COMMITTEE ON
SCIENCE, SPACE AND TECHNOLOGY
CHAIRMAN FRANK LUCAS

**FULL COMMITTEE**

**HEARING CHARTER**

***"An Overview of the Budget Proposal for the Department of Energy for Fiscal Year 2025"***

**Wednesday, June 26, 2024**
**10:00 A.M. EST**
**2318 Rayburn House Office Building**

## Purpose

The purpose of this hearing is to examine the Department of Energy's (DOE) fiscal year 2025 (FY25) budget request to Congress and the impact this proposed funding could have on civilian research, development, demonstration, and commercial application programs at the Department.

## Witness

- **The Honorable David M. Turk,** Deputy Secretary, Department of Energy.

## Overarching Questions

- What new initiatives and terminations are proposed in the FY25 budget for DOE?
- What research infrastructure investments are necessary for DOE to maintain its global competitiveness? Of these, what facilities or investments should be prioritized?
- What is the status of large-scale demonstration investments, including the Hydrogen Hubs, direct air capture (DAC) technology, and the Advanced Reactor Demonstration Program?
- How is DOE leveraging this FY25 budget compared to the Infrastructure Investment and Jobs Act (IIJA), Inflation Reduction Act (IRA), and CHIPS and Science Act funding?

## Background

Although only in existence since 1977, the Department of Energy traces its lineage to the Manhattan Project effort to develop the atomic bomb during World War II, and to the various energy-related programs that were previously dispersed throughout Federal agencies.[1]

DOE's mission is to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions.[2] In service of its mission, DOE employs over 14,000 federal employees, oversees 95,000 contractors, and operates 17 world-leading national laboratories which steward cutting-edge research across the scientific disciplines. DOE is a leader in energy technology innovation, the largest federal sponsor of basic research in the

[1] "About Us | Department of Energy." Energy.Gov, 8 Apr. 2024, www.energy.gov/about-us.
[2] *Id.*

physical sciences, and plays a central role in the U.S. research ecosystem.

The Committee on Science, Space, and Technology has jurisdiction over DOE's civilian research, development, demonstration, and commercial application programs. In total, the Committee oversees and authorizes over $17.90 billion in DOE activities, approximately one third of the Department's annual budget. DOE activities and programs under the Committee's jurisdiction include, but are not limited to: DOE's national laboratory system; fundamental science research; grid modernization and cybersecurity activities; fossil, nuclear, renewable, and other advanced energy technologies; waste and environmental management research; international research projects; alternative fuels; critical minerals research; industrial process improvements; pipeline research, development, and demonstration projects; and relevant oversight.

