Energy Efficiency and Renewable Energy

Office of Energy Efficiency and Renewable Energy

Overview

Appropriation Summary by Program

(dollars in thousands)

	FY 2009 Current Appropriation[a]	FY 2009 Current Recovery Act Appropriation	FY 2010 Current Appropriation	FY 2011 Request
Energy Efficiency and Renewable Energy				
Hydrogen and Fuel Cell Technologies	164,638	42,967	174,000	137,000
Biomass and Biorefinery Systems R&D	214,245	777,138[b]	220,000	220,000
Solar Energy	172,414	115,963	247,000	302,398
Wind Energy	54,370	106,932	80,000	122,500
Geothermal Technology	43,322	393,106	44,000	55,000
Water Power	39,082	31,667	50,000	40,488
Vehicle Technologies	267,143	109,249	311,365	325,302
Building Technologies	138,113	319,186	222,000	230,698
Industrial Technologies	88,196	212,854	96,000	100,000
Federal Energy Management Program	22,000	22,388	32,000	42,272
RE-ENERGYSE	0	0	0	50,000
Facilities and Infrastructure	76,000	258,920[b]	19,000	57,500
Weatherization and Intergovernmental Activities	516,000[c]	11,544,500	270,000	385,000
Program Direction	127,620	80,000[d]	140,000	200,008
Program Support	18,157	21,890	45,000	87,307
Congressionally Directed	228,803	0	292,135	0
Advanced Battery Manufacturing	0	1,990,000	0	0
Alternative Fueled Vehicles	0	298,500	0	0
Transportation Electrification	0	398,000	0	0
Information and Communication Efficiency	0	48,647	0	0
Subtotal, Energy Efficiency and Renewable Energy	2,170,103	16,771,907	2,242,500	2,355,473

[a] SBIR/STTR funding transferred in FY 2009 was $19,327,840 for the SBIR program and $2,347,160 for the STTR program.
[b] Facilities and Infrastructure includes $13.5 million for the Integrated Biorefinery Research Facility.
[c] Includes $250.0 million in emergency funding for the Weatherization Assistance Grants program provided by P.L. 111-6, "The Continuing Appropriations Resolution, 2009."
[d] Does not include $4.0 million transfer to Departmental Administration

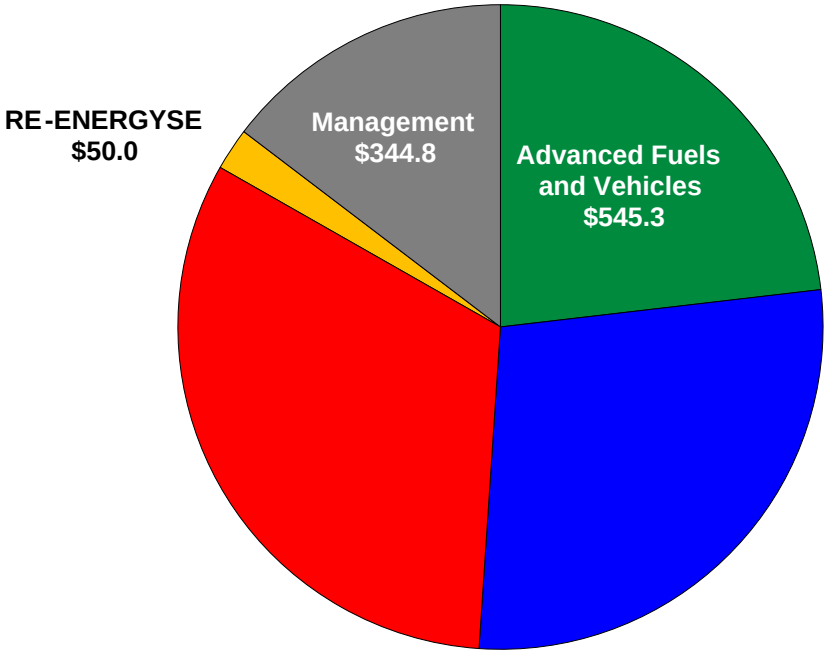
(dollars in thousands)

	FY 2009 Current Appropriation[a]	FY 2009 Current Recovery Act Appropriation	FY 2010 Current Appropriation	FY 2011 Request
Use Of Prior Year Balances	-13,238	0	0	0
Total, Energy Efficiency and Renewable Energy	2,156,865	16,771,907	2,242,500	2,355,473

Preface

The Office of Energy Efficiency and Renewable Energy (EERE) requests $2.4 billion in FY 2011. EERE's research, development, demonstration, and deployment (RDD&D) activities are critical to meeting the Nation's goals of sustaining strong economic growth and job creation while dramatically reducing greenhouse gas (GHG) emissions and energy imports. EERE programs provide a vital link between advances in basic research and the creation of commercially successful products and services. EERE does this by supporting strategic applied research and development projects, and identifying ways that national policies can create strong markets for innovations that can be deployed into widespread use by commercial enterprises, creating new businesses and jobs. Among other goals, the budget is designed to ensure that accelerated projects funded by the Recovery Act are sustained by private investment.

FY 2011 Request by Major Energy Categories
$2,355.5



The FY 2011 portfolio is aimed at accelerating revolutionary change in the Nation's energy economy through four distinct technical areas that will drive productivity advances in industry that can sharply increase profits while slashing demand for fuels and electricity. First, it will achieve rapid gains in the efficient use of energy. This means identifying cost-effective new building designs that can reduce commercial and residential energy use by at least a factor of two in the next five years (compared to existing structures and enabling a vigorous building energy retrofit industry capable of providing comprehensive energy retrofits for the Nation's buildings in the next 15 years. This will be achieved through major national programs in codes, standards, labeling, and innovative financing.

