United States Department of Energy
Energy Efficiency and Renewable Energy Office
Industrial Technologies Program

“Save Energy Now” Initiative
Electric Power Annual with data for 2004
Report Released: November 2005
Next Release Date: November 2006

Note: Conventional hydroelectric power and hydroelectric pumped storage facility production minus energy used for pumping.
## Existing Capacity by Energy Source, 2004 (Megawatts)

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>No. of Generators</th>
<th>Generator Capacity</th>
<th>Net Summer Capacity</th>
<th>Net Winter Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal[1]</td>
<td>1,526</td>
<td>335,243</td>
<td>313,020</td>
<td>315,364</td>
</tr>
<tr>
<td>Petroleum[2]</td>
<td>3,175</td>
<td>37,970</td>
<td>33,702</td>
<td>37,339</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>3,048</td>
<td>256,627</td>
<td>224,257</td>
<td>241,391</td>
</tr>
<tr>
<td>Dual Fired</td>
<td>3,003</td>
<td>193,115</td>
<td>172,170</td>
<td>184,399</td>
</tr>
<tr>
<td>Other Gases[3]</td>
<td>119</td>
<td>2,535</td>
<td>2,296</td>
<td>2,259</td>
</tr>
<tr>
<td>Nuclear</td>
<td>104</td>
<td>105,560</td>
<td>99,628</td>
<td>101,377</td>
</tr>
<tr>
<td>Hydro (Conventional)</td>
<td>3,995</td>
<td>77,130</td>
<td>77,641</td>
<td>77,227</td>
</tr>
<tr>
<td>Other Renewables[4]</td>
<td>1,608</td>
<td>21,113</td>
<td>18,763</td>
<td>19,000</td>
</tr>
<tr>
<td>Pumped Storage</td>
<td>150</td>
<td>19,569</td>
<td>20,764</td>
<td>20,676</td>
</tr>
<tr>
<td>Other[5]</td>
<td>42</td>
<td>754</td>
<td>700</td>
<td>716</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16,770</strong></td>
<td><strong>1,049,615</strong></td>
<td><strong>962,942</strong></td>
<td><strong>999,749</strong></td>
</tr>
</tbody>
</table>
## Planned Nameplate Capacity Additions from New Generators, by Energy Source, 2005 through 2009 (Megawatts)

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal[1]</td>
<td>573</td>
<td>450</td>
<td>2,064</td>
<td>1,879</td>
<td>8,122</td>
</tr>
<tr>
<td>Petroleum[2]</td>
<td>432</td>
<td>441</td>
<td>186</td>
<td>--</td>
<td>8</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>15,216</td>
<td>12,499</td>
<td>16,013</td>
<td>9,895</td>
<td>5,451</td>
</tr>
<tr>
<td>Dual Fired</td>
<td>4,916</td>
<td>1,924</td>
<td>5,236</td>
<td>2,649</td>
<td>1,860</td>
</tr>
<tr>
<td>Other Gases[3]</td>
<td>159</td>
<td>--</td>
<td>340</td>
<td>580</td>
<td>--</td>
</tr>
<tr>
<td>Nuclear</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Hydro (Conventional)</td>
<td>32</td>
<td>8</td>
<td>3</td>
<td>4</td>
<td>--</td>
</tr>
<tr>
<td>Other Renewables[4]</td>
<td>2,519</td>
<td>294</td>
<td>126</td>
<td>147</td>
<td>1</td>
</tr>
<tr>
<td>Pumped Storage[5]</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Other[5]</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>23,846</td>
<td>15,616</td>
<td>23,967</td>
<td>15,153</td>
<td>15,441</td>
</tr>
</tbody>
</table>

**59,000 MW of planned gas-fired capacity in 5 years**
“Easy Ways to Save Energy” Campaign

• In response to supply shortages and skyrocketing natural gas prices which may last into 2006 DOE created four initiatives:

  1. Energy Hog campaign
     – Public Service Announcements
  2. Energy Savers tips to help homeowners save energy
  3. Federal Energy Management Program (FEMP) energy saving teams
  4. Industrial Technologies Program (ITP) “Save Energy Now”
The Context

“America’s businesses, factories, and manufacturing facilities use massive amounts of energy. To help them during this period of tightening supply and rising costs, our Department is sending teams of qualified efficiency experts to 200 of the nation’s most energy-intensive factories. Our Energy Saving Teams will work with on-site managers on ways to conserve energy and use it more efficiently.”

