

ClearPath Proposal to Modernize the U.S. Department of Energy

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CLEARPATH

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Executive Summary

The U.S. Department of Energy (DOE, the Department) must remain focused on the United States' global leadership in energy production, advancing innovative energy technologies, protecting national security interests and supporting fundamental research and science. The Department has experienced incremental changes since its inception 50 years ago in attempts to respond to the rapidly changing energy landscape. This report offers holistic policy recommendations and proposes a new organizational structure to best promote energy innovation in a new administration. Effective implementation will require the Department to prioritize energy security, innovations for major emitting sectors and public-private partnerships to achieve rapid deployment.

In recent years, Congress has expanded the Department's energy innovation mission, providing unprecedented funding increases to commercialize new technologies through demonstration programs. These new authorities stem from bipartisan legislation, including the Energy Act of 2020, the CHIPS and Science Act and the Infrastructure Investment and Jobs Act (IIJA). If implemented effectively, these programs could reduce emissions, lower energy costs to consumers, boost domestic manufacturing and allow the U.S. to retain its position as a global energy leader.

Today, the United States faces different conditions characterized in the energy crisis of the 1970s that spurred the Department's creation, yet the legacy structure of the Department largely persists. In recent years, the U.S. has transformed from an import-dependent country to become a net energy exporter since 2019. Most notably, this era of American energy dominance has been marked by the United States becoming the world's largest producer of oil and gas. The core challenges facing the U.S. energy sector today are how to best promote American technology at home and abroad, advance energy innovation and thwart the influence of foreign adversaries over energy and mineral supply chains.

The challenge ahead demands a rethinking of how to best align the applied energy offices to implement the energy research, demonstration and deployment mission enacted by Congress. The current structure of the Department incentivizes political appointees and career officials alike to advocate for specific technologies rather than promoting an integrated, practical application of technology innovation in the energy sector. In recent years, Administrations of both parties have tweaked the Department's structure while leaving the organization of the applied energy offices largely unchanged.

The new proposed structure outlined in this report will empower the next Secretary of Energy with the necessary tools to lead strategically from day one. Such a transformation requires an approach that is highly adaptive with sophisticated managerial capabilities to ensure operational efficiency. A key focus must be to foster coordination within the Department, emphasizing the importance of adapting to ensure long term durability.

These reforms are designed to maximize impact without requiring new authorizing legislation. Generally, these recommendations apply only to the Office of the Secretary and the applied energy program offices, except where noted. Taken together, they are designed to accelerate innovative technologies from basic research in the lab to commercial deployment and reaffirm the role of Congressional oversight of programs and funding.

ClearPath has analyzed past efforts at reorganization, evaluated office budgets and interviewed former senate-confirmed officials from past Administrations. The restructure proposed in this report considers various factors, including the department's sheer size, technological evolution and statutory requirements to propose comprehensive reforms. Addressing these elements ensures that the reorganization aligns with the current

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energy landscape while learning from historical perspectives. In total, the recommendations in this report will advance the United States' position as a global energy leader and promote fiscally responsible policy. Together, they will best position the Department to deliver on innovation priorities enacted by Congress.

Key Recommendations

Policy:

- P-1.** Develop procedures to protect private American intellectual property, ensuring that Department funding advances energy innovation by U.S. entities in collaboration with our allies while protecting national security from China and other adversaries.
- P-2.** Streamline Department funding competitions to encourage new applicants. The Department should minimize application requirements that are unrelated to the technical merits of the project to ensure funding decisions are free from political or social influence.
- P-3.** Implement “early-success, early advancement” or “rapid prototyping” initiatives to accelerate promising, high-impact technologies. The Department should identify Research and Development (R&D) with proven early success and then provide additional funding to achieve well-defined milestones in a rapid timeframe. Setting aside a percentage of discretionary funding for rapid innovation will promote end-to-end innovation, complementing other funding tools such as ARPA-E.
- P-4.** The Department must coordinate with other federal agencies and use every tool at its disposal to expedite permitting for demonstration projects, which frequently require authorizations from multiple agencies. Accordingly, the Department should designate a Director-level position within the Office of the Secretary to manage interagency permitting needs to prevent bureaucratic delays. Further, the Department should extend its existing R&D categorical exclusion to include demonstration projects.
- P-5.** The Department should utilize block grant transmission & distribution funds to the states to support state-based decision making rather than federally determined project-based competitions.

Organizational:

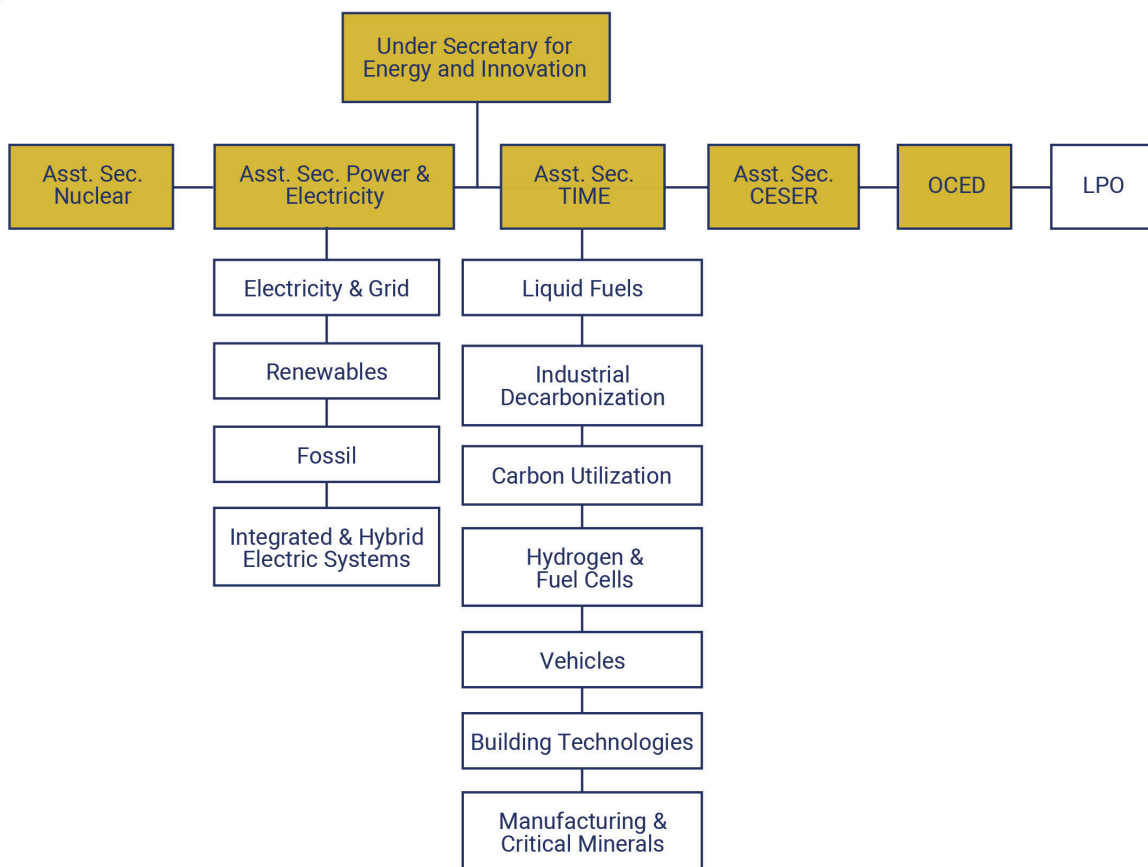
The following organizational recommendations are designed to improve performance, efficiency and accountability. For these recommendations, the Department's leadership structure is organized with an Under Secretary for Science & Future Technologies who would primarily lead the Office of Science and an Under Secretary for Energy & Innovation would oversee the applied energy, demonstration and commercialization functions.

