clean tomorrow | Re-Energizing America

Rebuilding Momentum Through 2030

The Road Ahead, 2026–2030

Despite recent setbacks, the goals of energy innovation remain essential, and the rationale for a catalytic federal role in the innovation process remains crucial. To re-energize American energy innovation leadership through the rest of this decade, federal policymakers must reclaim the bipartisan momentum of 2020 to 2022 while incorporating lessons learned and addressing changing circumstances in the economic and geopolitical landscape.

The "Road Ahead" calls for a federal investment of $25 billion for DOE's RD&D programs by 2030, resetting ambitious and strategic targets for American investment in the technologies of the future. These budgets are strategically focused on 10 technology pillars and aligned to the imperatives of security, affordability, decarbonization, and economic opportunity. Increased and sustained federal investment must be accompanied by implementation improvements that address legal and organizational roadblocks at DOE that were laid bare over the past few years. To fully support an ambitious innovation agenda with the funding levels this report calls for, we also propose several reforms that would augment DOE's innovation capability, unleash the full potential of DOE, and ensure the nation reaps the economic benefits of those investments.

As in the original *Energizing America* report, growth in federal funding for its own sake is not the goal, especially in a fiscal environment of a ballooning federal deficit. Our funding target of $25 billion by the end of the decade is built from a strategic assessment of technology priorities, historic investment, and how the United States compares to global peers and competitors. Additionally, DOE must be equipped and empowered to fully leverage this funding efficiently and with maximum impact via smart, thoughtful reforms in how the department operates.

The "Road Ahead" calls for a federal investment of **$25 BILLION** for DOE's RD&D programs by 2030.

Enabling a rejuvenated energy innovation mission, both through funding and institutional reforms, will only be successful with support from across the political spectrum. The foundation for bipartisan American energy leadership remains largely intact. However, sustained progress will require regular, consistent support that reflects national strategic priorities. The alternative to sustained investment in innovation is continued vulnerability to feast and famine cycles of funding that leave American innovators and workers adrift without a consistent national strategy. China's comprehensive industrial strategy for clean energy technologies succeeds precisely because it transcends short-term political considerations in favor of long-term strategic planning. If America is to continue to lead the world in energy innovation, we must ensure that what should be enduring national investments are not subject to policy whiplash. This is not only possible, but imperative for our nation to meet the moment.

Federal Budgets and Priorities

To meet this renewed energy innovation mission, our methodology for generating recommended budgets consisted of:

Identifying 10 strategic technology pillars based on the original work of *Energizing America*, updated to meet today's imperatives.

Setting an ambitious topline goal of $25 billion by 2030 to restore the United States to funding levels established when DOE was established and set us back on par with leading peer and competitor nations globally.

Prioritizing technology pillars based on their potential to meet the goals of security, affordability, decarbonization, and economic opportunity.

Mapping the path to achieve that target over the next five years.

