Advanced Research Projects Agency - Energy
Proposed Appropriation Language

For necessary expenses in carrying out the activities authorized by section 5012 of the America COMPETES Act (Public Law 110-69), as amended, [$280,000,000] *$325,000,000*, to remain available until expended: Provided, That [$28,000,000] *$29,250,000* shall be available until September 30, [2015] *2016* for program direction.

Explanation of Changes

No Change

Public Law Authorizations
P.L. 95-91, "Department of Energy Organization Act" (1977)
P.L. 109-58, "Energy Policy Act of 2005"
P.L. 110-69, "America COMPETES Act of 2007"
P.L. 111-358, "America COMPETES Reauthorization Act of 2010"

Advanced Research Projects Agency - Energy

($K)			
FY 2013 Current	**FY 2014 Enacted**	**FY 2014 Current**	**FY 2015 Request**
250,636	280,000	280,000	325,000

Overview

The Advanced Research Projects Agency – Energy (ARPA-E) mission is to enhance the economic and energy security of the United States through the development of energy technologies that result in reductions of imports of energy from foreign sources; reductions of energy-related emissions, including greenhouse gases; and improvement in the energy efficiency of all economic sectors; and to ensure that the United States maintains a technological lead in developing and deploying advanced energy technologies.

ARPA-E catalyzes transformational energy technologies that could create a more secure and affordable American future by advancing high-potential, high-impact energy technologies that are too early for private sector investment. ARPA-E focuses on energy technologies that can be meaningfully advanced with a small investment over a defined period of time in areas that are not funded elsewhere due to high technical and financial uncertainty. ARPA-E's rigorous program design includes close coordination with other DOE and federal programs, a competitive project selection process, and hands-on engagement, thereby leading to thoughtful expenditures while empowering America's energy researchers with funding, technical assistance, and market awareness.

Since its inception in 2007, ARPA-E has invested in 362 projects, across 39 states, with over $900 million in funding. These projects have been selected through 18 focused programs and 2 open solicitations. Approximately 32% of projects are led by small business, 42% by universities, 14% by large businesses, 8% by federally funded research and development centers, and 4% by non-profits.

Highlights and Major Changes in the FY 2015 Budget Request

In FY 2015 ARPA-E expects to release a third "open" funding opportunity announcement (FOA) as well as 4 - 5 "focused" programs. Focused programs will continue to identify gaps where high-impact, high-potential investment by ARPA-E could lead to transformational technologies, developing entirely new ways to generate, store, and use energy. Following a pilot in FY2014, ARPA-E may also use a small rolling open solicitation to rapidly support innovative applied energy research that has the potential to lead to new focused programs. ARPA-E also will continue its stand-alone Small Business Innovation Research / Small Business Technology Transfer (SBIR/STTR) program to provide additional support to small businesses beyond the significant number of awards that go to small businesses via the standard FOA process.

Advanced Research Projects Agency - Energy
Funding by Congressional Control ($K)

	FY 2013 Current	FY 2014 Enacted	FY 2014 Adjustments	FY 2014 Current	FY 2015 Request	FY 2015 vs FY 2014 Enacted
ARPA-E Projects	226,647	252,000	0	252,000	295,750	43,750
Program Direction	23,989	28,000	0	28,000	29,250	1,250
Total, Advanced Research Projects Agency - Energy	**250,636**	**280,000**	**0**	**280,000**	**325,000**	**45,000**
Federal FTEs	**34**	**47**	**0**	**47**	**54**	**+7**

SBIR/STTR:

- FY 2013 Transferred: $6,914,588 total (SBIR $6,121,111 / STTR $793,477)
- FY 2014Estimate: $8,064,000 total (SBIR $7,056,000 / STTR $1,008,000)
- FY 2015 Request: $9,759,750 total (SBIR $8,576,750 / STTR $1,183,000)

ARPA-E Projects

Overview

ARPA-E has created a nimble and adaptive structure that allows the Agency to quickly develop and execute programs, recruit a highly talented and experienced technical team, and provide awardees with technical assistance and market awareness to help projects succeed.

