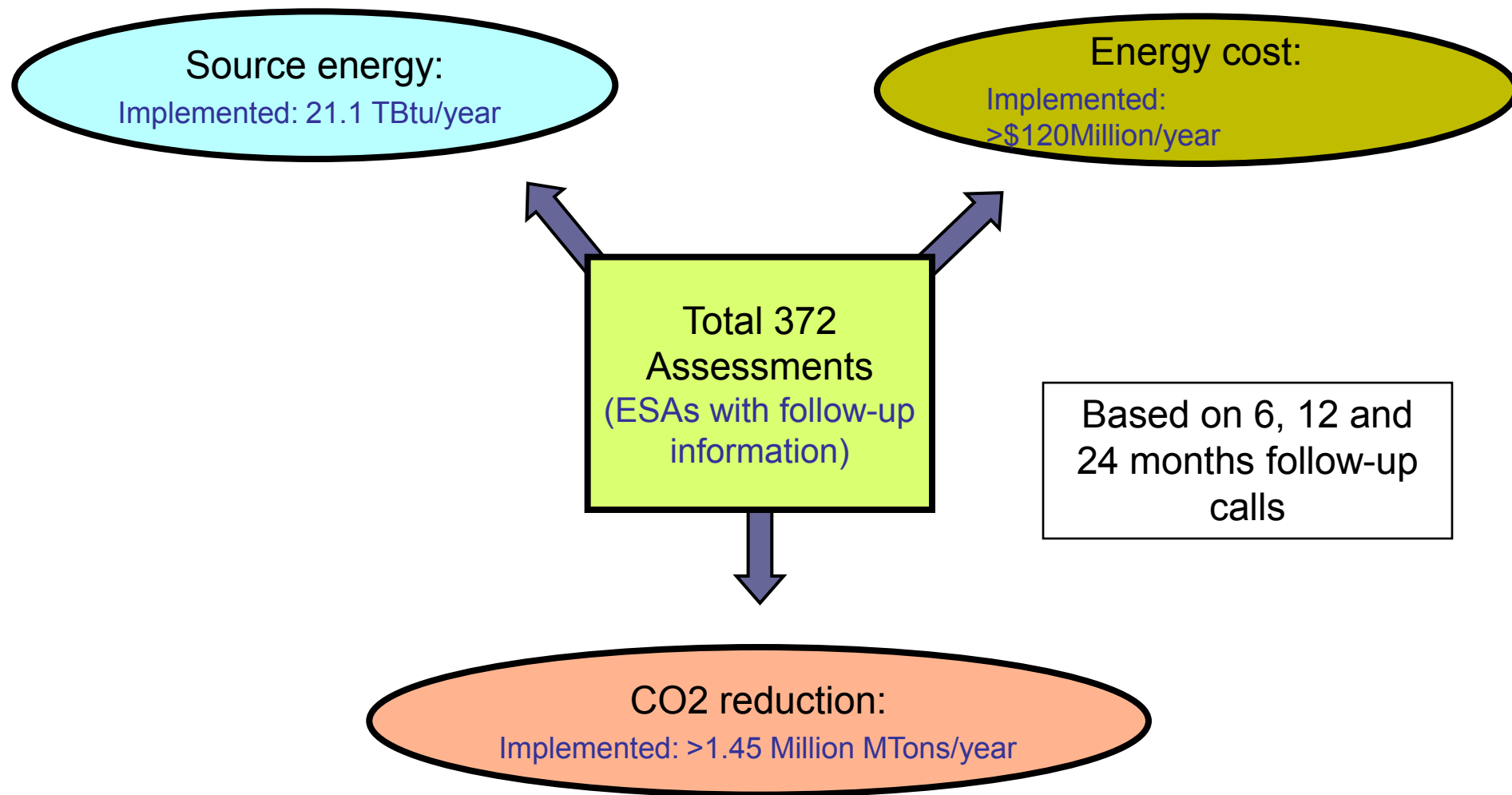
**Teach a man to fish
and he will eat for a
lifetime.**



