

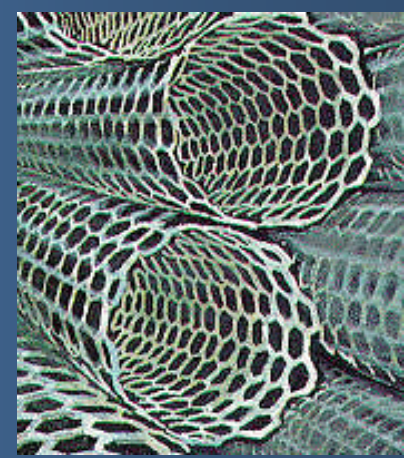


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Energy Efficiency and Renewable Energy

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

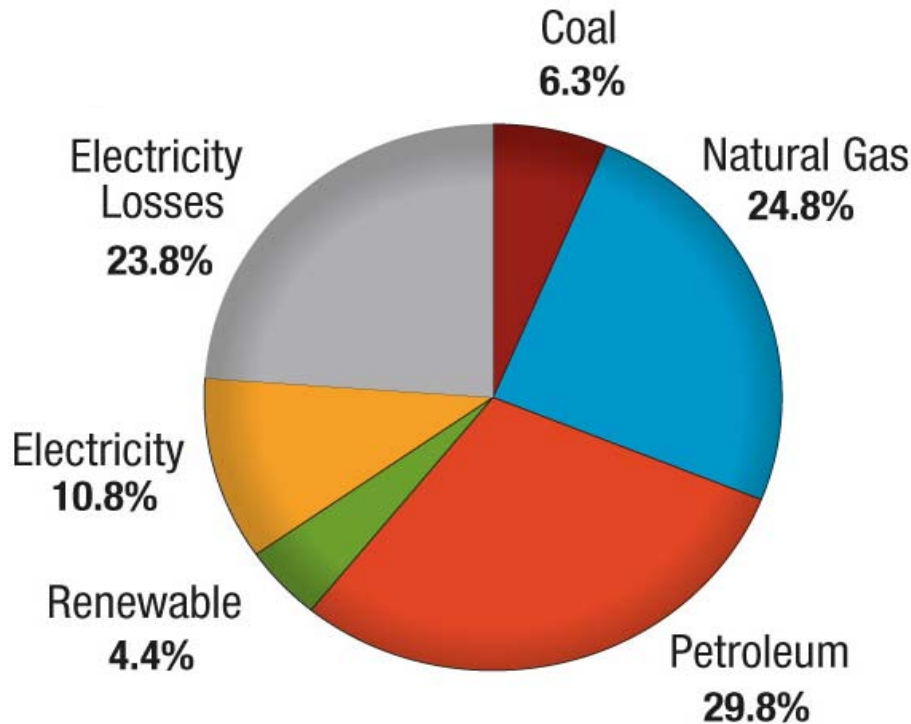


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U.S. Industrial Sector: A Big Opportunity

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



Barriers within the U.S. Industrial Sector

- Energy efficiency peripheral to most corporate business strategies
- R&D expenditures minimal for process and energy technologies
- Lack of incentives to invest in energy efficiency technologies
- No common standard for managing energy
- Insufficient energy management skills in work force
- Limited energy fuel choices
- Volatile US energy prices
- Uncertain future environmental regulations



