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 LEADER

# Save Energy Now

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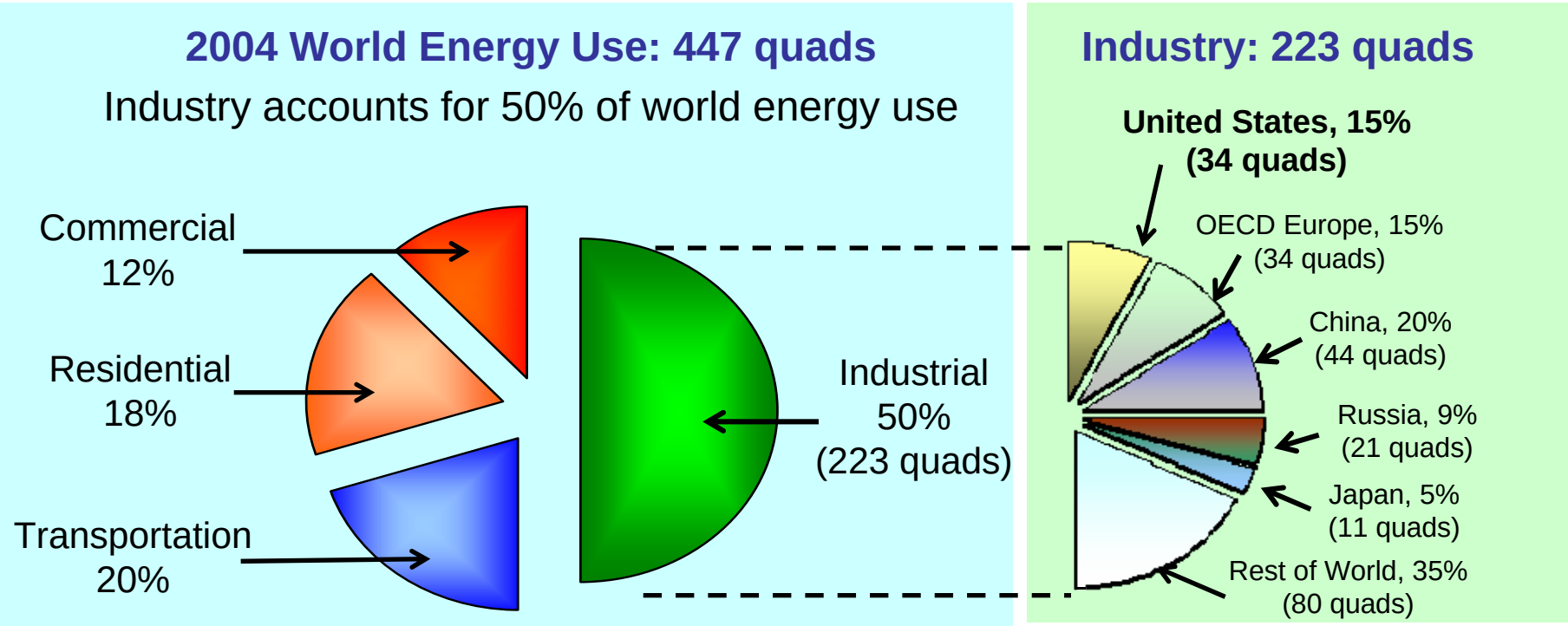
# Converging Issues

- 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

# Industrial Energy = ½ World's Energy




***15% of industrial energy is consumed in the United States***

*Source: EIA/International Energy Outlook 2007*

# Save Energy Now Impetus

- Encourage industry to voluntarily reduce its energy usage in a period of tight supplies by working with America's largest energy-intensive plants
- Create momentum to significantly improve energy efficiency practices throughout the manufacturing sector

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

**Secretary of Energy Sam Bodman**
**October 3, 2005**

# National Initiative

***Goal:***

Drive a 25% reduction in industrial energy intensity by 2017.

