Lawrence Berkeley National Laboratory

The Second U.S.-China Energy Efficiency Forum

U.S. Industrial Energy Efficiency Programs

Second U.S.-China Energy Efficiency Forum

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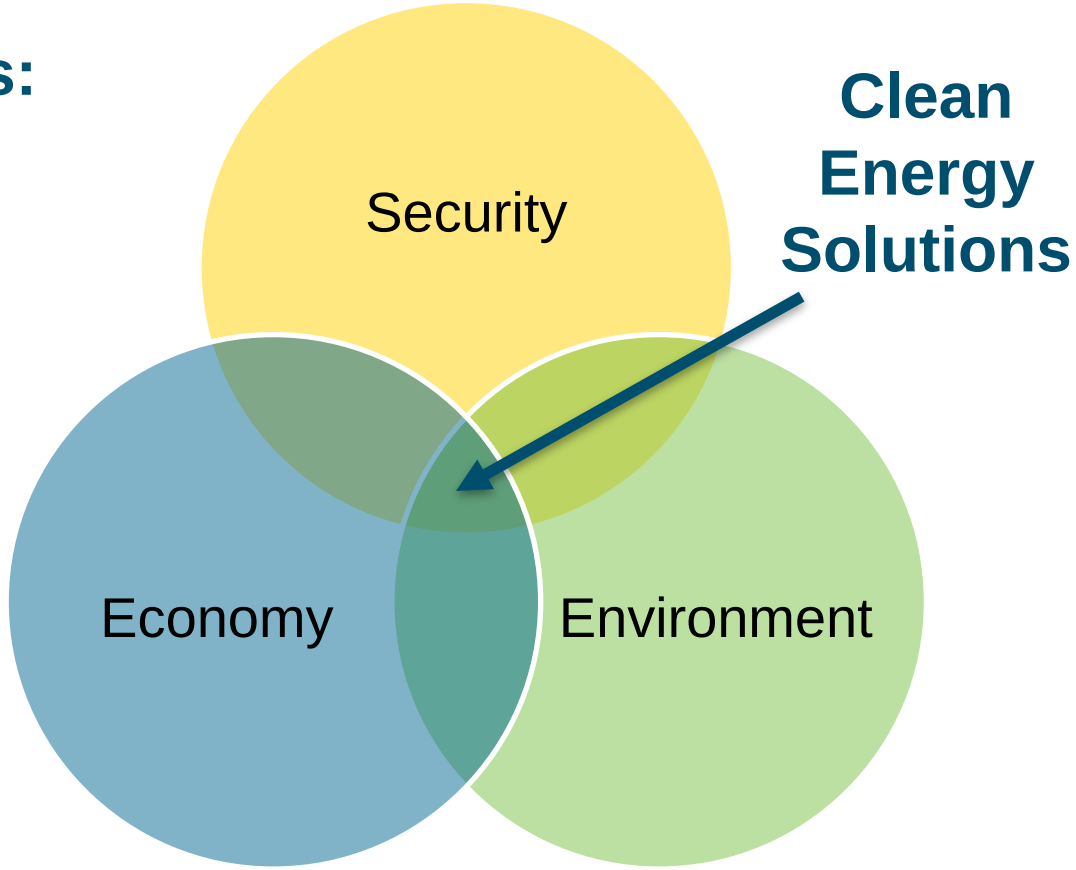
James Quinn

Energy Efficiency & Renewable Energy
U.S. Department of Energy

Global Energy Challenges

Overarching Challenges:

- Carbon reduction
- Market delivery of clean energy technologies
- Research and development needs
- Economic growth
- Workforce development

