



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

# The FY 2008 Budget Request

## *Twenty in Ten: Strengthening America's Energy Security*

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## President's State of the Union Address

*"Tonight, I ask Congress to join me in pursuing a great goal. Let us build on the work we've done and reduce gasoline usage in the United States by 20 percent in the next 10 years."*





## The President's "20 in 10" Goal

Enables Us to Further Enhance Our Energy Security By:

- Increasing the transportation sector's energy diversity.
- Increasing the supply of oil alternatives and reducing oil demand.

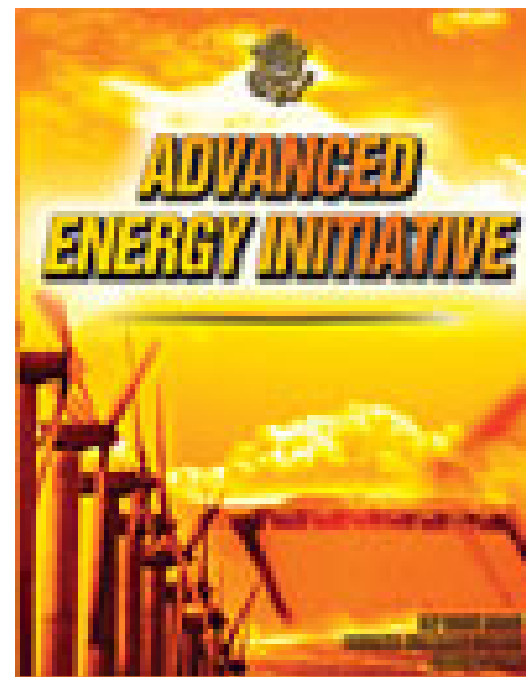


Corbis



## Building on the Advanced Energy Initiative

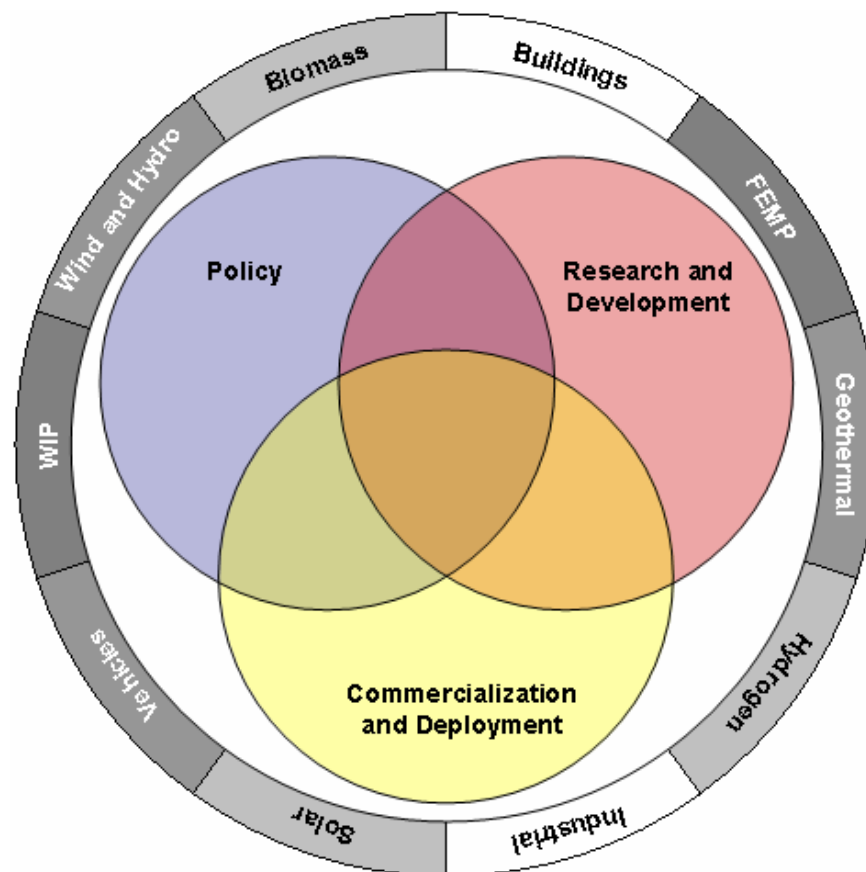
- We need to continue with important research into plug-in and advanced hybrid vehicles, and expand the use of high efficiency clean diesel vehicles and biodiesel fuel.
- We must continue investing in new methods of producing ethanol and other biofuels.
- We must further expand the use of solar and wind energy.