ARPA-E "focused" programs provide a unique bridge from basic science to early stage technology. These programs draw from the latest scientific discoveries and envision a viable path to commercial implementation through firm grounding in the economic realities and changing dynamics of the marketplace. For example, in FY 2012, ARPA-E developed the Methane Opportunities for Vehicular Energy (MOVE) program to advance technologies to use abundant domestic natural gas as fuel for passenger vehicles, and in FY 2011, developed the Rare Earth Alternatives in Critical Technologies (REACT) program as a rapid response to the disruption in the rare earth supply chain.

The concept for a new focused program is developed through engagement with diverse science and technology communities, including some that may not have traditionally been involved in the topic area, and by learning from the outcomes of current ARPA-E programs and projects. For example, the FY 2013 Strategies for Wide-Bandgap, Inexpensive Transistors for Controlling High-Efficiency Systems (SWITCHES) program was influenced by breakthroughs in the area of wide-bandgap semiconductor technology from the Agile Delivery of Electrical Power Technology (ADEPT) program from FY 2011. The program development cycle also involves careful coordination with ongoing research and development efforts in other Department of Energy program offices and industry. The new Reliable Electricity Based on Electrochemical Systems (REBELS) program, which is aimed at developing fuel cell technology for distributed power generation, has been closely coordinated with other Department of Energy elements working on fuel cell technology, along with the work of industry stakeholders. In addition, the FY 2011 Green Electricity Network Integration (GENI) program is modernizing the way electricity is transmitted and, has been closely coordinated with other Department of Energy offices working on grid modernization, along with the work of industry stakeholders.

The ARPA-E focused program development cycle identifies gaps where high-impact, high-potential investment could lead to transformational technologies, developing entirely new ways to generate, store, and use energy. New programs are carefully constructed by Program Directors, and every aspect of a proposed program is intensely scrutinized for technical and economic viability as well as relevance to ARPA-E's mission.

ARPA-E also ensures that potentially transformational ideas not within the scope of existing focused programs are not lost by utilizing "open" funding opportunity announcements. Projects selected under the open solicitations pursue novel approaches to energy innovation and work to meet technical needs not addressed by other parts of ARPA-E, other Department of Energy program offices, other government agencies, or the private sector.

Each ARPA-E project includes clearly defined technical and commercial milestones that awardees are required to meet throughout the life of a project. Program Directors work closely with each awardee, through regular meetings and onsite visits, to ensure that milestones are being achieved in a timely fashion. When a project is not achieving the goals of the program, ARPA-E works with the awardee to rectify the issue or, in cases where the issue cannot be corrected, ARPA-E discontinues funding for the project. To ensure the efficiency of ARPA-E's hands-on engagement with awardees, ARPA-E has in-house legal, procurement, and contracting staff co-located with the Program Directors to provide direct access and timely communication.

The final element of the ARPA-E model is the Technology-to-Market program. Awardees are required to provide a Technology-to-Market plan prior to receiving an award and work closely with ARPA-E's Technology-to-Market advisors throughout the project, to develop custom strategies, including practical training and critical business information to equip projects with a clear understanding of market needs to guide technical development. In addition, ARPA-E facilitates relationships with investors, government agencies, small and large companies, and other organizations that are necessary to move awardees to the next stage of their project development.

Highlights of Recent Programs

In FY 2013 and to date in FY 2014, ARPA-E has announced seven solicitations to fund innovative energy technologies, including a dedicated SBIR/STTR program in connection with a new focused program, and one rolling solicitation open to all technology areas that will run as a pilot program through FY 2014.

- **Robust Affordable Next Generation Energy Storage Systems (RANGE):** This program aims to accelerate widespread EV adoption by dramatically improving driving range and reliability, and by providing low-cost, low-carbon alternatives to today's vehicles. RANGE seeks to re-envision the total EV battery system rather than working to increase the energy density of individual battery cells. Some of the projects selected will focus on developing robust battery chemistries and architectures that would improve vehicle driving range and overall battery robustness. RANGE projects will also focus on multifunctional energy storage designs that use these robust storage systems to simultaneously serve other functions in a vehicle, further reducing an energy storage system's effective and overall EV weight. ARPA-E has announced 22 projects across 15 states will receive a total of $36 million under the RANGE program.