Setting an Ambitious but Justified Topline Goal

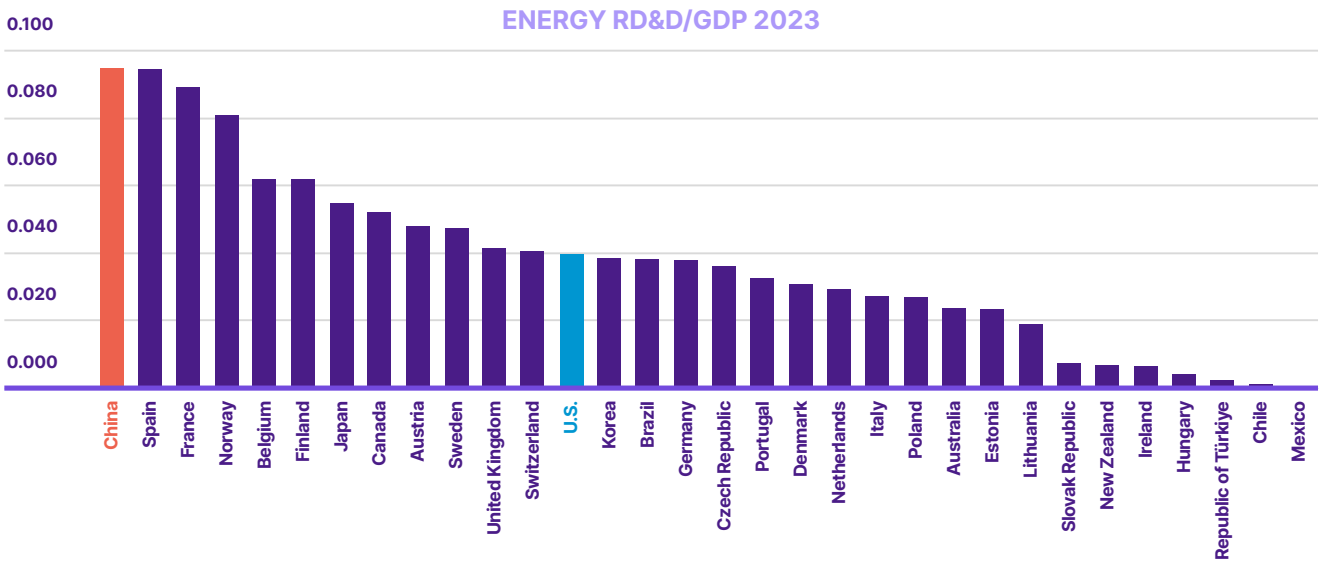
We recommend increasing energy RD&D funding by 80% from the FY 2025 baseline[1] in the remainder of this decade, ramping to $25 billion in FY 2030. Now is not the time to pull back; it is the time to double down on investments that bring down technical risk, support American innovators, and build out the energy system we need to power the modern economy. Twenty-five billion dollars by the end of the decade, strategically applied to technology pillars and incorporating lessons learned on how DOE can effectively and impactfully deliver this funding (as we dive into more fully below), will put the United States on a path toward more affordable energy, greater national security, increased economic opportunity, and reduced global emissions.

In 2020, *Energizing America* set a goal of ambitiously expanding federal energy RD&D funding over five years, with DOE receiving over $18 billion in FY 2026 (if this number is inflation-adjusted from 2020, it would correspond to $22 billion in today's dollars).[2] The authors argued that this investment would provide the foundation for the United States to achieve key goals in the coming decades and that the target was in line with funding responses to similarly urgent science and technology challenges in the past as well as those of other countries.

As we have seen, progress was made toward this goal, but American energy innovation is now in jeopardy amidst increasing energy demand, rising energy costs, China's technology dominance, and faltering emissions reductions. Now is the time for Congress to reclaim leadership on global energy innovation.

China's public energy RD&D spending is a reminder of what we're up against. As Figure 10 shows, China spent a greater share of GDP than any other country on energy innovation. Even that is likely an underestimate given the Chinese government's deep involvement in China's private sector. The United States spends less than half that of China on energy innovation as a share of GDP and invests less than 11 other countries.[3] "We're number 13!" is not a slogan that Americans can be proud of. Our proposed target, if adopted today, would restore the United States to the top tier of this year's rankings and set us within competitive distance of China.