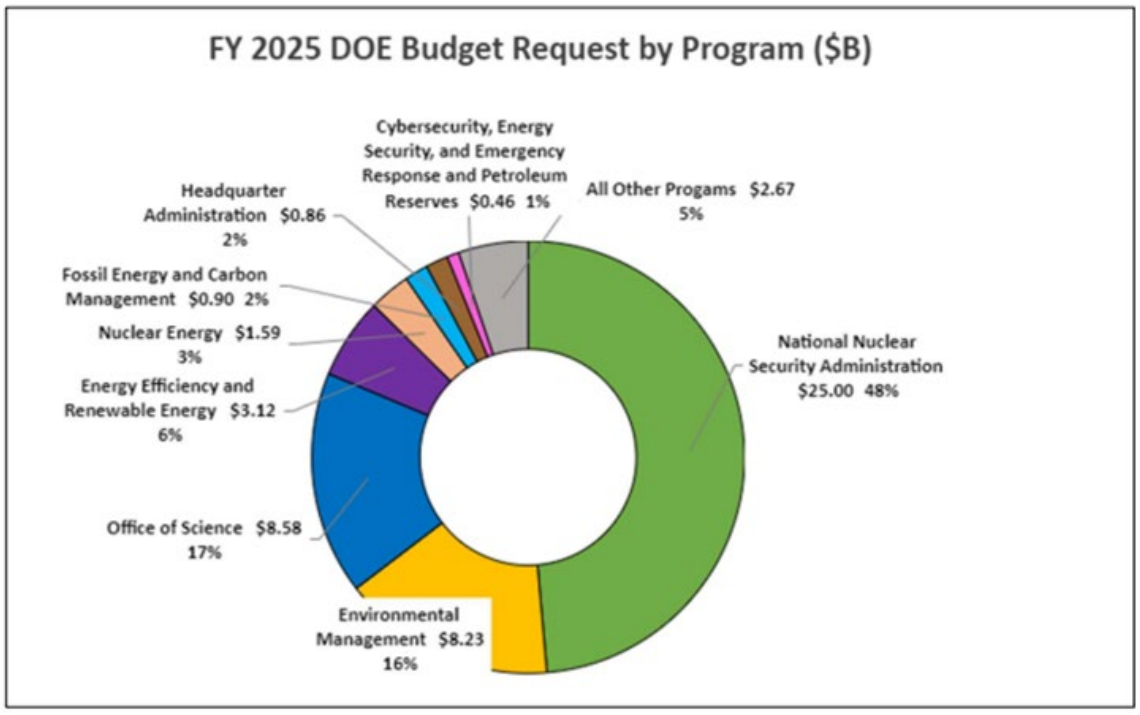
The Honorable David Turk was sworn in as Deputy Secretary of the U.S. Department of Energy on March 25, 2021. As Deputy Secretary of the U.S. Department of Energy, he serves as the second highest ranking official. This hearing will be his first time testifying before the Committee.

## FY 2025 President's Budget for DOE

| DOE Budget ($Billions) | 2023 Enacted*^ | 2024 Annualized CR | 2025 Request |
|---|---|---|---|
| *Defense (050)* | *$30.96* | *$30.96* | *$33.52* |
| *Non-defense (non-050)* | *$16.86* | *$17.01* | *$17.90* |
| **Total Budget Authority** | **$47.82** | **$47.97** | **$51.42** |
| | | | |

* Includes $300 million in emergency designated funding enacted in Division M, Additional Ukraine Supplemental Appropriations, of the Consolidated Appropriations Act, 2023 (P.L. 117-328) for the Office of Nuclear Energy.
^ FY 2023 Enacted does not reflect the $2.0 billion rescission of mandatory funding for the Office of Petroleum Reserves.

**Total = $51.42 Billion**



## Budget Request

There are five main focuses of the President's DOE FY25 budget request: leading on clean energy investments; investing in communities that have been left behind; using research and development to ensure that each future generation of clean energy technology will become more innovative; advancing critical climate goals; and increasing America's energy and national security. Of the $51.42 billion requested for DOE, the request proposes $1.60 billion to support a clean energy workforce, $8.23 billion for the Environmental Management Program, $8.58 billion for the Office of Science, $10.60 billion for climate and clean energy research and development, and $25 billion for the National Nuclear Security Administration.[3]

## Office of Science[4]

The President's FY25 budget request for the Office of Science is $8.58 billion, a $340 million increase from the $8.24 billion appropriated in FY24. All programs within the Office of Science except for one—Basic Energy Science (BES)—would receive funding boosts under the President's proposal.

Of the 17 National Labs, 10 fall solely within the Office of Science: Lawerence Berkeley National Lab, Argonne National Lab, Oak Ridge National Lab, Ames National Lab, Brookhaven National Lab, Princeton Plasma Physics Lab, SLAC National Accelerator Lab, Pacific Northwest National Lab, Fermi National Accelerator Lab, and Thomas Jefferson National Accelerator Facility.[5] Along with the National Lab facilities, the Office of Science also operates a network of 28 national scientific user facilities.[6] Together, the national labs and facilities provide resources for thousands of scientists to conduct research they otherwise would not be able to. Additionally, forty Fortune 500 companies and dozens of small businesses leverage the labs' unique tools and capabilities across an array of areas to further enhance innovation.[7]