Summary of identified savings (500 Assessments)

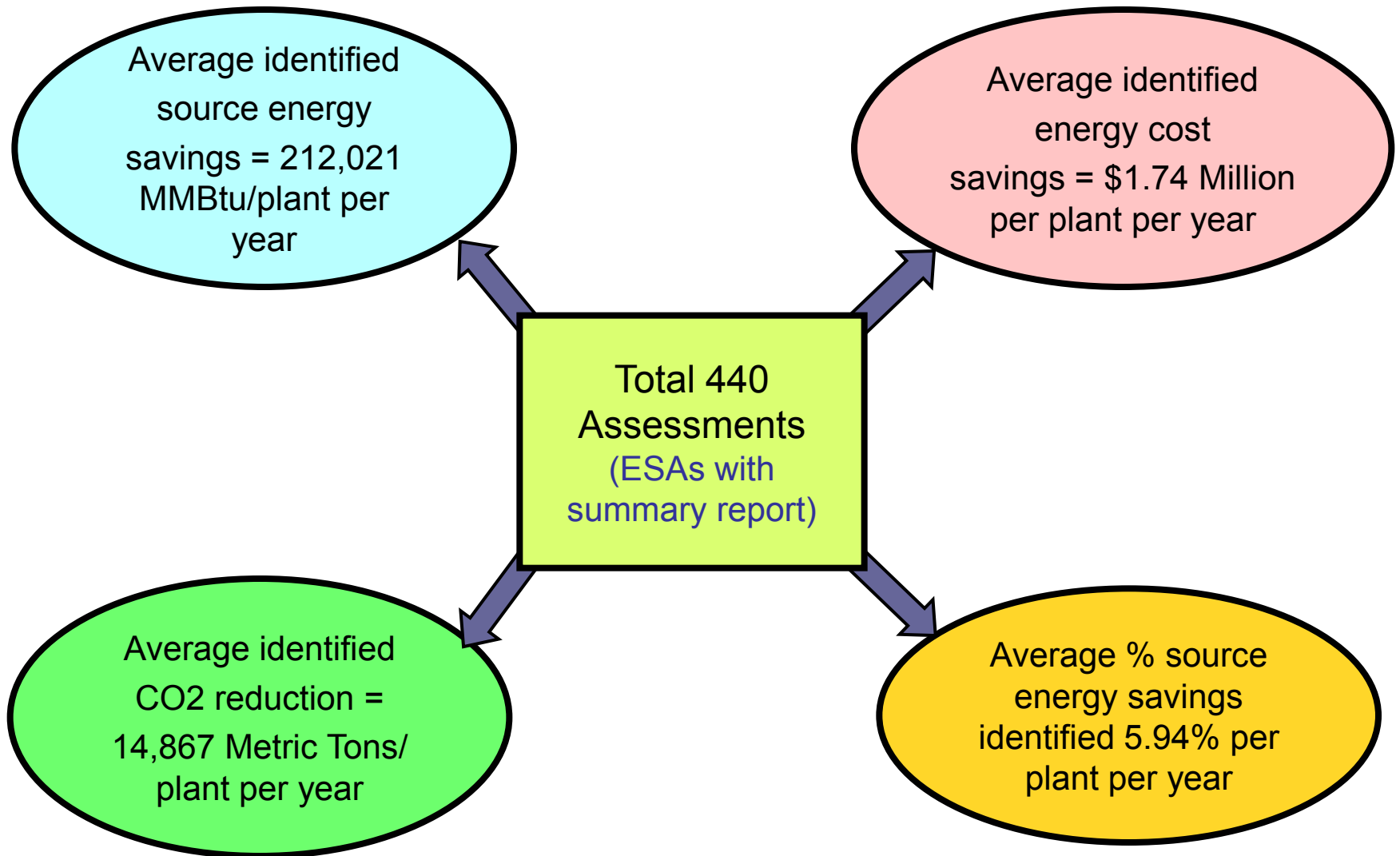


Summary of implemented savings (372 Assessments)



