



DOE Industrial Technologies Program Status

- ANSI-accredited Plant Certification & Standards Development
 - Creating Energy Efficient Data Centers
 - State Partnerships

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DOE Industrial Technologies Program

ASERTTI Fall 2007 Meeting

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Bolton Landing, NY



U.S. Department of Energy

Energy Efficiency and Renewable Energy

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

Certifying US industrial plants for energy management and efficiency improvements



Current Situation

- Energy efficiency peripheral to most corporate business strategies
- R&D expenditures minimal for process and energy technologies
- Some US plants are best-in-class; application of state-of-the art technology; excellence in energy management
- Combined heat & power applications are common place, but not as prolific as in EU and Japan
- 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

Desired Future

- U.S. world leader in manufacturing energy efficiency
- U.S. plants best-in-class for energy-efficient technology
- U.S. plants certified as strong energy managers; continually improving across the supply chain
- U.S. is leading exporter of energy efficiency technologies and solutions
- Incentives to stimulate investment in energy efficiency
- Energy management expertise abounds in plants and market
- Energy security with flexible and affordable energy choices



What would help *all* U.S. industry capture these energy savings?

- Provide industrial plants with easier access to information and tools for managing energy
- Provide incentives and recognition for effective industrial energy management
 - Integrate energy management into existing management systems (treat energy like every other resource)
- Develop market value for effective energy management and the resulting energy savings and carbon reductions
- Meet the R&D and technological support needs required to help industry reach an annual 2.5% energy intensity reduction goal through 2016



CERTIFIED



DOE Industrial Technologies Program Goals

- 25% reduction in U.S. industrial energy intensity by 2017
- Contribute to an 18% reduction in U.S. carbon intensity by 2012



Vision

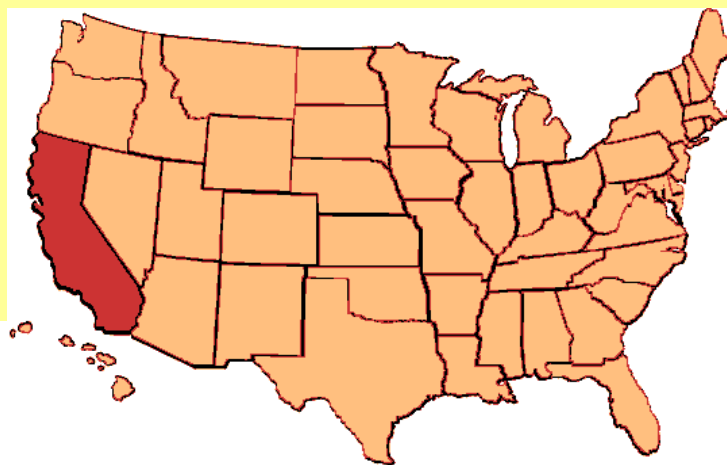
- U.S. industry leads the world in energy efficiency and productivity.



ITP - US Industry Energy Efficiency Goal

Reducing U.S. Industry's Energy Intensity by 25 percent (2007 to 2016)

- Saves 8.4 quadrillion Btu per year
- Equal to energy consumption of state of California in one year; every house, commercial building, automobile and manufacturing plant