Secretary of Energy Bodman
National Press Club
October 3, 2005
Industry: Critical to National Energy Policy

- 1/3 of U.S. energy consumption
- More than 40% of U.S. natural gas demand
- ~28% of U.S. electricity demand
- Energy is key to economic growth and maintaining U.S. jobs in manufacturing

### 2004 Energy Use*

- Industry: 34.0%
- Transportation: 28.0%
- Residential: 21.0%
- Commercial: 17.0%

*Includes electricity losses

Source: DOE/EIA Monthly Energy Review 2004 (preliminary)
Relatively Few Plants Use the Most Energy

U.S. Manufacturing Plants: By Size

- Small Plants <$100K: 104,299
- Mid-Size Plants $100K-$2M: 115,636
- Large Plants >$2M: 6,802
- All U.S. Plants: 226,737

Percent of Total Industrial Energy

- Small & Medium: 47%
- Large: 53%

1998 EIA MECS
Energy Use - Large Plants by Sector

* Not including Mining
“Save Energy Now” Initiative

Goals:  
- 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
Save Energy Now: A New DOE Initiative

- Conduct 200 energy savings assessments of the most energy-intensive U.S. plants
- Work with partners to create awareness and find energy savings solutions
- Disseminate energy savings information & tools to 50,000 plants to help reduce natural gas and electricity use.
Energy Savings Assessments
Plant Energy Assessments

**Small/Medium Plant Assessments**

- Plants with energy consumption $100,000 to $2 million
- Over 500 assessments per year
- Average plant savings: 4.2 billion Btus (about $21,000)
- Conducted by industrial assessment centers at 26 universities

**Large Plant Assessments**

- Over 120 assessments underway or completed
- Plant wide assessments (comprehensive)
- Targeted system assessments (quick focused)
- Annual savings opportunities identified: > $250 million
- Average identified energy savings per plant: 10-15%
- Annual savings implemented ~$30 million
Energy Savings Assessments

• 200 assessments of targeted industrial systems by Energy Efficient Experts using the DOE software tools

• ESA Report identifies potential energy and cost savings

• Plants will be 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
Energy Savings Teams

- Teams Composed of DOE Qualified Energy Experts and Plant Personnel
- Teams will focus on either steam generation or process heating
- Plant personnel and affiliates will be trained on DOE efficiency tools

Manufacturing Energy Use by Type of System (%)

- Steam 35%
- Process Heating 38%
- Motor Systems 12%
- Process Cooling 1%
- Electro-chemical 2%
- Other 4%
- Facilities 8%

Note: Does not include off-site losses
Who are Energy Efficient Experts?

• Experienced industry professionals - typically equipment suppliers, consultants, or highly skilled end users who:
  – Are experienced in system optimization in their area of steam, or process heating
  – Take the DOE Qualified Specialist training program - 2-3 days focused on appropriate use of the EERE system assessment software tool
  – Successfully complete a rigorous qualifying exam that tests their ability to apply the software in conducting system assessments
Energy Savings Assessment Process

- Gather Preliminary data
- Conduct Plant Visit
- Analyze & Report Results
- Follow-up

Train Plant Staff
Assistance and support available to all industrial plants

• For plants applying who do not meet the criteria for an Energy Savings Assessment, other assistance will be offered such as:
  – Industrial Assessment Center assessment
  – Personalized phone consultation to address energy efficiency in their plant
  – Self assessment tools
  – Information products, DOE software tools and training
## Status of Energy Savings Assessments

