




ASERTTI Fall 2008 Meeting
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U.S. Department of Energy



U.S. Department of Energy
Energy Efficiency and Renewable Energy
 Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

What is the Industrial Technologies Program?

ITP is the lead federal agency responsible for improving energy efficiency in the largest energy-using sector of the country.

Together with our industry partners, we strive to:

- Accelerate adoption of the many energy-efficient technologies and practices available today
- Conduct vigorous technology innovation to radically improve future energy diversity, resource efficiency, and carbon mitigation
- Promote a corporate culture of energy efficiency and carbon management



What Does ITP Offer?

- **New and Emerging Technologies:** More than 142 technologies from ITP R&D portfolio are emerging
- **Assessments:** Free assessments for industrial manufactures of all sizes!
- **Software Tools:** Free software tool to help identify, examine and quantify potential energy saving measures
- **Databases:**
 - State Incentives and Resource Database
 - Industrial Assessment Center Database
 - Save Energy Now Participating Plants Database
- **Publications:** From factsheets to tip sheets to technical manuals to detailed research reports
- **Training:** ITP provides a variety levels of training both on the Web and multi-day training sessions located throughout the U.S.
- **Plant Certification:** In Partnership with ANSI developing a certification program to promote industrial Efficiency!



ITP Working with Industry Delivers Results

Our most recent documented achievements include:

- **Over 891 trillion Btu in savings** in 2005 and 2006 (equivalent to 83 large tankers filled with crude oil)
- **CO₂ reductions of 17.9 MMTC_e** in 2005 and 2006 (equivalent to taking 15 million mid-sized cars off the road for an entire year)
- **11 prestigious R&D 100 Awards** in 2006 and 2007 (a total of 42 since 1991)
- **595 industrial plants assessed** in 2006 and 2008
- **14 new technologies commercialized** in 2006 alone



Industrial Technologies Program R&D Investment

FY2008 Total: 64.408 Million Dollars

Industry Specific (thousands of dollars)

Chemicals	3,710	5.80%
Steel	3,569	5.50%
Forest and Paper Product	1,738	2.70%
Aluminum	1,737	2.70%
SBIR/STTR	299	0.50%
Metal Casting	192	0.30%
Subtotal	11,245	17.50%

Crosscutting Technologies (thousands of dollars)

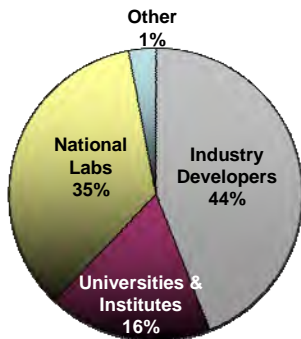
Industrial Distributed Energy	14,467	22.50%
Technical Assistance	12,751	19.80%
Energy Intensive Process*	7,186	11.20%
Waste Heat Minimization and Recovery		
Industrial Reactions and Separations		
High-temperature Processing		
Sustainable Manufacturing		
Nanomanufacturing	4,823	7.50%
Industrial Materials	4,717	7.30%
EE Information Technologies	2,948	4.60%
Fuel/Flex	2,805	4.40%
Sensors & Automation	1,805	2.80%
SBIR/STTR	1,020	1.60%
Combustion	641	1.00%
Subtotal	53,163	82.50%

* Waiting on solicitation awards for actual breakdown

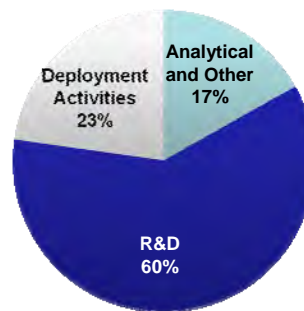


Industrial Technologies Program Funding Breakdown

ITP Funding by Recipient



ITP Investment





Industry R&D

- **Industry Specific**
 - Supports advanced technologies to reduce energy and carbon intensity of America's energy- and waste-intensive industries
 - Aluminum - Metal Casting
 - Chemicals - Steel
 - Food Processing - Glass
 - Forest & Paper Products - Information Technology
- **Crosscutting R&D**
 - Enabling Technologies that can be used across industries



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Crosscutting Technology R&D

- **Energy-Intensive Process R&D** in technology platforms that address broad industry needs
- **Nanomanufacturing R&D** to apply nanoscience in industrial processes and products
- **Fuel and feedstock flexibility activities** to facilitate the use of non-traditional fuels and feedstocks
- **Clean distributed energy activities** to promote the use of CHP in industrial applications
- **Industrial materials R&D** to develop breakthrough materials for industrial processes



- ITP Technology Platforms**
- Waste Heat Minimization and Recovery
 - Industrial Reactions and Separations
 - High-Temperature Processes
 - Sustainable Manufacturing



Super Boiler

Super Boiler ground breaking to occur in 2009 at ORNL

First-generation package boiler

- Offers up to 25% increases in steam generation efficiency
- Occupy substantially less floor space

Main Benefit

- Maintains fuel-to-steam efficiency of 93%-94%

Currently undergoing 3 demonstrations at plants around the U.S.