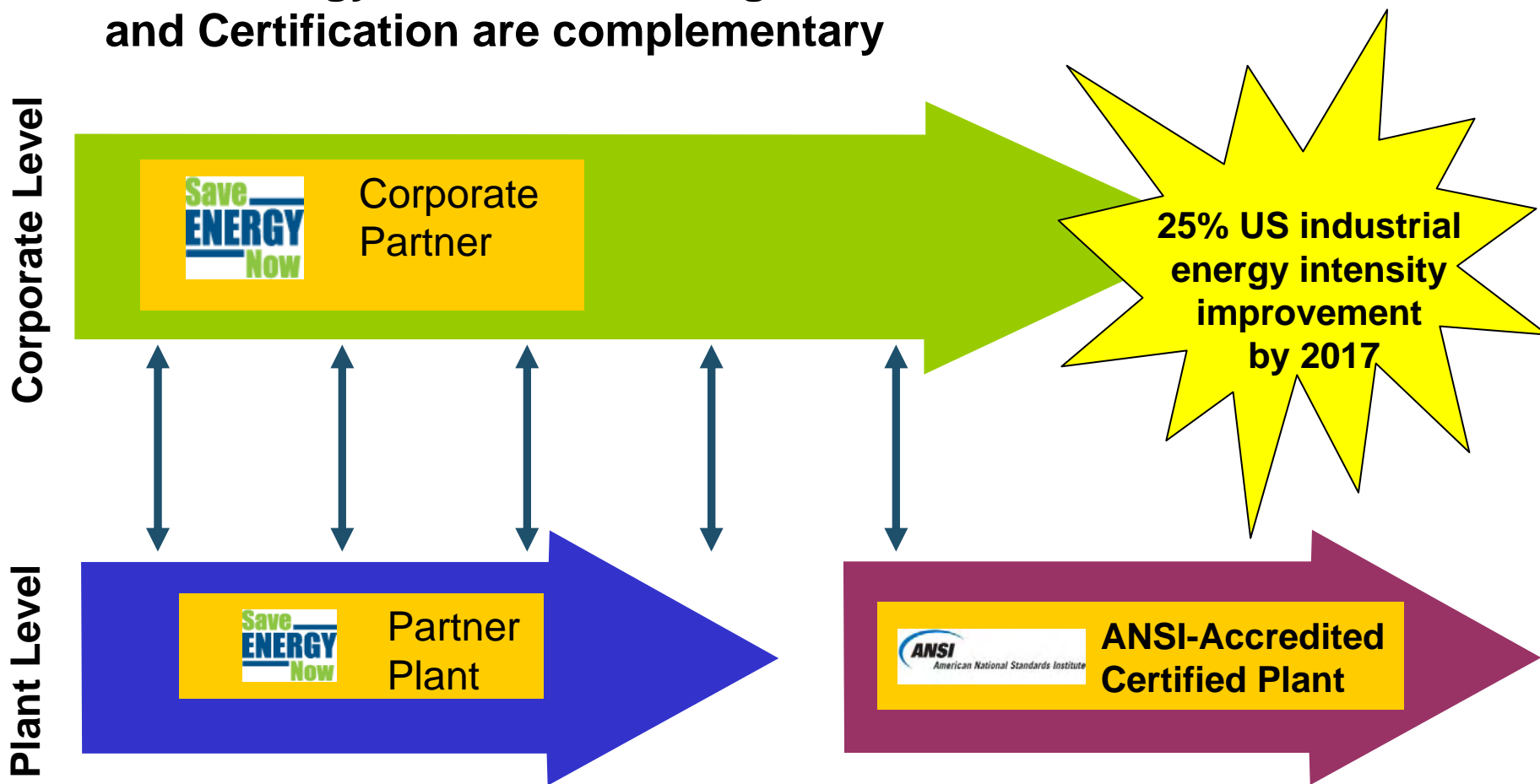




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Save Energy Now Partner Programs and Certification are complementary





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Corporate Partner

Corporate Level

Key Elements

- Energy baseline
- CEO commits to 10 yr goal to reduce energy intensity 25%
- Energy management plan
- Technology evaluation/ best practices adoption
- Report progress annually
- Supply chain focus preferred

Resources

- Quick Start website
- Tools, training, and technologies
- Energy management tools
- Energy assessments

Rewards/Recognition

- Enhanced technical assistance
- Preference in RD&D solicitations
- National energy efficiency recognition

25% US industrial energy intensity improvement by 2017

Plant Level



Partner Plant



ANSI-Accredited Certified Plant



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Corporate Level



Corporate Partner



Partner Plant

Plant Level

Key Elements

- Energy baseline
- Take steps to save energy, including creating a simple energy management plan
- Report energy savings annually

Resources

- Quick Start website
- System tools & training
- Energy management tools
- Energy assessments

Recognition

- Energy saving recognition
- Case study
- Publicity

25% US industrial energy intensity improvement by 2017



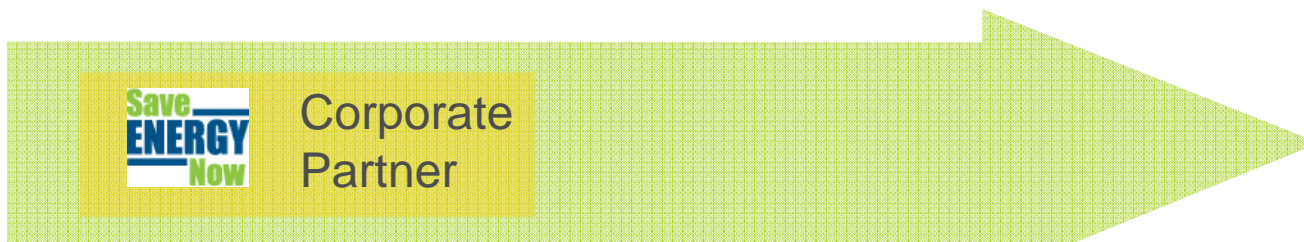
ANSI-Accredited Certified Plant



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Corporate Level



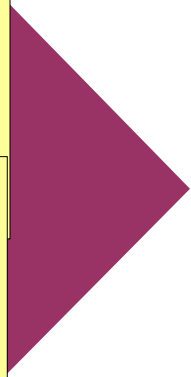
25% US industrial energy intensity improvement by 2017



Plant Level



<p>ANSI American National Standards Institute</p> <p>ANSI-Accredited Certified Plant</p>	<p>Key Elements</p> <ul style="list-style-type: none">• Energy management standards• System assessment standards• Independently certified energy savings
<p>Rewards/Recognition</p> <ul style="list-style-type: none">• Utility incentives• Tradable credits/tags• Market recognition• Preferred supplier status• National energy efficiency recognition	<p>Resources</p> <ul style="list-style-type: none">• Quick Start website• System tools & training• Energy management tools & support• Energy assessments





What is an ANSI Certified Plant?