## EERE Portfolio

- Fuels & Vehicles
  - Vehicle Technologies
  - Biomass/Biofuels
  - Hydrogen
- Power Generation
  - Wind
  - Solar
- Energy Efficiency
  - Building Technologies
  - Industrial Technologies
  - Weatherization
  - Federal Energy Management





## Increased Emphasis on Market Transformation

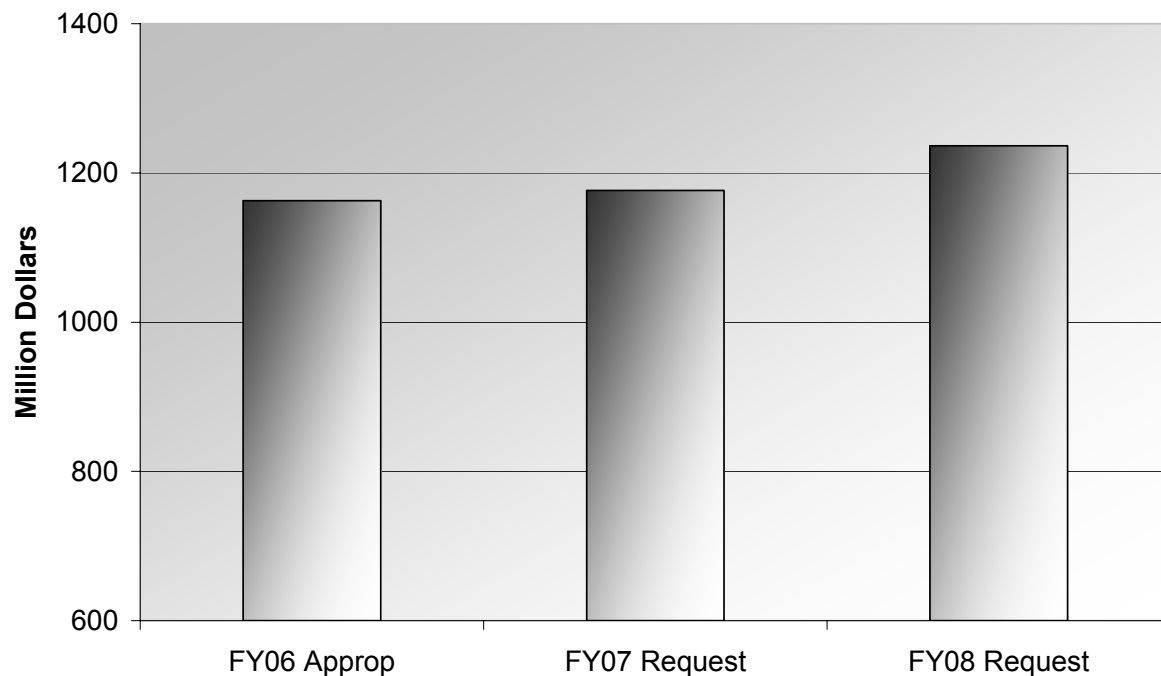
- Energy industry is entering an era of major change.
- By questioning conventional wisdom and embracing ambitious timetables, EERE can help bring about positive commercialization opportunities for new energy technologies.
- EERE believes that success will be defined by enabling commercial frameworks and free enterprise to accelerate the development and deployment of new energy technologies to address the Nation's energy challenges head on.



## President's FY08 Budget Continues Robust Funding for EERE

**Energy Efficiency  
and Renewable Energy**  
Bringing you a prosperous future where energy  
is clean, abundant, reliable, and affordable

**EERE Budgets**





## Summary of FY08 Request

- The budget request increases funding for essential growth in programs key to reducing our dependence on foreign oil and changing the way we power our homes and businesses.
  - Biomass and Biorefinery Systems R&D (+\$29.576M)
  - Vehicle Technologies R&D (+\$10.114M)
  - Hydrogen Technologies R&D (+\$17.199M)
- It also increases funding for Building Technologies, while maintaining critical funding levels for Solar, Wind, Industrial Technologies, and the Federal Energy Management Program.



