The FY 2008 Budget Request

Twenty in Ten: Strengthening America's Energy Security

Alexander Karsner
Assistant Secretary
Office of Energy Efficiency and Renewable Energy

February 2007

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."

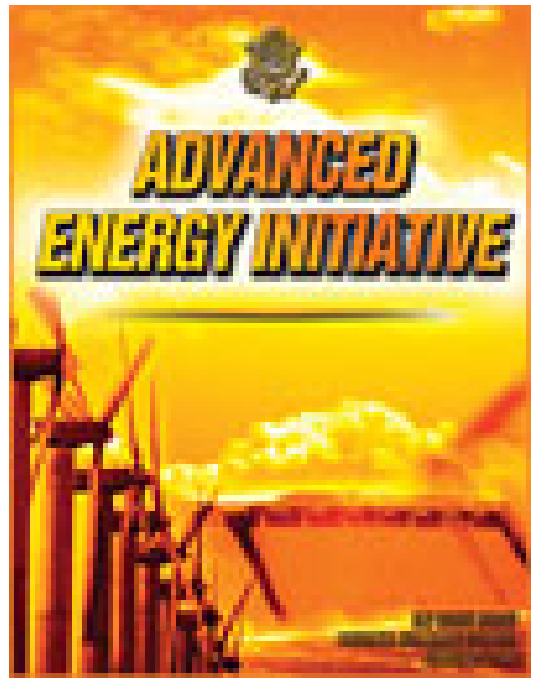
The President's "20 in 10" Goal

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.

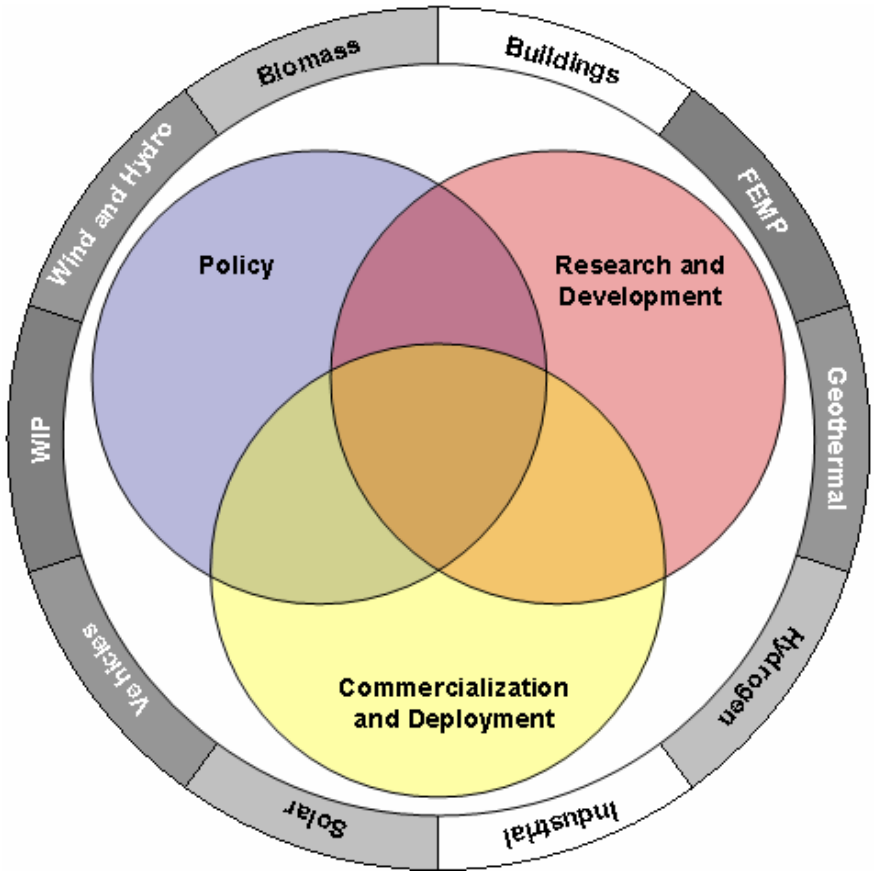
Building on the Advanced Energy Initiative