- **Reducing Emissions Using Methanotrophic Organisms for Transportation Energy (REMOTE):** REMOTE will develop transformational biological technologies to convert gas to liquids (GTL) for transportation fuels. This program aims to lower the cost of GTL conversion while enabling the use of low-cost, domestically sourced natural gas for transportation, which could reduce vehicle emissions compared to conventional gasoline engines. Using unique biological conversion methods, REMOTE will develop innovative catalysts and lab-scale reactors for efficient and cost-effective natural gas conversion. Current GTL approaches are technologically complex and require large, capital-intensive facilities, which limit widespread adoption. ARPA-E has announced 15 projects across 9 states will receive a total of $34 million under the REMOTE program.

- **Modern Electro/Thermochemical Advances in Light-Metal Systems (METALS):** METALS will develop innovative technologies for cost-effective processing and recycling of Aluminum, Magnesium and Titanium. These metals have high strength-to-weight ratios that make them ideal for creating lighter vehicles that can save fuel and reduce carbon emissions. Utilizing domestically available ores and reducing energy inputs and emissions from processing can make light metals cost competitive with current materials such as steel. METALS will also develop technologies for rapid and efficient light metal sorting to enable domestic recycling. ARPA-E has announced 18 projects across 14 states will receive a total of $32 million under the METALS program.

- **Strategies for Wide-Bandgap, Inexpensive Transistors for Controlling High-Efficiency Systems (SWITCHES) (SBIR/STTR):** SWITCHES will develop next-generation power conversion devices with the potential to transform how power is controlled and converted throughout the grid. SWITCHES will create innovative new wide-bandgap semiconductor materials, device architectures, and fabrication processes to enable increased energy density and switching frequencies, enhanced temperature control, and reduced power losses in a range of power electronics applications for electric motor drives and power switching devices for the grid. Because ARPA-E anticipated that a large number of applicants in this technology would be academia and non-SBIR/STTR eligible companies, ARPA-E issued the SWITCHES solicitation in tandem with an SBIR/STTR solicitation. ARPA-E has announced 14 projects across 9 states will receive a total of $27 million under the SWITCHES and SBIR/STTR programs.

- **Full-Spectrum Optimized Conversion and Utilization of Sunlight (FOCUS):** FOCUS will develop new technologies that deliver cost-effective solar energy when the sun is not shining. The technologies developed will help advance solar energy beyond current photovoltaic (PV) and concentrated solar power (CSP) technologies to ensure solar power remains a consistent, cost-effective renewable energy option. This new program seeks to develop technology options to deliver low-cost, high-efficiency solar energy on demand. It aims to create hybrid solar energy systems that turn sunlight into electricity for immediate use, while also producing heat that can be stored at low cost for later conversion into electricity. These hybrid converters will use the entire solar spectrum more efficiently than PV or CSP technologies. ARPA-E has announced 12 projects across 7 states will receive a total of $30 million under the FOCUS program.

- **Innovative Development in Energy-Related Applied Science (OPEN IDEAS):** In September 2013, ARPA-E launched OPEN IDEAS, a small rolling open solicitation to allow ARPA-E to rapidly support innovative seedling research projects that have the potential to lead to new focused programs. As of February 1, 2014 ARPA-E has selected 1 project for $3.75 million under the OPEN IDEAS program.

- **Reliable Electricity Based on Electrochemical Systems (REBELS):** REBELS will develop fuel cell technology for distributed power generation to improve grid stability, increase energy security, and balance intermittent renewable technologies while reducing CO2 emissions associated with current distributed generation systems. REBELS addresses these challenges by developing innovative, low-cost distributed generation technologies using electrochemical power generation that can also act as a storage device. REBELS projects will focus on developing intermediate-temperature fuel cells through innovative designs, fuel activation approaches, and low-cost materials to facilitate widespread distributed power generation. REBELS projects also explore multi-functional fuel cell systems that can store energy like a battery or use electricity to convert natural gas to liquids. ARPA-E announced a funding opportunity of up to $30 million for REBELS.

