



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

FY 2009 Budget Request

*Accelerating and Scaling Clean Energy Solutions
to Address Energy Security and Climate Change*

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Accelerating Clean Energy Solutions

We don't have problem solving going on today that is commensurate with the level and detail of problem identification — which we now have in spades. Our efforts today and onward need to be about implementation of solutions: well identified solutions, multipath solutions, parallel path solutions, trying what we must on a scale and at a pace that is consequential to the magnitude of the challenge.



Laying the Groundwork for the Energy Independence and Security Act of 2007

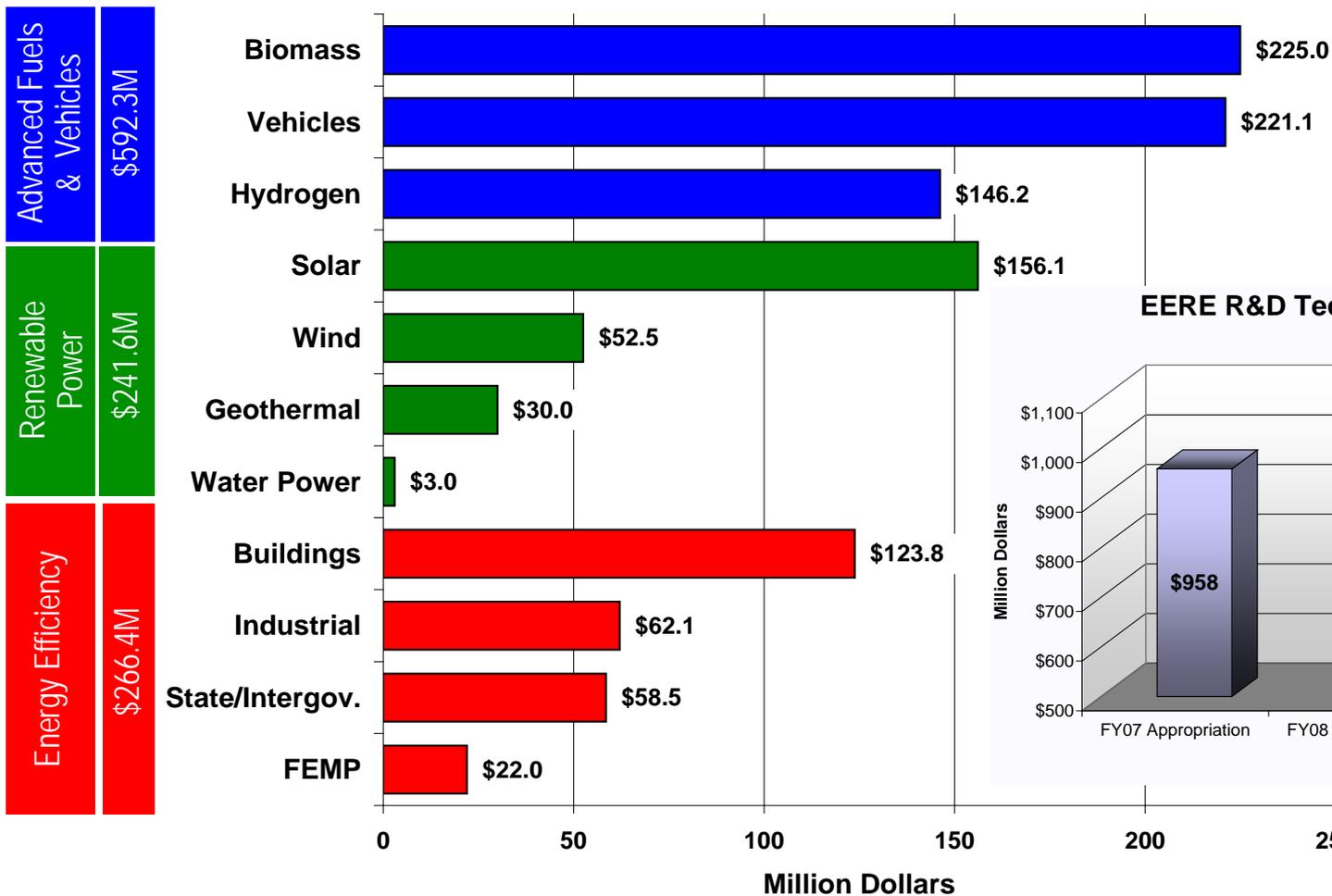


- New mandates are unprecedented in size, scope and timeframe.
 - Increases our energy security
 - Diversifies our energy systems
 - Makes America stronger, safer and cleaner for future generations.
- Responds to the President's "Twenty in Ten" challenge to reduce oil consumption in a decade:
 - Increases CAFE by 4% per year to 35 mpg for all passenger automobiles, including light trucks, by 2020;
 - Replaces 36 billion gallons of gasoline with renewable fuel by 2022, including 16 billion gallons of cellulosic ethanol.
- Supports U.S. positions on climate change underscoring the critical global role of clean energy technologies in reducing greenhouse gas emissions with nationally appropriate, environmentally effective, and economically sustainable ambitious sectoral plans.

