Advanced Research Projects Agency

- Energy -

Advanced Research Projects Agency – Energy
($K)

FY 2023 Enacted	FY 2024 Annualized CR	FY 2025 Request	FY 2025 Request vs FY 2023 Enacted
470,000	470,000	450,000	-20,000

Proposed Appropration Languange
For Department of Energy expenses necessary in carrying out the activities authorized by section 5012 of the America COMPETES Act (Public Law 110–69), $450,000,000, to remain available until expended: Provided, that of such amount, $42,000,000 shall be available until September 30, 2026, for program direction.

Mission
The mission of ARPA-E is to enhance the economic and energy security of the U.S. through the development of energy technologies that reduce imports of energy from foreign sources; reduce energy-related emissions, including greenhouse gases; improve the energy efficiency of all economic sectors; provide transformative solutions to improve the management, clean-up, and disposal of radioactive waste and spent nuclear fuel; and improve the resilience, reliability, and security of infrastructure to produce, deliver, and store energy.

Overview
The U.S. Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E) was established by the America COMPETES Act of 2007 (Public Law 110–69), as amended. ARPA-E will ensure that the U.S. maintains a technological lead in developing and deploying energy technologies. ARPA-E will identify and promote revolutionary advances in energy, translating scientific discoveries and cutting-edge inventions into technological innovations. It will also accelerate transformational technological advances in areas where industry by itself is not likely to invest due to technical and financial uncertainty. ARPA-E focuses on novel early-stage energy research and development (R&D) with technology applications that can be meaningfully advanced with a small investment over a defined period of time. ARPA-E coordinates its work with DOE's basic research and applied programs and other Federal research agencies to ensure work is not duplicated.

Projects that receive ARPA-E support are considered “high risk” and too early for private sector support. They are subject to strict technical and commercialization milestones intended to ensure accountability and transparency that enable rapid reprioritization of Agency funds towards only the most promising technologies. This has resulted in significant commercial interest, investment, and follow-on funding for successful technologies, amplifying the impact of the Agency’s funding decisions and accelerating progress towards achieving the Agency’s mission.

In FY 2025, ARPA-E will support R&D on climate adaptation and resiliency energy innovations as well as support the Administration’s Net Zero Gamechangers Initiative. This will support the target to achieve a net zero emissions economy by 2050 to meet the Administration’s goals to adapt and strengthen resilience to the impacts of climate change. Funding is requested to support the Administration’s energy technology agenda that will drive innovation to tackle the climate crisis while creating good paying jobs, assure the U.S. remains the world’s leader in energy technologies, and increase societal resilience to climate change impacts. ARPA-E will work with partners from across the Federal Government to develop transformative solutions for the climate crisis, including adaptation and resilience, and lay the foundation for future improvements in R&D across the Federal Government.

FY 2023 Key Accomplishments
Since its inception in 2009 through September 2023, ARPA-E has provided approximately $3.68 billion in funding to over 1,530 projects through focused programs and OPEN funding solicitations. A total of 218 ARPA-E projects have attracted more than $11.8 billion in private-sector follow-on funding, 300 project teams have partnered with other agencies for further development, and 150 companies have been formed from ARPA-E projects. In addition, ARPA-E project teams have generated 7,047 peer-reviewed journal articles and received 1,073 patents from the U.S. Patent and Trademark Office.

In FY 2023, ARPA-E released $400 million in new funding opportunities including:

- $100 million for **SCALEUP 2023** - Seeding Critical Advances for Leading Energy technologies with Untapped Potential