- A plant which is continually improving in energy intensity (by a to-be-defined amount) and has demonstrated the adoption of energy management practices that meets ANSI standards
- The plant's energy intensity improvement and compliance with standards are validated by a third party



What is an ANSI Certified Plant?, continued

- Meets all Energy Management Standards (revision of existing ANSI standard). **Eventually an ISO energy management standard**
- Applies System Assessment Standards for industrial systems (initially pumping, compressed air, steam, process heating) to assess plant facilities
- May use certified practitioners, recognized by third party to assist in:
 - Complying with energy management standards
 - Implementing system assessment standards
- Uses measurement and validation experts, recognized by a third party, to verify implemented energy savings
- Uses an ANSI-accredited process to achieve third-party voluntary plant certification



Superior Energy Performance Interim Steering Committee: guiding development of Plant Certification

- ❑ Determine the scope of work to support of the SEP initiative through April 2008
- ❑ Develop an implementation plan, including
 - Establish voluntary working groups as required
 - Work with DOE, EPA, and NIST to secure required resources
 - Develop a transition plan to a more permanent organizational structure that supports the goals of the SEP

Interim Steering Committee Members

Representative	Organization
Bill Alemon	Ford
Joe Almaguer	Dow Chemical
Bill Bailey	DuPont
Sean Diamond	Texas Petrochemical
Tom Dunn	Weyerhaeuser
Betsy Dutrow	EPA
Fred Fendt	Rohm and Haas
Martha Gibbons	IPSCO Steel
Jim Hoffman	Huntsman Chemical
Greg Jason	Cargill
Michelle Mazza	Owens Corning
Brad Reed	Toyota
Paul Scheihing	DOE ITP
Steve Schultz	3M
Dan Pitkin	NIST
Don Verdiani	Sunoco
Glen Wieger	Eastman Chemical
Jeff Yigdall	PPG



Key Milestones

- Nov. 2007: Identify and select ANSI-accredited standards developer for system assessment standards
- May 2008: Begin field testing of ANSI energy management standard and system assessment standards
- July 2008: Select third-party certifying organization
- Sept. 2008: Launch pilot certification program (Texas IOF assisting)
- April 2009: Begin field testing of measurement and verification methodology in pilot plants
- June 2009: Begin training certified practitioners in energy management and system assessments
- Dec. 2009: First plants are ANSI certified for energy efficiency, based on results from pilot program
- March 2010: National launch of third-party certification program
- Dec. 2011: Third Party Certifier self-sufficient on fee-based system



Moving U.S. industry to greater energy efficiency

- Moving the US industrial sector to an energy intensity improvement rate of 2.5% per year.
- Certifying plant energy management programs; create transparency for continual energy efficiency improvement
- Unite US corporate leaders in energy efficiency; commit to 25% energy intensity improvement over 10 years (through EPEAT section 106)
- Empowering the supply chain to demand energy efficiency
- Enhancing the business case for energy efficiency
- Paving the way for U.S. global leadership in energy efficiency technologies and practices





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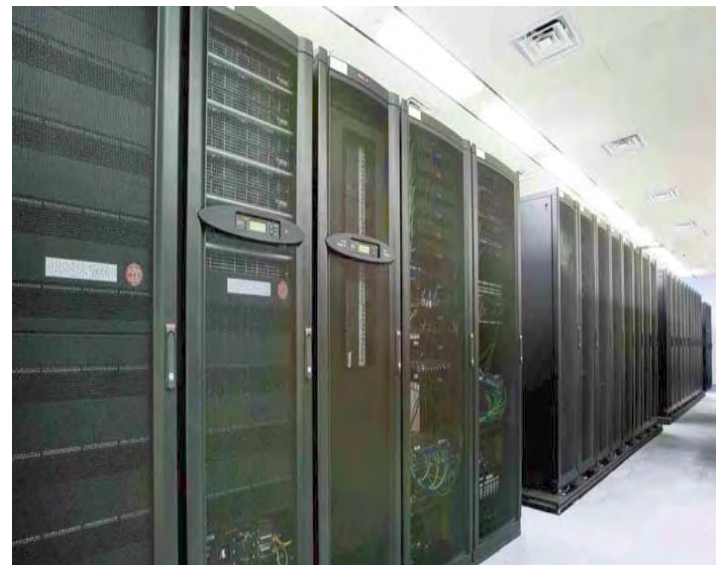
Creating Energy-Efficient Data Centers

U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Industrial Technologies Program



Why Data Centers?