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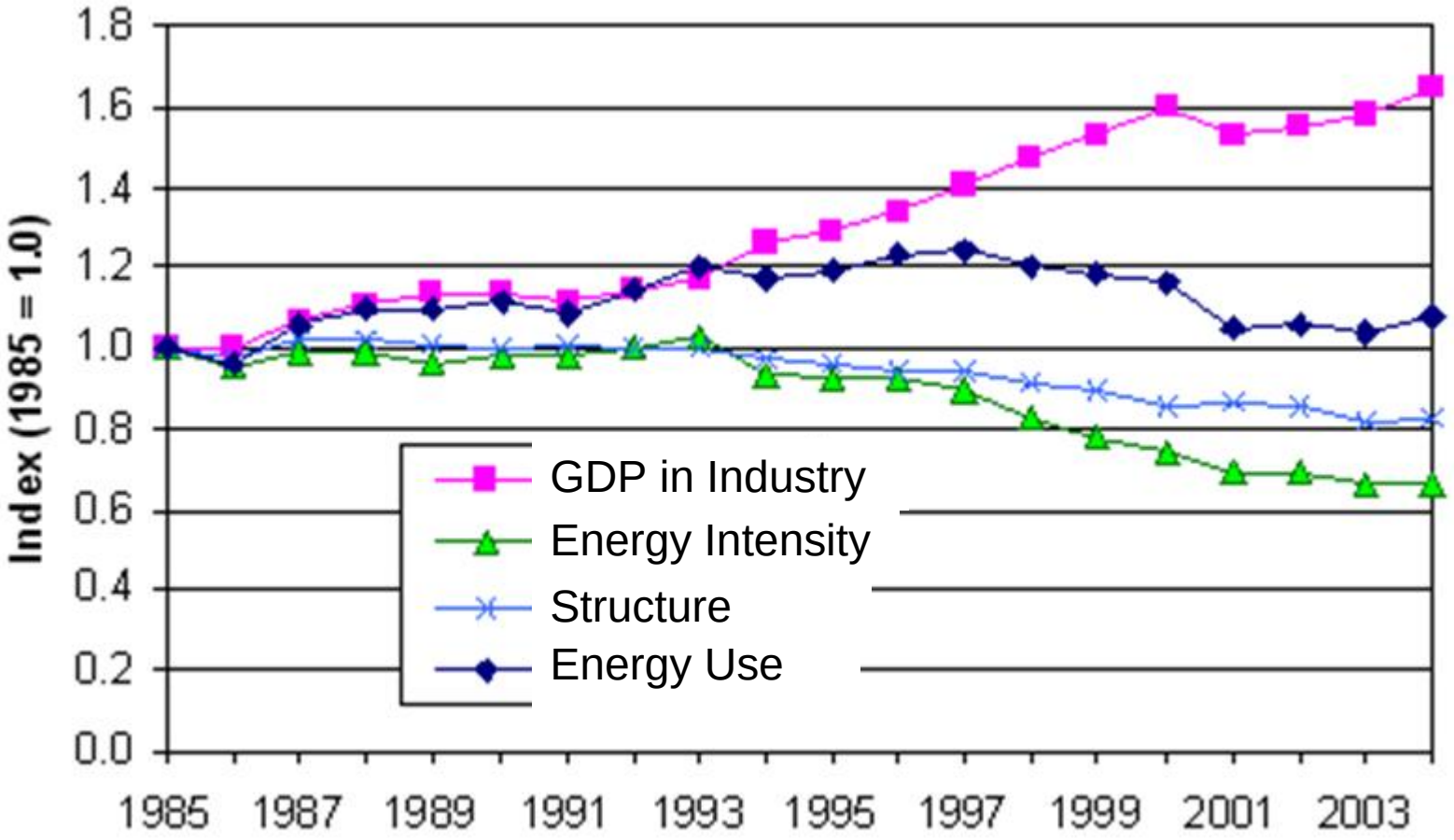
**Achieving the 25-in-10 goal will save an amount of energy equal to that consumed in California (all sectors)—8.4 quads each year.**

# U.S. Trends in Industrial Energy Intensity

**Industrial Sector Intensity: Delivered Energy, 1985-2004**



# Substantial Progress Is Achievable

- Existing technologies *with an attractive internal rate of return* can cut the growth in global energy demand by half or more within 15 years.