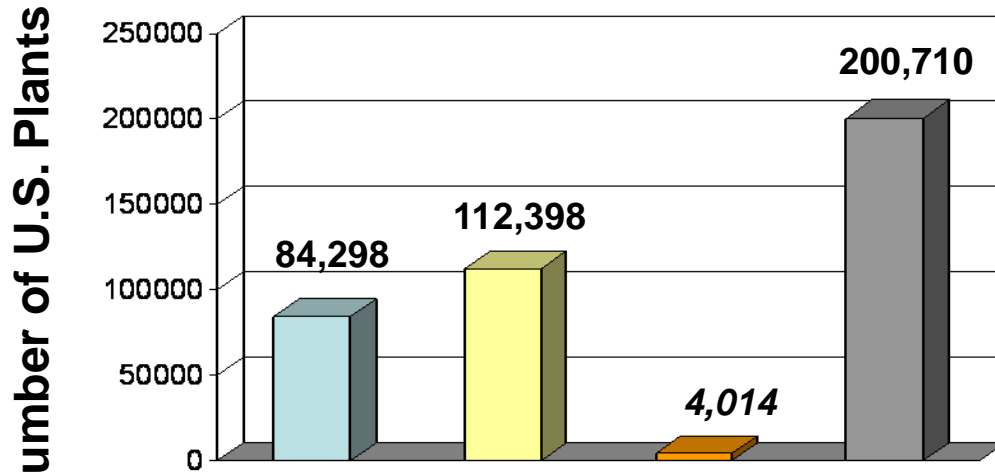
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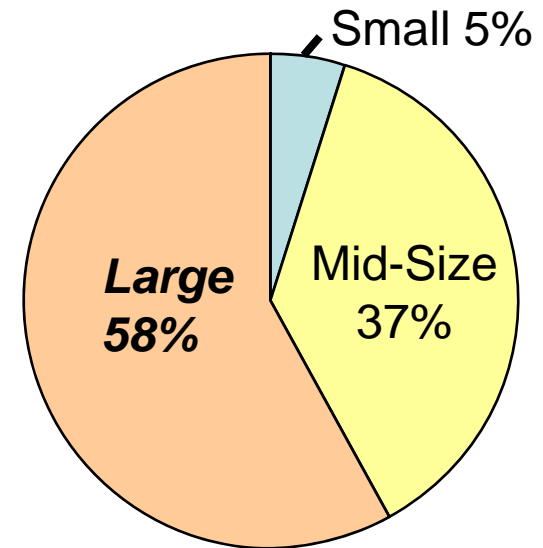
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U.S. Manufacturing Sector Energy Use

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.)



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



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)

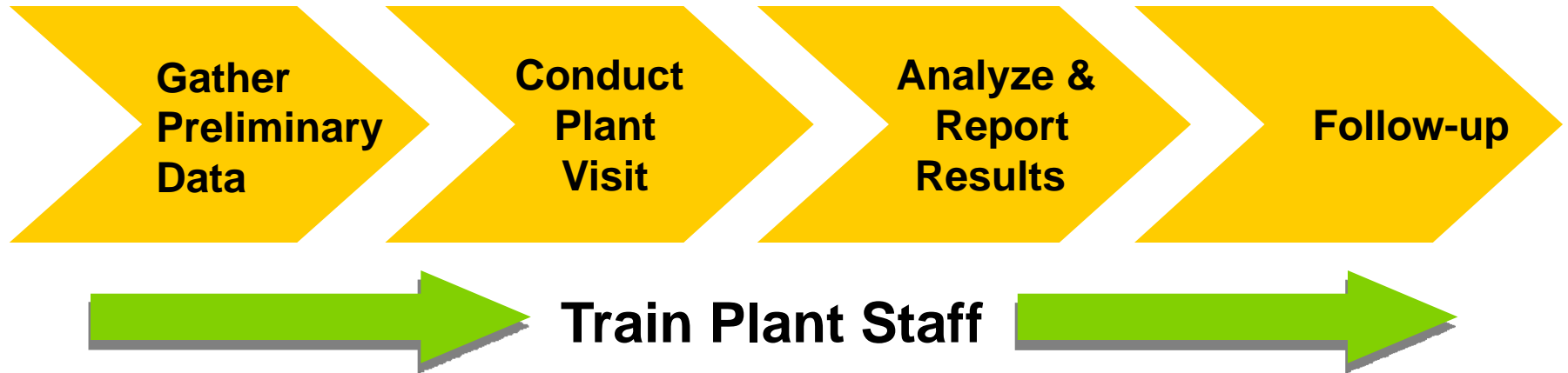
A Training-Assessment is **not** a standard industrial system assessment.