- $235 million for eight focused programs:
    - **GOPHURRS** - Grid Overhaul with Proactive, High-Speed Undergrounding for Reliability, Resilience, and Security
    - **PROPEL-1K** - Pioneering Railroad, Oceanic and Plane ELectrification with 1KWH/KG Energy Storage Systems
    - **ROSIE** - Revolutionizing Ore to Steel to Impact Emissions
    - **SEA CO2** - Sensing Exports of Anthropogenic Carbon Through Ocean Observation
    - **ULTRAFAST** - Unlocking Lasting Transformative Resiliency Advances by Faster Actuation of Power Semiconductor Technologies
    - **SPARKS** - Spurring Projects to Advance energy Research and Knowledge Swiftly
    - **CriticalMAAS** - Critical Mineral Assessments with AI Support
    - **REEACH Phase II** - Range Extenders for Electric Aviation with Low Carbon and High Efficiency
- $65 million for seven Exploratory Topics:
    - **INTERMODAL** - Increasing Transportation Efficiency and Resiliency through MODeling Assets and Logistics
    - **CREATE** - Creating Revolutionary Energy And Technology Endeavors
    - **PRE-TRAILS** - Predictive Real-time Emissions Technologies Reducing Aircraft Induced Lines in the Sky
    - **Algal Mining** - Critical Mineral Extraction from Ocean Macroalgal Biomass
    - **NSTC** - Novel Superconducting Technologies for Conductors
    - **Geological Hydrogen** - Production of Geologic Hydrogen through Stimulated Mineralogical Processes
    - **Geological Hydrogen** - Subsurface Engineering for Hydrogen Reservoir Management

Advanced Research Projects Agency - Energy
($K)

	FY 2023 Enacted	FY 2024 Annualized CR	FY 2025 Request	FY 2025 Request vs FY 2023 Enacted	
				$	%
ARPA-E Projects	433,000	433,000	408,000	-25,000	-5.8%
Program Direction	37,000	37,000	42,000	+5,000	+13.5%
Total, Advanced Research Projects Agency - Energy	**470,000**	**470,000**	**450,000**	**-20,000**	**-4.3%**

SBIR/STTR ($K):

- FY 2023 Enacted: SBIR: $13,856; STTR $1,949
- FY 2024 Annualized CR: SBIR: $13,856; STTR $1,949
- FY 2025 Request: SBIR: $13,056; STTR: $1,836

Future Years Energy Program (FYEP)
($K)

	FY 2025 Request	FY 2026	FY 2027	FY 2028	FY 2029
Advanced Research Projects Agency – Energy	450,000	460,000	471,000	482,000	493,000

Outyear Priorities and Assumptions

In the FY 2012 Consolidated Appropriations Act (P.L. 112-74), Congress directed the Department to include a future-years energy program (FYEP) in subsequent requests that reflects the proposed appropriations for five years. This FYEP shows outyear funding for each account for FY 2026 - FY 2029. The outyear funding levels use the growth rates in outyear account totals published in the FY 2025 President's Budget for both the 050 and non-050 accounts. Actual future budget request levels will be determined as part of the annual budget process.

Advanced Research Projects Agency - Energy priorities in the outyears include the following: ARPA-E will continue its focus on novel early-stage energy R&D with technology applications that can be meaningfully advanced with a small investment over a defined period of time. Outyear funding will support new focused programs, as well as continued support for OPEN solicitations (every three years), SCALEUP, and Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) programs.

ARPA-E Projects

Overview

ARPA-E identifies and supports revolutionary inventions and transformational energy advances, which requires constant evolution of its programmatic focus. This is accomplished by establishing dynamic technical programs (each lasting about three years) designed to accelerate innovation in high-potential areas. The breadth of the program portfolio that has developed over ARPA-E's lifetime addresses different parts of the energy technology space from year to year.

ARPA-E has demonstrated the efficacy of its model for accelerating high-potential, novel technical approaches to existing and emerging U.S. energy challenges. Program Directors, recruited for their technical expertise, leadership, and experience in energy issues, are given significant autonomy in identifying potential high-impact areas for R&D investment. ARPA-E's Program Directors work to develop their proposals in the context of both private sector and federally funded work in the technical space, and ultimately propose focused programs designed to accelerate research and commercial development in the topic area.

As a complement to its focused technology programs, ARPA-E also supports OPEN solicitations. OPEN solicitations seek the most innovative new ideas in energy technology across the full spectrum of energy applications, allowing the Agency to support the development of important technologies that fall outside the scope of its focused programs. OPEN solicitations are released every three years and were run in 2009, 2012, 2015, 2018, and 2021. Consistent with the triennial release schedule, ARPA-E plans to release another OPEN solicitation in 2024.

