



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

A Mid-Course Report Card on Federal Energy Efficiency Initiatives

James Quinn

Office of Energy Efficiency and Renewable Energy

November 16, 2006

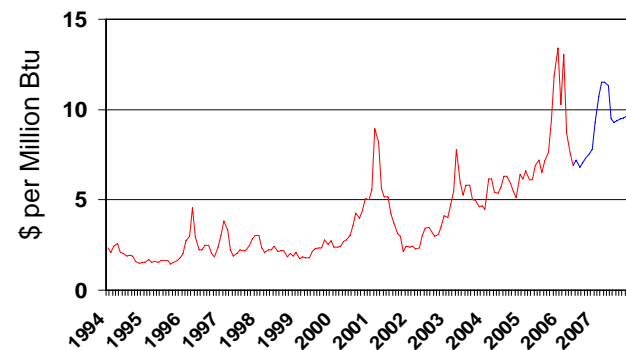




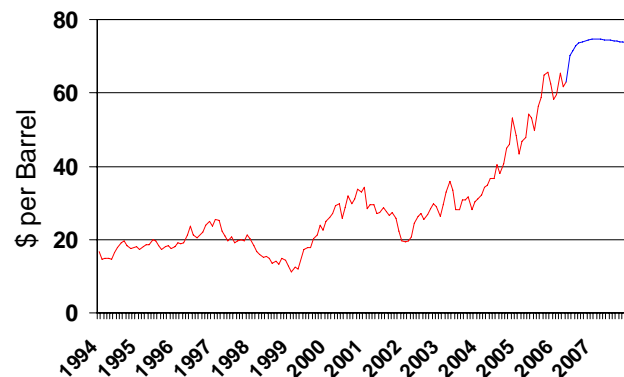
Global Energy Challenges

- **National energy security:** Global oil and gas reserves are in unstable areas and flexible alternatives are not readily available.
- **Economic security:** Rising prices hurt America's ability to remain competitive in the global market place.
- **Global Warming:** Global concerns regarding carbon emissions and climate change are forcing industries and governments to rethink their strategies on energy fuels.

Natural Gas Prices, Henry Hub 1994-2007



Oil Prices, West TX Intermediate 1948-2007





Reshaping U.S. Energy Policy

- **2005 Energy Policy Act:** Strong legislation to address the new energy landscape
- **Hurricanes:** Devastating effects of Hurricane Katrina and other storms severely impacted US energy resources and industries
- **Presidential Energy Initiatives:** President Bush calls for increased energy diversification and efficiency; technology competitiveness
- **Asst. Secretary Karsner:** New focus on private investment and partnerships
- **Easy Ways to Save Energy:** Secretary Bodman's comprehensive national campaign to highlight how American families, businesses and the federal government can save energy in response to rising energy costs





Driver: Energy Policy Act of 2005

- **Federal Sector:** Reauthorization of Energy Savings Performance Contract (ESPC) Program
- **Industry:** Forge voluntary agreements with large companies to reduce energy intensity by $\geq 2.5\%$ each year through 2016
- **Renewables:** Provides loan guarantee authorization for commercial-scale biofuels demonstrations; authorizes subsidies for wind energy
- **Transportation:** Provides tax credit for hybrid vehicle owners; increases amount of biofuel that must be mixed with gasoline; requires Federal Fleet vehicles capable of using alternative fuels to use them exclusively; mandates use of 7.5 B gallons of renewable fuels per year in U.S. gasoline by 2012
- **Residential Buildings:** Provides tax breaks for those making energy conservation improvements in their homes