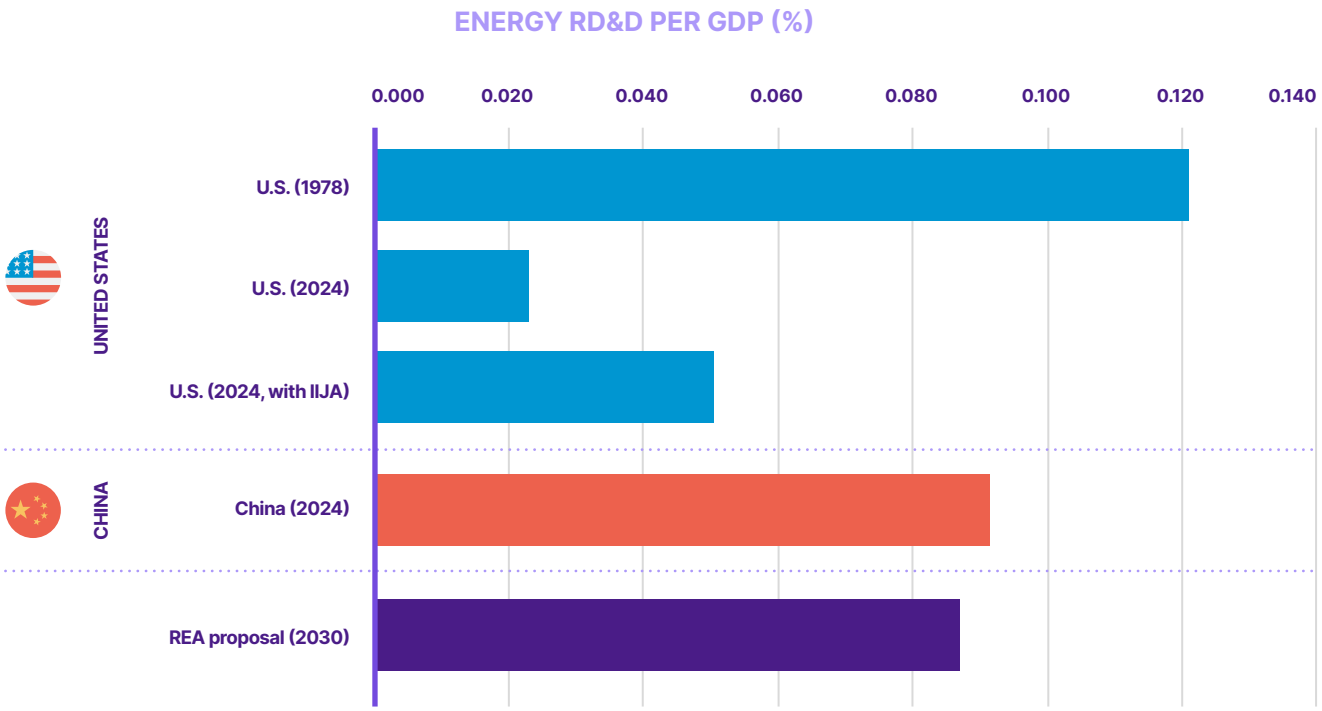
FIGURE 10. Energy RD&D as a share of GDP for select countries. Data from IEA (2023 is the latest year available for all the countries).



It would also bring the priority placed on energy innovation within the national context up to where it was during the energy crisis of the 1970s, when DOE was founded. Today's challenges are no less compelling than those of 50 years ago. Those investments in the 1970s set the United States up to be a global leader in the 20th century, and we must not lose the opportunity to lead again in the 21st century and beyond with the technologies of the future.

For some perspective, this report's target of $25 billion for energy RD&D funding is less than half a percent (0.4%) of the total federal budget, and only 1.4% of all discretionary spending. In fact, it is less than half of DOE's total budget.[4] With the returns on investment that RD&D funding provides for our nation, the benefits of meeting our proposed funding target are critical and worth every dollar.

FIGURE 11. Federal RD&D funding as a percentage of GDP for selected countries and years.[5, 6, 7]



Setting Priorities and Allocating Resources within DOE

Funding across DOE offices and programs should be allocated based on the likelihood and urgency of their work to impact the four policy imperatives of affordability, national security, economic opportunity, and decarbonization. To build out our funding recommendations, we divided the 10 technology pillars by level of priority and assigned a five-year funding multiplier to each level (Table 2). Technology pillars for grid, clean firm generation, manufacturing, and supply chains have the highest multipliers. Technology pillars for science, fuels, and buildings fall into our medium prioritization category, while pillars for variable generation, transportation, and carbon management are prioritized lowest.