  -- *Curbing Global Energy Demand Growth*, McKinsey & Co., May 2007

- More than 10% of U.S. industry's energy use could be saved by more broadly adopting existing technologies that yield an internal rate of return greater than 10%.

  -- McKinsey, 2007

- Industries around the globe can cut $CO_2$ emissions 19 to 31% using *proven* technologies and practices.

  -- International Energy Agency, 2007

# Industrial Technologies Program Delivers Solutions

***Energy Efficiency R&D***

Develop cross-cutting technologies addressing the top energy savings opportunities across industry

***Technology Delivery***

Help plants save energy today by assessing opportunities and facilitating adoption of best energy management practices and efficient new technologies

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# ITP R&D Program Areas

## Industry Specific Applications

- Aluminum
- Chemicals
- Forest and Paper Products
- Metal Casting
- Steel
- Information Technology

***Advanced technologies for specific, energy-intensive industries***

## Crosscutting Technologies

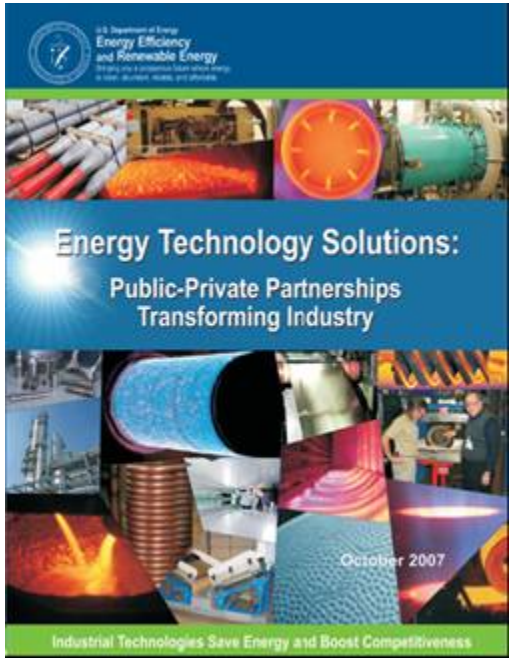
- Materials, Sensors, and Combustion
- Energy-Intensive Process R&D
- Nanomanufacturing & Other Interagency Manufacturing R&D
- Fuel and Feedstock Flexibility
- Distributed Energy (CHP and Reciprocating Engines)
- Inventions & Innovations

***Crosscutting technologies for diverse, energy-intensive manufacturing processes***

# Energy Efficiency R&D Delivers Results

*Together with industry, we have successfully put cutting-edge technologies and energy-saving measures into practice*

- Received 42 R&D 100 awards between 1991 and 2007
- Commercialized over 220 technologies since program inception
  - 5 quads of energy savings
  - 86 MMTCe reduction
  - 85 technologies in market today
- Obtained 156 patents between 1994 and 2005




Available online

# ITP Technology Highlights

*Modular equipment that enables more flexible operations while achieving enormous energy savings*

## Isothermal Melting (ITM) Process

- Continuous flow system with immersion heaters that convert electricity to melting energy with 98% efficiency
  - 50% less energy consumption than traditional furnace
  - Zero in-plant emissions
  - April 2006 ribbon-cutting ceremony highlighted scale-up demonstration at a General Motors facility

## SuperBoiler

- Gas-fired package boiler incorporating innovative concepts in combustion, heat transfer, heat recovery, and control components
  - Capable of achieving energy efficiencies ≥94%
  - Field evaluation of firetube boiler initiated in 2006