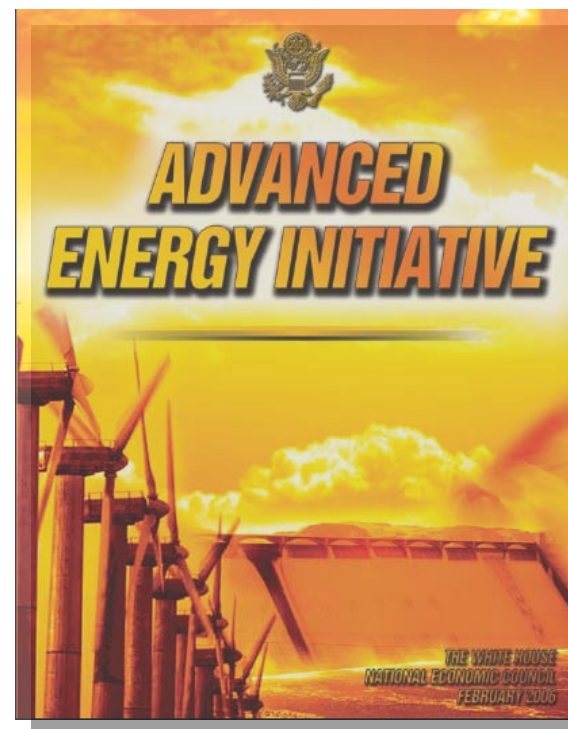




Driver: Advanced Energy Initiative

Announced by President Bush in his 2006 State of the Union address

- **Changing the way we fuel our vehicles:** Increase use of technologies that reduce oil use by improving efficiency, expand fuels from biomass, and develop fuel cells that use hydrogen from domestic feedstocks
- **Changing the way we power our homes and businesses:** Generate more electricity from clean coal, advanced nuclear power, and renewable resources (biofuels, wind power, solar power, and hydrogen and fuel cells)





Energy Efficiency in Federal Programs

- Federal Energy Management Program (FEMP)
- Industrial Technologies
- Renewables
- Commercial Buildings
- Residential Buildings
- Transportation





FEMP: EPA Act Drivers

- Federal agency annual reduction in energy use of 2% in FY2006; Increasing 2% annually to reach 20% in 2015
- Electric metering required in all federal buildings by 2012
- Energy Savings Performance Contracts reauthorized through 2016
- Renewable energy requirements for federal agencies
 - 2007 to 2009: >3%
 - 2010 to 2012: >5%
 - 2013: >7.5%





Federal Facilities: Challenges & Opportunity

- 70 trillion Btu reduction annually by 2015 per EPACK goal
- **Est. investment needed: \$7.5 Billion**
 - \$950 million per year
 - 17% of current annual energy costs
- **Expected appropriations, FY07-FY14: \$1.4 Billion**
 - \$173 million per year
- **Shortfall: \$6.2 Billion**
 - At least \$775 million per year investment potential from ESPC/UESC





ESPCs Today

- FY1998 to FY2006, 166 Super ESPC delivery orders signed
 - Total project investment: \$838 million
 - Guaranteed cost savings of \$2 billion
 - Annual energy savings of 7.7 trillion Btu (131 TBtu to date)
- \$164 million for ESPCs in FY 2006 **(double the amount from 2005)**
- FY2007 Goal: \$300 million invested





Federal Energy Management Program: ESPCs

- Energy Savings Performance Contracts (ESPC) Blitz
- Super ESPC contract being re-competed and existing contracts extended through March 2008
- EPA Act electric metering requirement guidance issued Feb. 3, 2006; meters may be installed as part of measurement and verification under an ESPC





ESPC Success: NASA Johnson Space Center

- Houston, TX
- Regional Super ESPC
 - Installation of energy-efficient lighting and compressed-air systems
 - Water reduction measures
 - Improved air-conditioning and lighting control systems
- Savings: \$2 million/yr in energy and water costs





Recently Awarded Contracts

- Argonne National Laboratory
 - Coal-fired boiler upgrade
 - Chiller replacement
 - Lighting system upgrades
 - Steam pipe installation
 - Estimated savings: \$1.2 million/yr
- Luke Air Force Base
 - Chiller replacement
 - Chiller thermal energy storage
 - Chiller VFD pumping improvements