- O-1.** Replace the Under Secretary for Infrastructure with an Under Secretary for Energy & Innovation to oversee the Office of Clean Energy Demonstrations (OCED), the Loan Programs Office (LPO) and the applied energy programs. OCED must be led by a Presidentially Appointed, Senate-Confirmed (PAS) official and LPO must receive more stringent oversight of funding commitments.

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- 0-2. Create an Assistant Secretary for Power & Electricity to align power sector applied energy offices (fossil, renewables and grid applications), reporting to the Under Secretary for Energy & Innovation.
- 0-3. Create an Assistant Secretary for Transportation, Industrial, Manufacturing and Efficiency (TIME) to align hard-to-decarbonize sectors, reporting to the Under Secretary for Energy & Innovation.
- 0-4. Reduce the number of offices and initiatives that report directly to the Secretary.

Proposed Direct Reports to the Under Secretary for Energy & Innovation (simplified)



Introduction

ClearPath's mission is to develop and advance policies that accelerate innovations to reduce and remove global energy emissions. With a team and advisors experienced in both the public and private sectors, ClearPath frequently serves as a trusted resource to decisionmakers on Capitol Hill. With this report, ClearPath aims to provide valuable recommendations for a new presidential administration and Congress' role in advancing the United States' position as a global energy leader.

The Department of Energy (DOE, the Department) is the world's largest funder of research for physical sciences and applied energy research, development and demonstrations (RD&D).¹ It is the sole federal entity with the capacity to advance innovative clean energy technologies in coordination with the private sector. These public-private partnerships are critical to commercialize breakthrough technologies domestically and ultimately export them globally to key partners.

Congress has recently tasked the Department with an updated and expanded mission, namely through billions of dollars in funding for demonstration programs in addition to the Department's research and development activities. To effectively implement these new authorities, the Department requires an organizational structure that matches how energy is generated and consumed. Over time, the Department has experienced many piecemeal additions to its jurisdiction. This report seeks to address these additions through a holistic lens. A comprehensive modernization effort is essential to ensure a future Secretary and leadership team have the tools to lead strategically in a rapidly changing technology landscape and global energy race.

ClearPath has partnered with a former senior Department official with experience at DOE and the national labs to help craft the report recommendations. The recommendations are informed by analysis of past attempts at modernization, office budget evaluations and interviews with former senate-confirmed officials from the past four Presidential Administrations. In addition, ClearPath incorporated feedback from industry and external stakeholders that work with the Department and compete for funding.

During the process and interviews, the importance of two key organizational development factors became clear: the need to manage change methodically and the human element of restructuring. Recognizing that change is often challenging and can evoke a chaotic atmosphere, a methodical approach is crucial. Effective change management requires both time and financial investments, understanding that the process has distinct phases. It is imperative to remember that restructuring the department ultimately revolves around its people—their work, interactions and management. The long term success of the effort to modernize the Department will ultimately be determined by how well the human aspect is considered and addressed during implementation.

The recommendations in this report seek to augment the historical scientific, engineering and innovation accomplishments of the Department to best position it for long-term success.

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The scope of this report is limited and is not intended to affect the National Nuclear Security Administration (NNSA), operation or management of the national labs or the Office of Science. Generally, these recommendations apply only to the Office of the Secretary and the applied energy program offices, except where noted.

The reforms proposed here are not intended to require any new authorizing legislation. Instead, they are designed to leverage the foundational Department of Energy Organization Act, which provides broad managerial flexibility for the Department. These reforms largely preserve existing budget control points and reduce the need for split-budget, cross-cutting initiatives at the Department. While these reforms can be implemented administratively, Congressional support will be crucial to enable long term durability and success.

The Department's Changing Mission

From the Energy Crisis to a Research and Development Leader

The Department of Energy was created in 1977 in response to the “energy crisis.” In actuality, the energy crisis was a series of related crises that included the United States rapidly becoming increasingly import-dependent on oil, compounded by the Arab Oil Embargo and national policies controlled pricing in energy markets, as well as stagflation, the phenomenon of high inflation, low economic growth and high unemployment.

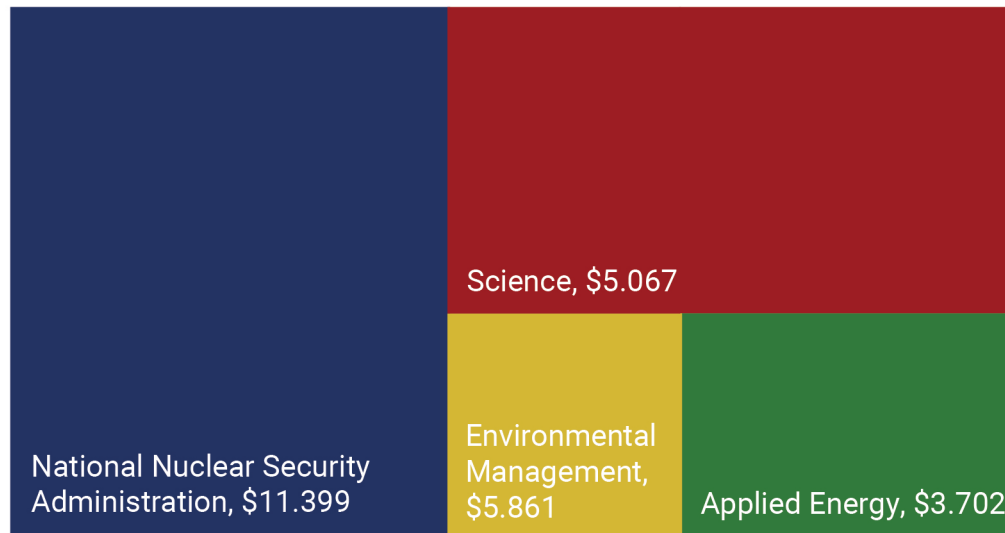
Today, the United States faces none of the same conditions that characterized the energy crisis of the 1970s, yet the legacy structure of the Department largely persists. As early as 1996, the then General Accounting Office (GAO), found that the Department's culture, organizational structures and management practices remained deeply rooted in a model based on the Cold War, with distributed sites and laboratories around the country.²