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

# EERE Program Details

FY 2008 Budget Request



## EERE FY08 Budget Request

Funding (\$ in thousands)

|                                                 | FY 2006<br>Appropriation. | FY 2007<br>Request | FY 2008<br>Request | Change<br>FY07 to FY08 |
|-------------------------------------------------|---------------------------|--------------------|--------------------|------------------------|
| <b>Energy Supply and Conservation</b>           |                           |                    |                    |                        |
| Biomass and Biorefinery Systems R&D             | 89,776                    | 149,687            | 179,263            | +29,576                |
| Building Technologies                           | 68,190                    | 77,329             | 86,456             | +9,127                 |
| Federal Energy Management Program               | 18,974                    | 16,906             | 16,791             | -115                   |
| Geothermal Technology                           | 22,762                    | 0                  | 0                  | 0                      |
| Hydrogen Technology                             | 153,451                   | 195,801            | 213,000            | +17,199                |
| Hydropower                                      | 495                       | 0                  | 0                  | 0                      |
| Industrial Technologies                         | 55,856                    | 45,563             | 45,998             | +435                   |
| Solar Energy                                    | 81,791                    | 148,372            | 148,304            | -68                    |
| Vehicle Technologies                            | 178,351                   | 166,024            | 176,138            | +10,114                |
| Weatherization and Intergovernmental Activities | 316,866                   | 225,031            | 204,904            | -20,127                |
| Wind Energy                                     | 38,333                    | 43,819             | 40,069             | -3,750                 |
| Facilities and Infrastructure                   | 26,052                    | 5,935              | 6,982              | +1,047                 |
| Program Direction                               | 101,868                   | 91,024             | 105,013            | +13,989                |
| Program Support                                 | 13,321                    | 10,930             | 13,281             | +2,351                 |
| Adjustments                                     | -3,339                    |                    |                    |                        |
| <b>Total, Energy Supply and Conservation</b>    | <b>1,162,747</b>          | <b>1,176,421</b>   | <b>1,236,199</b>   | <b>+59,778</b>         |



**Program Focus:** Reduce oil imports through the development and validation of advanced conversion technologies that produce transportation fuels, chemicals, heat and power in integrated biorefineries.

## Budget Request

Funding (\$ in thousands)

| Activity                            | FY 2006<br>Approp. | FY 2007<br>Request | FY 2008<br>Request |
|-------------------------------------|--------------------|--------------------|--------------------|
| Feedstock Infrastructure            | 492                | 9,967              | 10,000             |
| Platforms R&D                       | 19,542             | 50,530             | 59,400             |
| Utilization of Platform Outputs R&D | 22,915             | 89,190             | 104,863            |
| Cellulosic Ethanol Reverse Auction  | 0                  | 0                  | 5,000              |
| Congressionally Directed Activities | 46,827             | 0                  | 0                  |
| <b>TOTAL</b>                        | <b>89,776</b>      | <b>149,687</b>     | <b>179,263</b>     |

## Key Activities

- Support selected industry cost-share projects from EPACT 2005 Section 932 Solicitation initiated in FY07.
- Support industry cost-share projects selected from the FY07 Solicitation to develop improved organisms to reduce the cost of fermenting sugars to produce cellulosic ethanol.
- Further lower the cost of sugars and ethanol through integration of advanced enzymes with optimized pretreatment processes.
- Initiate a solicitation to validate conversion technologies performance and their economics at 10% commercial scale by 2010.
- Continue to establish regional feedstock development partnerships to ensure an affordable and sustainable biomass supply across the United States.



**Program Focus:** Enable America to use less petroleum through research and development of technologies to improve the energy efficiency of cars and trucks.

## Budget Request

Funding (\$ in thousands)

| Activity                            | FY 2006<br>Approp. | FY 2007<br>Request | FY 2008<br>Request |
|-------------------------------------|--------------------|--------------------|--------------------|
| Hybrid Electric Systems             | 0                  | 0                  | 80,664             |
| Vehicle Systems (X)                 | 12,720             | 13,315             | 0                  |
| Hybrid and Electric Propulsion (X)  | 42,843             | 50,841             | 0                  |
| Advanced Combustion Engine R&D      | 40,594             | 46,706             | 34,550             |
| Materials Technology                | 34,373             | 29,786             | 33,382             |
| Fuels Technology                    | 13,356             | 13,845             | 13,845             |
| Technology Integration              | 0                  | 0                  | 13,697             |
| Innovative Concepts (X)             | 495                | 500                | 0                  |
| Technology Introduction (X)         | 6,250              | 11,031             | 0                  |
| Biennial Peer Reviews (X)           | 990                | 0                  | 0                  |
| Technical/Program Mgt. Support      | 2,475              | 0                  | 0                  |
| Congressionally Directed Activities | 24,255             | 0                  | 0                  |
| <b>TOTAL</b>                        | <b>178,351</b>     | <b>166,024</b>     | <b>176,138</b>     |