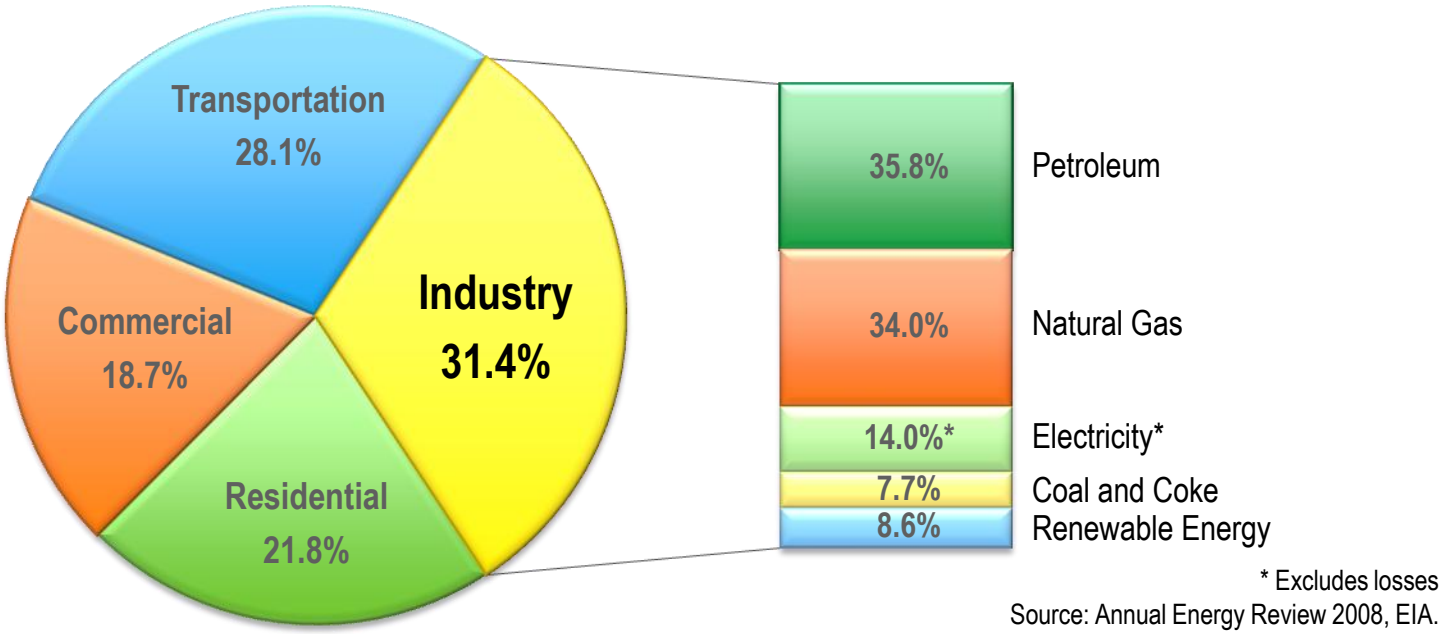


Energy efficiency and renewable energy provide solutions to global energy challenges.

U.S. Industry Energy Use

U.S. industry accounts for about one-third of all U.S. energy consumption.

Reducing U.S. industrial energy intensity is essential to achieving national energy and carbon goals.



* Excludes losses

Source: Annual Energy Review 2008, EIA.

DOE's Industrial Technologies Program





Mission:

Reduce industrial energy and carbon intensity by partnering with industry to research, develop, and deploy advanced manufacturing technologies and energy management practices.

Objectives:

- Develop innovative technology to improve energy diversity, resource efficiency, and carbon mitigation
- Accelerate adoption of today's energy-efficient technologies and practices
- Harness scientific ingenuity, expand resources, and extend our outreach through strategic partnerships

ITP Delivers Solutions

Research & Development (R&D)

Develop more efficient technologies to address the top opportunities for saving energy across industry.