One significant component of ARPA-E's mission is accelerating the economic impact of U.S. investments in energy R&D, and advancing the commercialization readiness of successful projects is essential to achieving this goal. As project teams demonstrate success, ARPA-E's Technology-to-Market Advisors and Program Directors work closely with the teams to help identify pathways toward commercial deployment. Many of ARPA-E's alumni projects have been able to obtain follow-on funding from private investors, state agencies, and/or federal programs, and ARPA-E's maturing portfolio is offering increasing opportunities for commercialization of ARPA-E funded technologies.

Despite the level of technology 'de-risking' that projects from focused and OPEN solicitations have achieved, ARPA-E determined that further de-risking is necessary in some areas to validate technologies at a scale pertinent to investment. To this end, ARPA-E released SCALEUP solicitations in 2019, 2021, and 2023. SCALEUP is designed to fund successful technologies that were previously funded by ARPA-E for which the proof-of-concept R&D challenges have been addressed. Success in scaling these projects would enable industry, investors, and partners to justify substantial commitments of financial resources, personnel, production facilities, and materials to develop promising ARPA-E technologies into early commercial products. ARPA-E plans to release an open ended evergreen SCALEUP FOA in FY 2024 to continue the push toward commercialization for previous early-stage ARPA-E funded projects.

In FY 2025, ARPA-E plans to continue funding for SCALEUP and release up to 10 new focused FOAs. Potential technology areas for new focused FOAs in FY 2025 may include:

- Raw materials for the new-energy economy: Extraction and processing
- Low-carbon electricity generation and resilient distribution: Wind, hydro, geothermal, and nuclear, undergrounding
- Electrification of transportation and heat: Aviation, batteries, and thermal storage
- Waste management and resource recovery: Carbon capture, utilization, and storage (CCUS), nuclear, building materials

ARPA-E will also continue its stand-alone SBIR/STTR program to provide additional support to small businesses beyond the significant number of awards to small businesses via ARPA-E's standard non-SBIR/STTR solicitations.

ARPA-E Projects
Funding ($K)

	FY 2023 Enacted	FY 2024 Annualized CR	FY 2025 Request	FY 2025 Request vs FY 2023 Enacted	
				$	%
ARPA-E Projects	433,000	433,000	408,000	-25,000	-5.8%
Total, ARPA-E Projects	**433,000**	**433,000**	**408,000**	**-25,000**	**-5.8%**

ARPA-E Projects
Explanation of Changes
($K)

	FY 2025 Request vs FY 2023 Enacted
ARPA-E Projects: The FY 2025 Request is $25 million less than FY 2023 Enacted. At the decreased budget level, ARPA-E will issue approximately one less focused FOA than the FY 2023 Enacted.	**-25,000**
Total, ARPA-E Projects	**-25,000**

Program Direction

Overview

Program Direction enables ARPA-E to maintain and support a world-class Federal workforce that supports its mission. Funding provides resources for program and project management, oversight activities, workforce management, IT support, and Headquarters facilities and infrastructure. Funding also supports ARPA-E summer scholars, which is a cohort of graduate students to support ARPA-E's efforts to develop new programs and commercialization pathways for ARPA-E funded technologies.

Program Direction
Funding ($K)

	FY 2023 Enacted	FY 2024 Annualized CR	FY 2025 Request	FY 2025 Request vs FY 2023 Enacted	
				$	%
Program Direction					
Salaries and Benefits	12,666	13,170	16,390	+3,724	+29%
Travel	1,000	1,000	1,500	+500	+50%
Support Services	17,048	16,632	17,300	+252	+1%
Other Related Expenses	6,286	6,198	6,810	+524	+8%
Total, Program Direction	**37,000**	**37,000**	**42,000**	**+5,000**	**+14%**
Federal FTEs	**60**	**60**	**80**	**+20**	**+33%**
Support Services					
Technical Support	5,967	5,821	6,055	+88	+1%
Management Support	11,081	10,811	11,245	+164	+1%
Total, Support Services	**17,048**	**16,632**	**17,300**	**+252**	**+1%**
Other Related Expenses					
Working Capital Fund	4,123	4,123	5,061	+938	+23%
Energy Information Technology Services (EITS)	1,588	1,500	1,500	-88	-6%
Other Services	575	575	249	-326	-57%
Total, Other Related Expenses	**6,286**	**6,198**	**6,810**	**+524**	**+8%**