- Specification Rubber Products: 12.2 million Btus/hr, 13% gas savings, 2-years operational
- Clement Pappas, under development
- ORNL, ground breaking in 2009



DOE predicts industry savings of more than 185 trillion Btu of natural gas by 2020; about \$10 billion in annual energy costs



Energy Intensive Processes Lab Call 2008

\$15 Million Given to Develop More Efficient Energy-Intensive Industrial Processes

Lab Call Selections:

- 36 proposals received and 8 projects selected
 - \$15 million will be given in DOE funds support of projects from 2008 to 2011
 - Projects selected from ORNL, LANL, INL, ANL, and PNNL
-
- High Magnetic Field Processing (HMFP) – A Heat Free, Heat-Treating Method (ORNL)
 - Flexible Hybrid Friction Stir Joining Technology (ORNL)
 - Enhanced Separation Efficiency in Olefin/Paraffin Distillation (LANL)
 - Modifications and Optimization of the Organic Rankine Cycle to Improve the Recovery of Waste Heat (INL)
 - Steam Cycle Washer for Unbleached Pulp: Commercial Demonstration (INL)
 - Ultra-Fast Boring for Improved Energy Efficiency and Reduced Emissions in Materials Processing Industries (ANL)
 - Near Net Shape Manufacturing of New, Low Cost Titanium Powders for Industry (ORNL)
 - High Surface Area Inorganic Membrane for Process Water Removal (PNNL)



Energy Intensive Processes Industry Call 2008

\$15 Million Given to Develop More Efficient Energy-Intensive Industrial Processes

Industry Call Selections:

- 70 proposals received and 6 projects selected
- \$15 million will be given in DOE funds support of projects from 2008 to 2011
- Projects selected from a variety of companies:
 - Electrohydraulic Forming of Near-Net Shape Automotive Panels – Ford Motor Company
 - Inorganic Membranes for Refinery Gas Separations at Extremely High Pressures, Intermediate Temperatures and in Hydrocarbon-containing Environments – Media and Process Technologies, Inc.
 - Prototyping Energy Efficient Thermo-Magnetic and Induction Hardening for Heat Treat and Net-shape Forming Applications – Eaton Corporation
 - Ultra-Efficient and Power Dense Electric Motors for the U.S. Industry – Reliance Electric Company
 - Energy Reduction and Advanced Water Removal via Membrane Solvent-Extraction Technology – 3M Company
 - Induction Consolidation/Molding of Thermoplastic Composites using Smart Susceptors – The Boeing Company



Industrial Distributed Energy: Current Priorities

- **Restart stationary engine R&D with Caterpillar, Cummins and Waukesha**
 - Include alternates to natural gas as fuel
 - Continue to use the capabilities of Argonne National Laboratory
- **Initiate R&D on technologies to improve cost-effectiveness of CHP**
- **Support near-term demonstrations of CHP in target markets**
 - Frito-Lay, supported with FY 2007 funds
 - IBM/UTC Data Center, supported with 2008 funds
 - Additional opportunities identified in solicitation
- **Continue to support activities of the CHP Regional Application Centers**





Frito – Lay CHP Demonstration

Combined Heat and Power in Action

- **System will take facility off the electric grid**
- **GHG emissions cut by > 5%**
- **CHP System**
 - 4.6 MW Solar Taurus 50 Gas Turbine with SCR for NOx Control
 - Provides 100% electricity needs and 50% of site steam needs
- **Site in Killingly, Connecticut**
 - 400 employees
 - Processes 250,000 lb/day of corn and potatoes (each) for chips
- **Scheduled groundbreaking 4th quarter FY08**