The Department of Energy Organization Act established and directed the Department to coordinate national energy policy, research and planning, consolidating energy policy jurisdiction at a single agency rather than dispersed across eight departments, agencies and commissions. As amended, the Act limits the Department to three Under Secretaries and eight Assistant Secretaries with duties and portfolios to be assigned by the Secretary.³ One Under Secretary has traditionally overseen the National Nuclear Security Administration (NNSA) and the three associated national laboratories for nuclear weapons.

Historically, the vast majority of the Department's budget structure has supported the NNSA and weapons-related activities, along with funding for the Office of Science and the Office of Environmental Management, which is tasked with environmental cleanup of defense nuclear sites. The applied energy and fuels offices have historically represented roughly a quarter of annual departmental appropriations.

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Figure 1: Department of Energy Budget Appropriations for FY2015⁴



While the Department was originally charged with national energy policy and energy research in a time of crisis, congressional interest in consistently funding those functions waned as oil prices came down in the 1980s. Over time, the Department has been characterized by a variety of missions including:

- an increasing focus on the Cold War and nuclear weapons development in the 1980s;
- the early to mid-1990s with a recognition of environmental cleanup failures from decades of legacy waste produced by nuclear weapons development;
- a period of national security failures in the latter 1990s at the national laboratories that called into question the need for the Department's continued existence; and
- the early 2000s, where early-stage, fundamental research and science was viewed as the Department's core strength.

A New Demonstration, Deployment and Commercialization Mission

The Department has now entered a fifth phase of its existence, with a heightened focus on demonstration projects authorized and funded through bipartisan legislation, namely through the Energy Act of 2020, the CHIPS and Science Act and the Infrastructure Investment and Jobs Act (IIJA).

These bills represent core parts of the GOP energy innovation agenda. Five years in the making, the Energy Act of 2020 was the first major energy reauthorization since the Energy Policy Act of 2005. It was the bipartisan culmination of dozens of individual energy bills that were passed and consolidated into a package granting the Department new authorities, reauthorizing programs such as ARPA-E and providing new direction on decarbonization and demonstration programs.⁵ These bills were built on the successful launches of the Advanced Reactor Demonstration Program (ARDP) and the Energy Storage Grand Challenge catalyzed under the Trump Administration.

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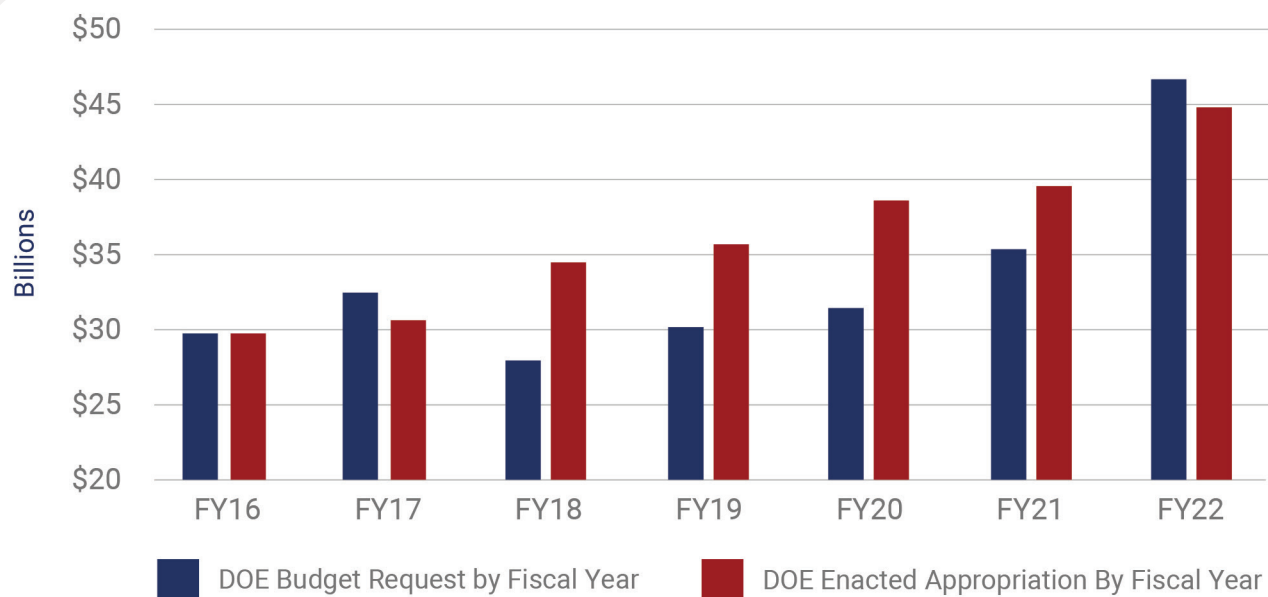
The IJA appropriated more than \$60 billion in multi-year forward-funding for energy program authorizations from the Energy Act of 2020, including programs for hydrogen, carbon capture, critical minerals, energy efficiency, grid modernization and incentives for nuclear power.⁶

In addition, the Inflation Reduction Act (IRA), passed through a process called 'budget reconciliation' without Republican support, provided significant new appropriations and authorities for the Loan Programs Office (LPO) including an additional \$40 billion in loan authority for the Section 1703 program and \$250 billion in loan authority for a new energy infrastructure reinvestment program. Additionally, the IRA appropriated funds for industrial decarbonization, interstate electric transmission and the production of high-assay, low enriched uranium (HALEU) for advanced reactors.⁷

Finally, the CHIPS and Science Act included key industrial decarbonization programs, including the Steel Upgrading Partnerships and Emissions Reduction (SUPER) Act of 2021, which established the Department's first research and development program focused on low-emission steel production to strengthen American manufacturing.⁸

Between these bills and general appropriations, the Department's budget has continued to increase over the past decade, frequently at rates greater than the President's annual request, reaching \$46.2 billion in fiscal year (FY) 2023.