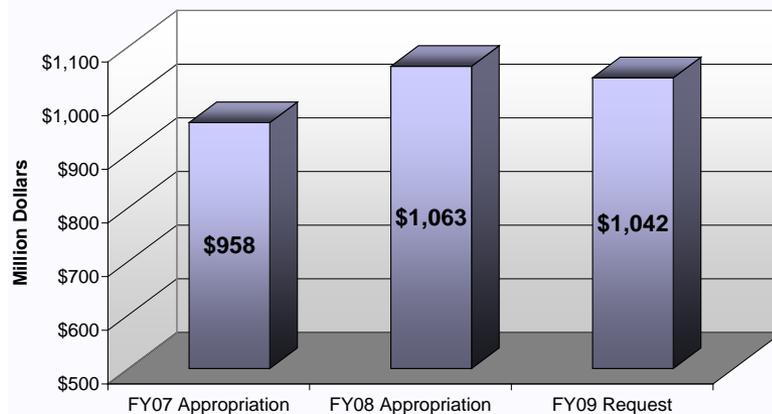


Diverse Portfolio of Solutions

Fiscal Year 2009 Request



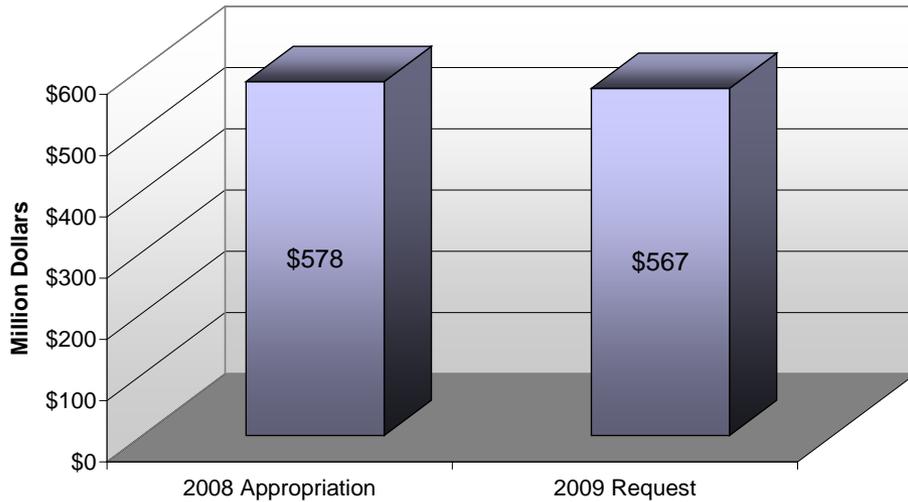
EERE R&D Technology Budgets



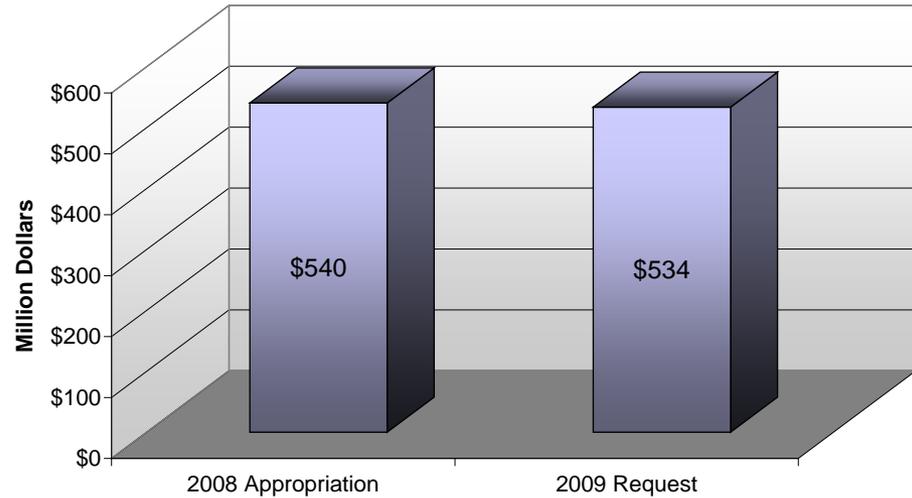


Balanced EE and RE Solutions

Energy Efficiency RD&D Technology Budgets



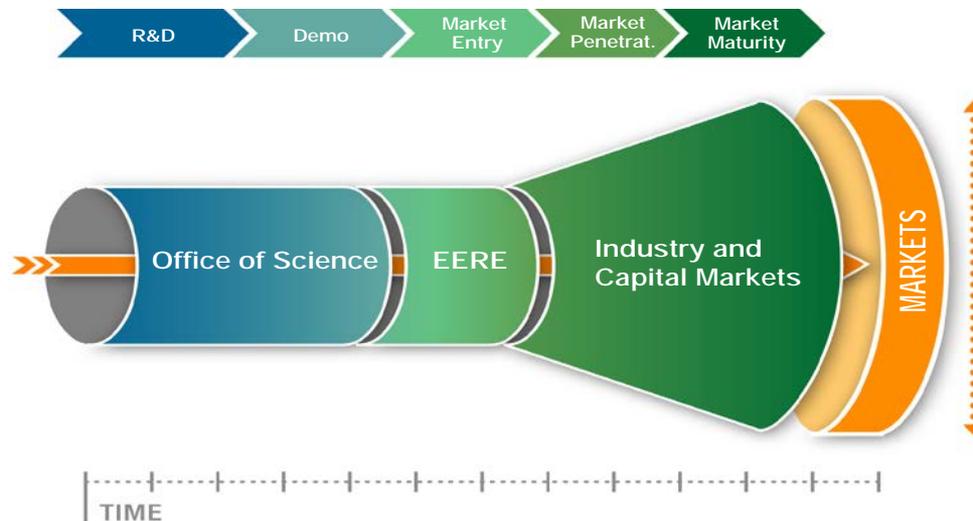
Renewable Energy RD&D Technology Budgets





Leveraging Capital and Markets

- DOE's FY09 budget is \$1.2 billion for critical energy technologies.
- Venture capital investment in new energy technology companies was \$2.6 billion in 2007.*
- EPACT's DOE Loan Guarantee Program commits \$10 billion for advanced and innovative clean energy technology from the \$38.5 billion appropriation for 2008-2009.
- Market clean energy project investment was nearly \$12 billion in 2007.*



* Source: New Energy Finance Investment Database: www.newenergymatters.com



Advanced Fuels and Vehicles Solutions

- Advancing essential RD&D projects to achieve cost competitive, commercial scale cellulosic ethanol production by 2012, to meet the Renewable Fuels Standard in the Energy Independence and Security Act.
- Accelerating RD&D on lithium-ion batteries, plug-in hybrids, and drive-train electrification to diversify and make our nation's vehicles more efficient to reduce petroleum dependency.
- Continuing to research and develop critical hydrogen technologies that enable near-term commercialization pathways.