Measuring Success

The success of ARPA-E programs and projects will ultimately be measured by impact in the marketplace. As the projects ARPA-E funds seek to create transformational energy technologies that do not exist today, ARPA-E looks at various metrics to measure progress towards eventual market adoption. The primary metrics are the individual project and program milestones, which are reviewed quarterly, while more broadly, technical success is measured by indicators such as patents and publications. Most importantly, ARPA-E gauges success by project handoffs, including the formation of new companies and fostering public and private partnerships to ensure projects continue to move towards the market, as well as formation of new communities. To date, 22 ARPA-E projects have attracted more than $625 million in private-sector follow-on funding after ARPA-E's investment of approximately $95 million. In addition, at least 24 ARPA-E project teams have formed new companies to advance their technologies, more than 16 ARPA-E projects have partnered with other government agencies for further development, and at least 4 technologies funded by ARPA-E are in preliminary commercial sales.

Highlights of the FY 2015 Budget Request

In FY 2015, ARPA-E plans to release an open funding opportunity announcement (FOA) for approximately $150 million. Building on ARPA-E's two previous open funding solicitations, in FY 2009 and FY 2012, the OPEN 2015 solicitation would be designed to catalyze transformational breakthroughs across the entire spectrum of energy technologies. With the remaining requested funds beyond an OPEN FOA, ARPA-E plans to release an additional 4 – 5 focused programs, and, if the FY 2014 pilot is successful, ARPA-E plans to continue its rolling open solicitation (IDEAS). ARPA-E will also continue its stand-alone SBIR/STTR program to provide additional support to small businesses beyond the large number of awards that go to small businesses via the standard FOA process. ARPA-E will continue to employ two primary thrusts in its research portfolio: Transportation Systems and Stationary Power Systems. The ARPA-E program development model makes it impossible to predict in detail the specific focused programs that will be established in FY 2015 or the awards that will be made under OPEN 2015. The exact allocations will be determined when the FY 2015 focused programs are developed.

Strategic Vision Report

In accordance with the America COMPETES Act, Public Law 110-69, section 5012(g)(2)(2007) as amended, which has been codified as 42 U.S.C. § 16538 (h)(2), ARPA-E''s Strategic Vision Report can be found at http://arpa-e.energy.gov/sites/default/files/ARPA-E_Strategic_Vision_Report_101713.pdf.

ARPA-E Projects
Funding ($K)

	FY 2013 Current	FY 2014 Enacted	FY 2014 Current	FY 2015 Request	FY 2015 vs FY 2014 Enacted
ARPA-E Projects					
Transportation Systems	**123,311**	**100,800**	**100,800**	**147,875**	**47,075**
Stationary Power Systems	**103,336**	**151,200**	**151,200**	**147,875**	**-3,325**
Total, ARPA-E Projects	**226,647**	**252,000**	**252,000**	**295,750**	**43,750**

SBIR/STTR:

- FY 2013: Transferred $6,914,588 total (SBIR $6,212,111 / STTR $793,477)
- FY 2014Estimate: $8,064,000 total (SBIR $7,056,000 / STTR $1,008,000)
- FY 2015 Request: $9,759,750 total (SBIR $8,576,750 / STTR $1,183,000)

ARPA-E Projects
Explanation of Major Changes ($K)

	FY 2015 vs FY 2014 Enacted
ARPA-E plans to release an open funding solicitation in FY 2015 for $150 million and, assuming successful piloting in FY 2014, plans to continue its rolling open solicitation (IDEAS). In addition, ARPA-E plans to release 4 – 5 focused program solicitations. Finally, ARPA-E will continue its stand-alone SBIR/STTR program and may issue a solicitation in conjunction with an appropriate focused program.	**+43,750**
Total, ARPA-E Projects	**+43,750**