- Highly energy-intensive and rapidly growing
- Consume 10 to 100 times more energy per square foot than a typical office building
- Large potential impact on electricity supply and distribution
- Used over 60 billion kWh in 2006
- Projected to increase to 100 billion kWh in 2011.



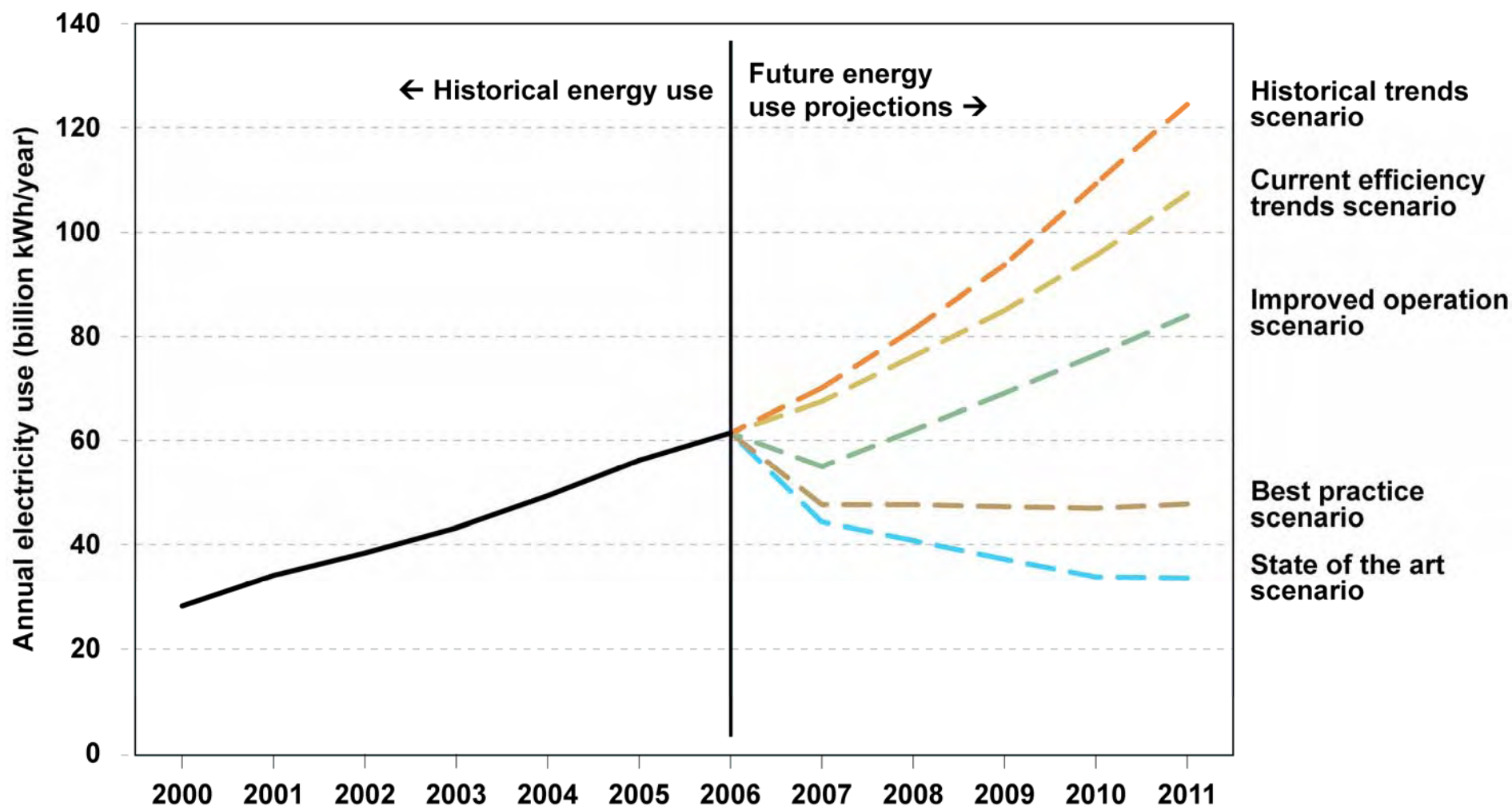


Key Barriers to Energy Efficiency

- Lack of efficiency definitions for equipment and data centers
 - Service output difficult to measure, varies among applications
 - Need for metrics and more data: *How do we account for computing performance?*
- Split incentives
 - Disconnect between IT and facilities managers
- Risk aversion
 - Fear of change and potential downtime; energy efficiency perceived as a change with uncertain value and risk