| Office of Science | | | | | |
|---|---|---|---|---|---|
| Office's | FY 23 Enacted ($MM) | FY 24 Enacted ($MM) | FY 25 Request ($MM) | Change from FY 23 Enacted (%) | Change From FY 24 Enacted (%) |
| Advanced Scientific Computing Research (ASCR) | 1,068.00 | 1,016.00 | 1,152.68 | 7.93 | 13.45 |
| Basic Energy Research (BES) | 2,534.00 | 2,625.63 | 2,582.29 | 1.91 | -1.65 |
| Biological and Environmental Research (BER) | 908.69 | 900.00 | 945.23 | 4.02 | 5.03 |
| Fusion Energy Sciences (FES) | 763.22 | 790.00 | 844.50 | 10.65 | 6.90 |
| High Energy Physics (HEP) | 1,166.00 | 1,200.00 | 1,230.77 | 5.55 | 2.56 |
| Nuclear Physics (NP) | 805.20 | 804.00 | 833.09 | 3.46 | 3.62 |

[3] *Department of Energy FY 2025 Budget in Brief*, 3 Mar. 2024, www.energy.gov/sites/default/files/2024-03/doe-fy-2025-budget-in-brief-v2.pdf.
[4] *Department of Energy FY 2025 Congressional Justification*, 19 Mar. 2024, www.energy.gov/sites/default/files/2024-03/doe-fy-2025-budget-vol-5-v2.pdf.
[5] *Office of Science National Laboratories | Department of Energy*, 25 Mar. 2011, www.energy.gov/science/office-science-national-laboratories.
[6] Science, Office of. "User Facilities at a Glance." *U.S. DOE Office of Science (SC)*, 8 July 2019, science.osti.gov/User-Facilities/User-Facilities-at-a-Glance.
[7] *About the Office of Science | Department of Energy*, 18 May 2019, www.energy.gov/science/about-office-science.

Advanced Scientific Computing Research (ASCR)

The ASCR program maintains advanced computational infrastructure, accelerates U.S. computational and networking capabilities, and partners with programs within DOE to expedite innovation. Among Office of Science programs, the ASCR budget request contained the largest single year percentage increase of 13.45% - from $1.02 billion in FY24 to $1.15 billion in FY25. This increase is responsive to the development of artificial intelligence (AI) technologies and emerging technologies like Quantum Information Science (QIS).

With the completion of the Exascale Computing Project (ECP) in FY24, DOE manages the top two supercomputers in the world according to the most recent TOP500 list: Frontier at Oak Ridge Leadership Computing Facility and Aurora at Argonne Leadership Computing Facility. The FY25 budget request supports increases for operations and competitive allocation of the exascale computing systems. Additional facilities will see increased funding to support operations at the National Energy Research Scientific Computing Center, Energy Science Network, and the AI testbed facilities at these locations.

The FY25 budget request also includes planning, long lead procurements, and vendor research and development partnerships to address rising demand for compute power. This will help U.S. leadership by ensuring High-Performance Computing (HPC) and Integrated Research Infrastructure (IRI) are in place to continue America's lead in innovation. Within the budget request, funds are proposed for the construction of a new High Performance Data Facility.

Basic Energy Science (BES)

The BES program supports basic scientific research to lay the foundation for new energy technologies. BES research emphasizes the discovery, design, and understanding of new materials, chemicals, biochemicals, and geological processes.[8]

BES supports national scientific user facilities in three areas.[9] The X-Ray Light Sources Facilities include the Advanced Light Source (ALS), the Advanced Photon Sources (APS), the National Synchrotron Light Source II (NSLS-II), the Linac Coherent Light Source (LCLS), and the Standford Synchrotron Radiation Light Source (SSRL).[10] Within the Neutron Scattering Facilities, BES supports the High Flux Isotope Reactor (HFIR) and the Spallation Neutron Source (SNS).[11] Under the third area, Nanoscale Science Research Centers (NSRCs), BES supports the Center for Function Nanomaterials (CFN), the Center for Integrated Nanotechnologies (CINT), the Center for Nanoscale Material (CNM), the Center for Nanophase Materials Sciences (CNMS), and the Molecular Foundry (TMF).[12]

The President's FY25 budget request for BES is $2.58 billion. This is a decrease of 1.65%, or $50 million, from the FY24 appropriated level of $2.63 billion.