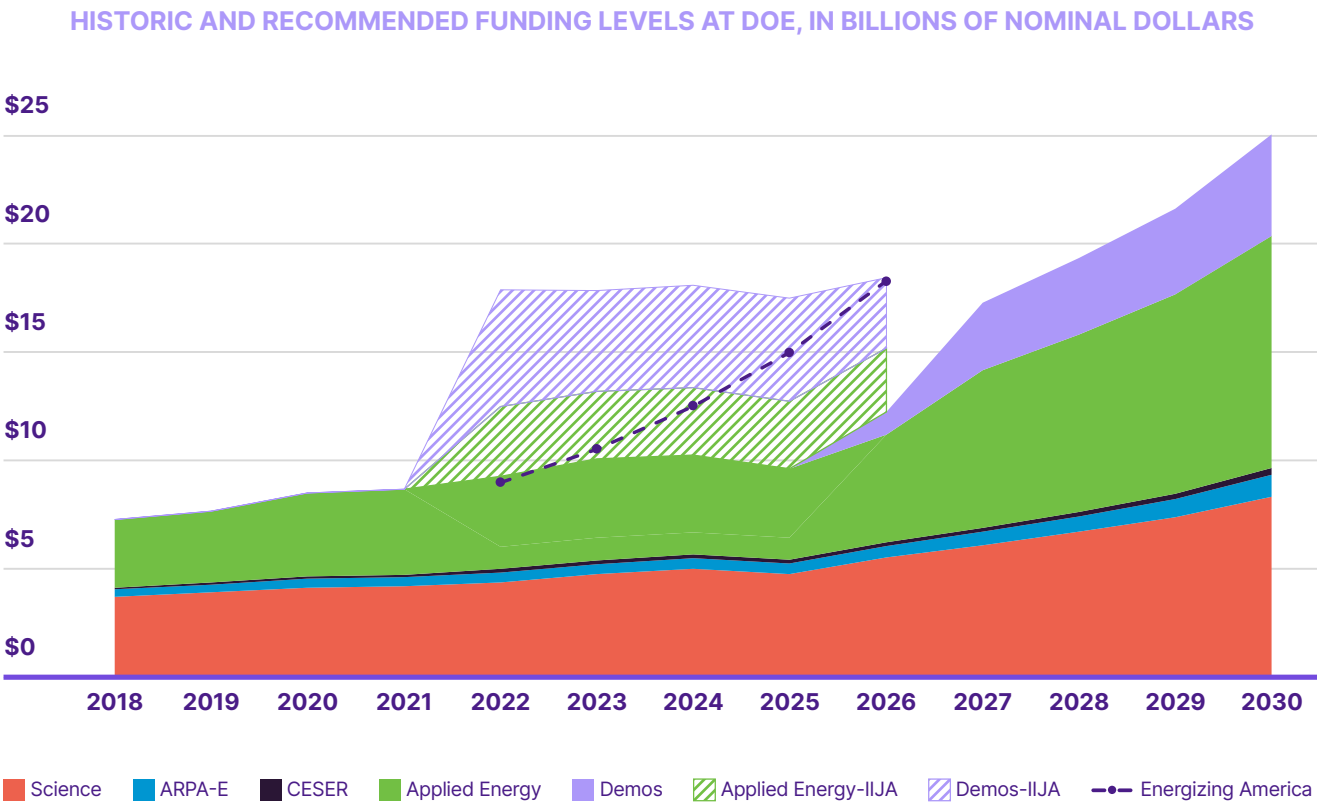
Table 2. Multipliers for priority technology pillars.