Second, it means shifting to a portfolio of new transportation technologies based on electricity, renewable fuels, and advanced technologies that can decouple the U.S. vehicle fleet from fossil fuels.

Third, EERE will achieve rapid growth in renewable energy supplies using biomass, wind, solar, geothermal, water power, fuel cells, and other energy resources to produce competitive sources of fuels and electricity through carefully targeted basic and applied research, demonstrations in partnership with industry, and investments that can lead to the installation of key infrastructure and facilitate permitting and acquisition of rights of way. Energy storage systems will be an important part of this investment.

In addition DOE's RE-ENERGYSE program will reinvigorate the investment in education at all levels to support the next generation of scientists and engineers that are needed to address the country's energy challenges.

EERE's budget will ensure robust, transparent, and accountable program management and support functions that will efficiently and effectively execute and inform this organization's critical mission.

EERE's organizational objectives will be achieved through a rigorous national program in: applied R&D; industry leading codes, standards and labeling; and innovative commercialization, financing and industry partnership models. EERE will work closely with DOE's Office of Science and the Advanced Research Projects Agency – Energy (ARPA-E) to ensure that cutting edge technology innovations are accelerated into the commercial marketplace.

Key FY 2011 investments include activities which:

- Demonstrate that renewable energy can be provided at a large scale and built quickly. This will include the following large scale demonstration programs:
    - Large Scale Biopower - Commercial use of biopower from cellulosic feedstocks at a scale that will validate the potential of biopower, cost sharing with private sector, and aligning with the DOE loan guarantee program;
    - Concentrating Solar Power (CSP) Initiative - More than one GW of CSP in a single cluster; and
    - Offshore Wind Initiative - Support at least one large-scale offshore wind project in the U.S., and build or expand on areas currently targeted for deployment by developers.
- Educate and train the workforce for the new energy economy. Building on infrastructure created by Recovery Act investments, EERE will continue to expand the scope and quality of training programs for green jobs in all efficiency and renewable program areas. It will also include initial investments in education programs that will ensure a continued flow of the skilled researchers, engineering teams, and field workers that will be needed to take the jobs created by rapidly growing investment in efficiency and renewable technologies.
- Ensure that all Federal buildings, transportation fleets, and other facilities operate with investments in energy efficiency and renewable energy that provide the greatest benefits to the taxpayer.
- Build upon Recovery Act investment to enable cost-effective retrofits for all homes, commercial, and government buildings. This will be achieved through a carefully crafted program of advanced building components and whole building designs, partnerships with major financial institutions to facilitate energy efficient mortgages, a clearly understood energy labeling system that will ensure efficient markets for energy efficiency, and innovative financial initiatives by cities. EERE will also help design model building energy codes that can drive rapid increases in the efficiency of new buildings.
- Transform the Nation's highway transportation system, including support for competing investments in renewable liquid fuels, hybrid electric and all-electric vehicles, and fuel cells as components of a strategy that will allow markets to shape the ultimate outcome.
- Drive continuous reductions in the price of wind and solar power, making them fully competitive with other energy sources on an aggressive schedule.
- Produce commercially viable biomass and bioproducts from diverse resources, and convert these materials into competitively priced fuels, electricity, and chemical feedstocks.

Within the Energy Efficiency and Renewable Energy Appropriation EERE has 15 programs in FY 2011: Hydrogen and Fuel Cell Technologies (6 subprograms), Biomass and Biorefinery Systems R&D (3 subprograms), Solar Energy (5 subprograms), Wind Energy (2 subprograms), Geothermal Energy (1

subprogram), Water Power (1 subprogram), Vehicle Technologies (6 subprograms), Building Technologies (5 subprograms), Industrial Technologies (2 subprograms), Federal Energy Management Program (5 subprograms), RE-ENERGYSE (2 subprograms), Facilities and Infrastructure (1 subprogram), Weatherization and Intergovernmental Activities (3 subprograms), Program Direction (4 subprograms), and Program Support (5 subprograms).

Mission

The mission of EERE is to undertake RDD&D activities that advance technologies and related practices to help meet the growing global demand for clean, reliable, sustainable, and affordable energy services, and to reduce energy consumption. EERE achieves this mission by developing cost competitive clean energy technologies and practices, and facilitating commercialization and deployment in the marketplace to strengthen U.S. energy security, environmental quality, and economic vitality.