Biological and Environmental Research (BER)

The BER program seeks to understand the biological, biogeochemical, and physical processes that span from molecular and genomic-controlled scales to the regional and global scales that govern changes in watershed dynamics, climate, and the earth system.[13] Projects that have come out of this program include helping map the human genome, pioneering initial research on atmospheric and ocean

[8] *Basic Energy Sciences | Department of Energy*, 14 June 2024, www.energy.gov/science/bes/basic-energy-sciences.
[9] BES User Facilities at a Glance: U.S. DOE Office of Science (SC).", 19 Nov. 2019, science.osti.gov/User-Facilities/User-Facilities-at-a-Glance/BES.
[10] *X-Ray Light Sources. U.S. DOE Office of Science (SC*), 2 Sept. 2021, science.osti.gov/User-Facilities/User-Facilities-at-a-Glance/BES/X-Ray-Light-Sources.
[11] *Neutron Scattering Facilities." U.S. DOE Office of Science (SC)*, 2 Sept. 2021, science.osti.gov/User-Facilities/User-Facilities-at-a-Glance/BES/Neutron-Scattering-Facilities.
[12] *Nanoscale Science Research Cente...: U.S. DOE Office of Science (SC)*, 19 July 2019, science.osti.gov/User-Facilities/User-Facilities-at-a-Glance/BES/Nanoscale-Science-Research-Centers.
[13] *Biological and Environmental Res...: U.S. DOE Office of Science (SC*), 1 Mar. 2023, science.osti.gov/ber.

circulation, and biology underpinning the production of biofuels.[14]

BER supports three DOE Office of Science user facilities: the Atmospheric Radiation Measurement (ARM) user facility, the Environmental Molecular Science Laboratory (EMSL), and the Joint Genome Institute (JGI). These facilities allow researchers to access world-class scientific instruments and capabilities to expand our understanding of the dynamic processes between plant biology and microbes; strengthen the predictive capabilities of ecosystem and global scale models; and pursue innovation in bio-based products, clean energy, and more.[15]

The President's FY25 budget request for BER is $945.23 million. This is an increase of 5%, or $45.23 million, from the FY24 appropriated level of $900 million.

Fusion Energy Sciences (FES)

The FES program has two goals: to expand the understanding of matter at very high temperatures and densities, and to build the knowledge needed to develop a fusion energy source.[16] Within the continental U.S., there are two user facilities that FES funds: the DIII-D National Fusion Facility (DIII-D) and the National Spherical Torus Experiment – Upgrade (NSTX-U). Along with these facilities, FES provides funding to projects such as the Matter in Extreme Conditions at SLAC and the Material Plasma Exposure eXperiment (MPEX) at Oak Ridge. FES also provides funding for U.S. contributions to the International Thermonuclear Experimental Reactor (ITER), a nuclear fusion power plant collaboration between six countries and the European Union located in Southern France.[17] In addition, this program supports private industry with the Milestone-Based Fusion Development Program, along with the Innovation Network for Fusion Energy (INFUSE) voucher program.

The President's FY25 budget request for FES is $844.5 million. This is an increase of 6.9%, or $54.5 million, from the FY24 appropriated level of $790 million.

High Energy Physics (HEP)

HEP explores what the world is made of and how it works at the smallest and largest scales.[18] To execute its mission, HEP organizes research into three interrelated frontiers of particle physics: Energy Frontier, Intensity Frontier, and Cosmic Frontier. This experimental scientific discovery is supported by efforts in theory and enabled by fundamental research into particle acceleration and detection techniques.[19] HEP also develops new accelerator, detector, and computational tools to facilitate this critical science and make accelerator technology widely available.[20] This program also works collaboratively with the National Science Foundation (NSF) on overlapping science research in the fields related to the Cosmic Frontier and Astronomy.