PRIORITY ONE	PRIORITY TWO	PRIORITY THREE
Secure, efficient, digitally enabled power systems: Advanced transmission, storage, cybersecurity, and digital technologies to support AI, manufacturing, and electrification while ensuring reliability and security of the electric grid	**Foundational science at platform technologies:** Platform technologies, including advanced materials, quantum computing, and AI, enabling breakthroughs across energy systems	**Variable electricity generation:** Next-generation solar, floating wind, and marine energy, building on renewable momentum and staying ahead of rapidly advancing technologies
Clean firm electricity generation: Around-the-clock, low-emission power from advanced nuclear, fusion, and enhanced geothermal to compete with China and power critical sectors	**Sustainable fuels:** Advanced biofuels, hydrogen, and synthetic hydrocarbons for transportation, industry, and agriculture security	**Advanced transportation systems:** Electrification and autonomous systems across all modes, from passenger vehicles to heavy-duty trucking and aviation
Secure supply chains: Domestic capacity for critical minerals, battery chemistry, and materials processing to reduce dependence on China	**Efficient buildings:** Heat pumps, smart controls, and advanced envelopes to reduce the 40% of U.S. energy consumed by buildings	**Carbon management:** Capture, storage, and removal technologies for hard-to-abate industrial and power sector emissions
Clean and competitive manufacturing: Process innovations and electrification for chemicals, steel, cement, and energy component production to meet global sustainability standards		

These priorities reflect our collective judgment. The highest-priority pillars can contribute to multiple policy imperatives, have suffered from historic underinvestment, and are geopolitically important. We use the *Energizing America* targets and funding levels (as described in earlier sections of this report) to assess historic underinvestment. Affordability and economic opportunity were assessed based on existing analyses for market potential in the United States, including the DOE Liftoff Reports and technology deep dives from several sources.[8, 9, 10, 11] Security was trickier to assess, as national security, economic security, and physical infrastructure security are all related but distinct aspects of security. We placed a higher priority on pillars that had a defense nexus, addressed securing supply chains for critical materials and components, and had the potential to improve grid and infrastructure stability. Decarbonization was based on sectors with the highest emissions.[12]

We then estimate the degree to which each DOE office advances each pillar. That calculation yields a recommended pace of funding increase for each office over our five-year time horizon. For instance, DOE's Buildings Technology Office primarily contributes to the efficient buildings pillar, but a portion of its work is devoted to the electricity grid pillar, because buildings increasingly interact with the grid. The pace of growth for the office thus blends the two multipliers. (The full methodology for priority setting and resource allocation can be found in Appendix A.) Combining this bottom-up analysis with our overarching goal yields the proposed funding targets shown in Figure 12.

FIGURE 12. Historical and recommended funding levels for DOE.