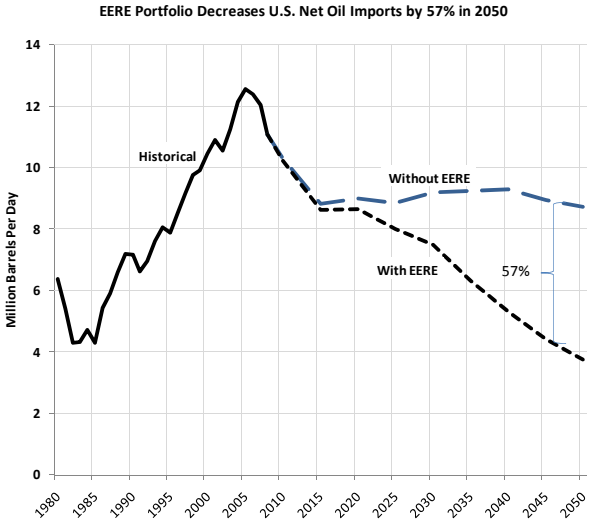
Benefits

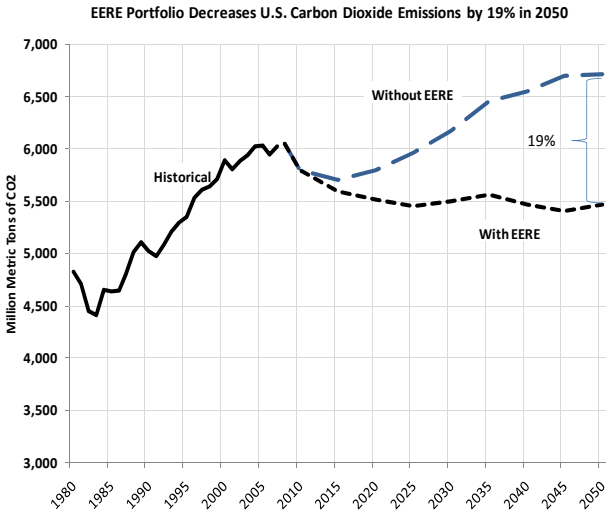
In recent years, EERE programs have played essential roles in encouraging private investments in technologies and enabling legislation that will continue to have major impacts on U.S. energy usage

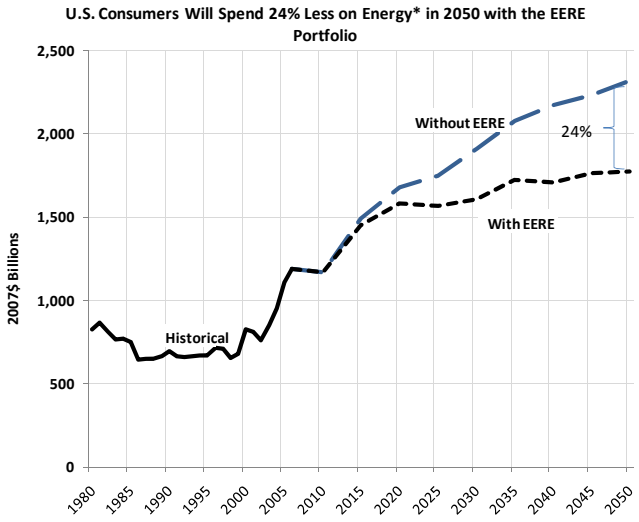
EERE continues to work to amplify these trends moving forward, and estimates that with the continued leveraging of EERE technologies: U.S. net oil imports can decline by 57 percent; consumers can spend 24 percent less on energy; the Nation can emit 19 percent less CO_2; and primary energy consumption can decline by 16 percent, all relative to 2050 baseline projections (see graphs below). Cumulatively, between 2011 and 2050, technology leveraged by EERE programs will help the U.S. reduce oil imports by approximately 30 billion barrels (approaching 10 years' worth of current passenger vehicle use)[a], save consumers and businesses more than $6 trillion in energy costs, and displace nearly 30 billion metric tons of CO_2 emissions and over 350 quadrillion Btu of primary energy (see Tables 1 and 2 for more portfolio data).

[a] Annual Energy Review. Energy Information Administration, Office of Energy Markets and End Use. Washington: June 2009, page xxiii. http://www.eia.doe.gov/aer/pdf/aer.pdf

Estimated Portfolio Benefits in Oil, Energy Cost, Carbon Dioxide and Energy Consumption







* This includes expenditures on fuels and electricity by all sectors. This does not include expenditures on capital investments in new energy equipment and infrastructure.

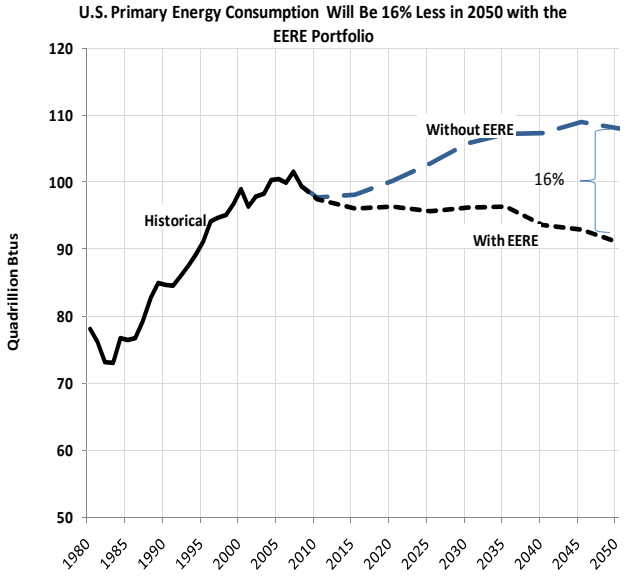


Table 1. Cumulative Impacts of Technology Leveraged by EERE Programs[a]