Plant level overview

Identified savings per plant (2006-2007)



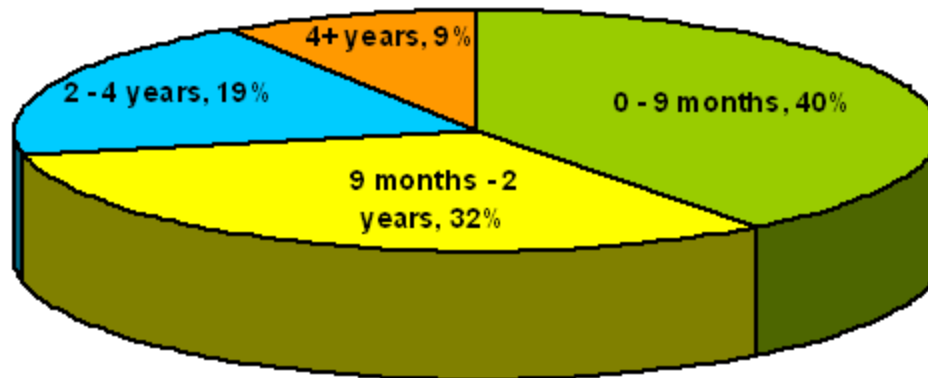
Summary – Identified savings per plant (by system type)

System Type (No. of Assessments)	Average Recommended Source Energy Savings (MMBtu/plant per year)	Average Percent Source Energy Savings Recommended (%)	Average Recommended Cost Savings (\$/plant per year)	Average Natural Gas Savings Recommended (MMBtu/plant per year)	Average CO2 Savings Recommended (Metric Tons/plant per year)
Compressed Air	31,270	1.83	\$206,717	606	1,829
Fans	129,109	4.25	\$839,262	71,092	7,175
Process Heating	256,549	8.20	\$1,829,423	183,965	14,819
Pumps	36,264	0.97	\$178,610	2,748	2,110
Steam	257,614	6.27	\$2,350,689	234,462	20,559