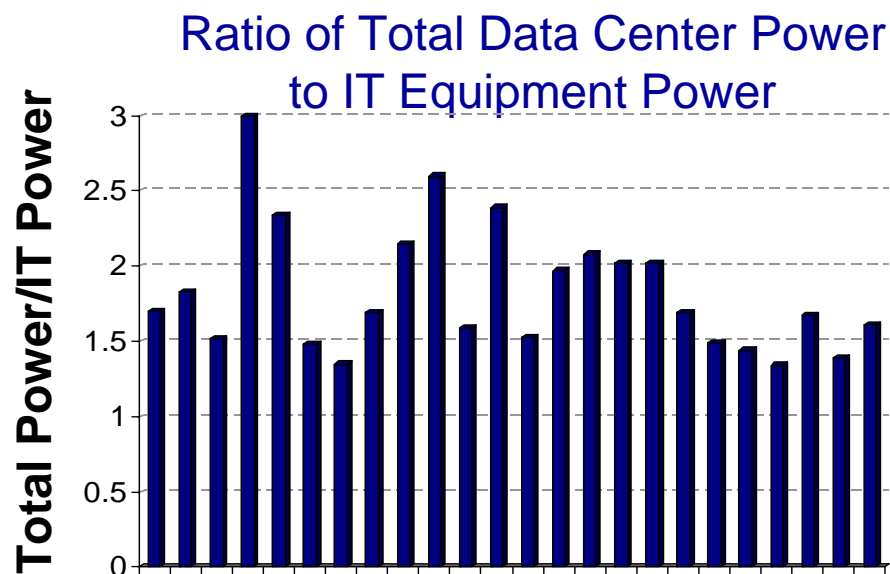
Comparison of Projected Electricity Use, All Scenarios, 2007-2011