	Metric	Model	Year			
			2015	2020	2030	2050
Energy Security	Oil Imports Reduction, cumulative (Bil bbl)	NEMS	0.10	0.63	4.6	N/A
		MARKAL	0.22	0.70	4.1	31
	Natural Gas Imports Reduction, cumulative (Tcf)	NEMS	0.19	1.5	6.1	N/A
		MARKAL	ns	1.9	10.2	41
Environmental Impacts	CO_2 Emissions Reduction, cumulative (Mil mtCO_2)	NEMS	251	1226	5717	N/A
		MARKAL	316	1290	6242	27367
	SO_2 Allowance Price Reduction ($/ton)	NEMS	ns	ns	ns	N/A
		MARKAL	N/A	N/A	N/A	N/A
	NO_x Allowance Price Reduction ($/ton)	NEMS	269	504	767	N/A
		MARKAL	N/A	N/A	N/A	N/A
Economic Impacts	Primary Energy Savings, cumulative (quads)	NEMS	4.4	19	80	N/A
		MARKAL	6.1	21	89	358
	Oil Savings, cumulative (Bil bbl)	NEMS	0.11	0.72	5.9	N/A
		MARKAL	0.23	0.88	5.5	34.4
	Consumer Savings, cumulative (Bil $)	NEMS	41	206	1055	N/A
		MARKAL	53	276	1473	5543
	Electric Power Industry Savings, cumulative (Bil $)	NEMS	42	119	378	N/A
		MARKAL	29	89	291	784
	Household Energy Expenditures Reduction ($/household/yr)	NEMS	50	190	640	N/A
		MARKAL	114	297	817	2316
	Jobs, cumulative (net added jobs)	NEMS/ IMSET	NA	NA	NA	NA

- "Reductions" and "savings" are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).
- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.
- All cumulative metrics are based on results beginning in 2011.
- All monetary metrics are in 2007$.
- Cumulative monetary metrics are in 2007$ that are discounted to 2011 using a 3% discount rate.

ns - Not significant NA - Not yet available N/A - Not applicable

[a] Additional information on EERE's impact analysis methodology and assumptions, as well as the final FY 2011 budget impact estimates, can be found at http://www1.eere.energy.gov/ba/pba/program_benefits.html

Table 2. Annual Impacts of Technology Leveraged by EERE Programs

	Metric	Model	Year			
			2015	2020	2030	2050
Energy Security	Oil Imports Reduction, annual (Mbpd)	NEMS	0.1	0.5	1.6	N/A
		MARKAL	0.2	0.3	1.7	5.0
	Natural Gas Imports Reduction, annual (Tcf)	NEMS	0.1	0.4	0.5	N/A
		MARKAL	ns	0.8	0.9	1.8
	MPG Improvement (%)	NEMS	0.0	0.0	0.2	N/A
		MARKAL	0.0	0.0	0.1	2.5
Environmental Impacts	CO2 Emissions Reduction, annual (Mil mtCO_2/yr)	NEMS	95.1	256.5	613.6	N/A
		MARKAL	112.9	276.6	677.9	1247.3
	CO_2 Intensity Reduction of US Economy (g CO2/$GDP)	NEMS	7.0	16.7	30.5	N/A
		MARKAL	9.1	19.5	37.8	44.7
	CO_2 Intensity Reduction of US Power Sector[3] (g CO2/kWh)	NEMS	ns	ns	ns	N/A
		MARKAL	ns	ns	ns	ns
	CO_2 Intensity Reduction of US Transportation Sector (g CO2/mile)	NEMS	ns	16.5	59.8	N/A
		MARKAL	ns	12.3	61.5	164.9
Economic Impacts	Primary Energy Savings, annual (quads/yr)	NEMS	1.5	3.7	8.0	N/A
		MARKAL	2.0	3.8	9.6	17.1
	Oil Savings, annual (Mbpd)	NEMS	0.1	0.5	2.1	N/A
		MARKAL	0.2	0.5	2.3	5.4
	Consumer Savings, annual (Bil $)	NEMS	18.3	61.0	188.4	N/A
		MARKAL	19.2	79.5	289.7	687.4
	Electric Power Industry Savings, annual (Bil $)	NEMS	13.9	24.7	55.0	N/A
		MARKAL	11.0	17.3	39.0	59.3
	Reduction in Energy Intensity of US Economy (BTUs of energy/$GDP)	NEMS	148.3	272.0	425.4	N/A
		MARKAL	163.8	265.7	532.6	612.3
	Net Energy System Cost Reduction, cumulative (Bil $)	NEMS	N/A	N/A	N/A	N/A
		MARKAL	90.1	324.8	1270.3	5480.7

- "Reductions" and "savings" are calculated as the difference between results from the baseline case (i.e. no future DOE funding for this technology) and the program case (i.e. requested DOE funding for this technology is received and is successful).
- Oil impacts are shown as two metrics. "Oil Imports Reduction" refers only to reductions in oil imports; "Oil Savings" refers to savings (reduction) in total oil consumption.
- All cumulative metrics are based on results beginning in 2011.
- All monetary metrics are in 2007$.
- Cumulative monetary metrics are in 2007$ that are discounted to 2011 using a 3% discount rate.

ns - Not significant NA - Not yet available N/A - Not applicable

Strategic Themes, Goals and the Secretary's Initiatives

EERE's programs contribute directly to the Secretary's Energy and Innovation goals. The achievement of RDD&D goals by EERE's programs will yield significant short- and long-term results in areas critical to the Secretary's strategic goals: reducing GHG emissions, deploying clean, secure energy, and enhancing economic prosperity.