Figure 2: Department of Energy Annual Funding in Billions of Dollars - Regular Appropriations Process⁹



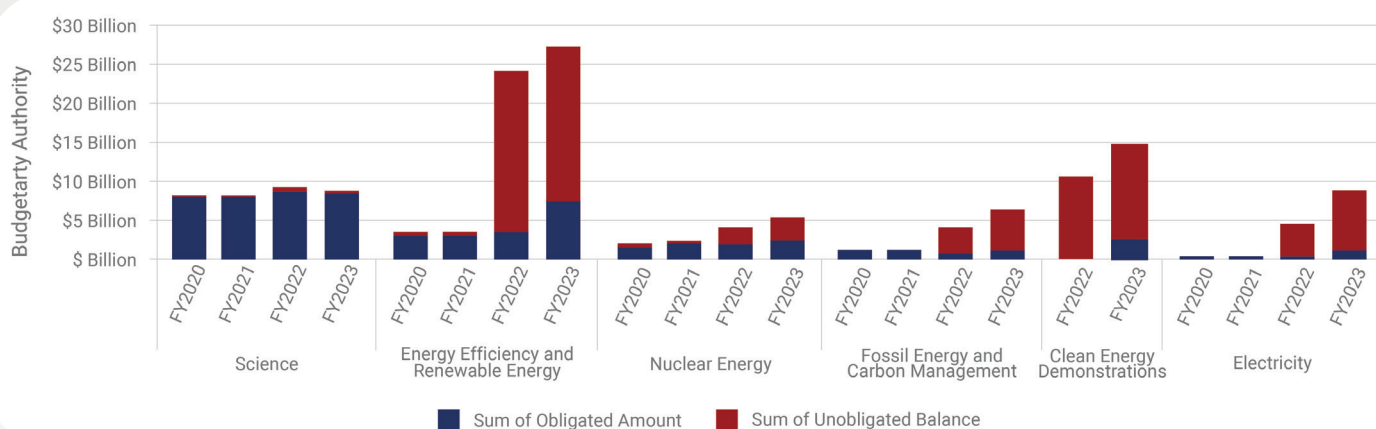
Congress, regardless of which party holds the majority, has opted not to endorse past proposals from Presidents' budget requests to repeal programs or rescind authorizations. For example, the Trump Administration's proposed budget for FY2018 requested a 54% cut in funding for applied energy programs. Instead, the Republican majority in Congress provided an increase of 24% over the President's request and more than 12% over the prior year, setting aside the Administration's stated preference for budget cuts and

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repeals of authorizing language. These budget totals offer important lessons from fiscal years during the Trump Administration that should be considered by Congress and the Office of Budget and Management during the annual budget setting and Congressional appropriations proceedings.

Historically, budget appropriations have been limited to a single year, with a “use it or lose it” approach that encouraged program offices to obligate all available funds before the end of the fiscal year. This paradigm has changed significantly for applied offices tasked with implementing federal demonstration programs. The nature of the advanced multi-year appropriations from the IIJA have altered the ways in which applied offices commit budgetary resources year-to-year. Given that IIJA appropriations remain available until expended, program offices are in the rare position to carry forward billions of dollars in unobligated funds across fiscal years. Congress could repurpose funds towards emerging innovation challenges, as Congress is doing in a bipartisan way in 2024 to invest in the domestic nuclear supply chain and reduce global reliance on nuclear fuel products.

Figure 3: Unobligated Balances in Select Offices from Fiscal Years 2020-2023¹⁰



Takeaways:

- The Department has changed from a predominantly early-stage and fundamental research focused department to one with new comprehensive, forward-funded authorities that move through the earliest R&D stages to demonstration and deployment.
- New demonstration authorities and advanced appropriations specifically target decarbonization on a department-wide scale.
- The subsequent Administrations will “own” the demonstrations and work that is authorized and forward funded, including the associated achievements and failures.

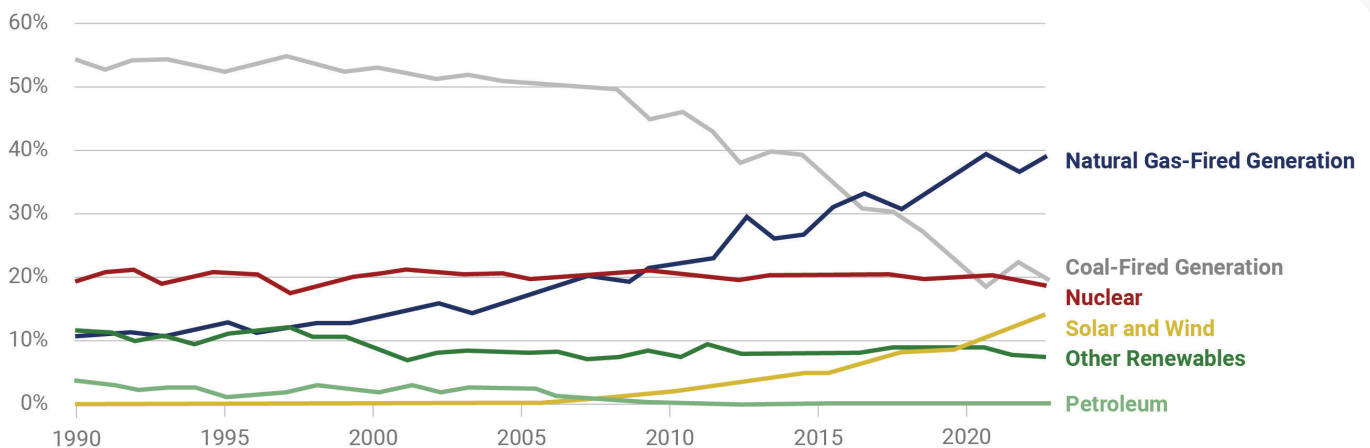
Energy Production and Supply Chains Have Evolved

The primary drivers of change in the energy sector today are entirely different from the energy crisis of the 1970s that spurred the creation of the Department. Today’s energy landscape is largely shaped by dueling conditions that present opportunities and threats to the U.S. energy sector to provide clean, reliable and affordable energy. These are characterized by the U.S. shale revolution and Chinese control of critical minerals increasingly necessary for clean technologies. As the energy system continues to evolve, the U.S. faces growing risks related to energy technology and supply chains.