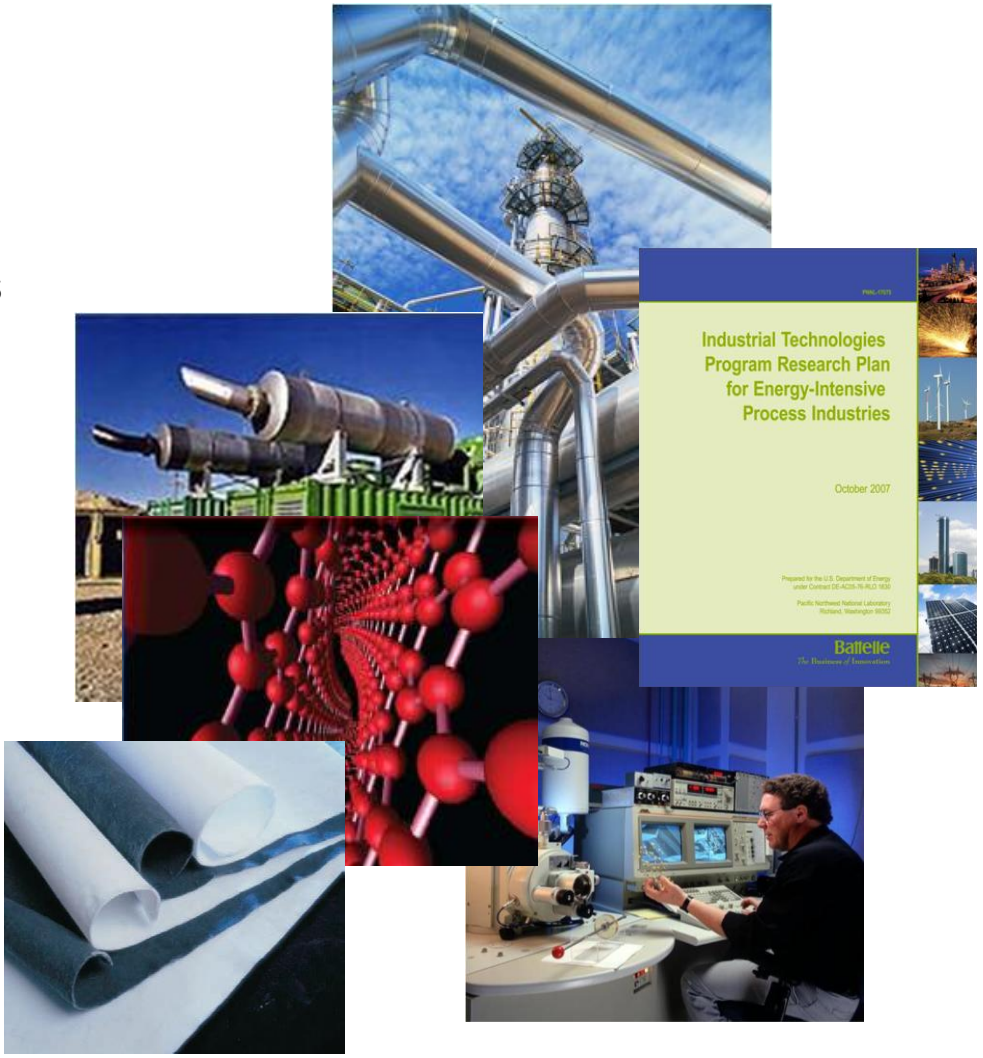
Save ENERGY Now

Technology Delivery

Help plants find opportunities to save energy today by adopting the best energy management practices and most efficient technologies.

Crosscutting 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 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



Crosscutting R&D

Energy Intensive Processes

Addressing top opportunities to save energy and reduce industrial emissions

- Reactions & Separations
- Waste Heat Recovery
- High-Temp. Processing
- Sustainable Manufacturing

Materials of the Future

Accelerating development of advanced materials for higher efficiency industrial processing and products

- Strategic, High-Performance Materials
- Production Technologies & Structural Materials
- Advanced Processing Concepts

Nanomanufacturing

Enabling manufacture of products to transform energy production, use, and storage

- Manufacturing methods for cost-competitive, large-scale production
- Ways to integrate nano-materials into intermediate and finished products

Distributed Energy

Facilitating market uptake of energy efficiency technologies

- Waste heat recovery to generate electricity and heat at >80% efficiency
- R&D to expand markets for combined heat and power and similar technologies

Fuel & Feedstock Flexibility

Energy security through diversification

- Fuel-flexible hardware
- Demonstrations of fuel-flexible equipment efficiently displacing fossil feedstocks

Resources to Manage Energy Use

Tools

- Energy and Carbon Baselining / Plant Energy Profiler
- Data Center Pro
- Process Heating
- Steam Systems
- Motors, Pumps, Fans, and more

Technical Assistance

- Methods to track and manage energy intensity by product output
- Analysis of project feasibility and how to sell to management
- Referrals to existing state, utility, and other resources for project implementation

Assessments

- Large & med-size plants: three-day assessments of energy/utility systems
- Small & med-size plants: one-day, full-plant assessment conducted by university-based teams from Industrial Assessment Centers (IACs)
- States/Utility Led Assessments