Clean Distributed Generation Combined Heat and Power

Selections*

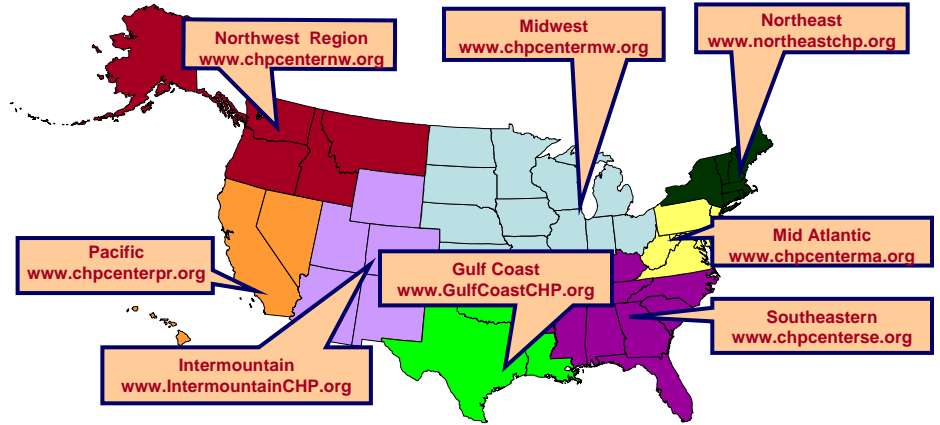
		Total	DOE
General Electric Global Research	Monitoring and control for food processing industry	\$3,050,000	\$2,000,000
United Technologies Research Center	Microturbine/chiller; data center Applications	\$3,109,072	\$2,007,505
Gas Technology Institute	Integrated recip/CHP; gas cleanup for LFG, digester gas, etc.	\$2,020,203	\$1,284,709
EXERGY Partners Corp.	Chiller for data center	\$2,059,420	\$729,763
FuelCell Energy, Inc.	Waste heat recovery for fuel cell Applications	\$2,589,218	\$1,812,451
The Regents of the University of California	Integrated FC/turbine for light industrial, commercial and institutional	\$1,863,110	\$1,282,576
CHP Subtotal		\$14,691,023	\$9,117,004

* closed 7/14/2008



Regional Applications Centers (RACs)

- Promote the development of CHP technology applications
- Offer project specific support
- Provide end user education and outreach
- Lead initiatives to educate state policymakers and regulators



RACs and EISA

Section 375 of the Energy Independence and Security Act (EISA) of 2007 authorizes continuation of the RACs to encourage deployment of CHP and other clean energy technologies.

EISA authorizes the RACs to:

- Develop and distribute informational materials on clean energy technologies
- Conduct target market workshops, seminars, internet programs, and other activities to educate end users, regulators and stakeholders
- Provide and coordinate onsite assessments for sites and entities that may consider deployment of clean energy technologies
- Offer consulting support to sites considering deployment of clean energy technologies



How RACs Have Helped

- **Led or been engaged in over 120 workshops**
 - Over 9,000 attendees have learned of the benefits of CHP for their applications
- **Education of state regulators and policymakers on CHP and clean energy benefits which has resulted in:**
 - Improved interconnection standards
 - More favorable standby policies
 - CHP incentives in many states.
- **Realized market accomplishments:**
 - Supported over 350 projects
 - Over 1.3 GWs of CHP installed or in development
 - Projects have resulted in 7.7 million tons of CO2 reduced.

“CHP has been identified as one of the top solutions for improving industrial energy efficiency; however, deployment of CHP requires help on project development, better educated end users, and reduced regulatory barriers. The RACs help with all of these.” - Acting Assistant Secretary for EERE John Mizroch



Voluntary Commitments by Industrial LEADERS

- Voluntarily pledge to reduce energy intensity by 25% or more over 10 years
- Make continuous improvements in energy efficiency and carbon reduction as part of robust business strategy
- Gain enhanced access to enabling resources: tailored technical assistance, training, assessments, and more
- Receive high-level recognition for participation and achievements

Save
ENERGY
Now



Reduced energy costs and carbon emissions



Becoming a *Save Energy Now* LEADER

- Take pledge and adopt goal to reduce energy intensity 25% or more over 10 years
 - Develop an energy intensity baseline
 - Develop an energy management plan
 - Designate an energy manager or leader
- Take steps to reduce energy intensity and reduce carbon emissions
- Report energy intensity data and achievements annually to DOE



Energy Assessments Success: 2006-2008

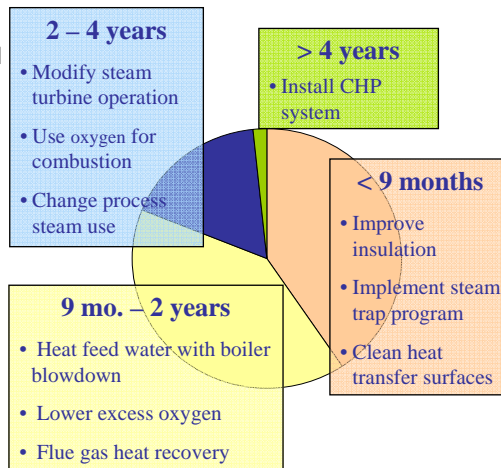
- **595 assessments completed**
- **479 assessments with completed reports**
- **Average plant found ways to reduce energy bill by about 8%**

Identified energy cost savings:
\$815 million

Total potential carbon dioxide emissions reduction:
6.8 million metric tons

Implemented energy savings:
\$118 million

Planned energy savings:
\$310 million



Estimated Payback Periods for Recommended Actions



Partnerships

Whether advancing RDD&D or Best Practices, ITP engages our stakeholders in the development of our multi-year investment strategies.