- Consolidation of technology validation for fuel infrastructure and vehicle testing; safety and codes & standards; and supporting education activities to accelerate the full portfolio of fuel and vehicle solutions to the market.



Renewable Power Solutions

- Accelerating high penetration of wind and solar power by addressing the key integration and inter-connection challenges of intermittency and variability.*
- Fostering greater dispatchability and response for wind and solar by developing and evaluating energy storage solutions.**
- Enabling wind power to produce up to 20% of the Nation's electricity by improving the performance of turbines, blades, and related components.
- Continuing Solar America Initiative to lower cost of photovoltaics to reach unsubsidized grid parity by 2015.
- Establishing demonstration sites for Enhanced Geothermal Systems and evaluating reservoir creation techniques.
- Benchmark testing of leading ocean, wave, and tidal technologies.

*(Cooperative programming with Office of Electricity Delivery and Energy Reliability (OE))

** (Joint program with OE and Office of Science)



Efficiency Solutions – Buildings

- Transforming the carbon footprint of the built environment through zero energy buildings.
 - Continuing fundamental and applied R&D for enabling technologies, such as solid state lighting and advanced windows;
 - Accelerating and elevating codes and appliance standards;
 - Expanding and modernizing ENERGYSTAR[®] program; and
 - Targeting the civic infrastructure (e.g., schools, hospitals, libraries, municipal facilities) to invest in Energy Smart solutions.