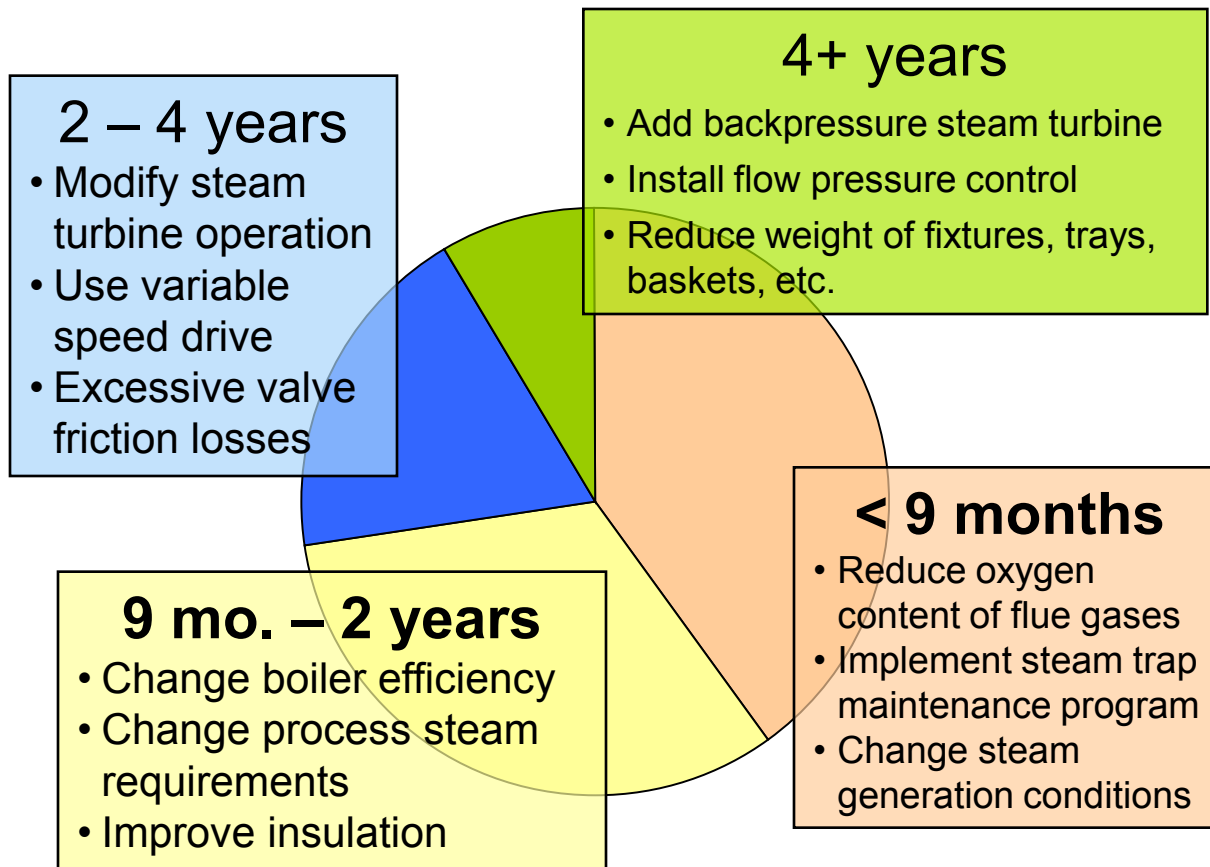


Payback – not the only impediment

- Over **72%** of recommended actions had paybacks of **less than 2 years**.
- **40%** of recommended actions had paybacks of **less than 9 months**.
- Only **9%** recommendations had **paybacks > 4 years**



Save Energy Now Assessments: 2006-2008



Estimated Payback Periods for Recommended Actions



US STEEL



Owens Corning

**Great example of a company using
ESAs to improve energy performance**

***Company using ESAs as tool to implement corporate
commitment to energy efficiency***

- ***Doing ESAs at 15 plants***
 - ***6 ESAs are cost-shared***
- ***Using ESAs to improve energy use at more than ESA plant***
 - ***Personnel at other plants often sent to ESA plant for training. Attendance as high as 20 people.***



Owens Corning

An Example of Success from one of their ESAs

ESA at Newark, Ohio: (Fans System: March, 07)

- Found \$197,200 in potential annual energy savings
 - will cost \$277,000 to implement the projects
 - 16 month payback
- 12 opportunities reviewed & analyzed during ESA
 - Due to the ESA success, OC decided to target 7 more areas (on their own) in the future
 - Side bonus--participants identified 11 safety issues



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Owens Corning — (quotes from OC Newsletter)



ESA at Newark, Ohio:

- "The DOE training and tools gave a whole new meaning to waste when I saw the energy excess used on some fans or how they were set up to run," said **Bill Cooper, Newark Process Area Leader**. "It was very eye opening! I can't wait to use some of the other DOE tools on other processes such as pumps or motors."
- "Plant energy leaders at the event plan to take what they have learned and apply it at their plants to find additional energy-savings opportunities."



Save Energy Now Assessment Recognition Program

- Rewards companies that implement energy-saving technologies and practices identified through the assessments to achieve a high level of energy efficiency

- **Awards to date:**

- **43 Energy Champion Plants:**

- Saved > 250,000 MMBtu or 15% total energy use

- **85 Energy Saver Plants:**

- Saved > 75,000 MMBtu or 7.5% total energy use



Companies include:

- Alcan Packaging
- Dow Chemical
- Northrop Grumman
- International Paper
- Saint-Gobain
- BASF
- Huntsman
- Black & Decker
- US Steel
- Ocean Spray
- DuPont
- Earthbound Farm



Issues to Consider Prior to Applying

- Company Policy regarding payback periods of new projects and budget priorities.
- Engagement of upper management necessary to move forward.
- Recent changes in the company policy emphasizing energy reduction (good time to get involved).
- Flexibility regarding operational changes and downtime.
- Limitations of the current available technology or design.
- Manpower issues (unions, lay-offs, early retirements, etc.).
- Pending mergers, divisions, etc.
- Manpower to implement new projects.