- 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

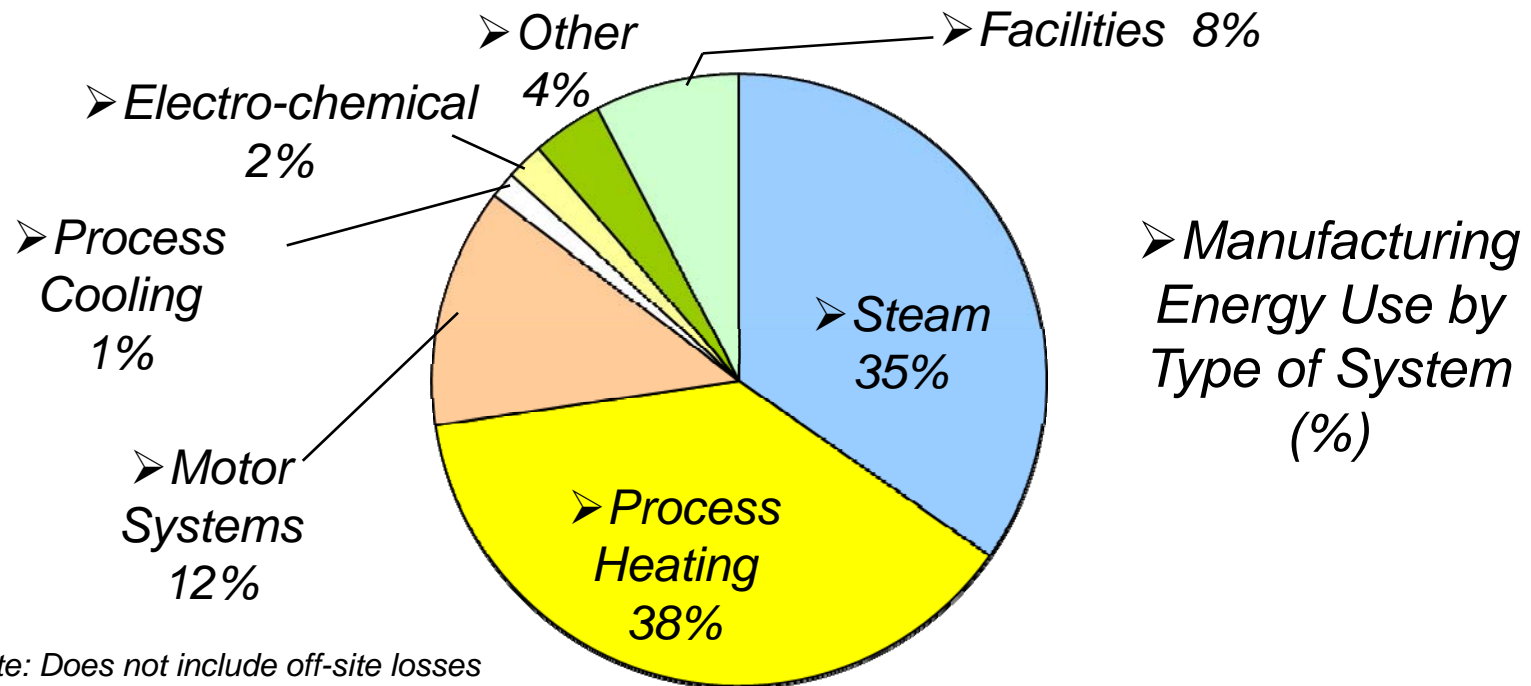
Day 3

- 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

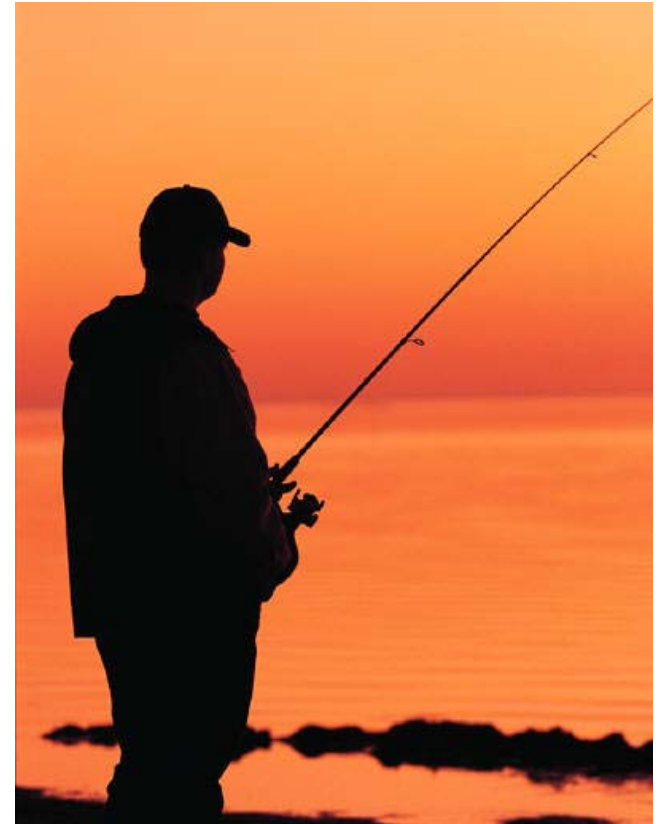
- Teams composed of DOE Qualified Energy Experts and plant personnel
- Teams will focus on one of five DOE efficiency tools
- Plant personnel and affiliates will be trained on DOE efficiency tools