Basic and Applied R&D Coordination

Coordination between the Department's basic research and applied technology programs is a high priority for the Secretary of Energy. The Department has a responsibility to coordinate its basic and applied research programs to effectively integrate R&D by the science and technology communities (e.g., national laboratories, universities, and private companies) that support the DOE mission. Efforts have focused on improving communication and collaboration between federal program managers and increasing opportunities for collaborative efforts targeted at the interface of scientific research and technology development to ultimately accelerate DOE mission and national goals. Coordination between the basic and applied programs is also enhanced through joint programs, jointly-funded scientific facilities, and the program management activities of the DOE Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. Additionally, co-funding research activities and facilities at the DOE laboratories and funding mechanisms that encourage broad partnerships (e.g., Funding Opportunity Announcements) are also means by which the Department facilitates greater communication and research integration within the basic and applied research communities.

Key Accomplishments

Hydrogen and Fuel Cell Technologies diversified its portfolio and competitively selected 13 projects under the Recovery Act to deploy hundreds of fuel cells and create jobs in manufacturing, installation, maintenance, and support service sectors. The program developed and demonstrated residential combined heat and power (CHP) fuel cell systems operating for more than 3,000 hours and demonstrating up to 85 percent overall efficiency.

Biomass and Biorefinery Systems R&D accelerated deployment of Recovery Act funding by issuing solicitations for: new integrated biorefineries; the development of an algal biofuels consortium; the development of an advanced biofuels consortium; accelerated alternative vehicle fuels testing; and biofuels infrastructure. Critical analytical studies have been completed and put to use for program investment and portfolio decision making. Fifteen sustainability-focused projects were initiated with domestic and international partners.

Solar Energy attained several significant R&D milestones. PV R&D demonstrated manufacturable 23.4 percent efficient cells and manufactured the first 100KW of U.S.-produced T-5 product for commercial rooftops. Targets of $0.17-$0.20/kWh for residential and $0.12-$0.16/kWh for commercial PV systems have been exceeded. CSP R&D developed next generation polymeric reflective coatings for troughs and towers that critically enable reduced solar field cost and enhanced performance necessary to achieve targets.

Wind Energy completed dynamometer testing and calibration of a wind turbine gearbox that will provide invaluable operational data for the Gearbox Reliability Collaborative effort. The program selected 81 new wind energy project awards for up to $22.3 million, more than half of which will simultaneously address market and deployment challenges. The program also issued the 2008 Wind Technologies Market Report, which is the most comprehensive, publicly-available source on the state of the wind market.[a]

Geothermal Technologies developed a National Geothermal Action Plan and Road-Map[b] and sponsored the first Annual National Science Foundation Geothermal Research opportunity for undergraduate students.

Water Power awarded EERE's first-ever grants for wave, tidal, and ocean current energy. These grants support the development and testing of devices; fund resource assessments; address environmental impacts and siting concerns; and establish two university-led National Marine Renewable Energy Centers to serve the emerging marine and hydrokinetic (MHK) industry as integrated facilities for research and in-water testing. The program established the primary source of information for the water power industry with an updated, searchable database of all wave, tidal, and ocean current technologies and projects, as well as a catalogue for MHK technology developers.[c]

Vehicle Technologies determined that its commercial vehicle engine efficiency work has resulted in fuel economy gains of 10 to 12 percent over the past four to five years. These gains are estimated to have saved 2.4 billion gallons of fuel worth more than $7.6 billion since 2002.[d] The program garnered three *R&D 100* awards program during the year and signed two separate license agreements to commercialize their patented composite cathode materials for advanced lithium-ion batteries. The program developed performance for significantly higher specific battery capacities, a 50 percent increase over conventional materials.

Building Technologies established seven new energy conservation standards; and updated six and completed seven test procedure final rules. The program engaged more than 20 commercial building stakeholders to design a new building prototype that uses 50 percent less energy, and retrofit an existing building for at least 30 percent energy savings. The program also demonstrated Solid State Lighting (SSL) prototypes including: a cool white LED that delivers 117 lm/W and a record-breaking white OLED with a power efficacy of 102 lumens/Watt (lm/W) at 1,000 candela/square meter (cd/m^2); commercialized dynamic insulation; new Energy Star Hybrid Electric Water Heaters; and a low-cost solar water heating system. DOE also established the ENERGY STAR criteria for water heaters and SSL, and completed 30 to 40 percent whole house energy savings builder technology packages for five U.S. climate regions.

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[a] 2008 Wind Technologies Market Report. EERE. Washington: July 2009. Available at: http://www1.eere.energy.gov/windandhydro/pdfs/46026.pdf

[b] Draft National Geothermal Action Plan. EERE. Washington. Available at: http://www1.eere.energy.gov/geothermal/ngap.html

[c] Additional information on the Marine and Hydrokinetic Technology Database is available at: http://www1.eere.energy.gov/windandhydro/hydrokinetic/default.aspx

[d] Company data provided individually to EERE Vehicle Technologies Program by Caterpillar, Cummins, and Detroit Diesel in November 2008.

Industrial Technologies (ITP) R&D activities won three *R&D 100* awards in 2009. ITP has completed 2,264 Save Energy Now assessments, resulting in the identification of over 171 trillion Btus of natural gas savings and $1.3 billion dollars per year energy savings.

The Federal Energy Management Program awarded an unprecedented $594 million in Energy Savings Performance Contract (ESPC) projects, including DOE's largest-ever ESPC to construct one of the largest biomass facilities in the country at the Savannah River Site. Our training efforts have reached over 1,500 people in Utility Energy Service Contracts and ESPCs. The program also selected 104 agency energy and efficiency projects funded by the Recovery Act.