### Prototype Assessments

<table>
<thead>
<tr>
<th>Company</th>
<th>Process</th>
<th>State</th>
<th>Plant Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3M</td>
<td>Process Heating</td>
<td>Brownwood, TX</td>
<td>Chemicals</td>
</tr>
<tr>
<td>JR Simplot</td>
<td>Steam</td>
<td>Lathrop, CA</td>
<td>Chemicals</td>
</tr>
<tr>
<td>Dow</td>
<td>Steam</td>
<td>Hahnville, LA</td>
<td>Chemicals</td>
</tr>
<tr>
<td>Boise Cascade</td>
<td>Steam</td>
<td>Jackson, AL</td>
<td>Pulp &amp; Paper</td>
</tr>
<tr>
<td>General Motors</td>
<td>Steam</td>
<td>Flint, MI</td>
<td>Automotive Assembly</td>
</tr>
<tr>
<td>Rohm and Haas</td>
<td>Steam</td>
<td>Grand Saline, TX</td>
<td>Chemicals</td>
</tr>
</tbody>
</table>

### Energy Savings Experts

- Experts solicited and in process of being put under contract with DOE/ORNL

### Applications for Energy Savings Assessments

- Companies applied on-line beginning November 8
- Applications are currently open
Early Energy Saving Assessment Results

• 3M Brownwood, TX site:
  – Use Waste Heat from Glass Melting Furnaces, Heat Treating furnaces and Thermal Oxidizers
  – Replace Steam for Heating Make-up Air with Waste Heat from Higher Temperature Furnaces and Ovens.
  – Optimize Combustion in Furnaces, Ovens and Boilers

• J.R. Simplot Lathrop, CA site:
  – Back Pressure Turbine Generator
  – Upgrade Turbine Governor and Controls
  – Sell Excess Power to Grid
Partnerships and Outreach to 50,000 Plants
Robust Partnerships to Reach Plants

- Allied Partners
- States
- Utilities
- Equipment Suppliers & Service Companies
- Trade Associations
- Replication within Industrial Companies
“Save Energy Now” Outreach Goal: 50,000 Plants

- Utilize a wide variety of information materials, web tools, and technical assistance

- Work with our existing partners and develop new partnerships to significantly increase our “reach”
Save Energy Now Website

www.eere.energy.gov/industry/saveenergynow
Information, Tools and Training

- Tip sheets, case studies, brochures, technical briefs etc.
- *Energy Matters* newsletter
- Industrial Technologies Monthly e-bulletin
- Software tools
- Training workshops and webcasts
- Web sites

**New:**
- Packets of Information for Plants
- Save Energy Now CD
EERE Information Center

• Information on EERE products/services
• Unbiased, customized technical and programmatic assistance to help achieve industrial energy savings
• Experts help thousands of industries as well as consultants, vendors, government agencies, and others that serve them

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Fax: 360-236-2023
Email: eerecsc@ee.doe.gov
The IAC National Webcast Lecture Series

The lectures given by distinguished professors who in addition to being internationally recognized experts in their fields, serve as directors of the DOE sponsored Industrial Assessment Center located at their universities.

• Energy Efficient Building Management Strategies - Feb
• Measuring and Improving Boiler Efficiency - March
• Combined Heat and Power - April
• Optimizing Combustion Systems - May
• Steam System Management - Jun

Register for FREE at http://iac.rutgers.edu/lectures2006/
20 Ways to Save Energy Now

Think saving energy will require costly new equipment or complicated changes to your operating practices?

Think again!
20 Ways to Save Energy Now

All Combustion Systems

1. Operate furnaces and boilers at or close to design capacity

2. Reduce excess air used for combustion

3. Clean heat transfer surfaces

4. Reduce radiation losses from openings
5. Use proper furnace or boiler insulation to reduce wall heat losses

6. Adequately insulate air or water-cooled surfaces exposed to the furnace environment and steam lines leaving the boiler

7. Install air preheat or other heat recovery equipment
20 Ways to Save Energy Now

Steam Generation Systems

8. Improve water treatment to minimize boiler blowdown

9. Optimize deaerator vent rate

10. Repair steam leaks

11. Minimize vented steam
12. Implement effective steam trap maintenance program

13. Use high-pressure condensate to make low-pressure steam

14. Utilize backpressure turbine instead of pressure-reducing or release valves

15. Optimize condensate recovery
16. Minimize air leakage into the furnace by sealing openings

17. Maintain proper, slightly positive furnace pressure

18. Reduce weight of or eliminate material handling fixtures
20 Ways to Save Energy Now

Process Heating Systems

19. Modify the furnace system or use a separate heating system to recover furnace exhaust gas heat

20. Recover part of the furnace exhaust heat for use in lower-temperature processes