Note: Program has been restructured in FY 2008. Activities indicated by "X" have been incorporated within other activity lines.

## Key Activities

- Increase emphasis on R&D for high energy storage batteries, power electronics/motors, and systems analysis/testing needed for plug-in hybrid electric vehicles.
- Consolidate engine research cooperative agreements for commercial vehicles and continue exploring advanced combustion regimes that have the potential for high efficiency and near-zero emissions.
- Expand activities to increase the deployment of non-petroleum based fuels.
- Focus waste heat energy recovery research on solid state thermoelectric devices.
- Focus materials research on advanced processing of lightweight structural materials and on using advanced tools for modeling of propulsion materials to develop cost-effective energy conversion/storage devices.



Program Focus: Research, develop, and validate fuel cell and hydrogen production, delivery, and storage technologies for transportation and stationary applications.

## Budget Request

Funding (\$ in thousands)

| Activity                             | FY 2006<br>Approp | FY 2007<br>Request | FY 2008<br>Request |
|--------------------------------------|-------------------|--------------------|--------------------|
| Hydrogen Production & Delivery       | 8,391             | 36,844             | 40,000             |
| Hydrogen Storage R&D                 | 26,040            | 34,620             | 43,900             |
| Fuel Cell Stack Component R&D        | 30,710            | 38,082             | 44,000             |
| Technology Validation                | 33,301            | 39,566             | 30,000             |
| Transportation Fuel Cell Systems     | 1,050             | 7,518              | 8,000              |
| Distributed Energy Fuel Cell Systems | 939               | 7,419              | 7,700              |
| Fuel Processor R&D                   | 637               | 4,056              | 3,000              |
| Safety and Codes and Standards       | 4,595             | 13,848             | 16,000             |
| Education                            | 481               | 1,978              | 3,900              |
| Systems Analysis                     | 4,787             | 9,892              | 11,500             |
| Manufacturing R&D                    | 0                 | 1,978              | 5,000              |
| Congressionally Directed Activities  | 42,520            | 0                  | 0                  |
| <b>TOTAL</b>                         | <b>153,451</b>    | <b>195,801</b>     | <b>213,000</b>     |

## Key Activities

- Increase emphasis of hydrogen production R&D in renewable technologies including bio-liquid reforming, biomass gasification, photoelectrochemical, high temperature thermochemical, and electrolysis technologies.
- Develop macro-system model of hydrogen fuel infrastructure to meet transportation needs.
- Develop high efficiency compressor and liquefaction technology for cost-effective hydrogen delivery.
- Ramp up hydrogen storage materials research and engineering science; demonstrate lab-scale regeneration of 40% energy efficiency for chemical hydrogen storage.
- Reduce 80kW vehicle fuel cell system cost to \$70/kW (high volume production) toward achieving 2010 goal of \$45/kW.
- Continue “learning demonstration” with auto & energy industry and validate 250-mile driving range.
- Improve electrical efficiency for natural gas/propane-fueled 5-250 kW stationary fuel cell system to 35% at full power.
- Publish a Best Practices Manual for hydrogen safety, an on-line resource detailing practices and lessons learned for the safe use of hydrogen.
- Initiate new end-user activities to support market transformation efforts. Expand training opportunities for emergency responders, code officials, and state and local government representatives.
- Initiate new manufacturing research to lower manufacturing costs of fuel cell and hydrogen technologies and create a competitive domestic supplier base.