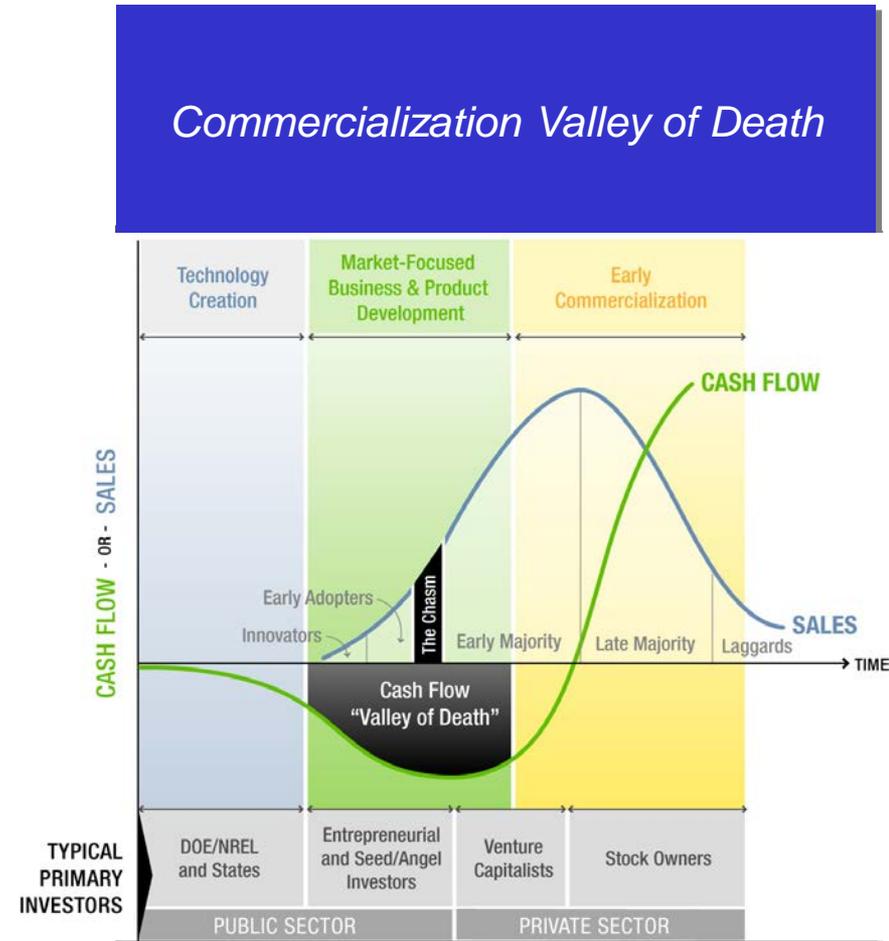
Efficiency Solutions – Industry

- Driving a 25% reduction in U.S. industrial energy intensity by 2017 in support of the EPCACT 2005 and achieve at least an 18% reduction in U.S. carbon intensity by 2012.
 - Developing advanced manufacturing processes for energy-intensive industries such as iron and steel that can reduce energy intensity by 2.5% a year.
 - Developing clean and efficient crosscutting technologies applicable for manufacturing industries such as food, information technology, and fabricated metals;
 - Conducting Save Energy Now plant assessments and leveraging State resources to increase program impact; and
 - Expanding partnerships with leading corporations across major manufacturing supply chains to enable dramatic energy savings.



Deployment Solutions

- Stimulating market transformation
 - Optimizing the nexus between public sector and capital markets; and
 - Alleviating the “first-investor disadvantage.”
- Facilitating capital formation
 - DOE Loan Guarantee Program;
 - Energy Saving Performance Contracts (ESPCs);
 - Utility Energy Services Contracts (UESCs).
 - Renewable Energy Certificates Standardization;
 - Technology Commercialization & Deployment Fund; and
 - EERE Venture Capital Technology Showcases.
- Investing in education and outreach:
 - Targeting multi-generational audiences; and
 - Utilizing modern multi-media.





Summary of FY09 Request

- Balanced and diverse portfolio of solutions to address the energy and environmental challenges facing us today by:
 - Researching and developing renewable energy technologies to dramatically increase the amount of clean energy produced in the U.S.;
 - Advancing energy efficiency technologies and practices to sustainably decouple energy demand from economic growth; and
 - Strengthening commercialization and deployment to support rapid adoption by private industry of clean energy technologies.
- Concludes Weatherization Assistance Program to focus on EERE's diverse portfolio of advanced energy efficiency and renewable energy technology R&D essential to addressing national energy security and climate change priorities.



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

EERE Program Details

FY 2009 Budget Request



EERE FY09 Budget Request

	Funding (\$ in thousands)				
Energy Efficiency and Renewable Energy	FY 2007	FY 2008	FY 2009	Change	% Change
Programs:	Appropriation	Appropriation	Request	FY08 to FY09	
Biomass and Biorefinery Systems R&D	196,277	198,180	225,000	+26,820	13.5%
Building Technologies	102,983	108,999	123,765	+14,766	13.5%
Federal Energy Management Program	19,480	19,818	22,000	+2,182	11.0%
Geothermal Technology	5,000	19,818	30,000	+10,182	51.4%
Hydrogen Technology	189,511	211,062	146,213	-64,849	-30.7%
Industrial Technologies	55,763	64,408	62,119	-2,289	-3.6%
Solar Energy	157,028	168,453	156,120	-12,333	-7.3%
Vehicle Technologies	183,580	213,043	221,086	+8,043	3.8%
Water Power	0	9,909	3,000	-6,909	-69.7%
Wind Energy	48,659	49,545	52,500	+2,955	6.0%
Subtotal, Programs	958,281	1,063,235	1,041,803	-21,432	-2.0%
State and Other Supporting Activities:					
Weatherization and Intergovernmental Activities	281,731	282,217	58,500	-223,717	-79.3%
Facilities and Infrastructure	107,035	76,176	13,982	-62,194	-81.6%
Program Direction	99,264	104,057	121,846	+17,789	17.1%
Program Support	10,930	10,801	20,000	+9,199	85.2%
Congressionally-Directed Activities	0	186,664	0	-186,664	-100.0%
Adjustments	0	-743	-738	+5	-0.7%
Subtotal, State and Other Supporting Activities:	498,960	659,172	213,590	-445,582	-67.6%
Total, Energy Efficiency and Renewable Energy	1,457,241	1,722,407	1,255,393	-467,014	-27.1%