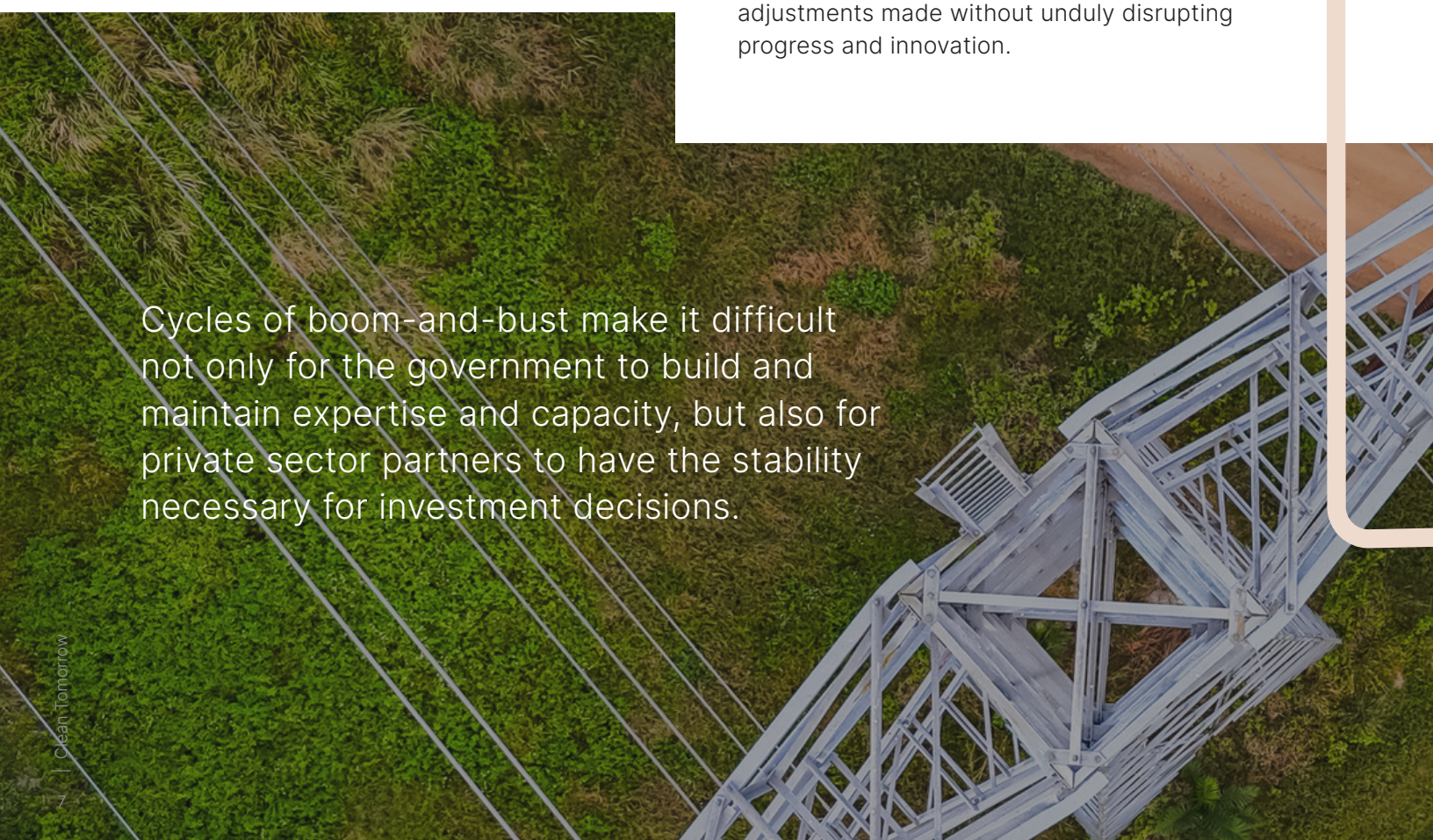
Note: While OCED has essentially been dismantled at the time of writing of this report, we retain demos as an important area of funding for DOE. The "demos" funding we recommend in this figure and more broadly in this report may remain in a distinct office, be subsumed under a different DOE office, or spread out across distinctive technology offices. See below for a discussion on demonstration-scale projects.

Stable Growth and Regular Assessment

As Figure 12 shows, we propose a smooth ramp-up to meet our goal. Short-term volatility in funding damages the long-term mission of energy innovation. Cycles of boom-and-bust make it difficult not only for the government to build and maintain expertise and capacity, but also for private sector partners to have the stability necessary for investment decisions.

Funding allocations from the IIJA go through FY 2026 and no further. This heralds an "innovation cliff" in FY 2026—the exact type of boom-and-bust that Energizing America cautioned against. To that end, Congress must increase funding in FY 2027 to accommodate for that drop-off and meet innovation funding targets that ensure robust and continued investment. Given current circumstances and what the past few years have shown, it is likely that IIJA funds will remain available beyond FY 2026. Those funds should be reallocated and invested to help meet our recommended targets, not squandered.

The ramp-up, of course, cannot be sustained indefinitely. We recommend it level out to match the pace of overall economic growth, so that the target level of 0.1% of GDP is sustained on an inflation-adjusted basis beyond 2030. Similarly, the technology pillars and priorities should not be set in stone, but rather revisited and updated periodically. New imperatives will emerge, along with unexpected scientific discoveries and technological developments. These opportunities can be seized and adjustments made without unduly disrupting progress and innovation.



Cycles of boom-and-bust make it difficult not only for the government to build and maintain expertise and capacity, but also for private sector partners to have the stability necessary for investment decisions.