The HEP program supports two user facilities: the Fermilab Accelerator Complex, which executes experiments within the Intensity Frontier, and the Facility for Advanced Accelerator Experimental Tests-II (FACET-II) where experiments in beam-driven plasma wakefield particle acceleration are executed.[21]

The President's FY25 budget request for HEP is $1.23 billion. This is an increase of 2.56%, or $30 million, from the FY24 appropriated level of $1.20 billion.

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[14] *Biological and Environmental Research | Department of Energy*, 8 May 2024, www.energy.gov/science/ber/biological-and-environmental-research.
[15] *Id*.
[16] *Fusion Energy Sciences | Department of Energy*, 11 Mar. 2024, www.energy.gov/science/fes/fusion-energy-sciences.
[17] *What Is ITER?*, 15 Sept. 2023, www.iter.org/proj/inafewlines.
[18] *High Energy Physics | Department of Energy*, 3 Feb. 2011, www.energy.gov/science/hep/high-energy-physics.
[19] *HEP Research: U.S. DOE Office of Science (SC)*, 11 July 2019, science.osti.gov/hep/Research.
[20] *High Energy Physics (HEP)*, 1 Mar. 2023, science.osti.gov/hep.
[21] *HEP User Facilities at a Glance: U.S. DOE Office of Science (SC)*, 22 Mar. 2023, science.osti.gov/User-Facilities/User-Facilities-at-a-Glance/HEP.

Nuclear Physics (NP)

The NP program studies all forms of nuclear matter to solve the mystery of the basic constituents of matter and how they interact to form the elements and properties we observe.[22] NP supports the necessary experimental and theoretical research to understand and unlock the atom's nucleus. Stewardship of this field is shared with NSF's Nuclear Physics Program. Together, DOE and NSF fund almost all basic research in nuclear physics.[23]

Four nuclear physics user facilities are supported by the NP program: the Argonne Tandem Linac Acceleratory System (ATLAS), the Continuous Electron Beam Accelerator Facility (CEBAF), the Facility for Rare Isotope Beams (FRIB), and the Relativistic Heavy Ion Collider (RHIC).[24]

The President's FY25 budget request for NP is $833.09 million. This is an increase of 3.62%, or $29.09 million, from the FY24 appropriated level of $804 million.

**Applied Energy Research and Development**[25]

The President's FY25 budget request would provide $7 billion for applied energy research and development. The programs and offices funded through the applied energy research and development portfolio are instrumental in bridging fundamental science discoveries with real-world applications. Therefore, the success of each office, in tandem with the Office of Science, is essential for the U.S. to continue its leadership in the scientific world.

[22] *Nuclear Physics | Department of Energy*, 25 Mar. 2011, www.energy.gov/science/np/nuclear-physics.
[23] *Nuclear Physics (NP)*, 1 Mar. 2023, science.osti.gov/np.
[24] *NP User Facilities at a Glance: U.S. DOE Office of Science (SC)*, 19 Nov. 2019, science.osti.gov/User-Facilities/User-Facilities-at-a-Glance/NP.
[25] *Department of Energy FY 2025 Congressional Justification*, 28 Mar. 2024, www.energy.gov/sites/default/files/2024-03/doe-fy-2025-budget-vol-4-v5.pdf.