# President's Hydrogen Fuel Initiative FreedomCAR Program

## Budget Request

| Funding (\$ in thousands) |                            |                    |                    |
|---------------------------|----------------------------|--------------------|--------------------|
| Activity                  | FY 2006<br>Approp          | FY 2007<br>Request | FY 2008<br>Request |
| Hydrogen Fuel Initiative  |                            |                    |                    |
| EERE Hydrogen             | 153,451                    | 195,801            | 213,000            |
| FE                        | 21,036                     | 23,611             | 12,450             |
| NE                        | 24,057                     | 18,665             | 22,600             |
| SC                        | 32,500                     | 50,000             | 59,500             |
| DOE TOTAL                 | 231,044                    | 288,077            | 307,550            |
| DOT                       | 1,411                      | 1,420              | 1,425              |
| HFI TOTAL                 | 232,455                    | 289,497            | 308,975            |
| FreedomCAR                |                            |                    |                    |
| EERE Fuel Cells           | Included in Hydrogen above |                    |                    |
| EERE Vehicles             | 96,549                     | 109,774            | 126,619            |
| FC-HFI TOTAL              | 329,004                    | 399,271            | 435,594            |

## Key Activities

- Ramp up R&D for breakthrough hydrogen storage materials and increase emphasis on engineering science on track towards meeting 2010 system targets (EERE).
- Increase hydrogen production R&D in renewable technologies including bio-liquid reforming, biomass gasification, photoelectrochemical, high temperature thermochemical, and electrolysis technologies (EERE).
- Increase manufacturing R&D, including fuel cell components. Continue fuel cell research to increase durability and reduce cost (EERE).
- Continue configuration studies for scaling up hydrogen membrane reactors and advanced CO<sub>2</sub>/H<sub>2</sub> separation technologies for coal-based hydrogen systems (FE).
- Operate integrated laboratory-scale sulfur-iodine thermochemical and high-temperature electrolysis experiments to gather data on operability and reaction rates (NE).
- Expand basic research on nanomaterials for hydrogen storage, catalysis for fuel cells, and bio-inspired and solar hydrogen production. Increase emphasis on nanostructured design, novel synthesis, and theory and modeling of the physical and chemical interactions of hydrogen with materials (SC).
- Develop national safety standards to enable the introduction of hydrogen-powered vehicles to the market (DOT).
- Ramp up research, development, and validation of plug-in hybrid electric vehicle technologies including promising lithium-ion battery chemistries (EERE).



**Program Focus:** Accelerate the widespread commercialization of clean solar energy technologies for utility and distributed generation to change the way we power our homes, businesses, and automobiles.

## Budget Request

Funding (\$ in thousands)

| Activity                            | FY 2006<br>Approp. | FY 2007<br>Request | FY 2008<br>Request |
|-------------------------------------|--------------------|--------------------|--------------------|
| Photovoltaic Energy Systems         | 58,802             | 139,472            | 137,304            |
| Concentrating Solar Power           | 7,284              | 8,900              | 9,000              |
| Solar Heating and Lighting          | 1,449              | 0                  | 2,000              |
| Congressionally Directed Activities | 14,256             | 0                  | 0                  |
| <b>TOTAL</b>                        | <b>81,791</b>      | <b>148,372</b>     | <b>148,304</b>     |

## Key Activities

- Technology Pathway Partnerships – fund Solar America Initiative (SAI) contracts designed to achieve solar cost competitiveness by 2015 through public-private partnerships with industry, universities, laboratories, and state groups.
- Market Transformation Activities – fund SAI contracts to minimize market barriers and seize market expansion opportunities.
- Advanced PV R&D – develop PV technologies with the potential for dramatic cost reductions beyond 2015 with performance and reliability improvements.
- Concentrating Solar Power R&D – expand research on thermal storage, provide technical support to industry projects, and develop next-generation concentrators, solar engines, and receivers.
- Zero Energy Homes – establish Solar Heating & Lighting R&D activities that support achieving zero energy homes.



**Program Focus:** Accelerate U.S. wind energy use by improving technology performance and reliability and overcoming market acceptance and electric power system integration barriers.