# Next-Generation Manufacturing

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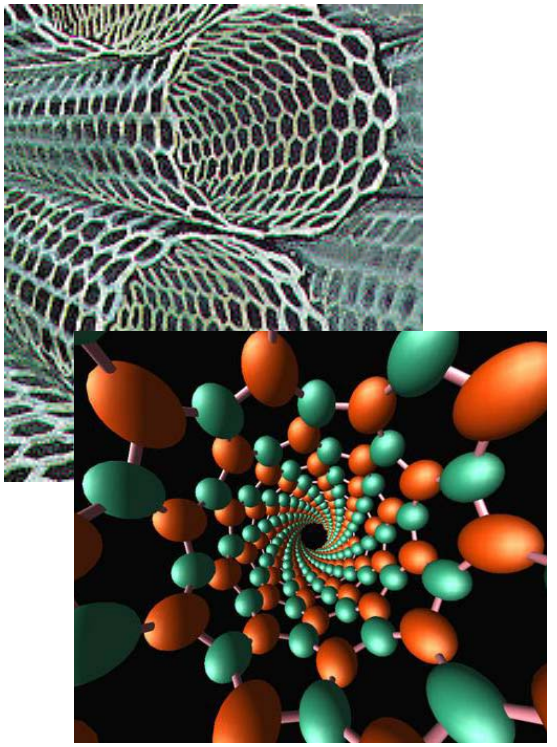
- ***Next-Generation Manufacturing Concepts:***
  - Eliminate/combine process steps
  - Improve energy efficiency throughout supply chain
  - Reduce environmental impacts
- ***Nanomanufacturing:***
  - Develop efficient techniques and manufacturing processes for **nano-enabled products**
  - Enable mass production and application of **nanotechnologies that could transform industrial processes**



View down middle of a boron nitride nanotube.

# Technology Delivery Products and Services

## Tools
- Process Heating
- Steam Systems
- Plant Energy Profiler
- Motors & Pumps
- Fans

## Information
- Website
- Information Center
- Tip Sheets
- Case studies
- Webcasts
- Emerging Technologies


## Standards
- Plant Certification

## Training
- Basic
- Advanced
- Qualified Specialist

## Assessments
- Energy Savings Assessments
- Industrial Assessment Centers

# Save Energy Now Assessments

- Scheduled 200 in 2006 and 250 in 2007
- 3-day large plant assessment process:
  - Leadership by qualified expert
  - Plant selects system of focus (e.g., steam, process heating, pumps, compressed, fans)
  - Plant staff trained on use of software tools
- Value of training component:
  - Prepares staff to play continuing role in assessments
  - Achieves strong staff buy-in for assessment results
  - Equips company to replicate assessments at sister plants

# Energy Assessments Success: 2006-2007

- 450 assessments completed
- 400 assessments with completed reports
- Average plant found ways to reduce energy bill by about 8%

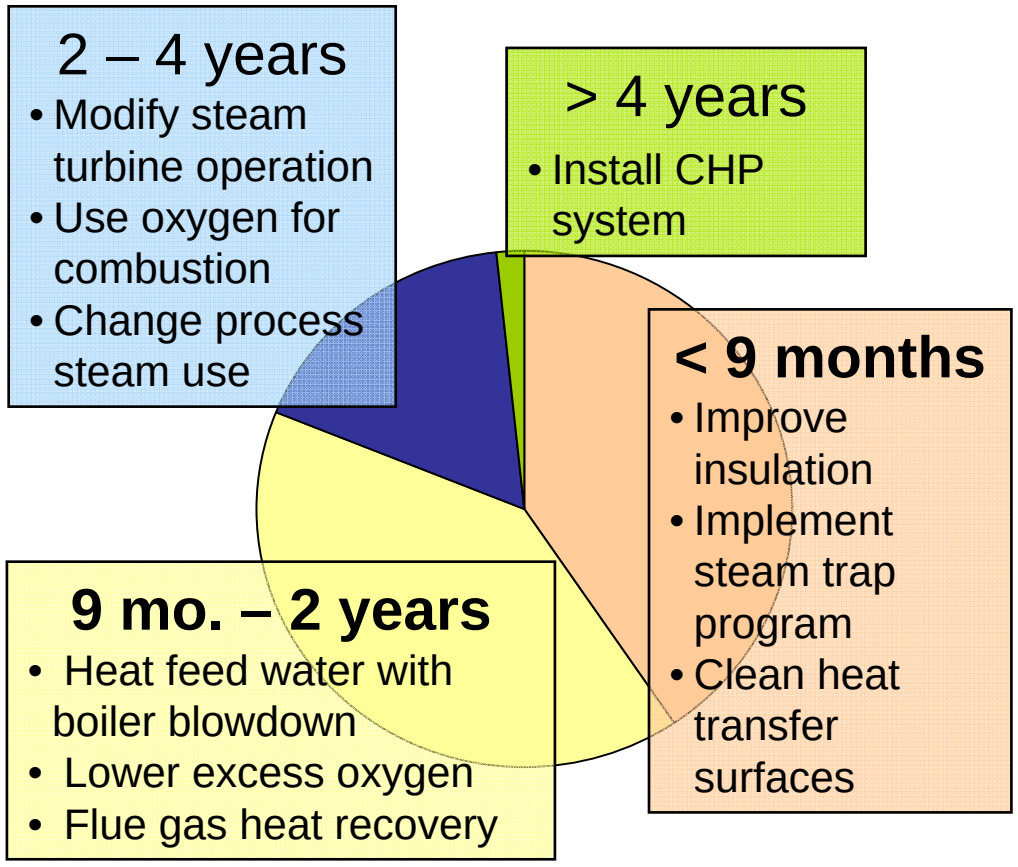
  Identified energy savings:
  77 TBtu/$725 million