How can industry get involved?

- ITP still has assessments available for the rest of 2008
- Website to apply and to get up to date statistics and case studies:
<http://www1.eere.energy.gov/industry/saveenergynow/assessments.html>
- Other ways:
 - Free resources, including publications and software tools
 - Agree to do a case study (for very successful plants)
 - Recognition Program

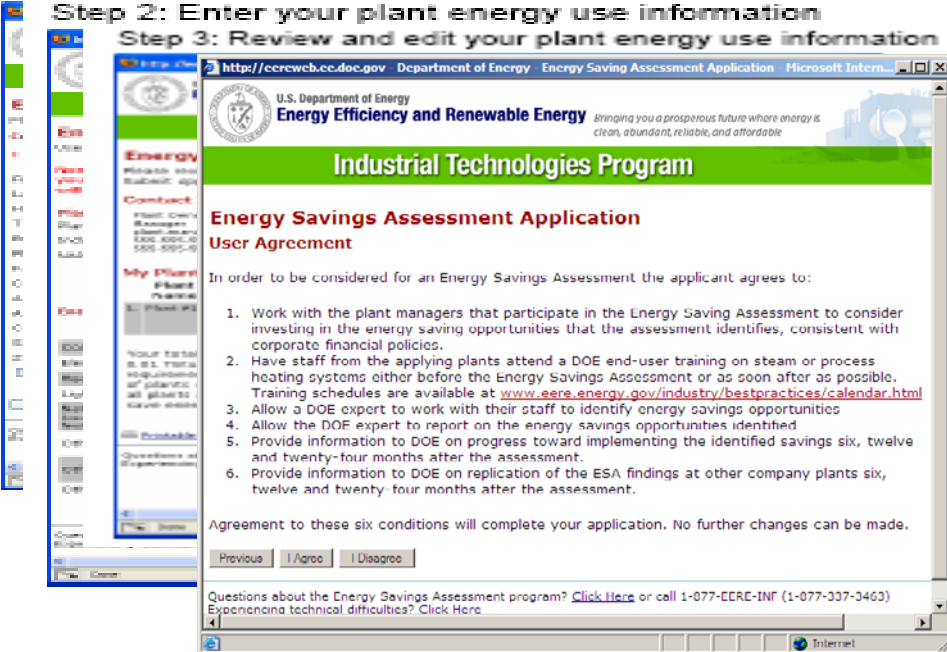


Application

Minimal information needed to complete online application:

- Company contact and information
- Address of facility
- Energy use (total facility)
 - Then break out by type/quantity (gas, oil, etc..)
- 3 sets of dates of availability
- Type of assessment desired
- Text box for any other requests/requirements

Step 1: Enter your corporate contact information
Step 2: Enter your plant energy use information
Step 3: Review and edit your plant energy use information



The screenshot shows a web browser window displaying the 'Energy Savings Assessment Application User Agreement' page. The page is titled 'Industrial Technologies Program' and 'Energy Savings Assessment Application User Agreement'. It lists six conditions for participation in the assessment, including working with plant managers, attending DOE training, allowing DOE experts to report on energy savings opportunities, and providing information to DOE on progress and replication of findings. The page also includes a section for 'Agreement to these six conditions' with 'Previous', 'I Agree', and 'I Disagree' buttons. The browser's address bar shows the URL 'http://eereweb.ec.doc.gov' and the page title 'Department of Energy - Energy Saving Assessment Application - Microsoft Intern...'. The browser's status bar at the bottom indicates 'Internet'.