ARPA-E Projects

Activities and Explanation of Changes

FY 2014 Enacted	FY 2015 Request	Explanation of Changes FY 2015 vs FY 2014 Enacted
In FY 2014, the following programs have been initiated (described in more detail above): • Strategies for Wide-Bandgap, Inexpensive Transistors for Controlling High-Efficiency Systems (SWITCHES) (SBIR/STTR) • Innovative Development in Energy-Related Applied Science (OPEN IDEAS) • Reliable Electricity Based on Electrochemical Systems (REBELS) The ARPA-E technology acceleration model seeks to identify new and timely opportunities. Specific funding opportunity announcements (FOAs) are informed via a collaborative approach between ARPA-E and the technical community. ARPA-E has conducted workshops in the following areas: methane sensing for quantifying and/or mitigating emissions from natural gas production and transmission systems; low-cost drivers and targets for thermonuclear fusion; and localized thermal management for reduced energy consumption in buildings. In addition, ARPA-E is considering additional programs in the broad thematic areas of alternative transportation fuels, energy materials and processes, energy storage, and the intersection of energy and information technologies. These include the use of modern information tools to optimize the transportation network, enhanced efficiency and cleanliness of small engine technology for distributed	ARPA-E anticipates new programs in both Transportation Systems and Stationary Power Systems in one or more of the following areas: **Transportation Fuels:** The utility and energy storage capacity of liquid fuels suggest that they will remain in our transportation infrastructure for years to come. The challenge lies in finding innovative ways to produce fuels from an ever increasing variety of feedstocks. Novel routes to create fuels from carbon-neutral feedstocks (biomass or carbon dioxide) offer the potential for transformative reductions in greenhouse gas emissions associated with transportation. ARPA-E will continue to use advances in bio-engineering and biochemistry to develop photosynthetic and non-photosynthetic routes to carbon-neutral fuels. **Energy Materials and Processes:** Advanced materials are central to the development of innovative energy conversion processes that improve efficiency in the generation and use of energy, with concomitant reduction in greenhouse gas emissions. ARPA-E will continue to build upon new discoveries in fundamental material science to develop a broad range of materials for energy: catalysts, photovoltaics, structural materials, thermoelectrics, intelligent materials, semiconductors, magnetic materials, membranes, and others. Many of these new materials are well tailored for specific function at the nanoscale level, but pathways for their cost-effective manufacture at the scale needed for energy technology does not yet exist. ARPA-E will continue to invest in research and development devoted to moving nanoscale materials from the realm of scientific discovery into real-world processes for improved energy utilization in a variety of technologies, including engines, heating and air conditioning units, electric motors, power electronics, solar cells, wind turbines, and other technologies that are only beginning to be envisioned for energy applications. **Energy Storage:** Effective, inexpensive, reversible conversion of	ARPA-E fully funds projects at the time of award. This will enable ARPA-E, as in prior fiscal years, to use FY 2015 funding mainly for new programs and projects. A portion of FY 2015 funding may be used to supplement ongoing ARPA-E projects for which a small amount of additional funding from ARPA-E could catalyze a substantial technological development, leading to future support from outside ARPA-E that will help advanced the technology towards the market.

FY 2014 Enacted	FY 2015 Request	Explanation of Changes FY 2015 vs FY 2014 Enacted
power generation, the development of technologies to maximize energy crop production while minimizing water and fertilizer usage, improved thermal management in stationary power generation to minimize water usage, further development of algorithms and control technologies for power grids at various scales of distribution, and the application of nanoscale photonic technologies to the conversion of solar energy to electricity.	electrical energy to a more easily stored form, such as chemical, mechanical, and thermal energy, remains a central challenge to the widespread adoption of electric vehicles and the increased penetration of intermittent renewable energy sources onto the electric grid. ARPA-E plans to build upon previous investments in electrical energy storage for both transportation and the grid. These programs have built new communities of scientists and engineers that are approaching the challenge of energy storage in new and exciting ways. Moreover, these projects exhibit an amplification of learning through crossovers between programs. Because of these new insights, ARPA-E continues to envision new technology approaches as well as additional areas where efficient and inexpensive energy storage technologies are required. **Sensors, Information, and Integration:** As energy technology meets the information age, the need to collect, analyze, standardize, and protect energy information will grow and diversify over many energy systems. The transition to smart and resilient energy systems will be enabled by reliable and inexpensive sensors to provide essential data, analytical tools capable of dealing with the vast amounts of data created, and sophisticated control algorithms to optimize system performance. ARPA-E has invested in building the innovative new components that need to be integrated into larger systems to achieve full impact and now sees a broad opportunity in the combination of sensor technology, informatics, and system integration. ARPA-E currently invests in the development of advanced sensors and control technologies for battery management and control algorithms for the power grid. ARPA-E plans to explore the further development of hardware and software tools needed to characterize, optimize, and control additional smart, integrated energy systems of the future. Future investments in systems integration will not replicate scale-up and manufacturing issues that are best addressed by the Department of Energy applied technology programs or private industry.	