A New Era of American Energy Dominance

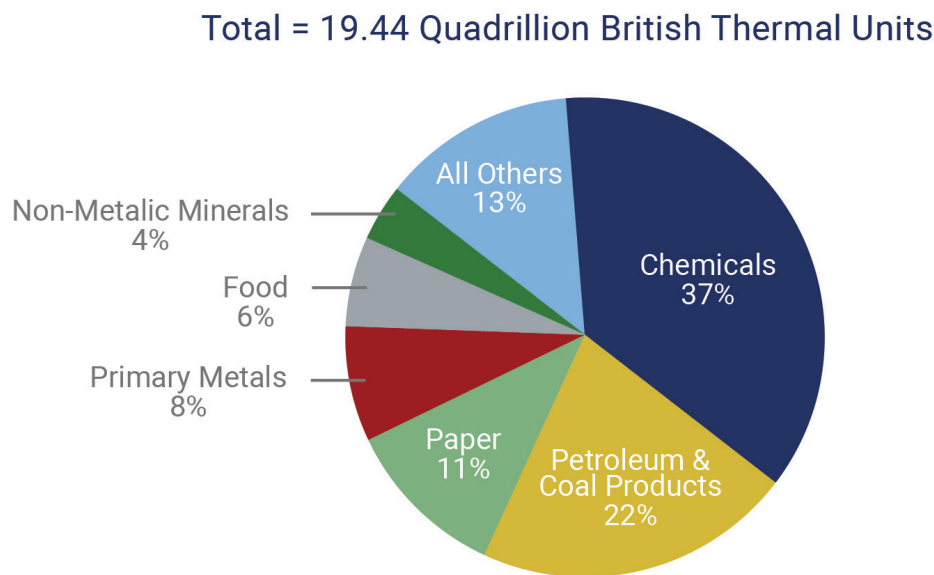
The shale boom has transformed the U.S. energy economy from a longstanding energy importer to become the world's top oil and gas producer. Domestic crude oil and natural gas production have more than doubled since 2002, positioning the United States as the world's exporter of liquefied natural gas (LNG).¹¹ Spurred by technological advancements for hydraulic fracturing and horizontal drilling, 3D microseismic imaging and polycrystalline diamond compact drill bits, this success story is a testament of the combined power of early stage federal investment from the Department, the national laboratories and private companies to enable the breakthroughs.¹²

Figure 4: Annual Percentage of U.S. Electricity Generation by Source¹²



In the electric power sector, natural gas use has steadily increased while coal use has been halved since 2012. Meanwhile renewable energy penetration in the electricity sector has more than doubled, with renewable electricity surpassing nuclear power in 2022. These dynamics have bent the curve down on power sector emissions, while transportation and industrial emissions remain harder to decarbonize. The electric sector has accounted for 75% of emissions reductions since 2005.¹⁴ While all sectors have seen at least modest reductions, the Energy Information Administration (EIA) reference case projects petroleum to remain the dominant source in the transportation sector, comprising 87% of sectoral energy consumption through 2042. Likewise, industrial sector emissions are expected to exceed those of the electric sector, making the industrial sector the largest source of U.S. emissions by 2035.¹⁵

Figure 5: U.S. Manufacturing Energy Consumption by Major Types of Manufacturers, 2018¹⁶



In the industrial sector, manufacturing activities account for 76% of energy consumption, largely driven by just six energy-intensive industries: chemicals, petroleum and coal products, paper, primary metals, food and non-metallic mineral products.¹⁷ Funding additional demonstration programs in this sector, building on the model created by the SUPER Act, will create opportunities for the private sector to advance cleaner technologies and best position the U.S. industrial sector to compete internationally.

Changing Energy Security Challenges

Changing trends for energy production and use is especially important to U.S. national security interests. Adopting more mineral-intensive technologies, including renewables for power generation and batteries for electric vehicles, will increase U.S. dependence on foreign supply chains. Globally, the minerals-intensity of each new unit of electric generating capacity has increased by 50% since 2010.¹⁸ Similarly an EV typically utilizes as much as 600% more minerals compared to an internal combustion engine powered vehicle.¹⁹

It is difficult to overstate U.S. dependence on foreign supply chains for critical minerals. The 2023 U.S. Geological Survey's Mineral Commodities Summary found the U.S. was 100% net import reliant for 12 of the 50 critical minerals and was more than 50% net import reliant for an additional 31 critical mineral commodities.²⁰ Meanwhile, China was the leading producing nation for 30 of those same 50 critical minerals.

Regardless of where the minerals are mined, China exerts dominant control over the refining process for a large majority of rare earth elements and has demonstrated a willingness to leverage its influence to pursue political objectives.²¹ Similar dynamics exist for a broad range of technologies, including electrolyzers to produce hydrogen and transformers to improve grid reliability.

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China makes no secret that it aims to develop and control important manufacturing and production efforts through its “One Belt, One Road” initiative.²² The House Select Committee on the Chinese Communist Party found that China routinely “exploits the openness of the U.S. research environment to steal U.S. intellectual property (IP) and transfer technology to advance its economic and security interests to the detriment of the United States.”²³ Similarly, state-run Chinese Talent Programs have sought to recruit American scientists and engineers for more than 20 years, either pressuring them or rewarding them to transfer proprietary, controlled and classified data and technologies to China. The Department and the national laboratories it manages are high priority targets for Chinese espionage efforts. Unfortunately, well-documented intelligence failures have compromised American national security as evidenced by unclassified public cases.

The Department must avoid using taxpayer dollars to subsidize energy supply chains inextricably linked to the Chinese Communist Party and other foreign entities of concern. One illustrative example of these relaxed guidelines is the Department’s 2022 selection of battery maker Microvast for a \$200 million award despite the fact that its CEO was a publicly acknowledged Chinese Talent Program participant. While the Department specifically prohibits participation in Chinese Talent Programs and China is a designated country of concern, these prohibitions failed to prevent the Department from making the Microvast selection. The award was later canceled following robust Congressional oversight.²⁴

Policy Recommendation P-1: Develop procedures to protect private American intellectual property, ensuring that Department funding advances energy innovation by U.S. entities in collaboration with our allies while protecting national security from China and other adversaries.