EERE FY08 Budget Request vs FY08 Appropriation

Energy Efficiency and Renewable Energy	Funding (\$ in thousands)			
	FY 2008 Request	FY 2008 Appropriation	FY08 Request vs FY08 Appropriation	% Change
Programs:				
Biomass and Biorefinery Systems R&D	179,263	198,180	+18,917	10.6%
Building Technologies	86,456	108,999	+22,543	26.1%
Federal Energy Management Program	16,791	19,818	+3,027	18.0%
Geothermal Technology	0	19,818	+19,818	na
Hydrogen Technology	213,000	211,062	-1,938	-0.9%
Industrial Technologies	45,998	64,408	+18,410	40.0%
Solar Energy	148,304	168,453	+20,149	13.6%
Vehicle Technologies	176,138	213,043	+36,905	21.0%
Water Power	0	9,909	+9,909	na
Wind Energy	40,069	49,545	+9,476	23.6%
Subtotal, Programs	906,019	1,063,235	+157,216	17.4%
State and Other Supporting Activities:				
Weatherization and Intergovernmental Activities	204,904	282,217	+77,313	37.7%
Facilities and Infrastructure	6,982	76,176	+69,194	991.0%
Program Direction	105,013	104,057	-956	-0.9%
Program Support	13,281	10,801	-2,480	-18.7%
Congressionally-Directed Activities	0	186,664	+186,664	na
Adjustments	0	-743	-743	na
Subtotal, State and Other Supporting Activities:	330,180	659,172	+328,992	99.6%
Total, Energy Efficiency and Renewable Energy	1,236,199	1,722,407	+486,208	39.3%



Program Focus: In support of the AEI goal to make cellulosic ethanol cost competitive by 2012, the Program will conduct research, development, and demonstration activities that improve the economic viability and environmental sustainability of integrated biorefineries.

Budget Request

Funding (\$ in thousands)

Activity	FY 2007 Approp.	FY 2008 Approp.	FY 2009 Request
Feedstock Infrastructure	9,725	12,386	15,500
Platforms R&D	49,306	67,282	53,400
Utilization of Platform Outputs R&D	137,246	113,557	156,100
Cellulosic Ethanol Reverse Auction	0	4,955	0
TOTAL	196,277	198,180	225,000

EISA codified the President's "Twenty in Ten" proposal, requiring 36 billion gallons per year of Biofuels by 2022

Year	Total	Conventional	Cellulosic
2010	13.0	12.0	0.1
2017	24.0	15.0	5.5
2022	36.0	15.0	16.0

Key Activities

- Develop detailed engineering designs and initiate construction for commercial scale biorefineries resulting in initial operation commencing by 2011.
- Approve preliminary engineering design packages for 10% of commercial scale biorefineries (6-10 estimated).
- Integrate alternative pretreatment and advanced enzyme technologies at bench-scale in support of making cellulosic ethanol cost competitive by 2012 (AEI).
- Validate thermochemical conversion technologies that produce clean synthesis gas or oil suitable for fuels production in support of making cellulosic ethanol cost competitive by 2012 (AEI).
- Develop integrated feedstock logistics prototype equipment (e.g. harvesting, collection, and storage systems) and cost data at industrial scale.
- Initiate a GIS-based bioenergy decision support tool providing biomass resource information to a wide variety of users to accelerate biorefinery development.
- Complete initial testing on intermediate blends of ethanol with the Vehicle Technologies Program and other agencies.
- Assess potential and R&D needs of other biofuels that will contribute to the EISA RFS goal.