ARPA-E Projects
Performance Measures

In accordance with the GPRA Modernization Act of 2010, the Department sets targets for, and tracks progress toward, achieving performance goals for each program. For more information, refer to the Department's FY 2013 Annual Performance Report.

	FY 2013	FY 2014	FY 2015
Performance Goal (Measure)	**Award Funding** - Cumulative percentage of award funding committed 45 days after award selections are announced		
Target	70%	70%	
Result	Met		
Endpoint Target	No endpoint - continuous measure of efficiency in awarding funds		
Performance Goal (Measure)	**New Company Formation** – Number of new companies formed as a direct result of ARPA-E funding. This is a new performance measure for ARPA-E in FY 2015. As of the end of FY 2013 ARPA-E funded research has led to the formation of at least 24 new companies. That is the baseline from which we would expect to add at least 3 new companies per year.		
Target	N/A	≥+3	≥+3
Result	N/A		
Endpoint Target	No endpoint – continuous measure of impact of ARPA-E awards on creating new jobs and industries		

Program Direction

Overview

Program direction provides ARPA-E with the necessary resources to execute ARPA-E's mission. Program direction funds are utilized for salaries and benefits of federal staff; travel; support services contracts to provide technical advisory and assistance services; and other related expenses, including the DOE Working Capital Fund.

The core of the ARPA-E model is the team, particularly the Agency's Program Directors and Technology-to-Market advisors. ARPA-E Program Directors provide awardees with technical guidance that combines scientific expertise and real-world experience and ARPA-E Technology-to-Market advisors supply critical business insight and direction to enable awardees to develop strategies to move technologies towards the market. The ARPA-E team manages awards through hands-on engagement with awardees to ensure thoughtful expenditures while empowering America's energy researchers with funding, technical assistance, and market awareness. Part of the ARPA-E model is to utilize technical contractor support, which enables ARPA-E to rapidly move into new technology areas in response to scientific discoveries, breakthroughs, and opportunities. Each ARPA-E project includes clearly defined technical and commercial milestones that awardees are required to meet throughout the life of a project. When a project is not achieving the goals of the program, ARPA-E works with the awardee to rectify the issue or, in cases where the issue cannot be corrected, ARPA-E discontinues funding for the project. To ensure the efficiency of ARPA-E's hands on engagement with awardees, ARPA-E has in-house legal, procurement, and contracting staff co-located with the Program Directors to provide direct access and timely communication.

Highlights of the FY 2015 Budget Request

ARPA-E Program Directors serve limited terms. The request therefore supports recruitment of sufficient program direction staff to manage ARPA-E programs funded in FY 2015. The increase in program funding will require an increase in staff to provide quality program oversight. In addition, ARPA-E will continue to build its Technology-to-Market team to ensure that appropriate resources are available to work closely with all ARPA-E awardees. Starting in FY 2014, ARPA-E's program direction funds will also support embedded procurement staff; the costs of which are included in the FY 2015 request.

Program Direction
Funding ($K)

	FY 2013 Current	FY 2014 Enacted	FY 2014 Current	FY 2015 Request	FY 2015 vs FY 2014 Enacted
Program Direction Summary					
Washington Headquarters					
Salaries and Benefits	5,264	8,880	8,880	9,696	816
Travel	950	1,003	1,003	1,316	313
Support Services	13,821	13,330	13,330	13,163	-167
Other Related Expenses	3,954	4,787	4,787	5,075	288
Total, Washington Headquarters	**23,989**	**28,000**	**28,000**	**29,250**	**1,250**
Federal FTEs	**34**	**49**	**49**	**56**	**7**