The Department must protect American IP and national security rather than enabling Chinese state influence to control U.S. supply chains for advanced technologies. This requires the Department to ensure that technologies in development do not leak through state-sponsored efforts, industrial espionage or neglect. Equally important, the Department must identify pathways to re-shore U.S. intellectual property that has been compromised due to past failures.

Developing integrated policies and processes requires effective management from the top. The next Secretary must make it clear that energy and national security is a priority from Day One for applied energy programs and national laboratories alike. Processes and controls must be consistently followed. Administered correctly, IP controls provide freedom for scientific and research endeavors while protecting American property rights.

A comprehensive approach will entail a top-to-bottom review of existing processes, including enforcement and the previous use of any waiver authorities especially in regard to China, along with:

- Upholding statutory requirements for domestic sourcing, manufacturing requirements and eligibility rules for federal funding.

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- Vetting potential awardees before finalists are determined and before award selections are made by reestablishing the Trump Administration policy to require large funding awards to receive direct approval from a senior official.
- Developing a list of proven bad actors that have applied for funding and creating an annual classified report on espionage attempts on the DOE complex to be shared government-wide through an interagency clearinghouse.
- Bolstering the Department's review capabilities to combat industrial espionage and IP theft.
- Instituting specific and separate annual evaluation criteria for IP protection for management and operations (M&O) contracts at each national laboratory.

Aligning, strengthening and streamlining IP structures across the DOE complex will provide more certainty for both management and the private sector seeking to work with the Department. Collaborating with national laboratories should be reliably seen as a value-added activity for American companies and research institutions. Clarity in this regard will ensure that American innovation is invigorated while international scientific collaboration in the U.S. national interest is not inadvertently chilled.

Modernizing the Structure of the Department

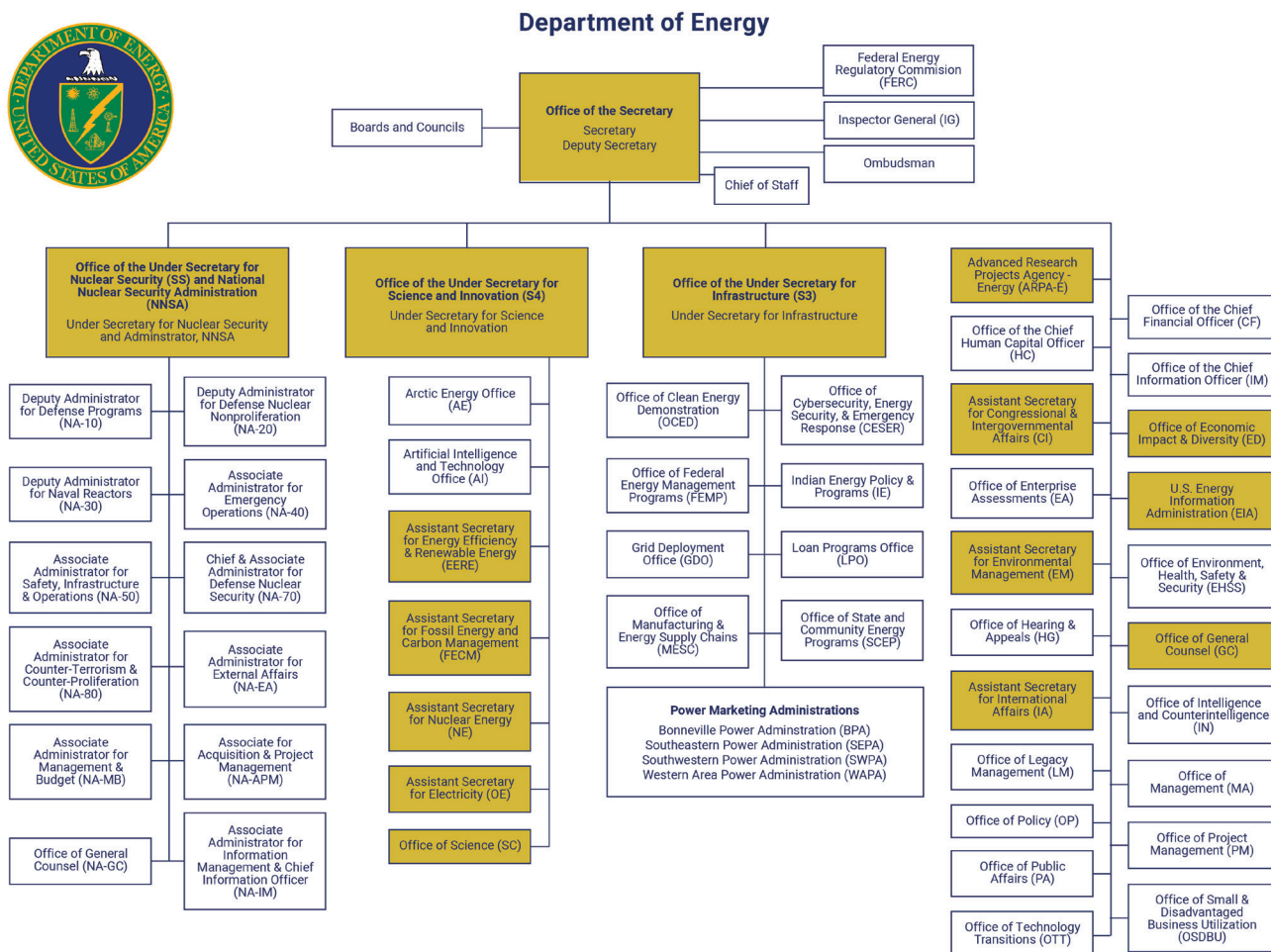
The Biden Administration's Attempted Restructuring

The Biden Administration completed the most recent reorganization of the Department in 2022, in part driven by the need to manage the influx of demonstration and deployment funds from the IIJA and the Energy Act of 2020.²⁵ The Administration reorganized large-scale demonstration, loan programs and other new authorities that did not explicitly fit the traditional structure under a new Under Secretary of Infrastructure. These functions are paired along with other operational elements that are not R&D focused, including cybersecurity, the federal power marketing administrations and new offices including the Grid Deployment Office (GDO), Manufacturing & Energy Supply Chains (MESC) and State & Community Energy Programs (SCEP). Under this construct, the applied energy offices and the office of science are organized separately under an Under Secretary for Science and Innovation.