## Budget Request

Funding (\$ in thousands)

| Activity                            | FY 2006<br>Approp. | FY 2007<br>Request | FY 2008<br>Request |
|-------------------------------------|--------------------|--------------------|--------------------|
| Technology Viability                | 17,829             | 35,905             | 27,200             |
| Technology Application              | 7,634              | 7,914              | 12,869             |
| Congressionally Directed Activities | 12,870             | 0                  | 0                  |
| <b>TOTAL</b>                        | <b>38,333</b>      | <b>43,819</b>      | <b>40,069</b>      |

## Key Activities

- Work with the Office of Electricity Delivery and Energy Reliability on several studies aimed at expanding electricity transmission between remote wind resources and urban areas.
- Collaborate with NREL and external sponsors to initiate design and construction of a 70 meter wind turbine blade test facility.
- Establish a Federal interagency siting group to minimize regulatory delays on wind projects.
- Initiate an independent testing program through NREL to certify small wind turbines.
- Support SNL in forming wind turbine user groups to exchange maintenance and operation data capable of developing equipment reliability models.
- Facilitate the installation of more than 100 MW of wind in at least 25 States, up from 20 in 2007.



**Program Focus:** Develop and deploy technologies, tools, and standards for making residential and commercial buildings and appliances more energy-efficient, affordable, and better performing.

## Budget Request

Funding (\$ in thousands)

| Activity                                      | FY 2006<br>Approp. | FY 2007<br>Request | FY 2008<br>Request |
|-----------------------------------------------|--------------------|--------------------|--------------------|
| Residential Buildings Integration             | 14,858             | 19,700             | 19,700             |
| Commercial Buildings Integration              | 3,069              | 4,699              | 7,000              |
| Emerging Technologies                         | 32,289             | 32,756             | 32,756             |
| Technology Validation and Market Introduction | 0                  | 8,249              | 13,361             |
| Equipment Standards and Analysis              | 10,153             | 11,925             | 13,639             |
| Oil Heat Research for Residential Buildings   | 990                | 0                  | 0                  |
| Technical/Program Management Support          | 1,485              | 0                  | 0                  |
| Congressionally Directed Activities           | 5,346              | 0                  | 0                  |
| <b>TOTAL</b>                                  | <b>68,190</b>      | <b>77,329</b>      | <b>86,456</b>      |

## Key Activities

- Double the efficiency of fluorescent lighting technology by advancing organic and inorganic light emitting diodes (LEDs) with a focus on applied research that enables the industrial base to manufacture LEDs.
- Integrate renewable energy systems into highly efficient building designs and operations, the focus of which is design packages that enable residential buildings to use 40-50% less energy than current practice.
- Develop highly insulating and dynamic window technologies, and integrated attic-roof systems needed to achieve long term zero energy building goals.
- Clear the backlog of equipment standards and test procedures, and meet the statutory schedule for rulemakings for newly covered EPCACT 2005 products.
- Accelerate widespread adoption of efficient building technologies through expanded EnergyStar ratings for emerging technologies, promotion of advanced building efficiency codes, and public-private partnerships to advance efficient schools, hospitals, commercial lighting and home building.



**Program Focus:** Reduce the energy intensity of the U.S. industrial sector through a coordinated program of research and development, validation, and dissemination of energy efficiency technologies and operating practices.

## Budget Request

Funding (\$ in thousands)

| Activity                                | FY 2006<br>Approp. | FY 2007<br>Request | FY 2008<br>Request |
|-----------------------------------------|--------------------|--------------------|--------------------|
| Industries of the Future (Specific)     | 20,708             | 17,001             | 9,254              |
| Industries of the Future (Crosscutting) | 27,928             | 28,562             | 36,744             |
| Technical/Program Management Support    | 3,755              | 0                  | 0                  |
| Congressionally Directed Activities     | 3,465              | 0                  | 0                  |
| <b>TOTAL</b>                            | <b>55,856</b>      | <b>45,563</b>      | <b>45,998</b>      |

## Key Activities

- Continue “Save Energy Now” industrial energy saving assessments through the Best Practices’ activity to identify cost-effective energy savings as part of the Secretary of Energy’s “Easy Ways to Save Energy” campaign.
- Begin investment in transformational R&D activities in essential focus areas that cut across industries to dramatically lower energy consumption compared to conventional processes.
- Accelerate development and commercialization of ultrananocrystalline coating applications that will provide ultra-hard and low-friction surfaces across energy-intensive industries to reduce cost and improve reliability of critical process equipment.
- Accelerate development of a revolutionary electric-based technology for the aluminum melting process with potential to reduce energy use by one-half, while reducing emissions by more than 80%.
- Contribute to the Administration’s goal of training more engineers and scientists in the energy field through the Industrial Technologies Program effort of Industrial Assessment Centers (IAC).