Technology Replication

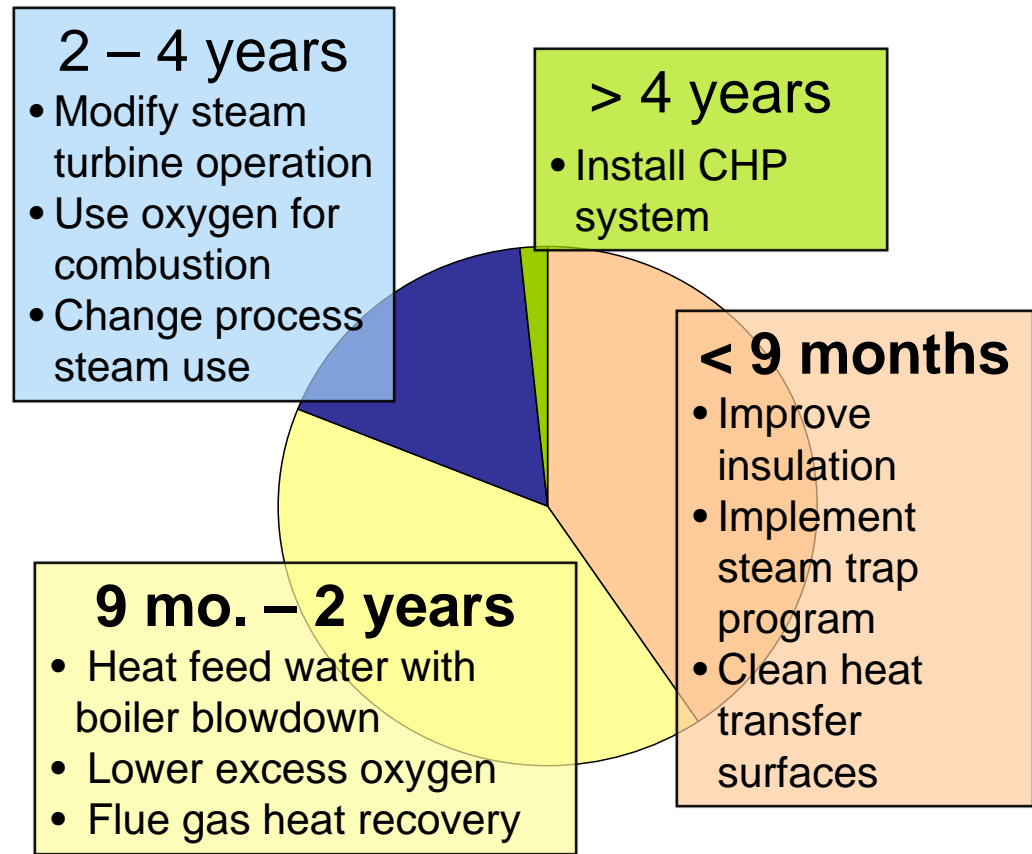
**Give a man a fish
and he will eat for a
day.**