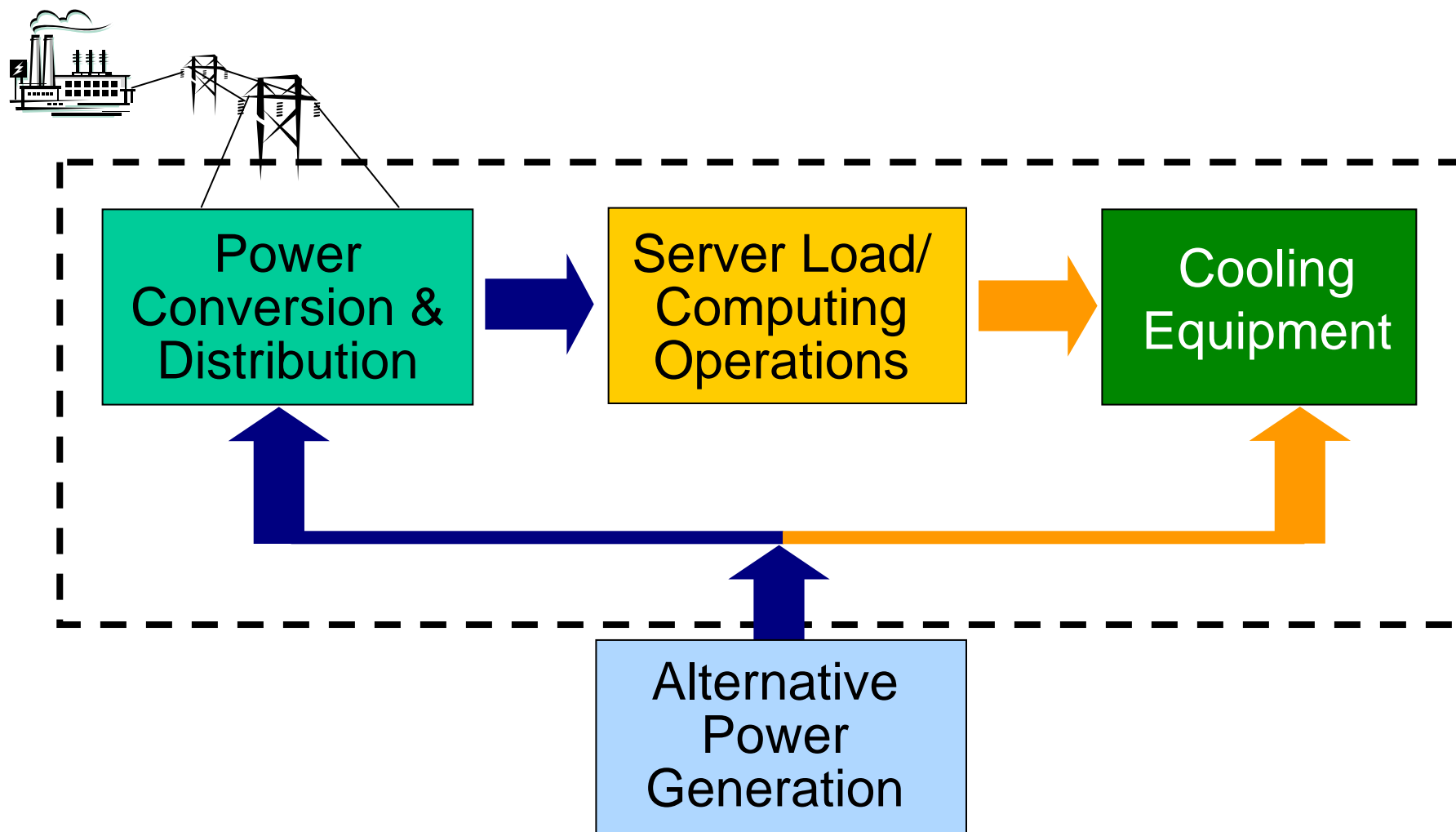
Building Existing Knowledge Base

- R&D Roadmap by Lawrence Berkeley National Lab (LBNL) identifies and prioritizes data center opportunities and research
- With funding from PG&E and CEC, LBNL conducted benchmark studies of 22 data centers:
 - Found wide variation in performance (total power/IT power)
 - Identified best practices
- DOE will greatly expand current knowledge base



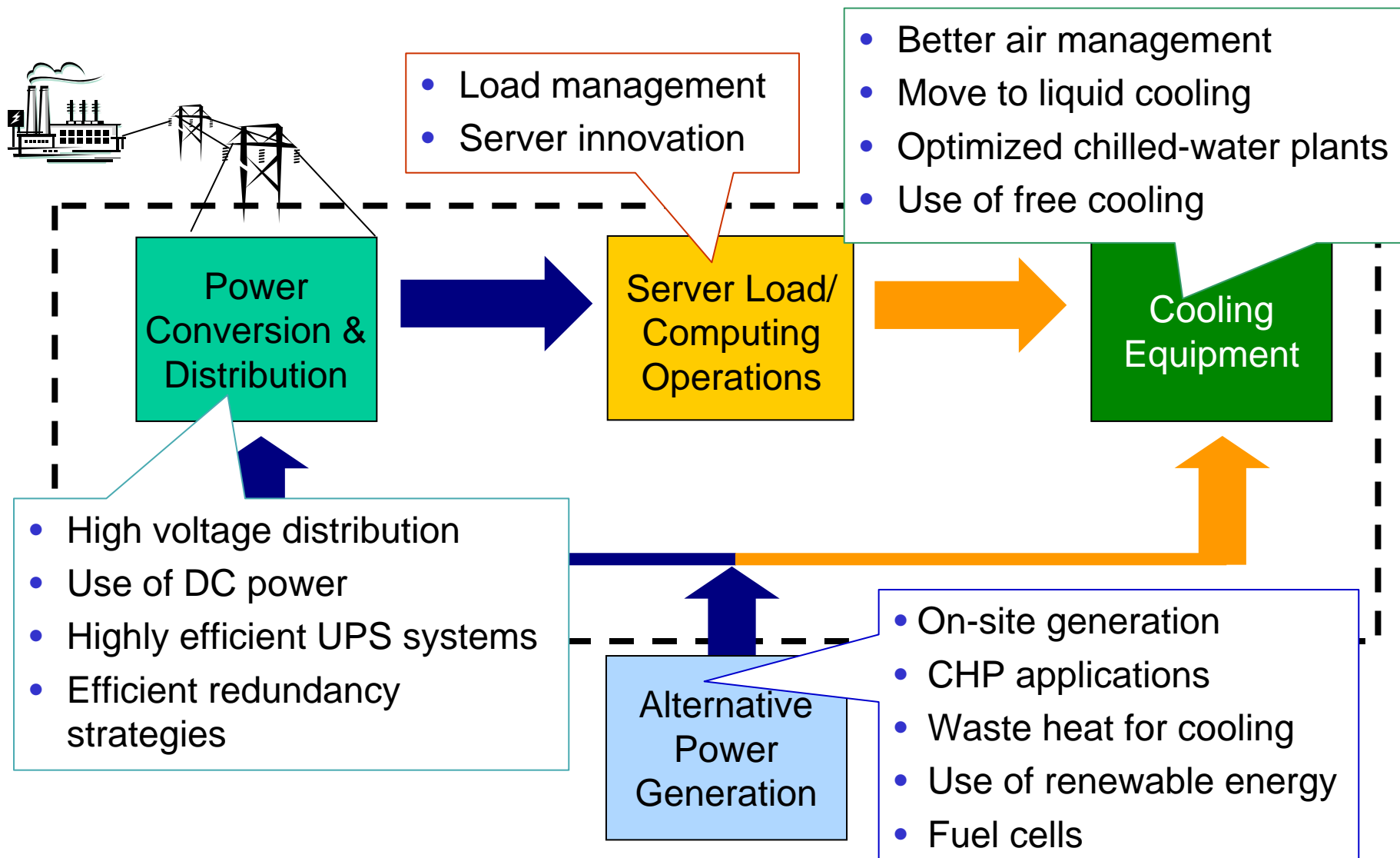


Energy Efficiency Opportunities





Energy Efficiency Opportunities





What Is Needed?