# Weatherization and Intergovernmental Activities

**Program Focus:** Accelerate the market penetration of energy efficiency and renewable energy technologies and practices for state and local governments, weatherization agencies, Native American Tribal governments, and international partners.

## Budget Request

Funding (\$ in thousands)

| Activity                                 | FY 2006<br>Approp. | FY 2007<br>Request | FY 2008<br>Request |
|------------------------------------------|--------------------|--------------------|--------------------|
| Weatherization Assistance Program Grants | 242,550            | 164,198            | 144,000            |
| State Energy Program Grants              | 35,640             | 49,457             | 45,501             |
| State Energy Activities                  | 495                | 0                  | 0                  |
| Gateway Deployment                       | 25,400             | 0                  | 0                  |
| International Renewable Energy Program   | 3,871              | 2,473              | 0                  |
| Tribal Energy Activities                 | 3,960              | 3,957              | 2,957              |
| Renewable Energy Production Incentive    | 4,950              | 4,946              | 4,946              |
| Asia Pacific Partnership                 | 0                  | 0                  | 7,500              |
| <b>TOTAL</b>                             | <b>316,866</b>     | <b>225,031</b>     | <b>204,904</b>     |

## Key Activities

- Weatherize 54,599 homes at an energy savings of 1.6 trillion Btus annually.
- Provide States with grants and technical assistance to improve energy emergency preparedness and implement projects saving 10 trillion Btus annually.
- Support Tribal clean energy projects working towards goal of 100MW of electricity generated by 2010.
- Provide incentive payments for over 250 million kWh of electricity generated from renewables.
- Facilitate deployment of clean energy technologies in the growing Asia-Pacific market.



**Program Focus:** Reduce energy costs and environmental impacts of government by promoting energy efficiency, water conservation and renewable energy at Federal sites, including DOE.

## Budget Request

Funding (\$ in thousands)

| Activity                               | FY 2006<br>Approp. | FY 2007<br>Request | FY 2008<br>Request |
|----------------------------------------|--------------------|--------------------|--------------------|
| Project Financing                      | 6,759              | 5,935              | 7,935              |
| Technical Guidance and Assistance      | 7,642              | 6,519              | 6,519              |
| Planning, Reporting and Evaluation     | 2,574              | 2,473              | 2,337              |
| Departmental Energy Management Program | 1,999              | 1,979              | 0                  |
| <b>TOTAL</b>                           | <b>18,974</b>      | <b>16,906</b>      | <b>16,791</b>      |

## Key Activities

- Achieve between \$110 and \$160 million in private sector investment through Super ESPCs and/or UESCs, which will result in about 15 trillion Btus in energy saved over the lifecycle of the projects.
- Provide technical and design assistance at Federal facilities which will result in about 5 trillion Btus in lifecycle energy saved.
- Train Federal energy attendees in energy management best practices.
- Report and track alternative fuel use in Federal vehicle fleets.



**Program Focus:** Increase the domestic geothermal resource base and reduce the cost of heat and power through advanced technologies.

## Budget Request

Funding (\$ in thousands)

| Activity                               | FY 2006<br>Approp. | FY 2007<br>Request | FY 2008<br>Request |
|----------------------------------------|--------------------|--------------------|--------------------|
| Technology Development                 | 14,860             | 0                  | 0                  |
| Technology Application                 | 4,190              | 0                  | 0                  |
| Congressionally Directed<br>Activities | 3,712              | 0                  | 0                  |
| <b>TOTAL</b>                           | <b>22,762</b>      | <b>0</b>           | <b>0</b>           |

## Key Activities

- Complete final closeout of Geothermal Technologies program.



Program Focus: Develop cost-competitive technologies that enable the development of new and incremental hydropower capacity.

## Budget Request

Funding (\$ in thousands)

| Activity               | FY 2006<br>Approp. | FY 2007<br>Request | FY 2008<br>Request |
|------------------------|--------------------|--------------------|--------------------|
| Technology Viability   | 150                | 0                  | 0                  |
| Technology Application | 345                | 0                  | 0                  |
| <b>TOTAL</b>           | <b>495</b>         | <b>0</b>           | <b>0</b>           |

## Key Activities

- Complete final closeout of the Hydropower program.