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 2007 Approp.	FY 2008 Approp.	FY 2009 Request
Residential Buildings Integration	17,270	24,475	26,900
Commercial Buildings Integration	8,699	11,891	13,000
Emerging Technologies	41,840	37,413	39,465
Technology Validation and Market Introduction	18,249	13,239	24,400
Equipment Standards and Analysis	16,925	21,981	20,000
TOTAL	102,983	108,999	123,765

Key Activities

- Develop and deploy advanced organic and inorganic light emitting diodes (LEDs) with more than double the efficiency of compact fluorescents.
- Advance highly efficient building designs and operations through design packages that enable buildings to use 40-50% less energy and integrate on-site renewable energy.
- Develop highly insulating and dynamic window technologies, and integrated attic-roof systems needed to achieve long term zero energy building goals.
- Meet all statutory requirements for equipment standards and test procedures and accelerate voluntary consensus standards development.
- Accelerate widespread adoption of efficient building technologies through an expanded and modernized ENERGYSTAR® portfolio, promotion of model building efficiency codes, and public-private partnerships to advance efficient homes, schools, commercial lighting and buildings.



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

Budget Request

Funding (\$ in thousands)

Activity	FY 2007 Approp.	FY 2008 Approp.	FY 2009 Request
Project Financing	8,509	8,606	8,000
Technical Guidance and Assistance	6,519	8,153	4,000
Planning, Reporting and Evaluation	2,473	3,059	2,000
Departmental Energy Management Program	1,979	0	0
Federal Fleet	0	0	2,000
DOE Specific Investment	0	0	6,000
TOTAL	19,480	19,818	22,000

Key Activities

- Through the Secretary's Transformational Energy Action Management (TEAM) initiative, redefine the Department's directives and policies to meet, exceed and lead in the implementation of Executive Order 13423 goals throughout the Departmental complex.
- Secure over \$300 million in private sector investment through Super ESPCs and/or UESCs, which will result in approximately 1.6 million metric tons carbon equivalent saved over the lifecycle of the projects.
- Provide technical and design assistance at Federal facilities which will result in about 7 trillion Btus in lifecycle energy saved.
- Partner with private sector alternative fuel providers to expand refueling stations at high priority Federal sites. Accelerate acquisition of alternative fuel vehicles to meet Executive Order requirements.
- Collect, verify and report on Federal agency progress toward goals of energy efficiency and renewable energy use.



Program Focus: Increase the domestic geothermal resource base and reduce the cost of heat and power through development of Enhanced Geothermal Systems (EGS) technologies.

Budget Request

Funding (\$ in thousands)

Activity	FY 2007 Approp.	FY 2008 Approp.	FY 2009 Request
Enhanced Geothermal Systems	2,000	19,818	30,000
Oil and Gas Well Co-Production and Resource Assessment	3,000	0	0
TOTAL	5,000	19,818	30,000

Note: A number of technologies intended for EGS also have applicability to hydrothermal resources. The program will work cooperatively with Office of Science and Office of Fossil Energy on technology development of mutual interest.

Background: In FY 2008 the Program was re-focused to concentrate on Enhanced Geothermal Systems, which are engineered reservoirs created to produce energy from geothermal resources deficient in economical amounts of water and/or permeability.

Key Activities

- Demonstrate first generation geothermal well stimulation at the Desert Peak, Nevada field site (EISA Section 615)
 - Evaluate stimulation methods and models
 - Use tracer tests to evaluate flow
- Initiate two to four cost-shared EGS demonstration projects in various geological settings
- Initiate critical EGS R&D for fracture detection, zonal isolation, and high temperature tools and sensors
- Upgrade hydrothermal cost and reservoir models to EGS applications
- Develop an advanced data center for exploration risk mitigation



Program Focus: Research and develop hydrogen storage and fuel cell technologies to enable technology readiness in 2015 for transportation and clean, reliable energy from stationary and portable power applications.

Budget Request

Funding (\$ in thousands)

Activity	FY 2007 Approp	FY 2008 Approp.	FY 2009 Request
Hydrogen Production & Delivery	33,702	39,636	0
Hydrogen Storage R&D	33,728	43,501	59,200
Fuel Cell Stack Component R&D	37,100	43,600	62,700
Technology Validation*	39,413	29,727	0
Transportation Fuel Cell Systems	7,324	7,927	6,600
Distributed Energy Fuel Cell Systems	7,257	7,630	10,000
Fuel Processor R&D	3,952	2,973	0
Safety and Codes and Standards*	13,492	15,854	0
Education*	1,978	3,865	0
Systems Analysis	9,637	11,395	7,713
Manufacturing R&D	1,928	4,954	0
TOTAL	189,511	211,062	146,213

*Transferred \$31,500 to EERE Vehicle Technologies Program- Technology Validation

Key Activities

- Accelerate fuel cell component research to reduce the high volume production cost of an automotive fuel cell system to \$60/kW in 2009 while increasing durability. Builds on major accomplishment of reducing fuel cell cost from \$275/kW in 2002 to \$70/kW planned in 2008.
- Develop breakthrough storage materials and system designs to achieve the 2010 system target of 6% hydrogen by weight.
- Improve electrical efficiency of natural gas or propane fueled 5-250 kW stationary fuel cell systems to 36% at full power and initiate small-scale, stationary solid-oxide fuel cell projects.
- Complete a macro-system model of the fuel infrastructure and analyze the well-to-wheels hydrogen costs and greenhouse gas emissions profiles for various hydrogen pathways.
- Budget request will maintain critical path program R&D.
- Transfer of Technology Validation; Safety and Codes & Standards; and Education to Vehicle Technologies enables operational synergies with full fuel and vehicle portfolio.