- Assistance in identifying the best opportunities for savings at each data center through tools, training and outreach
- Outside validation to help convince management that addressing opportunities is feasible and cost-effective
- Corporate leadership to drive energy efficiency programs from CEO to data center operation staff





Stakeholders

- DOE and EPA
- States
- Utilities
- Industry Organizations
e.g., Green Grid,
ASHRAE, AFCOM,
7x24, SVLG
- Equipment suppliers
- Research organizations
- Consultants





DOE Data Center Program Objectives

- Provide systems approach
- Develop tools, assessment protocols, and expertise
- Raise awareness of the opportunity
- Recognize industry leaders





Build on Save Energy Now Model

The DOE Industrial Technologies Program...

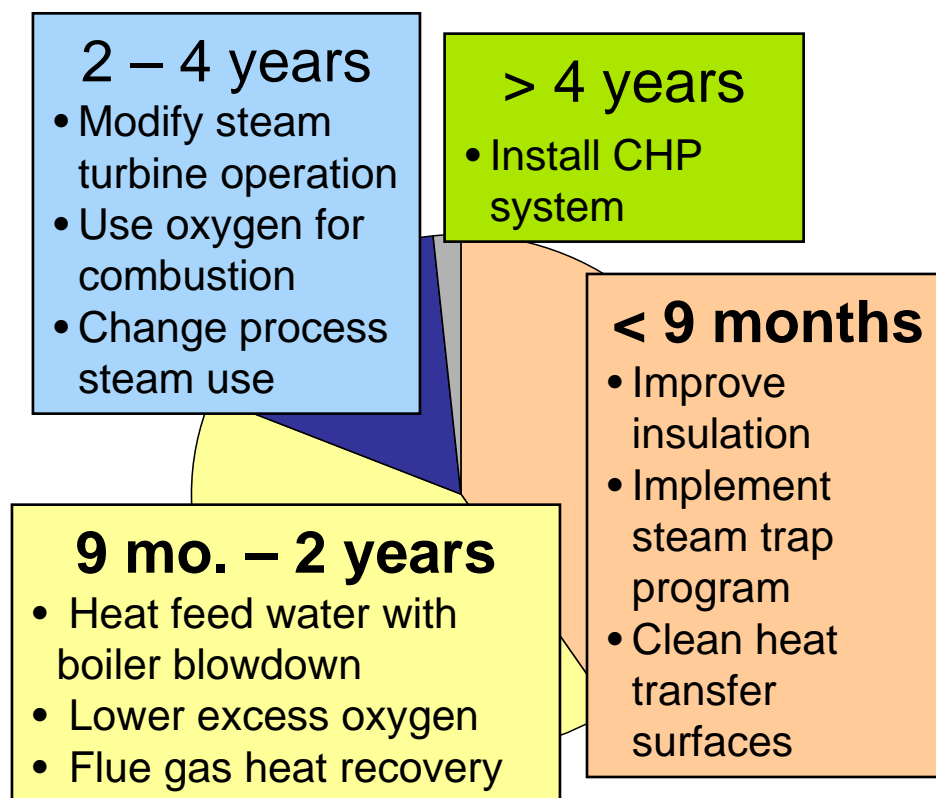
- Developed software to model energy use
- Created training programs in major industrial systems
 - Led to “Qualified Experts”
- Worked with experts to perform assessments at large industrial plants and trained staff on the use of Save Energy Now tools.
- Followed up on identified opportunities to track progress





Save Energy Now Results to Date

- 344 completed
- Natural gas potential savings = 60.4 trillion Btu/yr
 - Carbon dioxide avoided = 4.7 million metric tons/year
- Cost savings opportunity = \$586 million per year
 - Savings implemented or planned = \$330 million (180 plants)



Estimated Payback Periods for Recommended Actions



Program Strategy

- Expand Save Energy Now to Data Centers
 - Develop energy assessment protocols, software tools, training curriculum, and qualified experts to train and work with data center operators.
 - Carry out program development with industry input
- Conduct pilot assessments, promote and facilitate industry implementation.





Program Strategy, Cont.

- Also target Federal Sector Data Centers
 - Focus on DOE facilities initially
 - Identify largest federal data centers
- Develop federal procurement specifications for servers and data centers, overall
- Conduct energy efficiency demonstrations at federal facilities using Save Energy Now strategy; assessments, tools, protocols, technologies





2007 Move Forward Plan

- Build strong liaisons and partnerships with industry and others
- Work with these stakeholders to develop new energy assessment protocol
- Develop tools and info on best practices
 - Energy profiling tool
 - Sub-system analysis tools
- Conduct pilot assessments at data centers