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



Save Energy Now Results 2005-To Date

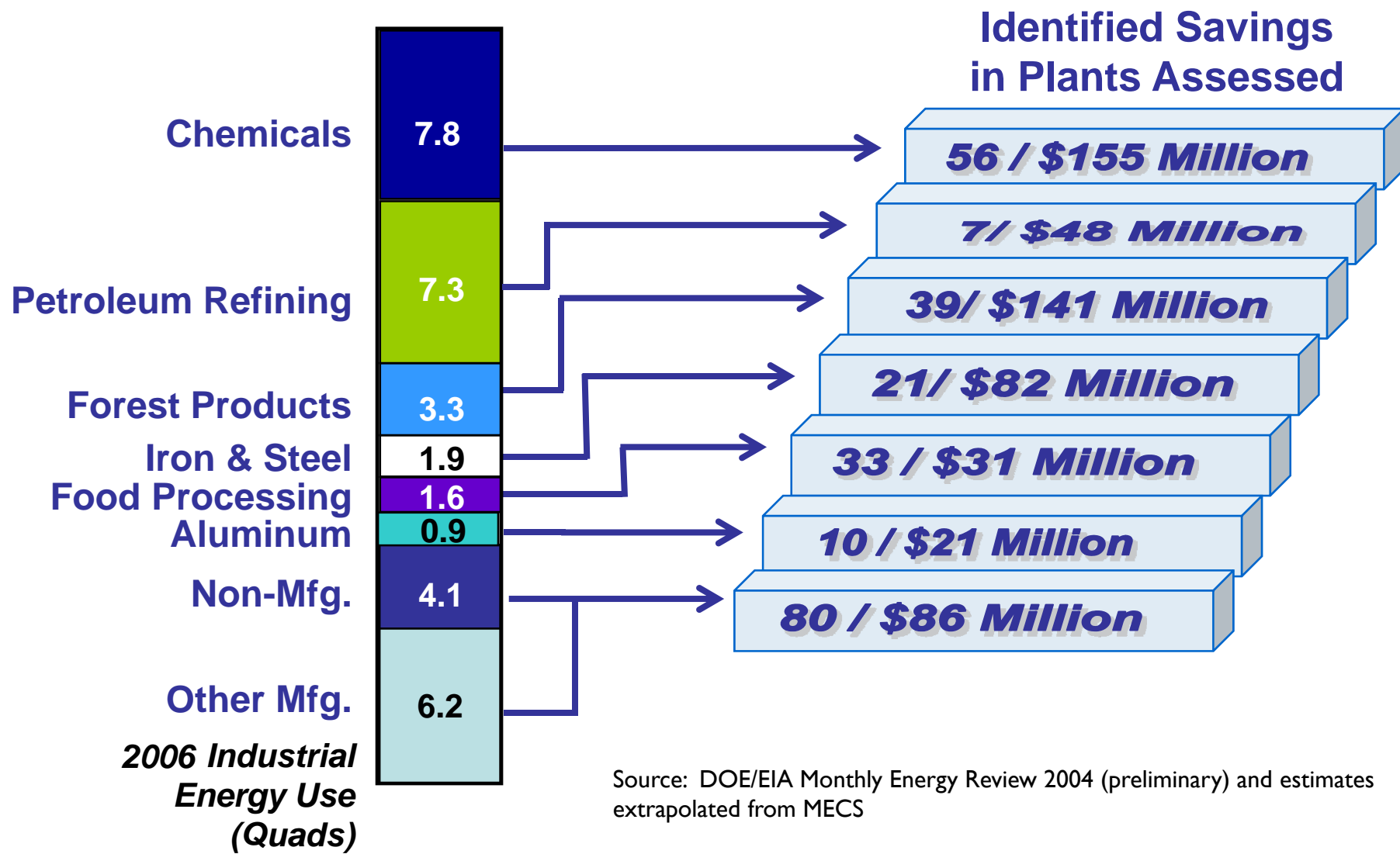
- 718 assessments completed, including 9 state assessments
- Implemented energy savings: 23.3 TBtu source energy / \$135.2 million
- Planned source energy savings: 18.4 TBtu/\$206.5 million
- Identified source energy savings: 116.5 TBtu/ \$937.1 million
- Total potential carbon dioxide (CO₂) emissions reduction: 7.94 million metric tons



Estimated Payback Periods for Recommended Actions Identified in 2006



Sector-Specific Impacts, 2006 and 2007



Source: DOE/EIA Monthly Energy Review 2004 (preliminary) and estimates extrapolated from MECS