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Industrial Technologies Program

Energy Savings Assessment Application User Agreement

In order to be considered for an Energy Savings Assessment the applicant agrees to:

1. Work with the plant managers that participate in the Energy Saving Assessment to consider investing in the energy saving opportunities that the assessment identifies, consistent with corporate financial policies.
2. Have staff from the applying plants attend a DOE end-user training on steam or process heating systems either before the Energy Savings Assessment or as soon after as possible. Training schedules are available at www.eere.energy.gov/industry/bestpractices/calendar.html
3. Allow a DOE expert to work with their staff to identify energy savings opportunities
4. Allow the DOE expert to report on the energy savings opportunities identified
5. Provide information to DOE on progress toward implementing the identified savings six, twelve and twenty-four months after the assessment.
6. Provide information to DOE on replication of the ESA findings at other company plants six, twelve and twenty-four months after the assessment.

Agreement to these six conditions will complete your application. No further changes can be made.

Previous | I Agree | I Disagree

Questions about the Energy Savings Assessment program? [Click Here](#) or call 1-877-EERE-INF (1-877-337-3463)
Experiencing technical difficulties? [Click Here](#)



Reports, etc.....

- Final reports
 - Drafts
 - Public Reports
 - Confidentiality
- Follow-up
 - 3, 6 and 12 months
 - Summary of changes made
 - Other issues which may have developed



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Confidentiality and Post Assessment

- Expert provides the Site Lead with the draft Report for review (within 10 days).
- Site Lead provides comments on report and gives the 'ok' for Expert to release the report to DOE only (business confidential).
- Golden sends Site Lead a draft Public Version of the report and asks them to remove ANY information they do not want released and return within 30 days.
- Golden releases plant approved Public Version of report on Save Energy Now website.





Post Assessment

- 6 months, 12 months, and 24 months after the ESA, Site Lead will be contacted by a student from the Industrial Assessment Center to complete a survey about implementation.
- Depending on results of ESA, Site Lead may also be contacted by DOE about being part of the recognition program and/or to ask if they would like to have the ESA written up as part of a case study



Other Related ITP Activities



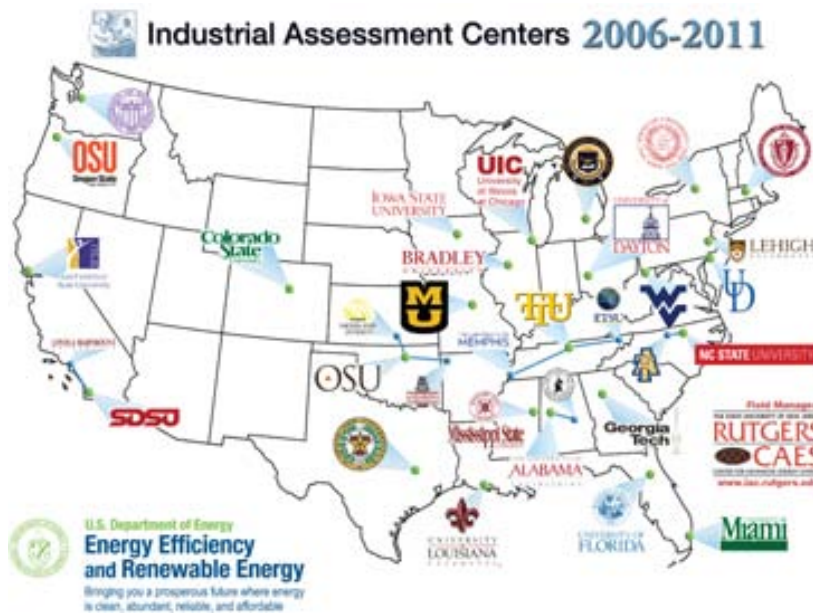
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Industrial Assessment Centers/Industry Resources