Support Services and Other Related Expenses					
Support Services					
Technical Support	4,837	4,665	4,665	4,607	-58
Management Support	8,984	8,665	8,665	8,556	-109
Total, Support Services	**13,821**	**13,330**	**13,330**	**13,163**	**-167**
Other Related Expenses					
Rental payments to GSA	1,987	2,202	2,202	2,283	81
Communications, utilities, and misc. charges	450	500	500	550	50
Printing and reproduction	10	10	10	10	0
Other services from non-Federal sources	440	465	465	475	10
Other goods and services from Federal sources	970	1,510	1,510	1,652	142
Supplies and materials	97	100	100	105	5
Total, Other Related Expenses	**3,954**	**4,787**	**4,787**	**5,075**	**288**

Program Direction

Activities and Explanation of Changes

FY 2014 Enacted	FY 2015 Request	Explanation of Changes FY 2015 vs FY 2014 Enacted
Salaries and Benefits		
At the FY 2014 enacted level ARPA-E anticipates needing up to 49 Federal FTEs. This includes the addition of about 8 procurement staff previously provided to ARPA-E by DOE Headquarters Procurement at no cost to ARPA-E, an additional 3 Program Directors, and 4 Technology-to-Market advisers. The number of Federal FTEs in FY 2014 is commensurate to the number of ongoing and anticipated projects.	At the FY 2015 request level ARPA-E anticipates needing up to 56 Federal FTEs.	The increase in funding and FTEs support the additional staff required to develop new programs and manage a larger number of projects.
Travel		
ARPA-E Program Directors and Technology-to-Market advisers visit performers regularly as part of ARPA-E's hands-on engagement; which is the primary component of ARPA-E travel. The amount of site visits is commensurate with the number of ongoing projects. In FY 2014 ARPA-E anticipates the number of active projects will continue to grow.	At the FY 2015 request level ARPA-E anticipates the number of active projects will continue to grow.	The FY 2015 request for travel is based on actual travel costs in FY 2013, and the projected number of projects that will be ongoing and started in FY 2014 and FY 2015.
Support Services		
The FY 2014 enacted level for support services reflects the estimated costs for the type of support service contractors appropriate to support ARPA-E federal staff in ensuring management and oversight of ARPA-E projects and other required functions. The level of support by contractors is commensurate to the number of ongoing and anticipated projects.	At the FY 2015 request level ARPA-E anticipates a continued level of support commensurate to the number of ongoing and anticipated projects.	ARPA-E will continue to optimize federal staff and contractor support based on funding levels and the number of projects under management.

FY 2014 Enacted	FY 2015 Request	Explanation of Changes FY 2015 vs FY 2014 Enacted
Other Related Expenses		
The FY 2014 enacted level for other related expenses reflects the anticipated costs of these activities for the fiscal year.	In FY 2015 ARPA-E is requesting $5,075,000 for other related expenses.	The primary drivers of the Other Related costs are the Working Capital Fund and Information Technology support resulting from the increase in staffing levels, and funding for the National Academies of Science study required by P.L. 110-69 “America COMPETES Act of 2007”, as amended by P.L. 111-358, “America COMPETES Reauthorization Act of 2010”.

Advanced Research Projects Agency - Energy
Research and Development ($K)

	FY 2013 Current	FY 2014 Enacted	FY 2014 Current	FY 2015 Request	FY 2015 vs FY 2014 Enacted
Basic	0	0	0	0	0
Applied	111,605	126,000	126,000	147,875	21,875
Development	115,042	126,000	126,000	147,875	21,875
Subtotal, R&D	226,647	252,000	252,000	295,750	43,750
Equipment	0	0	0	0	0
Construction	0	0	0	0	0
Total, R&D	**226,647**	**252,000**	**252,000**	**295,750**	**43,750**

Advanced Research Projects Agency - Energy
Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) ($K)

	FY 2013 Current	FY 2014 Enacted	FY 2014 Current	FY 2015 Request[1]	FY 2015 vs FY 2014 Enacted
ARPA-E Projects					
SBIR	6,121	7,056	7,056	8,576	1,520
STTR	793	1,008	1,008	1,183	175
Total, SBIR/STTR	**6,914**	**8,064**	**8,064**	**9,759**	**1,695**

[1] In FY 2015, ARPA-E plans to continue its stand-alone SBIR/STTR program to provide additional support to small businesses beyond the large number of awards that go to small businesses via the standard Funding Opportunity Announcement process.