Figure 6 below illustrates the full organization chart under the Biden Administration, with the designated Presidentially Appointed and Senate Confirmed (PAS) positions highlighted in yellow. The applied energy Assistant Secretaries and offices have historically been organized by fuel types and not by use-case or consumption. Because of the fuel-oriented structure at the leadership level, both political appointees and career officials are incentivized to advocate for their "house fuel," rather than looking at the energy system as a whole from a technology-inclusive standpoint. In creating the Under Secretary for Infrastructure, the Biden Administration fully separated the demonstration programs from the related applied energy offices.

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Figure 6: Department of Energy Organizational Chart as of January 2024²⁶



New Risks under the Current Structure

The Department's current structure has elicited critiques from external stakeholders and Department officials alike. In a special report, the Department's Inspector General (IG) identified both the volume of funding and the creation of large-scale clean energy demonstration projects as particular areas of risk for the Department.²⁷ The IG specifically pointed to risks related to insufficient federal staffing, circumvention of price controls, insufficient oversight of projects, inadequate internal controls and a lack of recipient-level controls. In April 2023 testimony before the House Committee on Oversight and Accountability, the IG acknowledged launching a monitoring project to improve oversight related to five new offices: OCED, LPO, GDO, SCEP and MESC.²⁸ The Biden Administration has opted to concentrate these risks within a single Under Secretary, as all five offices identified by the IG directly report to the Under Secretary of Infrastructure.

Appointments Are Important!

Appointments provide policy and strategic leadership, in addition to accountability. They ensure that the Department is supporting the policy direction of the President and Secretary. Political and other temporary, specialized appointments enable the recruitment of policy, technology and industry expertise to benefit DOE's decision-making and oversight; many specially qualified individuals would not be willing to make a permanent move to be a career government employee but are willing public servants for a specific period of time or to work on a technology and help bring it to success. An Administration that does not expeditiously fill appointed positions from day one is needlessly playing shorthanded.

One basic example of this risk is that OCED is not currently led by a senate confirmed individual.²⁹ Taken together with LPO, the largest portions of clean energy funding in the department do not currently have PAS leadership. Elevating the Director of the Office of Clean Energy Demonstrations to be a PAS position is imperative to satisfy congressional demands for stewardship and accountability of the funds.

The IG has a historical basis to assess these risks, given the Department's mixed record in large-scale energy demonstration projects, including past nuclear demonstrations that did not pan out.^{30,31} Almost unanimously, interviewees for this report supported OCED in principle but agreed that the office has the greatest risk for failure to perform in both the short- and long-term. The Department is expected to issue competitive solicitations worth billions of dollars in funding for dozens of megaprojects, something never before attempted. It is an exceptional leadership, hiring and accountability challenge.³² A reorganization would help greatly minimize misalignment of incentives, mission creep and politicization.

Recommendations for New Proposed Structure

The following organizational recommendations are designed to improve performance, efficiency and accountability. The recommendations shift the Department from an outdated energy generation focus to one that is aligned based on national priorities, major emitting sectors and driven by industry and market needs. For these recommendations, the leadership structure is organized as follows:

- The Office of the Secretary consists of the Secretary, the Deputy Secretary and their staff. The Secretary is equivalent to a CEO and is focused on strategy and policy for the department. The Deputy Secretary is equivalent to a COO and works to ensure that the Secretary's strategy, approach and priorities are implemented effectively.
- The Under Secretary for Science and Future Technologies leads the Office of Science. In addition to leadership, this Under Secretary serves an important national security role as many of the most cutting-edge technologies have been initially funded through the Office of Science and national laboratories. In addition to fundamental science and research, the Under Secretary is responsible for advancing and safeguarding nationally critical technologies. These advances include the fastest supercomputer in the world and breakthroughs for Artificial Intelligence and quantum computing.

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- The Under Secretary for Energy & Innovation oversees applied energy, demonstration and commercialization functions. It is important that RD&D for applied energy is housed under the same Under Secretary to provide the best chance of success for technologies to advance from early stage R&D through demonstration and commercialization. This proposal would also restore the appointment of an Assistant Secretary for the Office of Cybersecurity, Energy Security and Emergency Response (CESER), reversing the changes made under the Biden Administration in the 2022 reorganization.

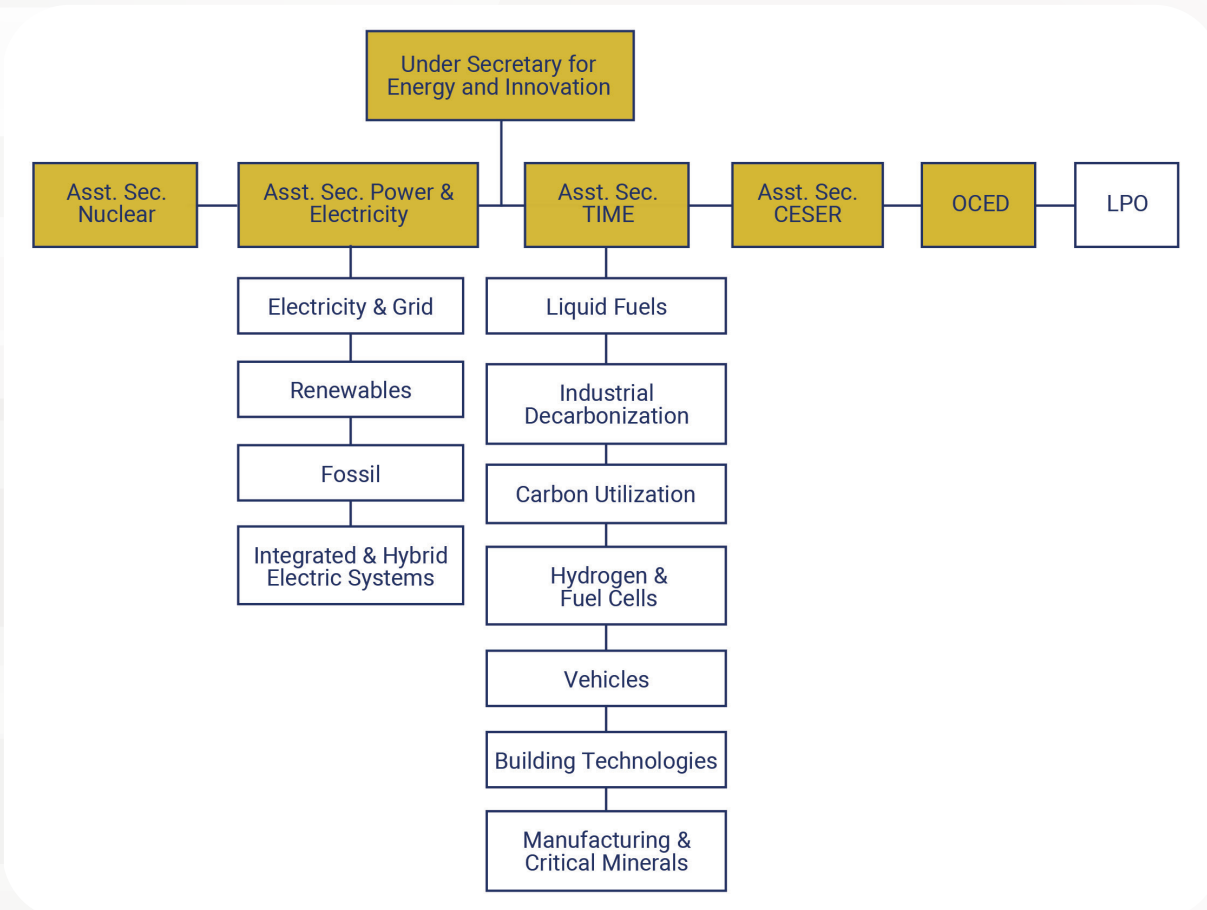
Organizational Change and Change Management