Program Direction

Activities and Explanation of Changes

FY 2023 Enacted	FY 2025 Request	Explanation of Changes FY 2025 Request vs FY 2023 Enacted
Program Direction $37,000,000	**$42,000,000**	**+ $5,000,000**
Salaries and Benefits		
At the FY 2023 Enacted level, ARPA-E supported 60 Federal FTEs.	At the FY 2025 Request Level, ARPA-E anticipates needing up to 80 Federal FTEs. Additional Program Directors, Tech to Market advisers, and Operations staff will be added in FY 2025 to support ARPA-E's portfolio of active projects, which has grown by over 80% since FY 2018.	+$3,724,000: The increase from the FY 2023 Enacted level is due to an increased federal staff to support ARPA-E's growing portfolio. Since ARPA-E is substantially involved in the direction of projects it funds from inception to completion, additional staff is needed to continue to effectively monitor and manage ARPA-E's portfolio, which has grown by over 80% from 291 active projects in FY 2018 to 500+ active projects in FY 2024.
Travel		
At the FY 2023 Enacted level, ARPA-E Program Directors and Technology-to-Market advisers will visit performers regularly as part of ARPA-E's hands-on engagement. The number of site visits will be commensurate with the number of ongoing projects.	At the FY 2025 Request level, ARPA-E Program Directors and Technology-to-Market advisers will increase visits to performers as part of ARPA-E's hands-on engagement. The number of site visits will increase with the number of ongoing projects.	+$500,000: Increase in travel is commensurate with the increase in number of active projects.
Support Services		
At the FY 2023 Enacted level, ARPA-E anticipates continuing the use of support service contractors to support ARPA-E federal staff in the management and oversight of projects and other required functions.	At the FY 2025 Request level, ARPA-E anticipates the continuing use of support service contractors to support ARPA-E federal staff in the management and oversight of projects and other required functions. The level of support is commensurate with the number of active and anticipated projects.	+$252,000: Increase in support services is commensurate with the increase in number of active projects.
Other Related Expenses		
The FY 2023 Enacted level for other related expenses primarily consists of Working Capital Fund and Energy Information Technology Services (EITS) support costs.	The FY 2025 Request level for other related expenses primarily consists of Working Capital Fund and Energy Information Technology Services (EITS) support costs.	+$524,000: Other related expenses are expected to increase slightly from FY 2023.

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

	FY 2023 Enacted	FY 2024 Annualized CR	FY 2025 Request	FY 2025 Request vs FY 2023 Enacted
Basic	0	0	0	0
Applied	235,000	235,000	225,000	-10,000
Development	235,000	235,000	225,000	-10,000
Subtotal, R&D	470,000	470,000	450,000	-20,000
Equipment	0	0	0	0
Construction	0	0	0	0
Total, R&D	**470,000**	**470,000**	**450,000**	**-20,000**

DEPARTMENT OF ENERGY

Funding by Site

TAS_0337 - Advanced Research Projects Agency - Energy - FY 2025

(Dollars in Thousands)

	FY 2023 Enacted	FY 2024 Annualized CR	FY 2025 President's Budget
Washington Headquarters			
ARPA-E Projects	433,000	433,000	408,000
Program Direction - ARPA-E	37,000	37,000	42,000
Total Washington Headquarters	**470,000**	**470,000**	**450,000**
Total Funding by Site for TAS_0337 - Advanced Research Projects Agency - Energy	**470,000**	**470,000**	**450,000**