Federal Buildings: Successes

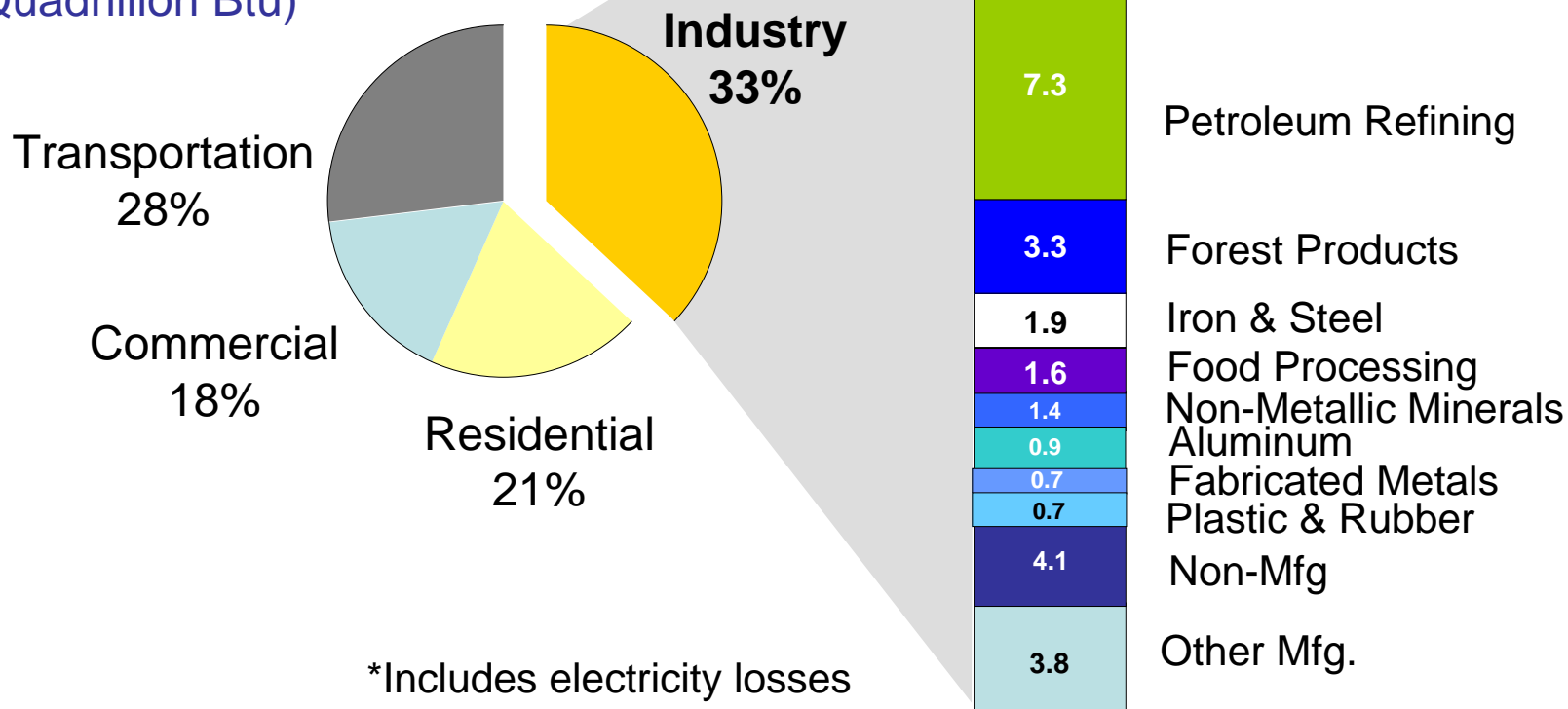
- Eight agencies have met energy reduction goals for FY 2005
- Standard buildings
 - Reduced energy use per gross square foot by 29.6% compared to FY 1985
- Industrial, Laboratory, and Other Energy-Intensive Facilities
 - Reduced energy use per gross square foot by 17.6% compared to FY 1990





Industry: Critical to U.S. Energy Picture

2004 Energy Use*
100.3 Quads
(Quadrillion Btu)



*Includes electricity losses



Industry: Underinvested in Energy Efficiency

- Until recently, perception was that return not sufficient to identify and implement energy efficiency improvements
- Loss of skills and resources necessary to capture the real savings attainable today
- Shrinking corporate R&D budgets
- Competition for scarce capital among investments in energy-efficient technologies and other priorities





Save Energy Now Goal:

- Encourage industry to voluntarily reduce its energy usage in a period of tight supplies by working with America's largest energy-intensive plants



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

Secretary of Energy Bodman
October 3, 2005



Energy Savings Assessment Status

- Of 200 planned, 187 Energy Savings Assessments completed
- With 141 assessments reporting:
 - Total potential natural gas savings of **35 trillion Btu per year**—equal to 490,000 U.S. homes
 - Total cost savings potential identified = **over \$340 million per year**
 - Potential natural gas & electricity savings equivalent to reducing carbon emissions by **.7 million tons.**
- **Solicitation of next round of 250 plants in 2007 opened October 2**



“While [Dow] has been a leader in energy efficiency, with DOE’s help, we found yet more cost-effective opportunities to save precious energy.”