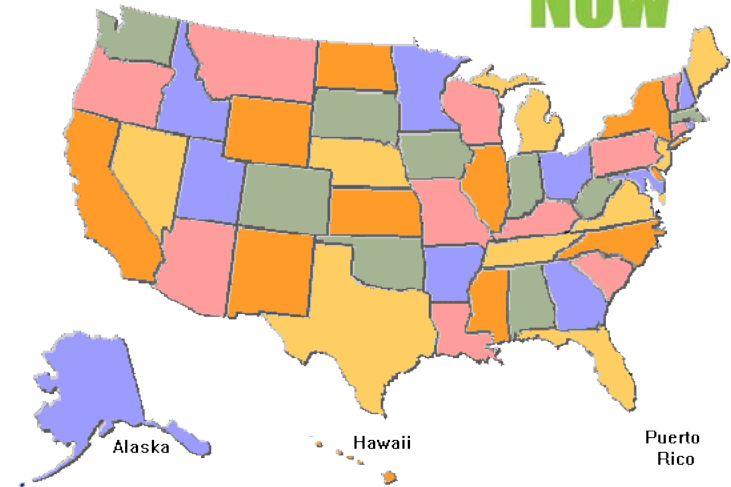
- DOE's 26 university-based Industrial Assessment Centers (IACs) conduct plant assessments and train engineering students for careers in industrial energy efficiency
- IACs serve 300 plants per year (under 1 TBtu/yr) and typically identify savings of 8%-10% or \$115,000/plant
- Database of 13,500 assessment results: <http://iac.rutgers.edu/database>



State-Level Save Energy Now



- A partnership of state energy offices, regional energy efficiency organizations, academia, and private companies with the purpose of:
 - Working with the states to establish energy assessment capability and expand on the success of the federal program
 - Transferring ITP and other energy efficient technologies to the market
 - Reducing carbon emissions through energy efficiency



- **In FY08, 19 states were selected for the State Industrial Assessment Projects Funding Opportunity.**
- **In FY09 solicitation issued for more states to receive assistance to launch state-level Save Energy Now campaigns. Twelve to sixteen awards are expected.**

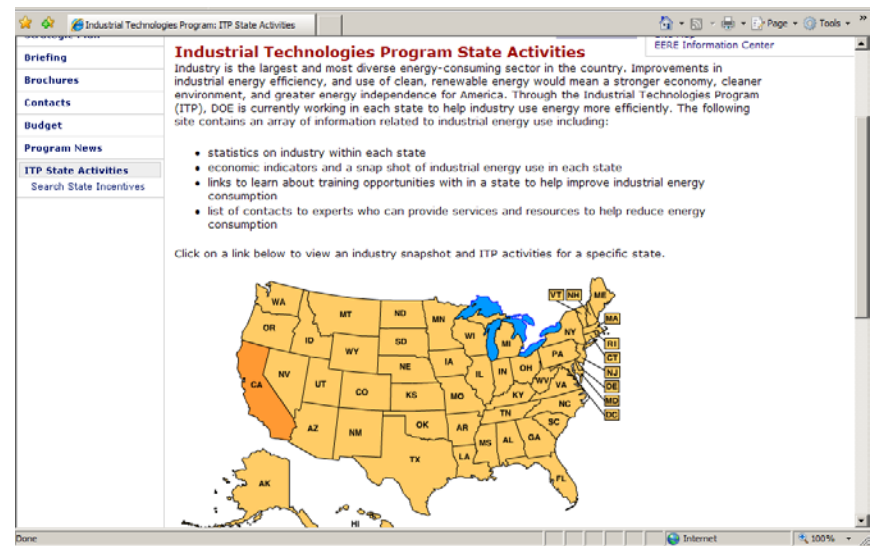


ITP State Activities Web site

http://www1.eere.energy.gov/industry/about/state_activities/main_map.asp

This Web site contains an assortment of information related to industrial energy use for each state including statistics on industry, economic indicators, and statistics on energy use. The site also includes the following data and contact information by state:

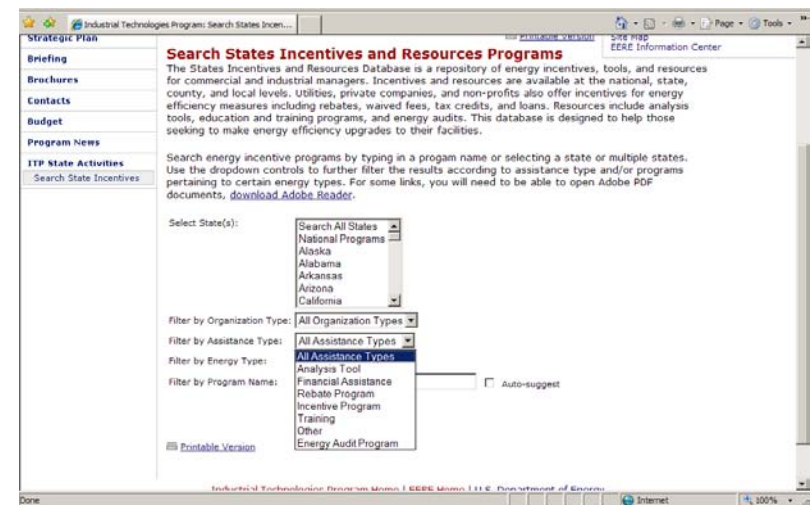
- State Incentives and Resources Database
- Energy Saving Assessments
- Industrial Assessment Center assessments
- Events and Training by State
- R&D fact sheets and successes



States Incentives and Resources Database

A repository of over 2,200 energy incentives, tools, and resources for commercial and industrial managers that are available at the national, state, county, local, utility, and non-profit levels. Sample incentives in the database include:

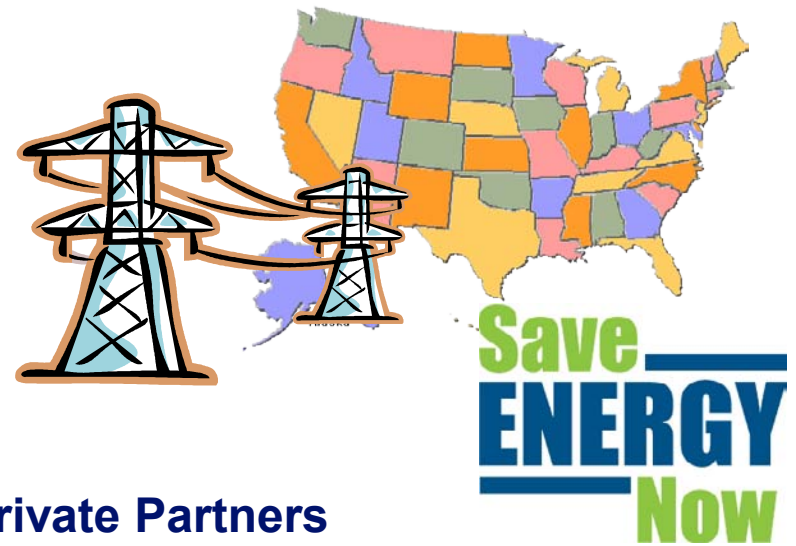
- Analysis Tools
- Energy Audits
- Loans
- Rebates
- Tax Credits
- Training and Education
- Waived Fees



Partnerships Key to Implementation

DOE is developing partnerships with states, utilities, regional organizations, academia, trade groups, and private companies

- Transfer energy-efficient technologies to the industrial market
- Reduce carbon emissions through energy efficiency



Government Partners

- NIST, U.S. Dept. of Commerce, Manufacturing Extension Partnership
- Environmental Protection Agency (Energy Star, Climate Leader, and Green Supplier Network)
- State governments and organizations

Private Partners

- National Assoc. of Manufacturers
- Green Grid
- Utilities
- Supply chains





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www.eere.energy.gov/industry



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