For EERE's **Facilities and Infrastructure**, Phase I of the Research Support Facility at the National Renewable Energy Laboratory (NREL) was successfully completed on time and within budget, providing workspace for approximately 750 Golden Field Office and NREL employees. Savings relative to the prior lease arrangement will net $122 million (in 2007 dollars) over a 30-year lifecycle.

The Weatherization and Intergovernmental Activities Program increased utilization of ESPCs by States and local governments, sustainable energy efficiency finance mechanisms, renewable energy certificate trading programs, and energy efficiency based utility incentives. The program awarded $16.5 million for 93 tribal energy projects and expanded the green workforce skilled in building energy retrofits. To date, approximately 7,300 homes were weatherized using Recovery Act funds. In FY 2009 approximately 95,000 homes were weatherized with Omnibus and emergency appropriations.

Indirect Costs and Other Items of Interest

Institutional General Plant Projects (IGPPs)

Institutional General Plant Projects (IGPPs) are miscellaneous construction projects that are less than $10 million and are of a general nature (cannot be allocated to a specific program). IGPPs support multi-programmatic and/or inter-disciplinary programs and are funded through site overhead.

Current projects include: safety and security improvements; replacement of building systems and components; replacement, and upgrades to building and site utilities; site wide energy efficiency improvements; reconfigurations of existing buildings to accommodate changes or growth in RDD&D programs or research support needs; upgrades to the primary site access point; and other site improvements to maintain the viability of EERE's capital investments at NREL. The following table displays IGPP funding by site.

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
Institutional General Plant Projects (IGPP)			
National Renewable Energy Laboratory	7,000	14,000	10,000
Total, IGPP	7,000	14,000	10,000

Facilities Maintenance and Repair

DOE's Facilities Maintenance and Repair activities are tied to its programmatic missions, goals, and objectives. Facilities Maintenance and Repair activities funded by this budget are displayed below.

Indirect-Funded Maintenance and Repair

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
National Renewable Energy Laboratory	2,219	2,504	2,884
Total, Indirect-Funded Maintenance and Repair	2,219	2,504	2,884

Outyear Indirect-Funded Maintenance and Repair

(dollars in thousands)

	FY 2012	FY 2013	FY 2014	FY 2015
National Renewable Energy Laboratory	4,261	5,519	11,979	15,723
Total, Indirect-Funded Maintenance and Repair	4,261	5,519	11,979	15,723

Direct-Funded Maintenance and Repair

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
National Renewable Energy Laboratory	0	0	3,000
Total, Direct-Funded Maintenance and Repair	0	0	3,000

Outyear Direct-Funded Maintenance and Repair

(dollars in thousands)

	FY 2012	FY 2013	FY 2014	FY 2015
National Renewable Energy Laboratory	3,300	4,000	5,200	5,500
Total, Direct-Funded Maintenance and Repair	3,300	4,000	5,200	5,500

Information Technology Investments

DOE's IT investments are tied to its programmatic missions, goals, and objectives. IT investments funded by this budget are displayed below.

Indirect-Funded IT Projects

(dollars in thousands)

	FY 2009	FY 2010	FY 2011	Description
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name NREL Application & Data Hosting/Housing	3,511	3,630	3,729	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
UPI/OMB Identifier 019-20-01-12-02-3004-00, IM System/Project Name NREL Computational Science Simulation & Modeling	704	1,205	2,505	Hardware, software and labor for numerical simulation and modeling capabilities for NREL's scientists as a fundamental tool for the Lab's scientific research.
UPI/OMB Identifier 019-20-01-12-02-3006-00, IM System/Project Name NREL Computational Science Visualization	504	1,005	1,505	Hardware, software and labor for data analysis and visualization for NREL's scientific and engineering staff to gain insight into the results of simulations necessary for the scientific discovery process.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name NREL Cyber Security	1,432	1,482	1,522	Provides shared security services. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. CS.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name NREL Enterprise Collaboration Services	1,505	1,557	1,599	Supports video distribution and conferencing services - includes hardware, software and support services (No LAN/WAN). Provides email, instant messaging, and collaborative tools. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
UPI/OMB Identifier 019-20-01-12-02-8777-00, IM System/Project Name NREL Enterprise Software Management	1,519	1,570	1,612	Management and maintenance of enterprise software licenses required for the legal use of various software products. Centralized procurement of software licenses to avoid duplication.
UPI/OMB Identifier 019-20-01-12-02-8780-00, IM System/Project Name NREL ESIF HPC System	0	12,000	1,200	Will support numerical simulation and modeling for energy system integration challenges associated with integrating renewable energy resources into the utility grid.
UPI/OMB Identifier 019-20-01-12-02-4005-00, IM System/Project Name NREL High Speed Scientific Computing Data Infrastructure Modernization	100	200	0	Upgrade high speed data infrastructure to provide access to all DOE laboratory supercomputing network capabilities in order to accelerate mission related data modeling activities.
UPI/OMB Identifier 019-20-03-00-02-3110-00, IM System/Project Name NREL IT Management and Planning	1,866	1,931	1,983	High-level management of the IS organization, including budgeting, planning and architecture design, performance assessment, development and tracking of performance metrics, and DOE reporting.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name NREL Office Automation	3,612	3,736	3,837	Provides desktop computing services to users to include all general purpose, desktop computing hardware and software, components and services. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. ES.
UPI/OMB Identifier 019-20-01-12-02-8779-00, IM System/Project Name NREL Scientific Data Management & Mining	200	200	500	Includes hardware, software and labor supporting NREL's scientists, engineers, and analysts engaged in research resulting in the creation of large data scientific and technical data sets.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name NREL Telecommunications Networks	2,772	2,867	2,945	Provides networking services within complex, including hardware, software, and services. Local Area Network support. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. TS.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name NREL Telephony Services	1,146	1,186	1,218	Provides voice services to users including hardware, software, services and communications not provided by WANs. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. TS.
UPI/OMB Identifier 019-20-01-12-02-8778-00, IM System/Project Name NREL UNIX Systems Administration	946	979	1,005	Unix server maintenance, implementation, and maintenance of security tools. Includes administration and management of scientific NREL data through user accounts, appropriate permissions, backup and restore, and appropriate security.
UPI/OMB Identifier 019-20-01-12-01-8781-00, IM System/Project Name NREL/SNL High Performance Computing System	9,475	1,418	1,350	High Performance Computing System.
Total, Indirect Funded IT Projects	29,292	34,966	26,510	