ITP is working with:

- **Supply Chains**
- **Utilities**
- **State Partnerships**
- **Regional Collaboratives**
- **International Programs**
- **Industry Trade Associations and Societies**
- **Other Federal Programs**



ITP State Save Energy Now

A partnership of state energy offices, utilities, regional energy efficiency organizations, academia, and private companies

- Provide state entities with expanded access to ITP resources and technical assistance
- Transfer energy-efficient technologies to the industrial market
- Reduce carbon emissions through energy efficiency
- Develop coordinated publicity to promote Save Energy Now in industry





State Funding Opportunity Announcement

- **Issue Date:** 7/29/2008
- **Close Date:** 10/16/2008
- **DOE is seeking proposals that include the following activities:**
 - Development and delivery of regional, state, or local Industrial energy efficiency programs that target a 2.5% annual reduction
 - Creation of a clearly defined marketing and outreach strategy
 - Delivery of DOE/ITP training on a local/regional level
 - Perform energy assessments in plants
 - Partner with a manufacturer to perform technology demonstrations
 - Establishing a strategy for the commercialization of emerging technologies and a process for selecting which technologies should be supported by ITP.
- **Number of Awards:** Expected to make 12 to16 awards for projects with 3-year project period



DOE's Support for State SEN

Funding History and FY2009 Request:

ITP has supported the States through SEP Special Projects directly to the state energy offices to conduct technical assistance. Resources in FY2009 will be used to:

- Continue to fund 96 new state-level SEN assessments in 19 states
- Call-For-Proposals to accelerate States engagement with industry
- Update, upgrade and maintain the state website
- Continue the regional energy workshops that bring resources and industry together

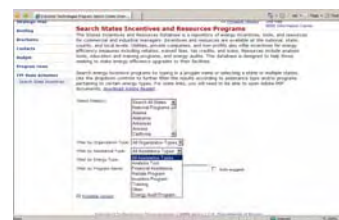
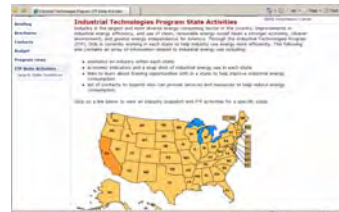
FY2006	FY2007	FY2008	FY2009
\$1.0M	\$0.473M	\$1.7M	\$5.0M

*Funding in FY2006 and 2007 was part of a traditional SEP Special Project solicitation to the State Energy Offices to conduct technical assistance.



Recent State Accomplishments

- **Wisconsin MOU**
- **Formal relationship NASEO**
- **Awarded 19 states grants to conduct assessments in FY08.**
 - To conduct 100 assessments with an energy savings of 5.8 trillion Btu.
 - To date have identified 0.1 trillion Btu of potential savings
- **Issued a Funding Opportunity Announcement on July 30th**
- **State Activities Website**
- **State Incentive and Resource Database**
- **Texas Plant Certification**



Regional Coalitions

Goals:

- Create a series of Summits with associated industries, utilities, states and organizations to establish the foundations for a nationwide commitment to reduce industrial energy intensity and related carbon emissions

Activities:

- Establish Southeast Industrial Energy Efficiency Coalition
- Formulate an action plan and leverage initial Summit as model for building similar energy-efficiency action plans in other regions of the nation
- Conduct Northwest Industrial Energy Efficiency Summit
- Formulating Northwest Food Processor's Vision and Roadmap
- Implementing utility action plan



Southeast Summit Success

Objective:

This Summit was a *Call to Action* for industries, utilities, States and regional organizations in the Southeast to work together and leverage their resources to implement energy efficiency strategies which will reduce the region's energy intensity and related carbon emissions.

- **When:** June 5, 2008 at the Oak Ridge National Laboratory
- **Participants:** Over 75 participants from industry, utilities, States and regional organizations.

Industry	States	Utilities	Organizations
Air Products	Alabama	Covanta	Alliance to Save Energy
Alcoa	Arkansas	Piedmont Natural Gas	Southeast Energy
Cargill	Florida	Santee Cooper	Efficiency Alliance
Corning	Kentucky	TVA	
Eastman Chemical	Mississippi	Southern	
GE	North Carolina		
Holcim	South Carolina		
LyondellBasell	Tennessee		
Owens Corning	Virginia		
Shaw Industries			

- **Initiative Underway:** Leadership Group meeting held on August 21, 2008 to provide structure and define Mission, Roles, and Focus areas.
- **Preliminary focus areas:** Technology Development, Energy Efficiency, Policy and Communications



How Can We Work Together?

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