John Dearborn,
Global Business VP, Energy, Dow



Industry: Other Initiatives to Boost Efficiency

- **Partnering with U.S. Department of Commerce:** Manufacturing Extension Partnerships reach 18,000 small-to-medium-sized manufacturers per year; will conduct assessment follow-ups to increase implementation of recommended actions
- **Promote top technology opportunities:**
 - Waste heat recovery
 - Advanced boiler technology
 - Combined heat & power
- **Technology Demonstrations**
 - Superboiler (January 2007)
- **Efficient Energy Management Standards & Certification**





Texas Technology Showcase

December 6-7, 2006, in Galveston, TX

- Targets Chemicals and Refining industries
- Latest in energy management practices and technology.
- Plant tours, exhibitors, presentations highlighting the latest in energy technology and pollution control.
- EERE co-hosting with Texas state government



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Wind Energy

- \$44 million for wind energy in FY2007:
 - \$5 million increase over FY2006
 - Improve efficiency and lower costs
 - Develop new, small-scale wind technologies for use in low-speed wind environments
 - Expand access to Federal lands for wind energy development
 - Dramatically increase the use of wind energy in the United States
- DOE and industry working together to derive 20% of electric power from wind





Solar Power

- Solar America Initiative
 - \$148 million: \$65 million over FY 2006
 - Addresses marketplace barriers
 - Accelerates R&D of advanced PV materials and low-cost approaches for manufacturing
- Goal: Make solar energy cost-competitive with other forms of renewable electricity by 2015





Biomass

- **Biofuels Initiative**
 - \$150 million in FY2007: \$59 million increase over FY2006
 - Cost-shared R&D
 - Non-food based biomass
 - Development of biorefineries to increase overall production
- **Bioenergy Research Centers**
 - Secretary Bodman awarded \$250 million to establish and operate two new centers
- **By 2012:** Make cellulosic ethanol cost-competitive
- **30x30 Goal:** By 2030, replace 30% of 2004 gasoline consumption with biofuels





Buildings: Platform for Integration

Green Power

Wind, Biomass, Hydropower

Building Technologies

Efficiency Technologies & Building Integration

Hydrogen & Fuel Cells

Fuel Cell Technology
& Hydrogen
Infrastructure

Zero Energy Buildings

Solar

PV and Solar Hot
Water Technologies

Geothermal

Heat Pumps &
Power Production

GOAL: Net Zero Energy Buildings



Residential Buildings

Zero-Energy Home: Through efficiency gains and the use of renewable energy sources, bring a residence that uses less electricity than it produces to the market by 2020.

Building America: Technical resources supporting the construction of energy- and resource-efficient homes

Lighting for Tomorrow: Design competition for energy-efficient residential decorative lighting fixtures to encourage market adoption of pin-based compact fluorescent bulbs; co-sponsored by DOE (through PNNL), American Lighting Association, and the Consortium for Energy Efficiency

Energy STAR: Programs and products to help save the environment and save consumers money by using less energy through advanced design or construction

Building Energy Codes: Information resource on national model energy codes





Commercial Buildings

- **Rebuild America**

National network of community-based partnerships that are committed to saving energy, improving building performance, easing air pollution through reduced energy demand, and enhancing the quality of life through energy efficiency and renewable energy technologies through retrofit of existing buildings



- **Building Energy Codes**

Information resource on national model energy codes



- **EnergyPLUS**

Building energy simulation program and design tool for modeling building system energy performance





Transportation

- Promote development of advanced vehicle technologies, especially hybrid engines and hydrogen and fuel cell systems.
- Consumer tax credits are now available for eligible cars purchased after Jan. 1, 2006. Credit (worth up to \$3,400 extends for next 6-10 years.
- Escalating biofuel requirement set by EPA Act is increasing capital available for ethanol and other plant development.
- Goal: Replace an amount of oil equal to 75% of our oil imports from the Middle East by 2025





A Larger Perspective

- Events of the past 15 months have changed the way America thinks about energy – we are not in a “business as usual” mode.
- ESPCs & other third-party financing are critical to U.S energy policy and recognized at all levels
- Industry through the Save Energy Now campaign has demonstrated that there are significant amounts of cost effective energy investments
- Market Transformation is a new focus area for EERE – we want to work with you on this!
- There is a lot of cooperative work to do with Administration and Congress to realize the tough energy challenges we face