- 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

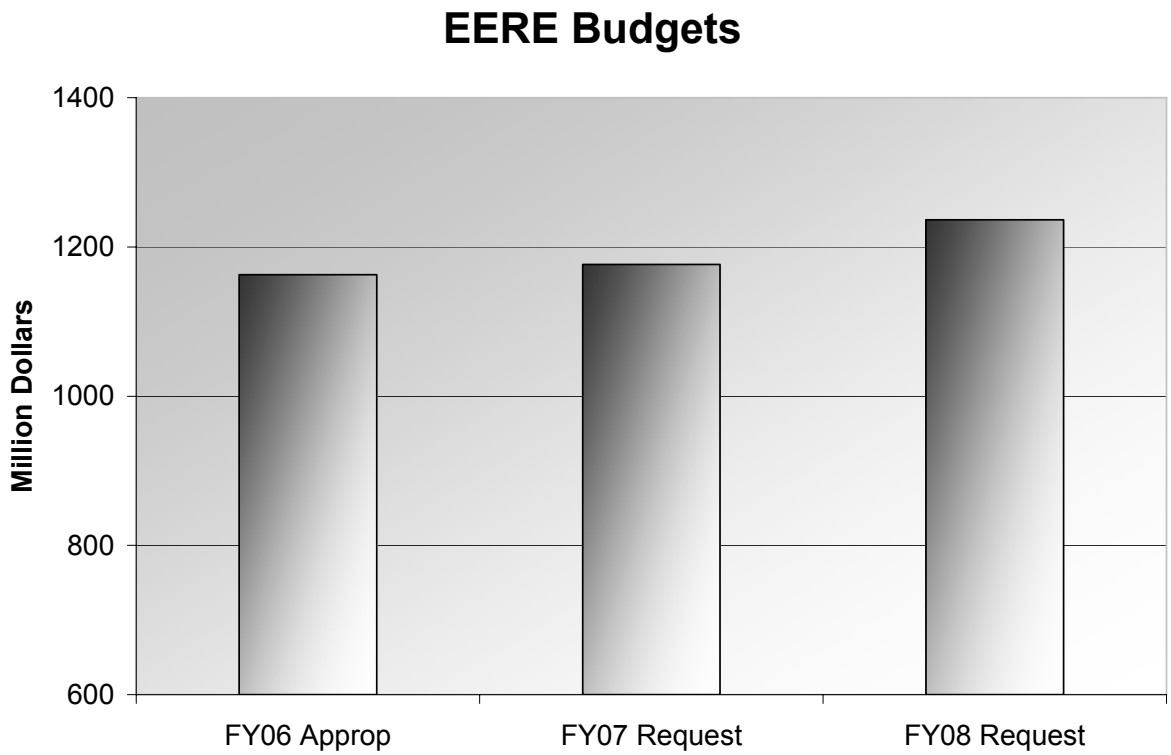


Increased Emphasis on Market Transformation

- 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



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.

EERE Program Details

FY 2008 Budget Request

EERE FY08 Budget Request

Funding ($ in thousands)

	FY 2006 Appropriation.	FY 2007 Request	FY 2008 Request	Change FY07 to FY08
Energy Supply and Conservation				
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			
Total, Energy Supply and Conservation	**1,162,747**	**1,176,421**	**1,236,199**	**+59,778**

Biomass & Biorefinery Systems R&D

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 Approp.	FY 2007 Request	FY 2008 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
TOTAL	**89,776**	**149,687**	**179,263**

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.

Vehicle Technologies

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 Approp.	FY 2007 Request	FY 2008 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
TOTAL	**178,351**	**166,024**	**176,138**

Note: Program has been restructured in FY 2008. Actiivities 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.

Hydrogen Technologies

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 Approp	FY 2007 Request	FY 2008 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
TOTAL	**153,451**	**195,801**	**213,000**

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 Approp	FY 2007 Request	FY 2008 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_2/H_2 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).

Solar Energy

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 Approp.	FY 2007 Request	FY 2008 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
TOTAL	**81,791**	**148,372**	**148,304**

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.

Wind Energy

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 Approp.	FY 2007 Request	FY 2008 Request
Technology Viability	17,829	35,905	27,200
Technology Application	7,634	7,914	12,869
Congressionally Directed Activities	12,870	0	0
TOTAL	**38,333**	**43,819**	**40,069**

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.

Building Technologies

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 Approp.	FY 2007 Request	FY 2008 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
TOTAL	**68,190**	**77,329**	**86,456**

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 EPACT 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.

Industrial Technologies

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 Approp.	FY 2007 Request	FY 2008 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
TOTAL	**55,856**	**45,563**	**45,998**

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 Approp.	FY 2007 Request	FY 2008 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
TOTAL	**316,866**	**225,031**	**204,904**

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.

Federal Energy Management Program

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 Approp.	FY 2007 Request	FY 2008 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
TOTAL	**18,974**	**16,906**	**16,791**

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.

Geothermal Technology

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 Approp.	FY 2007 Request	FY 2008 Request
Technology Development	14,860	0	0
Technology Application	4,190	0	0
Congressionally Directed Activities	3,712	0	0
TOTAL	**22,762**	**0**	**0**

Key Activities

- Complete final closeout of Geothermal Technologies program.

Hydropower

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

Budget Request

Funding ($ in thousands)

Activity	FY 2006 Approp.	FY 2007 Request	FY 2008 Request
Technology Viability	150	0	0
Technology Application	345	0	0
TOTAL	**495**	**0**	**0**

Key Activities

- Complete final closeout of the Hydropower program.