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 2007 Approp.	FY 2008 Approp.	FY 2009 Request
Industries of the Future (Specific)	16,585	11,245	11,392
Industries of the Future (Crosscutting)	39,178	53,163	50,727
TOTAL	55,763	64,408	62,119

Key Activities

- Continue "Save Energy Now" industrial plant assessments to identify cost-effective energy savings as part of the Secretary of Energy's "Easy Ways to Save Energy" campaign.
- Implement voluntary agreements with industry as directed by EPACT 2005 to reduce industrial energy intensity 2.5% annually .
- Accelerate development of an advanced iron-making process that eliminates the use of coke or natural gas as feedstocks.
- Conduct field trial of ultra-high efficiency watertube Superboiler capable of producing high temperature and pressure steam.
- Develop advanced reciprocating engines and energy efficient Cooling Heating and Power systems (<20 MW) for medium-sized industrial plants and high-growth commercial applications.
- Contribute to the Administration's goal of training more engineers and scientists in the energy field through the Industrial Assessment Centers (IACs) activity.



Program Focus: Provide executive and technical direction, oversight, analysis, and communications outreach for the implementation of EERE programs; provide for facilities operation and maintenance and construction/site development at NREL.

Budget Request

Funding (\$ in thousands)

Activity	FY 2007 Approp.	FY 2008 Approp.	FY 2009 Request
Program Direction	99,264	104,057	121,846
Program Support	10,930	10,801	20,000
Facilities and Infrastructure	107,035	76,176	13,982

Key Activities

- **Program Direction** provides personnel and operational resources for executive and technical direction and oversight for the EERE technology programs at Headquarters and the Field Project Management Center. The increase in FY 2009 funds mandatory pay increases, addresses critical-skill staffing shortfalls and increases support for mission-essential DOE and EERE business management systems
- **Program Support** provides for corporate analyses, portfolio performance assessment, and strategic planning; measurement and strategic direction, and for technology advancement and outreach. The FY 2009 increase expands EERE's market transformation analysis, including support for EPACT 2005 reporting requirements and the Energy Efficiency Public Information Initiative.
- **Facilities and Infrastructure** activity enables the acquisition and maintenance of scientific capabilities and support infrastructure at the National Renewable Energy Laboratory. The request provides for an increase for facilities operation, maintenance, and general capital equipment replacement as well as remaining funds needed to complete Phase I construction of the Energy Systems Integration Facility



Program Focus: Sustain President's Solar America Initiative for achieving PV cost competitiveness by 2015 and promote CSP with a focus on thermal storage concepts.

Budget Request

Funding (\$ in thousands)

Activity	FY 2007 Approp.	FY 2008 Approp.	FY 2009 Request
Photovoltaic Energy Systems	138,372	136,744	137,120
Concentrating Solar Power	15,696	29,727	19,000*
Solar Heating and Lighting	2,960	1,982	0**
TOTAL	157,028	168,453	156,120

Background:

* CSP system and component contracts will undergo a down-select at the beginning of FY2009.

** Solar Heating and Lighting was transferred to the Building Energy Technologies Program in FY2008

Key Activities

- Fund the 11 Solar America Initiative multi-year system level contracts designed to achieve solar cost range of \$0.12 to \$0.20/kWh in 2009 (depending on technology) and grid parity by 2015.
- Develop next generation processes and devices with 25 companies & universities to develop technologies that can lower the cost of PV beyond 2015.
- Address critical issues related to PV grid interconnection including advanced inverter development and improving grid reliability and power quality.
- Complete 13 Solar America Cities projects to minimize local market barriers, assist industry in developing PV codes and standards, and promote nationwide education and training of solar workforce through local colleges and universities.
- Begin Phase II of advanced CSP system industry contracts begun in 2008 and work with industry to develop and evaluate next generation thermal storage concepts.



Program Focus: Enable reductions in petroleum use and vehicle emissions through R&D to improve the energy efficiency and fuel-diversity of cars and trucks.