| Applied Energy Research and Development | | | | | |
|---|---|---|---|---|---|
| | FY 23 Enacted ($MM) | FY 24 Enacted ($MM) | FY 25 Request ($MM) | Change from FY 23 Enacted (%) | Change From FY 24 Enacted (%) |
| Energy Efficiency and Renewable Energy (EERE) | 3,460.00 | 3,460.00 | 3,118.00 | -9.88 | -9.88 |
| Fossil Energy and Carbon Management (FECM) | 890.00 | 865.00 | 900.00 | 1.12 | 4.05 |
| Nuclear (NE) | 1,766.30 | 1,685.00 | 1,440.66 | -18.44 | -14.50 |
| Electricity (OE) | 350.00 | 280.00 | 293.00 | -16.29 | 4.64 |
| Cybersecurity, Energy Security, and Emergency Response (CESER) | 200.00 | 200.00 | 200.00 | 0.00 | 0.00 |
| Advanced Research Projects Agency-Energy (ARPA-E) | 470.00 | 460.00 | 450.00 | -4.26 | -2.17 |
| Loan Program Office (LPO) | 66.21 | 70.00 | 55.00 | -16.93 | -21.43 |
| Office of Clean Energy Demonstrations (OCED) | 89.00 | 50.00 | 180.00 | 102.25 | 260.00 |
| Manufacturing and Energy Supply Chain (MESC) | 19.00 | 19.00 | 113.35 | 496.58 | 496.58 |
| Grid Deployment Office (GDO) | 0.00 | 60.00 | 101.87 | -- | 41.10 |

Office of Energy Efficiency & Renewable Energy (EERE)

EERE is the largest of DOE's applied energy research and development programs. EERE's investments directly support the deployment and demonstration of technologies within its five programmatic priorities: decarbonizing the electricity sector, decarbonizing transportation, decarbonizing the industrial sector, reducing the carbon footprint of buildings, and decarbonizing the agriculture sector, specifically focused on the nexus between energy and water.[26]

The President's FY25 budget request for EERE is $3.12 billion, a 9.9% decrease from the FY23 and FY24 appropriated levels of $3.46 billion.[27] Within this request, the Renewable Energy Grid Integration program would see an increase from $22 million to $65 million. The Wind Energy Technologies Office

[26] *About the Office of Energy Efficiency and Renewable Energy*. 8 June 2011, www.energy.gov/eere/about-office-energy-efficiency-and-renewable-energy.
[27] *Supra* note 3.

(WETO) would see an increase from $137 million to $199 million. The Geothermal Technologies Office (GTO) would see an increase from $118 million to $156.19 million.

The Advanced Manufacturing Office was split into two offices in FY24, transforming into the Industrial Efficiency & Decarbonization Office (IEDO) and the Advanced Material & Manufacturing Technologies Office (AMMTO). IEDO requested a funding increase from $237 million to $287.23 million and AMMTO has requested an increase from $215 million to $220 million. Combined these offices are requesting $507.23 million compared to $452 million appropriated in FY24, an increase of $55.23 million.

Office of Fossil Energy and Carbon Management (FECM)

FECM conducts research and development activities to minimize the environmental impacts of fossil fuels, critical minerals, materials, and industrial processes. FECM priority areas of technology work includes carbon capture, carbon conversion, carbon dioxide removal, carbon dioxide transport and storage, hydrogen production with carbon management, methane emissions reduction, and critical minerals production. FECM also manages the National Energy Technology Laboratory (NETL), creating a unique organizational structure with NETL serving as both an onsite science and technology research center and as the administrator of nearly 1,800 contracts with external organizations.

The President's FY25 budget request for FECM is $900 million, a 4% increase from the FY24 appropriated level of $865 million.

Office of Nuclear Energy (NE)

NE's mission is to advance nuclear energy science and technology to meet U.S. energy, environmental, and economic needs. Five goals have been identified to address challenges the industry faces, including enabling the continued operation of existing U.S. nuclear reactors; deploying advanced nuclear reactors; developing advanced nuclear fuel cycles; maintaining U.S. leadership in nuclear energy technology; and creating a high-performing organization. The Committee has historically provided bipartisan support for DOE nuclear energy research programs, with a focus on providing the necessary capabilities to support the development of advanced reactor technologies.

The President's FY25 budget request for NE is $1.44 billion, a 14.50% decrease from the FY 24 appropriated level of $1.69 billion. Notably, the request includes a proposed $70 million decrease for the Advanced Reactor Demonstration Program and zeroing out funding for the Versatile Test Reactor.