Plant-level Impacts

- Average identified cost savings per assessment: \$1.4 million
- Average reduction in energy bill costs: 10.3 %
- 39% of all energy opportunities have a payback of 9 months or less; 32% have a payback period of 10 months – 2 years



Large Plant Assessment Findings

- A systems focus allows substantial energy savings to be identified
- Despite in-house energy expertise, assessments find additional energy savings in most plants
- Many companies plan on replicating the assessment savings at other plants under corporate ownership
- Training has been successful in promoting continuous attention to energy management in a plant and to the numerous resources available to support energy management



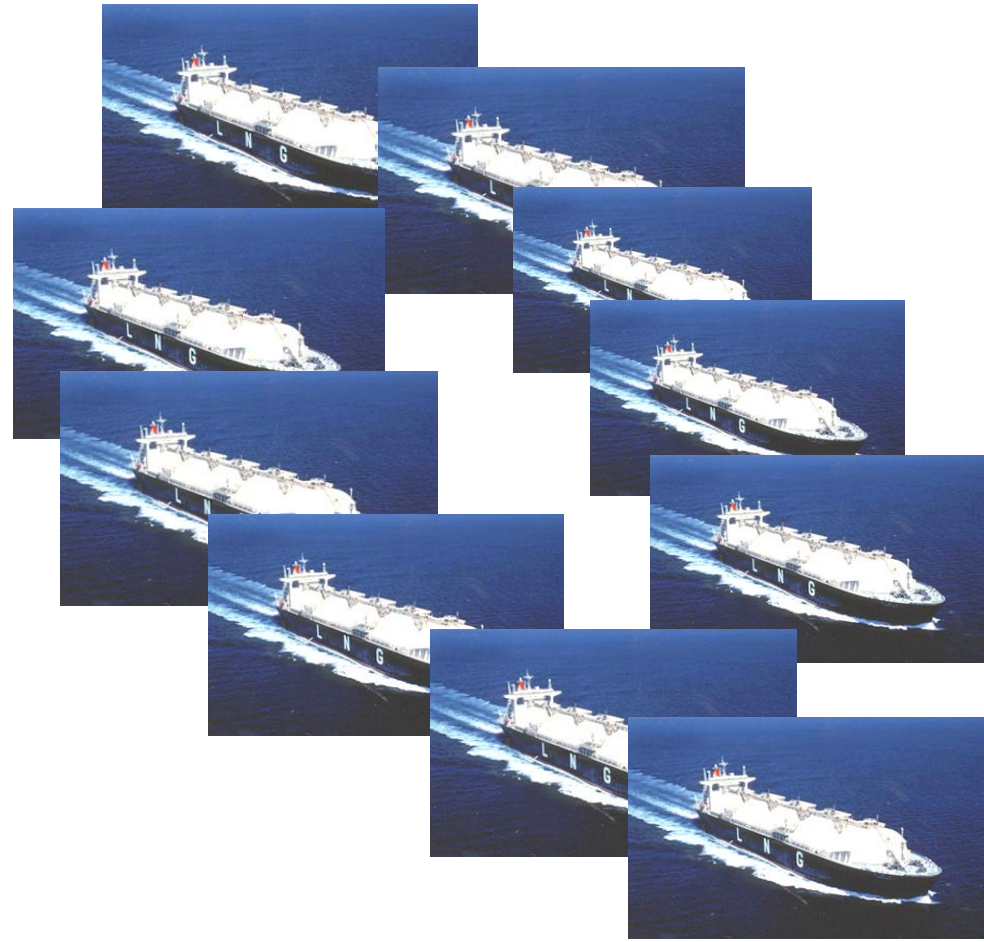
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Save Energy Now Has Significant Impacts

- By 2008, the large plant assessments of 2006 will annually save the amount of natural gas carried in 10 trips by LNG tankers
- By 2012, we can save 1.3% of U.S. natural gas use (295 TBtu/yr for 2006 – 2012 activities, with persistence)
- While models of price elasticity vary, we can conservatively estimate this decrease in demand could lower prices by 4-10%



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?