A Discussion of Demonstration-Scale Projects

In the years leading up to *Energizing America* and the major legislative actions taken in 2020 and 2021, a growing chorus of experts across science, business, academia, and technology highlighted the "demonstration valley of death" that prevents many energy technologies from moving from pilot scale to widespread adoption. Reporting and research alike have noted that the trend of moving overseas has enabled some technologies invented in the United States, including polycrystalline silicon solar panels and lithium iron phosphate batteries, to cross the valley, leading to the commercialization of these technologies abroad—and taking many benefits with them.[13, 14]

Various models for federal support of these riskier, first-of-a-kind generating facilities and industrial plants were proposed, from creating a government-funded "energy technology corporation" to an independent federal administration to a new office within DOE.[15, 16, 17] Congress voted in 2021 to establish the DOE OCED and appropriated over $20 billion for cost-shared projects that would not attract fully private investment.[18]

By the end of the Biden administration, OCED had obligated less than half its budget and outlaid much less.[19] This slow and deliberative approach, while justified by the technical complexity of the projects and the limited administrative resources available to OCED as the office grew, left funding vulnerable to recission and projects vulnerable to cancellation. The Trump administration has essentially dismantled OCED, canceled many projects overseen by the Office, and left others in limbo as of this report's publication.

The key argument offered by OCED's critics is that it unfairly subsidizes certain technologies and spends taxpayer dollars where the private sector should instead step in.[20] Yet, as the response to DOE's cancellations reveals, there is little evidence that the market will fill the gap. Moreover, the Trump administration recognizes the essential role of catalytic public funding for demonstration projects in specific cases, such as advanced nuclear power.[21]

As the United States pulls back, China is ramping up. This year, the central government announced 101 new demonstration projects, on top of 47 funded last year.[22] While the United States may not be poised to compete with China in manufacturing commodity products like solar cells, the complex, large-scale technologies like those OCED sought to demonstrate offer many promising opportunities to unlock private investment and capture economic benefits.

Additionally, there are clear examples that when public demonstration project funding is successfully layered onto the U.S. RD&D innovation advantage, there can be widespread gains towards all desired outcomes—national security, economic opportunity, decarbonization, and affordability. DOE's investments in hydraulic fracturing are perhaps the best, most recent example— the United States continues to lead globally in horizontal drilling and natural gas production, and this technology advance has changed the modern energy landscape. To this end, we maintain funding for demonstration projects in our budget proposal. They are vital tools of energy innovation policy without which many technologies will fail to commercialize.

Immediate Goals for FY 2026 and FY 2027

Each year presents a new opportunity to put ourselves on a path to revitalize U.S. energy innovation, to rebuild the momentum of the last five years, and to compete on the global stage, and we begin with fiscal year 2026. Recommended budgets for FY 2026 and FY 2027 are in the table below.

TABLE 3. Planned and recommended FY26 budgets for selected DOE offices (in millions of nominal dollars).

	FY 2025		FY 2026			FY 2027
Office	**Base Appropriation**	**IIJA Allocation***	**Proposed Base Appropriation**	**IIJA Allocation***	**% Increase (Base + IIJA)**	**Proposed Base Appropriation**
Science	$4,770		$5,500		16%	$6,100
Energy Efficiency and Renewable Energy (EERE)	$2,200	$1,490	$2,620	$1,450	10%	$3,780
Fossil Energy and Carbon Management (FE)	$570	$1,430	$710	$1,300	0%	$1,480
Nuclear Energy (NE)	$1,040		$1,190		15%	$1,360
Office of Electricity (OE)	$380	$200	$450	$200	13%	$630
ARPA-E	$470		$540		15%	$620
Office of Cybersecurity, Energy Security, and Emergency Response (CESER)	$120	$50	$140	$50	13%	$190
Office of Technology Commercialization (OTC)	$20		$23		15%	$26
Energy Demonstrations**	$50	$4,770	$1,000	$3270	-11%	$3,100