Outyear Indirect-Funded IT Projects

(dollars in thousands)

	FY 2012	FY 2013	FY 2014	FY 2015	Description
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name NREL Application & Data Hosting/Housing	3,915	4,111	4,317	4,532	
UPI/OMB Identifier 019-20-01-12-02-3004-00, IM System/Project Name NREL Computational Science Simulation & Modeling	2,630	2,762	2,900	3,045	
UPI/OMB Identifier 019-20-01-12-02-3006-00, IM System/Project Name NREL Computational Science Visualization	1,580	1,659	1,742	1,829	
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name NREL Cyber Security	1,598	1,678	1,762	1,850	
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name NREL Enterprise Collaboration Services	1,679	1,763	1,851	1,943	
UPI/OMB Identifier 019-20-01-12-02-8777-00, IM System/Project Name NREL Enterprise Software Management	1,693	1,778	1,867	1,960	
UPI/OMB Identifier 019-20-01-12-02-8780-00, IM System/Project Name NREL ESIF HPC System	1,260	1,323	1,389	1,459	
UPI/OMB Identifier 019-20-01-12-02-4005-00, IM System/Project Name NREL High Speed Scientific Computing Data Infrastructure Modernization	0	0	0	0	
UPI/OMB Identifier 019-20-03-00-02-3110-00, IM System/Project Name NREL IT Management and Planning	2,082	2,186	2,295	2,410	
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name NREL Office Automation	4,029	4,230	4,442	4,664	
UPI/OMB Identifier 019-20-01-12-02-8779-00, IM System/Project Name NREL Scientific Data Management & Mining	525	551	579	608	
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name NREL Telecommunications Networks	3,092	3,247	3,409	3,579	
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name NREL Telephony Services	1,279	1,343	1,410	1,480	
UPI/OMB Identifier 019-20-01-12-02-8778-00, IM System/Project Name NREL UNIX Systems Administration	1,055	1,108	1,163	1,221	
UPI/OMB Identifier 019-20-01-12-01-8781-00, IM System/Project Name NREL/SNL High Performance Computing System	1,418	1,488	1,563	1,641	
Total, Indirect-Funded IT Projects	27,835	29,227	30,689	32,221	

Direct-Funded IT Projects

(dollars in thousands)

	FY 2009	FY 2010	FY 2011	Description
Program Direction				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing HQ	2,687	4,521	4,810	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
UPI/OMB Identifier 019-20-01-12-02-1011-00, IM System/Project Name EE Corporate Management and Planning System	1,110	1,882	1,751	The CPS is a comprehensive planning and management system created in response to EERE's need to aggregate program and project data across all of its offices with an overarching, fully integrated system, encompassing both internal and external data sets.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Cyber Security HQ	1,163	1,794	1,967	Provides shared security services. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. CS.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Enterprise Collaboration Services HQ	853	3,045	3,342	Supports video distribution and conferencing services - includes hardware, software and support services (No LAN/WAN). Provides email, instant messaging, and collaborative tools. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Office Automation HQ	1,278	1,748	1,916	Provides desktop computing services to users to include all general purpose, desktop computing hardware and software, components and services. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. ES.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Telecommunications Networks HQ	448	1,333	1,459	Provides networking services within complex, including hardware, software, and services. Local Area Network support. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. TS.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Telephony Services HQ	424	445	467	Provides voice services to users including hardware, software, services and communications not provided by WANs. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. TS.
Total, Program Direction	7,963	14,768	15,712	
Technology Advancement and Outreach				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	2,727	2,543	2,682	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
Total, Technology Advancement and Outreach	2,727	2,543	2,682	
Biomass Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	221	223	226	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
Total, Biomass Program	221	223	226	
Buildings Technologies Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	1,046	848	851	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
Total, Buildings Technologies Program	1,046	848	851	
Federal Energy Management Program				

(dollars in thousands)

	FY 2009	FY 2010	FY 2011	Description
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	376	1,873	2,111	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
UPI/OMB Identifier 019-20-01-12-02-1040-00, IM System/Project Name EE FEMP Utility Data Management System	543	632	833	Establish a centralized utility data management system that will take advantage of meters installed by DOE sites.
Total, Federal Energy Management Program	919	2,505	2,944	
Geothermal Technologies Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	125	140	155	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
Total, Geothermal Technologies Program Total	125	140	155	
Hydrogen and Fuel Cell Technologies Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	331	285	288	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
Total, Hydrogen and Fuel Cell Technologies Program	331	285	288	
Industrial Technologies Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	424	439	483	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
Total, Industrial Technologies Program	424	439	483	
Solar Energy Technology Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	601	608	576	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
Total, Solar Energy Technology Program	601	608	576	
Vehicle Technologies Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	1,598	1,873	2,111	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
Total, Vehicle Technologies Program	1,598	1,873	2,111	
Weatherization & Intergovernmental Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	2,041	1,460	1,533	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.