Training

- Awareness
- Tool User
- System / Topic
- Qualified Specialists

Information

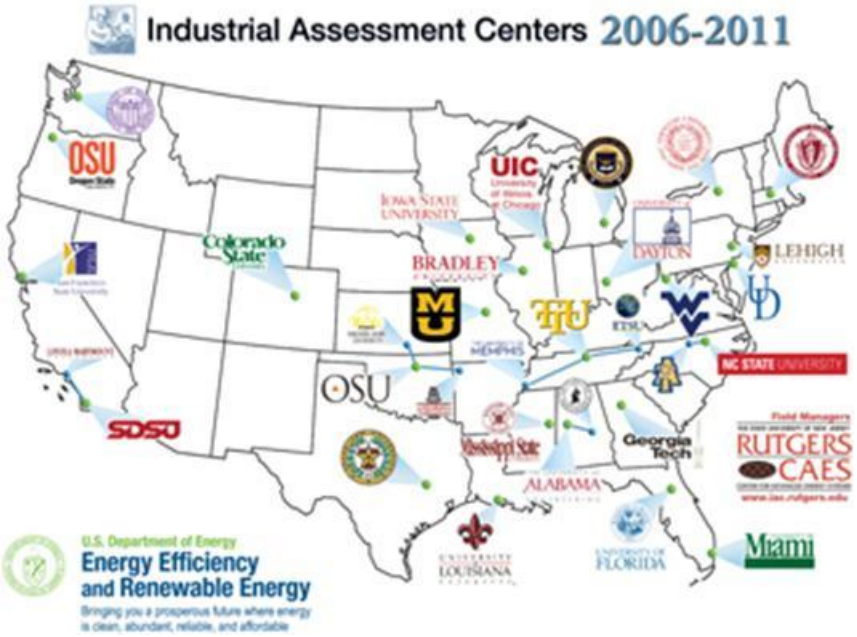
- Supply chain energy efficiency
- Best Practices Tip Sheets, Case Studies, Source Books
- Website and Webcasts
- On-line Databases (Incentives & Assessment Results)
- Information Center

- ISO 50001 energy management standard
- Protocols to measure and validate savings
- Superior Energy Performance

ISO

Industrial Assessment Centers

- DOE's 26 university-based Industrial Assessment Centers (IACs) conduct energy assessments of small and medium-size plants at no charge.
- Faculty-led teams of engineering students conduct the assessments as training 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.
- Maintain database of recommendations to help other facilities identify opportunities.



Save Energy Now LEADER Program

- Companies voluntarily pledge to adopt a goal of reducing energy intensity by 25% or more over 10 years
  - Designate an energy manager
  - Develop an energy intensity baseline
  - Develop an energy management plan
- Take steps to reduce energy intensity and reduce carbon emissions, and report annually to DOE
- Gain enhanced access to enabling resources: tailored technical assistance, training, assessments, and more
- Receive high-level recognition for participation and achievements

Pledge Form

Save Energy Now LEADER

Voluntary Pledge

Save ENERGY Now LEADER

_____ voluntarily agrees to become a *Save Energy Now* LEADER.

Company / Plant Name

We pledge to adopt a goal to reduce energy intensity by 25% or more over 10 years.

- Within 12 months, complete the following:
  - Establish an energy use and energy intensity baseline
  - Develop an energy management plan
  - Designate an energy leader or energy manager
- Take steps to reduce energy intensity and the associated carbon emissions
- Report energy intensity, energy use data, and achievements annually to DOE.

Through the *Save Energy Now* initiative, DOE will provide:

- Tailored technical assistance to assist in developing the energy baseline and energy management plan, plus ongoing access to an energy management expert
- Priority access to energy system assessments on multiple industrial systems
- Waived fees for training workshops on financing options, advanced technology, energy-analysis software, energy management, and other topics
- Easy access to proven, energy-analysis software tools and other technical resources from DOE and partner organizations
- National recognition for pledge participation and achieving reported energy savings
- Additional recognition for validated energy savings.

This pledge is a voluntary agreement. It is strictly for internal management purposes and is not legally enforceable and shall not be construed to create any legal obligation on the part of either party. This agreement can be terminated at any time without prior notification, penalties, or further obligation. DOE agrees to not comment publicly regarding a withdrawal of an agreement. This agreement does not authorize or obligate any party to expend, exchange, or reimburse funds, services or supplies, or transfer or receive anything of value. Companies and plants agree that they will not claim or imply that their participation in the *Save Energy Now* LEADER pledge program constitutes federal government approval or endorsement of anything other than its commitment to energy efficiency and will not make statements or imply that DOE endorses the purchase or sale of products and services or the organization's views. All agreements herein are subject to, and will be carried out in compliance with, all applicable laws, regulations, and other legal requirements.

On behalf of _____, the undersigned company representative understands and agrees to the terms of the *Save Energy Now* LEADER pledge.