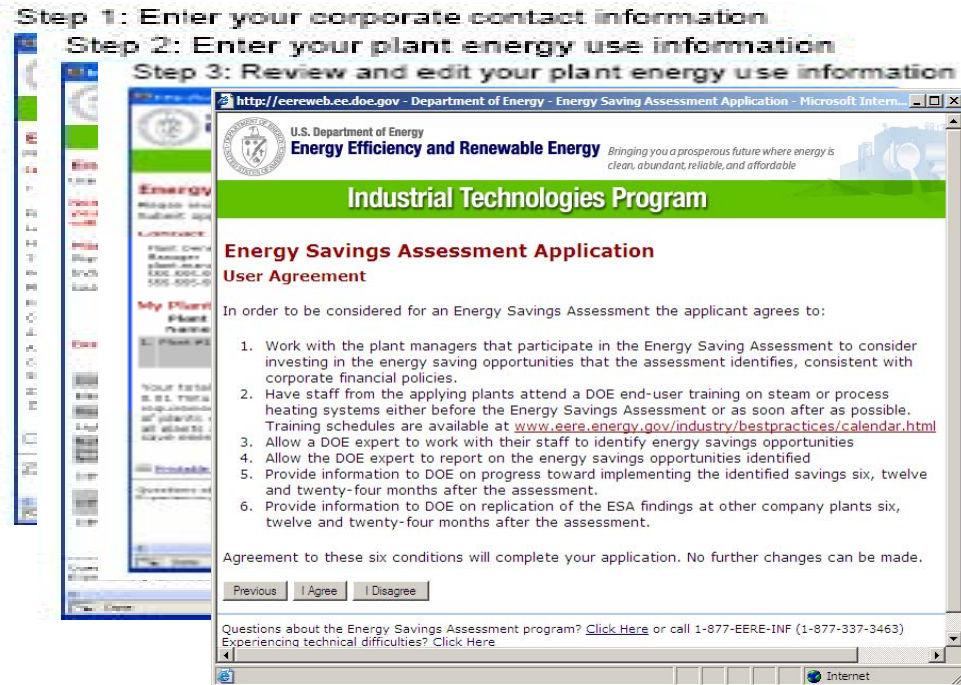
- ITP still has assessments available for 2009, but.....
- Website to apply and to get up to date statistics and case studies:
<http://www1.eere.energy.gov/industry/saveenergynow/assessments.html>
- Other ways:
 - Free resources, including publications and software tools
 - Agree to do a case study (for 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



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.



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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



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Other Related ITP Activities



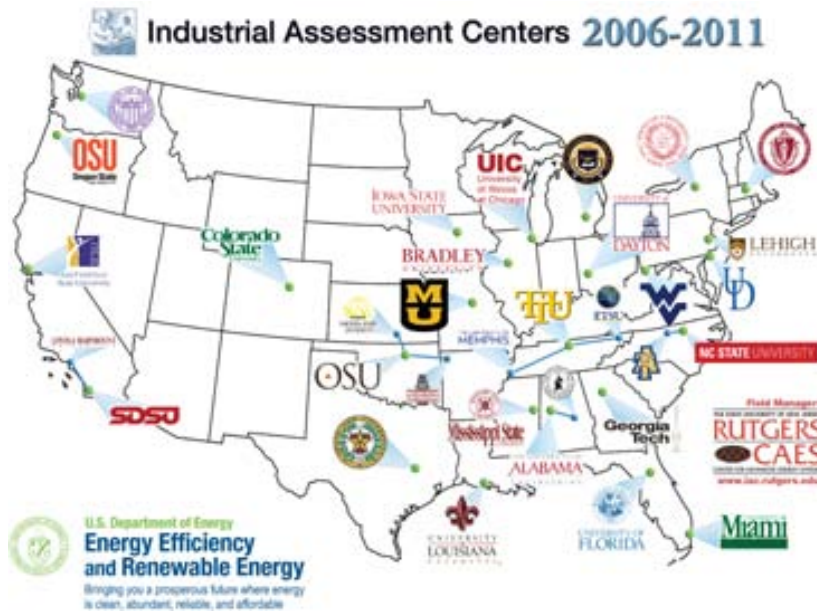
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Industrial Assessment Centers/Industry Resources

- 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 .3 TBtu/yr) and typically identify savings of 8%-10% or \$115,000/plant
- Database of 13,500 assessment results: <http://iac.rutgers.edu/database>