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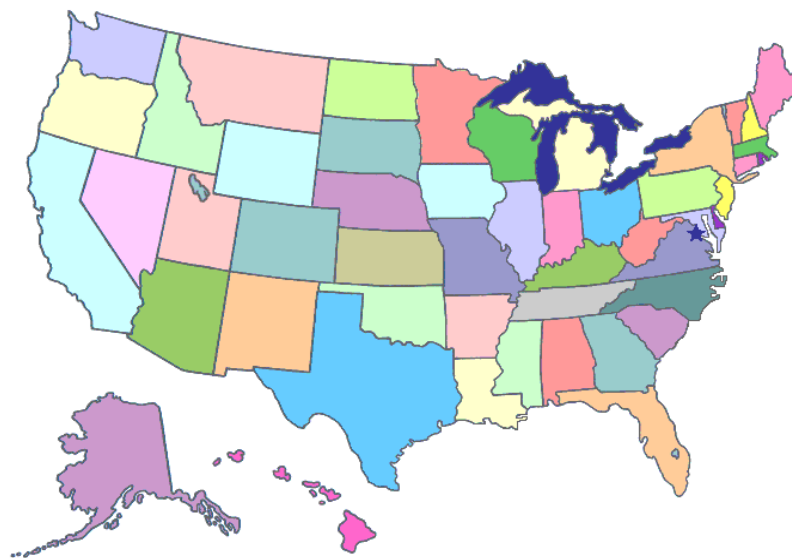
DOE ITP Partnership with States



Overview of ITP States

- **Goal:** Rapid deployment of energy efficient technologies and practices
- Collaborative Effort between ITP and States
- Transfer of Tools, Practices, and Technologies
- States are a **Key** Technology Delivery Vehicle for ITP and *Save Energy Now!*

Industrial Technologies Program





Local Approach

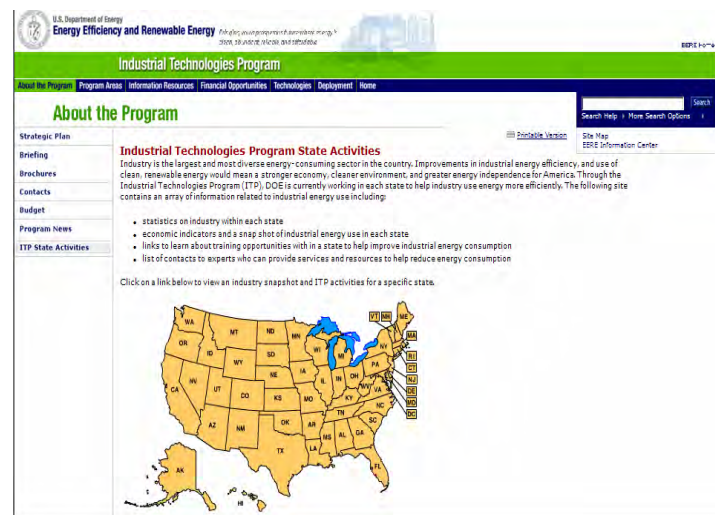
- “One Size Does Not Fits All”
 - Individual
 - Regional
- Relationships Built Locally
- Success Built on Relationships
- Work with States to Adapt ITP Tools, Practices and Technologies to their Needs
- Help to Overcome Barriers and Improve Industrial Efficiency





New Resources

- States Collaboration Plan
 - State level feedback used to guide future ITP State Activities
- ITP State Activities Web site
 - Statistics on Industry within Each State
 - Economic Indicators
 - Links to training opportunities
 - List of State Activities
 - Important Contacts
- Coming Soon: States Incentives Inventory
 - Comprehensive Database of Incentives for Commercial and Industrial Entities
 - Incentives for Improved Energy Efficiency and Renewable Technology Promotion





Plan of Action in FY08

- Establishing Strategic Partnerships
 - WI first taker (task shared partnership involving assessments, assessment implementation and new technology deployment)
 - IN (leverage training program; plant personnel training certification)
- States Solicitations
 - Currently Open Pilot: State-level assessments, rapid response, small scale
 - Closes November 1st
 - More Robust Funding Opportunity Announcement Planned for Dec. time frame





States Save Energy Now Effort

- Marketing and Outreach
 - Individual state marketing plans
 - Sustainable outreach efforts
 - Discuss energy efficient technologies and practices
- Training Centers
 - BestPractices Tools
 - Modified to Needs of Manufacturers in Each State
- Energy Assessments
 - Plant energy assessments (small, medium and large plants)
 - Implementation Follow-Up
 - Expert and Qualified Specialist training





States Save Energy Now (SEN) Effort

- Technology Demonstrations
 - Demonstrate commercially available energy efficient technologies
 - Conduct demonstration projects of emerging energy efficient technologies or fuel flexibility technologies
- Project Implementation
 - Implement a large energy efficient project at a plant





How can a State organization get involved with ITP?

- Help raise awareness, get word out, get products & services out to plants
- Respond to State RFPs issued or being issued
- Get plants to apply for Save Energy Now energy assessment
- Co-sponsor training workshops



www.eere.energy.gov/industry

Call the EERE Information Center

877-337-3463