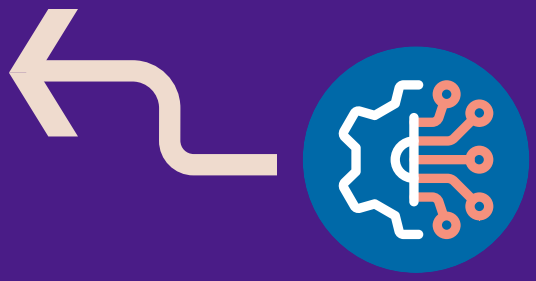
*IIJA allocation is the annualized appropriation for the multi-year appropriations for IIJA programs. As of the writing of this report, while some IRA funding has been rescinded and projects funded by those programs have been terminated (or proposed to be terminated), that funding remains appropriated by law for those programs.

**While OCED has essentially been disbanded, we recommend maintaining funding for demonstration-scale projects, whether in its own office, under a new office, or under the applied offices.

Across DOE offices, recommended budget increases from FY 2025 to FY 2026 fall between 0% and 16%, with the greatest increases for the Offices of Science, Nuclear Energy, and ARPA-E. The Offices of Electricity and Cybersecurity, Energy Security, and Emergency Response play essential roles in supporting innovation and improvements for our electric grid and also see substantial budget increases in our recommendations. The Office of Technology Commercialization, while not technology-specific, plays a key role in coordinating and supporting technology commercialization and program development at the Department, and we recommend an increase of 15% in their budget for FY 2026. These increases will set the United States on the path for increased energy RD&D investments and rebuilt federal funding mechanisms to advance strategic technology priorities along the innovation commercialization pipeline.

FY 2027 is included in the table to highlight the necessity of increasing appropriations in FY 2027 to fill the gap left by the loss of IIJA funding. Our funding targets seek to rebuild to IIJA levels and beyond, gradually over time to allow for staffing and capacity-building within DOE. With these sustained and gradual increases, DOE can be fully unleashed to re-establish U.S. dominance in energy innovation.

How to Deliver on Energy Innovation



The ambitious energy innovation agenda outlined in this report can only succeed if the federal government's capacity to execute matches its strategic vision. While Congress has provided unprecedented funding for energy innovation over the past five years, implementation challenges have limited the impact of these investments. Some programs encountered delays in disbursing funds, others struggled with complex procurement processes, and many operated in isolation rather than as part of a coordinated innovation pipeline.

These challenges are not failures of individual leadership or political will, but evidence of the difficulties of adapting a decades-old federal agency to nimbly meet the needs of today. To realize the full potential of federal energy innovation investment, DOE must transform from a collection of semi-autonomous programs into a unified system capable of moving technologies seamlessly from early-stage research to commercial-scale deployment. Simultaneously, caution in oversight of taxpayer dollars must be balanced with taking risks to ensure that federally funded projects have the opportunity to succeed. This transformation requires both structural reforms and cultural changes that prioritize collaboration, speed, and long-term thinking, without sacrificing technical chops and market savvy.

One prominent lesson learned from the past few years is that "supply-push" RD&D support for innovative technologies must be matched with complementary market and commercialization levers to advance technology adoption, especially if we aim to compete with China. The next chapter of energy innovation support must include close collaboration with the private sector and innovative ways of leveraging federal resources to reduce barriers, provide investment at key points in the innovation pipeline, and foster an ecosystem that allows American innovators to flourish.

Below, we lay out some initial recommendations on how to ensure that funding for energy innovation actually translates into meaningful emissions reductions. Passing policy is only the first step—we must effectively implement programs to support the full innovation pipeline, catalyze private investment, and deliver maximum impact and benefits for the nation. We anticipate a follow-up report with more detail on the lessons learned from the past few years on implementation of DOE programs and how to reinvigorate the department to meet future opportunities.

Sources

1 See Appendix A for the full discussion of how we determined the FY 2025 baseline.

2 While this report focuses on DOE, Energizing America emphasized the need for a whole-of-government approach to energy innovation, including opportunities for other departments and agencies to support the mission, particularly the Departments of Defense, Agriculture, and Commerce, and agencies such as NSF, NASA, and USGS.

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