Office of Electricity (OE)

OE's purpose is to ensure the nation's electrical delivery system is secure, resilient, and reliable. This is accomplished through R&D of new technologies to improve infrastructure and oversight of the Federal and state electricity policies and programs that shape planning and market operations. OE works with private industry and Federal, State, tribal, territorial, and regional governments on numerous projects and technologies to accomplish its mission.[28]

The President's FY25 request for OE is $293 million, a 4.64% increase from the FY24 appropriated level of $280 million. In FY 2024, the Grid Deployment Office (GDO) was separated from the Office of Electricity, and the FY25 budget request proposes increasing funding from $60 million in FY24 to $101 million in FY25.

[28] *Our History | Department of Energy*, 4 Mar. 2014, www.energy.gov/oe/our-history.

Office of Cybersecurity, Energy Security, and Emergency Response (CESER)

CESER, formerly part of the Office of Electricity, addresses the emerging threats facing the U.S. energy sector by strengthening security and resilience from cyber, physical, and climate-based risks and disruptions.[29] In partnership with industry, CESER serves as a bridge between industry and the government through the National Labs, the Electricity Subsector Coordinating Council (ESCC), the Oil and Natural Gas Subsector Coordinating Council (ONG SCC), along with exercises like Clear Path and GridEx to better prepare for various types of emergencies.[30]

The President's FY25 budget request for CESER proposes level funding from FY24 to FY25 at $200 million.[31]

**Advanced Research Projects Agency-Energy (ARPA-E)[32]**

Established by the America COMPETES Act, ARPA-E is modeled after the Defense Advanced Research Projects Agency (DARPA). ARPA-E aims to advance high-potential, high-impact energy technologies that are too early for private sector investment.[33] These projects are focused on transformational energy projects that can be meaningfully advanced with a small amount of funding.

The President's FY25 request for ARPA-E is $450 million, a 2% decrease from the FY24 appropriated level of $460 million. In FY25, ARPA-E plans to continue funding for Seeding Critical Advances for Leading Energy technologies with Untapped Potential (SCALEUP) and the release of up to 10 new focused Funding Opportunity Announcements (FOAs).

**Additional Offices Within Science, Space, and Technology's Jurisdiction[34]**

The Loan Program Office (LPO) manages the Title 17 Innovative Technology Loan Guarantee Program which finances projects supporting clean energy deployment and energy infrastructure reinvestment. The President's FY25 request proposes $55 million, a decrease of $15 million from the FY24 appropriated level of $70 million.[35,36] The Office of Clean Energy Demonstrations (OCED) partners with private industry to accelerate deployment, market adoption, and equitable transition to a decarbonized energy system. The President's FY25 request for OCED is $180 million, an increase of 260% increase from the FY24 appropriated level of $50 million. The Office of Manufacturing and Energy Supply Chains (MESC), which supports re-shoring and scaling U.S. energy supply chains, has a budget request of $113.34 million for FY25, an increase of 497% from the FY24 appropriated level of $19 million.[37,38]

[29] *Ceser Mission | Department of Energy*, 14 May 2018, www.energy.gov/ceser/ceser-mission.
[30] *About Us | Department of Energy*, 14 May 2018, www.energy.gov/ceser/about-us.
[31] *Department of Energy FY 2025 Congressional Justification*, 13 Mar. 2024, www.energy.gov/sites/default/files/2024-03/doe-fy-2025-budget-vol-3-v2.pdf .
[32] *Department of Energy FY 2025 Congressional Justification*, 21 Mar. 2024, www.energy.gov/sites/default/files/2024-03/doe-fy-2025-budget-vol-2-v4.pdf.
[33] *About*. Arpa-e, 21 Feb. 2013, arpa-e.energy.gov/about.
[34] *Supra* note 31.
[35] *Title 17 Clean Energy Financing | Department of Energy*, 19 May 2023, www.energy.gov/lpo/title-17-clean-energy-financing.
[36] *Supra* note 31.
[37] *About Us | Department of Energy*, 15 Sept. 2023, www.energy.gov/mesc/about-us.
[38] *Supra* note 31.