  Total potential carbon dioxide emissions reduction:
  6 million metric tons

- With 264 plants reporting:

  Implemented energy savings:
  18.5 TBtu/$100 million

  Planned energy savings:|
  20 TBtu/$280 million

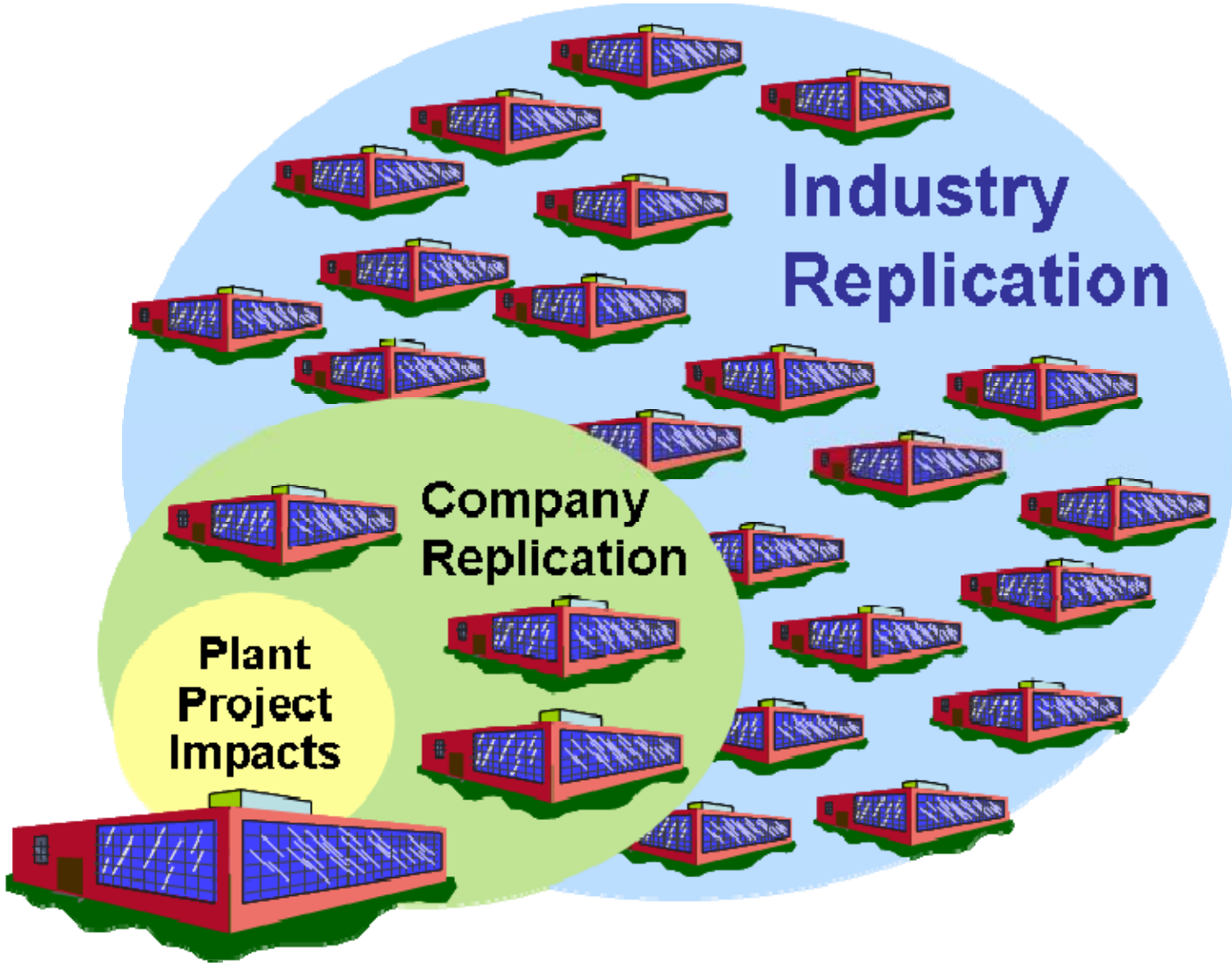



Estimated Payback Periods for Recommended Actions

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

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

# Replicating Assessment Savings



# 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:**

  **66 Energy Champion Plants:**
  Saved > 250,000 MMBtu *or* 15% total energy use

  **112 Energy Saver Plants:**
  Saved > 75,000 MMBtu *or* 7.5% total energy use

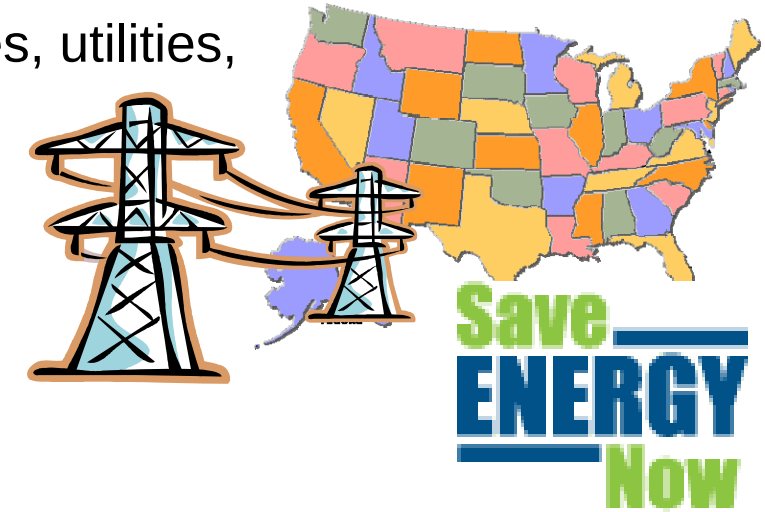

**Companies include:**

- Owens Corning
- Dow Chemical
- General Motors
- General Electric
- Sunoco
- Coors/Ball Corp.
- Boise Cascade
- Goodyear
- US Steel
- Tyson Foods
- Honeywell
- JR Simplot

# 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 and other associations
- Green Grid
- Utilities
- Supply chains

# Energy Management Standards & Certification

- Working with industry to facilitate development of recognized industrial energy management standard and certification program to:
  - Engage all employees in technically sound and sustainable process for improving energy efficiency (i.e., change corporate culture).
  - Make energy efficiency improvements part of existing industrial management systems (e.g., ISO, Six Sigma).
  - Help companies gain market value for accomplishments in energy efficiency.
  - Provide way for companies to show they are part of the solution to climate change.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