(dollars in thousands)

	FY 2009	FY 2010	FY 2011	Description
UPI/OMB Identifier 019-20-04-00-01-1030-00, IM System/Project Name EE State Grant Administration	3,422	3,428	1,934	Investment develops mission program management functionality and transitions back office grant functions to DOE corporate iManage investment and Grants.gov in FY2010. Investment also maintains Windows-based client/server system WinSaga during transition.
Total, Weatherization & Intergovernmental Program	5,463	4,888	3,467	
Wind Energy and Hydropower				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	186	146	181	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
Total, Wind Energy and Hydropower	186	146	181	
Golden Field Office				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Field Implementation	1,038	1,320	915	IT hardware and software used for multiple, related, computing services. This includes design, development, help and other support, operations and maintenance. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Cyber Security Field Implementation	1,317	1,678	1,157	Provides shared security services. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. CS.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Enterprise Collaboration Services Field Implementation	1,049	1,335	924	Supports video distribution and conferencing services - includes hardware, software and support services (No LAN/WAN). Provides email, instant messaging, and collaborative tools. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. MS.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Office Automation Field Implementation	1,077	1,369	949	Provides desktop computing services to users to include all general purpose, desktop computing hardware and software, components and services. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. ES.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Telecommunications Networks Field Implementation	1,160	1,479	1,021	Provides networking services within complex, including hardware, software, and services. Local Area Network support. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. TS.
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Telephony Services Field Implementation	204	257	180	Provides voice services to users including hardware, software, services and communications not provided by WANs. Service Level Agreement in place-NO. Costs Allocated based on Usage-NO. TS.
Total, Golden Field Office	5,845	7,438	5,146	
Total, Direct-Funded IT Projects (Appropriation EERE)	27,449	36,704	34,822	

Outyear Direct-Funded IT Projects

(dollars in thousands)

	FY 2012	FY 2013	FY 2014	FY 2015	Description
Program Direction					
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing HQ	2,821	2,962	3,110	3,265	
UPI/OMB Identifier 019-20-01-12-02-1011-00, IM System/Project Name EE Corporate Management and Planning System	1,166	1,224	1,285	1,349	
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Cyber Security HQ	1,221	1,282	1,346	1,413	
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Enterprise Collaboration Services HQ	896	941	988	1,037	
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Office Automation HQ	1,342	1,409	1,479	1,553	
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Telecommunications Networks HQ	470	494	519	544	
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Telephony Services HQ	445	467	491	515	
Total, Program Direction	8,361	8,779	9,218	9,676	
Technology Advancement and Outreach					
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	2,863	3,006	3,157	3,315	
Total, Technology Advancement and Outreach	2,863	3,006	3,157	3,315	
Biomass Program					
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	232	244	256	269	
Total, Biomass Program	232	244	256	269	
Buildings Technologies Program					
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	1,098	1,153	1,211	1,271	
Total, Buildings Technologies Program	1,098	1,153	1,211	1,271	
Federal Energy Management Program					

UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	395	415	435	457
UPI/OMB Identifier 019-20-01-12-02-1040-00, IM System/Project Name EE FEMP Utility Data Management System	571	599	629	660
Total, Federal Energy Management Program	966	1,014	1,064	1,117
Geothermal Technologies Program Total				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	131	138	145	152
Total, Geothermal Technologies Program Total	131	138	145	152
Hydrogen and Fuel Cell Technologies Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	348	365	383	402
Total, Hydrogen and Fuel Cell Technologies Program	348	365	383	402
Industrial Technologies Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	445	467	491	515
Total, Industrial Technologies Program	445	467	491	515
Solar Energy Technology Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	631	663	696	730
Total, Solar Energy Technology Program	631	663	696	730
Vehicle Technologies Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	1,678	1,762	1,850	1,943
Total, Vehicle Technologies Program	1,678	1,762	1,850	1,943
Weatherization & Intergovernmental Program				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	2,143	2,250	2,363	2,481
UPI/OMB Identifier 019-20-04-00-01-1030-00, IM System/Project Name EE State Grant Administration	3,593	3,773	3,961	4,159
Total, Weatherization & Intergovernmental Program	5,736	6,023	6,324	6,640

Wind Energy and Hydropower				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Internet Websites	195	205	215	226
Total, Wind Energy and Hydropower	195	205	215	226
Golden Field Office				
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Application & Data Hosting/Housing Field Implementation	1,090	1,145	1,202	1,262
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Cyber Security Field Implementation	1,383	1,452	1,525	1,601
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Enterprise Collaboration Services Field Implementation	1,102	1,157	1,215	1,275
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Office Automation Field Implementation	1,131	1,188	1,247	1,309
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Telecommunications Networks Field Implementation	1,218	1,279	1,343	1,410
UPI/OMB Identifier 019-60-02-00-01-5000-04, IM System/Project Name EE Telephony Services Field Implementation	214	225	236	248
Total, Golden Field Office	6,138	6,446	6,768	7,105
Total, Direct-Funded IT Projects (Appropriation EERE)	28,822	30,265	31,778	33,361