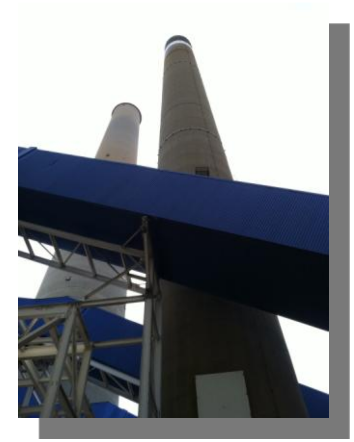
Company	U.S. Department of Energy
Printed Name	Printed Name
Position	Position
Date	Date

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Demand-Side Management Activities

- ITP partners with U.S. utilities to support their demand-side management programs for industrial customers
- Tennessee Valley Authority (TVA)
  - TVA's five-year plan includes
    - 3.5% reduction on the demand side by 2015
    - Closure of 18 fossil units
    - Current incentives for demand-side projects is $0.05/ kWh
  - TVA DSM program staff are DOE Qualified Specialists
  - Save Energy Now System Assessments are conducted for large direct customers in support of TVA's DSM efforts
- National Grid's "Save Steam Now Program"
  - Utility pays up to $2,500 per trap survey
  - Steam system assessment costs are reimbursed up to $10,000 if DOE steam tools are utilized (SSAT, SSST, 3E Plus)

nationalgrid



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Energy Management Standard

ISO 50001: a new energy management standard for buildings and industry

International Organization for Standardization

Potential impacts:

- Could influence up to 60% of the world's energy use across many economic sectors

Companies will implement the standard in response to:

- Corporate sustainability programs
- Energy cost reduction initiatives
- Demand created along the manufacturing supply chain
- Carbon and energy legislation and international climate agreements

Superior Energy Performance (SEP)

A *market-based plant certification program* that provides industrial plants aand commercial buildings with a roadmap for ***continuously improving*** energy efficiency while boosting competitiveness.

- Uses ISO 50001 standard as foundational tool for energy management
- Develops system to validate energy intensity improvements and management practices
- Encourages broad participation throughout industry, buildings, and public sector

ANSI Accredited Certification Program

ISO International Organization for Standardization

U.S. Superior Energy Performance launches in 2011

Global Superior Energy Performance
announced at Clean Energy Ministerial in July 2010

ENERGY STAR for Industry

A **voluntary** program that enables organizations of all types to achieve their best in environmental and energy performance

Companies agree to:

•Institute a policy to continuously improve energy performance

•Measure, track, and benchmark energy use in all facilities

•Develop and implement a plan to improve energy performance

•Educate employees about energy efficiency and ENERGY STAR

EPA agrees to:

- Support corporate energy managers
- Provide energy management resources
- Promote networking, recognition, and sharing of best practices
- Offer specialized energy efficiency focus groups for specific industries

E3: Economy, Energy, and Environment

U.S. DEPARTMENT OF ENERGY | National Development and Reform Commission (NDRC)

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Interagency Initiative

- Brings together local manufacturers, utilities, a business communities to provide training, assessments, and implementation support. Benefits include:
  - Create green jobs
  - Stimulate the local economy
  - Foster sustainability

San Antonio, TX

- Pilots are finding funding and opportunities for energy-saving projects.
- International projects planned

Columbus, OH

Supply Chain Strategy

The strategy leverages existing tools and partners…

Existing DOE Partners:
Industrial LEADERs, Commercial Building Energy Alliances

New tools & guidance materials facilitate outreach/ engagement process

Suppliers

Pursue continuous improvement in energy & carbon management

Existing DOE Programs, Tools, & Resources
Modified & refocused to target small & medium-sized suppliers

Reduced energy & carbon footprints, reduced risk

… to deliver extended benefits throughout the corporate value chain.

Potential U.S. China Collaboration

- Work together to develop training for energy management and systems-based energy efficiency
- Foster replication of university-based assessment model (UAIEE) to identify opportunities for energy savings and train the next -generation workforce
- Develop joint activities with organizations such as the Energy Cooperation Program (ECP) to support deployment of new energy efficiency technologies into the industrial sector
- Collaborate on development of energy system tools and assessment protocols
  - •Work together through international organizations:
    - –International Partnership for Energy Efficiency (IPEEC)
    - –Global Superior Energy Performance
    - –International Energy Agency