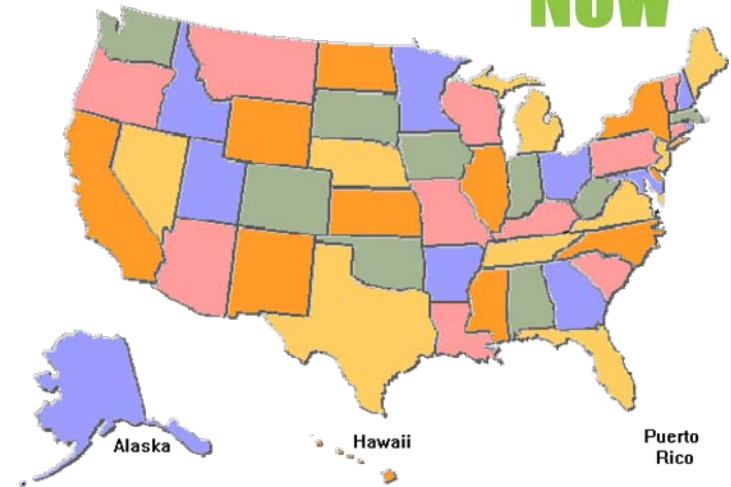


State-Level Save Energy Now



- 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. Announcement expected within a week or two.



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:

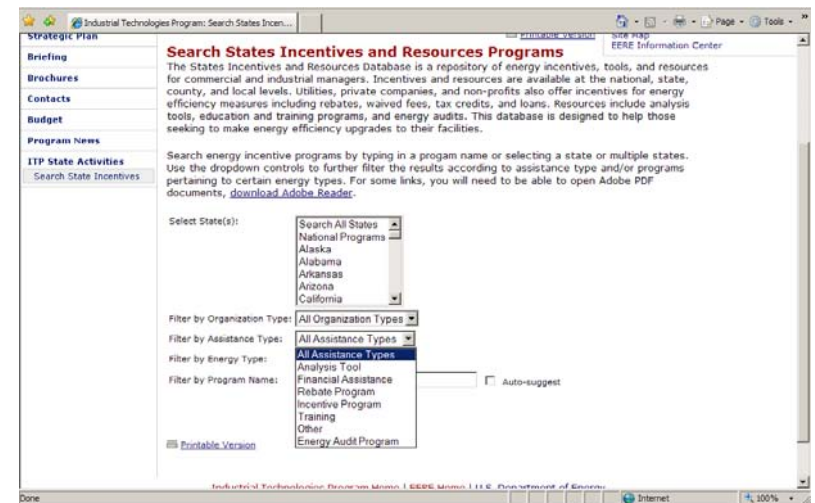
- State Incentives and Resources Database
- Energy Saving Assessments
- Industrial Assessment Center assessments
- Events and Training by State
- R&D fact sheets and successes



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



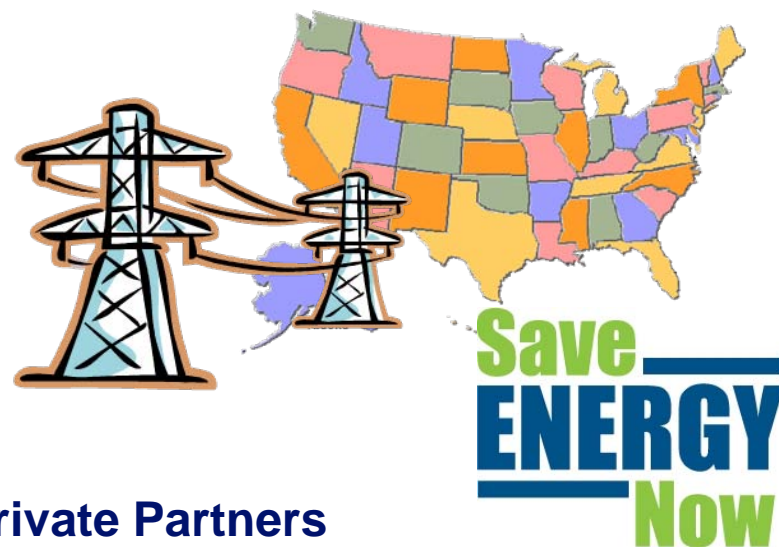
Partnerships Key to Implementation

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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