Budget Request

Funding (\$ in thousands)

Activity	FY 2007 Approp.	FY 2008 Approp.	FY 2009 Request
Hybrid Electric Systems	0	94,135	103,361
Vehicle Systems (X)	13,006	0	0
Hybrid and Electric Propulsion (X)	59,240	0	0
Advanced Combustion Engine R&D	48,346	44,591	33,600
Materials Technology	29,044	39,636	36,903
Fuels Technology	18,413	17,836	16,122
Technology Integration	0	16,845	31,100
Innovative Concepts (X)	500	0	0
Technology Introduction (X)	15,031	0	0
TOTAL	183,580	213,043	221,086

Note: Program restructured in FY 2008. "X" indicates activities incorporated in other lines.

Key Activities

- Increase R&D for plug-in hybrid electric vehicle (PHEV) technologies – high energy batteries, vehicle demonstration & testing, and power electronics & motors – through an expanded FreedomCAR and Fuels Partnership.
- Prioritize biofuels R&D (E85, biodiesel, etc.) to address engine efficiency optimization, performance, and high-level blends for accelerated market transformation.
- Integrate all Technology Validation, Safety and Codes & Standards; and Education to enable operational synergies with full fuel and vehicle portfolio, including “learning demonstrations”
- Support innovative R&D efforts, such as Automotive X-Prize, and implement EcoCAR: the Next Challenge (successor to Challenge X) – a three-year competition among North American university teams to design, build and demonstrate leading-edge vehicles.



Program Focus: Enable the development and deployment of water power technologies that will increase water-based electric generation in the United States.

Budget Request

Funding (\$ in thousands)

Activity	FY 2007 Approp.	FY 2008 Approp.	FY 2009 Request
Water Power	0	9,909	3,000

Key Activities

- Complete technology assessments/characterizations
- Continue testing a variety of river-based, wave, and ocean technologies for performance, reliability, and economics
- Continue to engage in key collaborative activities with other organizations, including international energy organizations

Activities Initiated in FY08:

- Expand and confirm initial estimates of U.S. water resources
- Initiate technology characterizations to identify relevant technical and market variables and most promising technologies for benchmark testing
- Continue key collaborative international activities on technology standards, research and development, and establishment of regulatory frameworks



Weatherization and Intergovernmental Activities

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

Budget Request

Funding (\$ in thousands)

Activity	FY 2007 Approp.	FY 2008 Approp.	FY 2009 Request
Weatherization Assistance Program Grants	204,550	227,222	0
State Energy Program Grants	49,457	44,095	50,000
State Energy Activities	9,348	0	0
International Renewable Energy Program	9,473	0	0
Tribal Energy Activities	3,957	5,945	1,000
Renewable Energy Production Incentive	4,946	4,955	0
Asia Pacific Partnership	0	0	7,500
TOTAL	281,731	282,217	58,500

Key Activities

- Support state, local, and utility energy projects, programs, and policies. Results in annual energy saving impact of 6 trillion Btus. Implementing clean energy initiatives and EPACT 2005 provisions is the FY 2009 priority.
- Encourage clean energy project planning and construction on Native American Tribal land. FY 2009 priority: develop prototype investment contracts.
- Facilitate deployment of clean energy technologies in the growing Asia-Pacific region. FY 2009 priority: modify proven analysis and planning tools for use in Asian countries.
- Concludes Weatherization Assistance Program to focus on advanced energy efficiency and renewable energy technology R&D which is essential for addressing national energy security and climate change priorities
- Concludes the Renewable Energy Production Incentive; payments are no longer sufficiently meaningful to stimulate increased renewable energy installation.



Program Focus: In support of the Advanced Energy Initiative, continue technology development to reduce costs and improve Storage, Transmission integration, Operability, and Reliability and dispatchability (STOR) of wind power. Conduct market transformation activities to achieve potential of wind providing 20% of the Nation's electricity.

Budget Request

Funding (\$ in thousands)

Activity	FY 2007 Approp.	FY 2008 Approp.	FY 2009 Request
Technology Viability	30,589	26,952	31,000
Technology Application	18,070	22,593	21,500
TOTAL	48,659	49,545	52,500

Key Activities

Improve the cost, performance, and reliability of land-based wind technologies:

- Perform detailed testing and analysis of drive trains and blades
- Install utility scale turbines at NWTC for field testing of control logic enhancements
- Support design and construction of large wind turbine blade test facilities in Massachusetts and Texas
- Advance small wind system performance through independent testing and certification
- Launch public-private partnerships to develop mid-size turbine

Accelerate the market penetration and interconnection of gigawatt-level wind and other renewables into the national electric power system:

- Develop wind integration system models for electric system operators and planners
- Develop new storage systems (mechanical, electrochemical, chemical, etc.) and test under real-world conditions
- Demonstrate and operate the integration of large scale storage with wind sites while implementing new controls/interconnection strategies to yield greater reliability and dispatchability
- Establish centralized source of technical information on wind energy interconnection