The reorganization of DOE applied energy offices into two new Assistant Secretaries is imperative to align with the evolving energy landscape and to respond to the complexities inherent in the DOE's new authorities, ensuring the Department remains agile and responsive to the demands of the energy sector.

While the necessity of this change is evident, it poses opportunities along with intricate challenges for employees and contractors accustomed to the Department's cutting-edge technological focus. This will require managing the potential for resistance from offices historically inclined towards their conventional approaches, necessitating a thoughtful and comprehensive organizational development perspective. As the upcoming Administration embarks on this significant change, it is crucial to employ a suite of effective change management strategies, recognizing the nature of the transition with a focus on the human element.

Figure 7 illustrates the major leadership offices that directly report to the Under Secretary for Energy & Innovation, with the PAS positions highlighted in yellow. This proposal moves offices such as OCED and LPO to the Under Secretary for Energy & Innovation. It also consolidates field offices by end uses or applications and recombines all electric transmission and grid functions.

Figure 7. Proposed Direct Reports to the Under Secretary for Energy & Innovation (simplified)



Organization Recommendation O-1: Replace the Under Secretary for Infrastructure with an Under Secretary for Energy & Innovation to oversee the Office of Clean Energy Demonstrations (OCED), the Loan Programs Office (LPO) and the applied energy programs. OCED must be led by a Presidentially Appointed, Senate-Confirmed (PAS) official and LPO must receive more stringent oversight of funding commitments.

As noted above, OCED and the large-scale demonstration programs it manages provide important opportunities for the commercialization of new technologies. This proposal recognizes the importance of retaining OCED in the new organizational structure. At the same time, the office should be directed by a PAS official, similar to the Directors of the Office of Science and ARPA-E. The OCED Director should work in tandem with the other offices and Assistant Secretaries to ensure that breakthrough technologies advance from the program offices to reach the demonstration phase at OCED.

Similarly, the Secretary should engage the Inspector General to better address risks posed as identified in previous testimony to Congress. The IG will have particular insight regarding LPO with its new spending authorities and how it is engaging with industry, vetting applicants, adhering to controls and engaging financial due diligence.

O-2. Create an Assistant Secretary for Power & Electricity to align power sector applied energy offices (fossil, renewables and grid applications), reporting to the Under Secretary for Energy & Innovation.

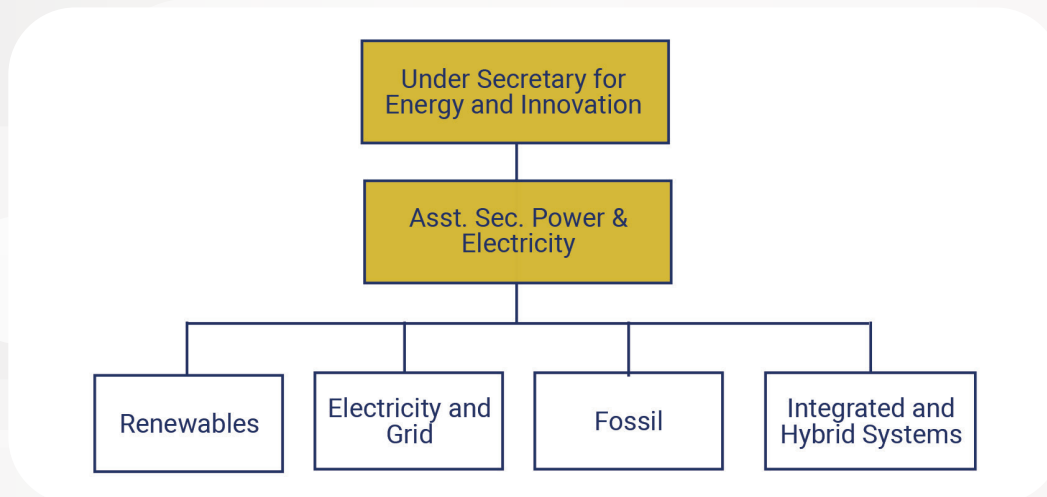
The Department has a longstanding history of the applied energy offices being stove-piped from each other by fuel rather than united by use and application. More recent efforts to get them to collaborate have had mixed results, with some a success while too often others lead to competition based on insular office interests. Moving them under one Assistant Secretary will improve planning, budgeting and implementation, especially for cross-cutting programs. Moreover, the new structure better aligns with private industry, allowing companies to work with a single point of contact rather than multiple offices for different energy applications.

In this proposed structure, DOE authorities related to LNG exports would remain in the fossil office, reporting to the Assistant Secretary for Power & Electricity. The Department should fully embrace these authorities to maximize U.S. exports to international allies.

One of the boundary constraints for this report is to maximize reforms without requiring new legislation. This approach creates tradeoffs to the proposed recommendations regarding the placement of the eight Assistant Secretaries. New legislation could authorize additional Assistant Secretaries which could allow for greater flexibility.

Figure 8 shows a recommended structure for how offices will be restructured under the Assistant Secretary for Power & Electricity, with PAS positions highlighted in yellow. The reorganization closely matches DOE's updated authorities while maintaining structures that match most budgetary accounts and congressional control points. It also offers the potential to improve applied energy coordination with the national labs.

Figure 8: Illustrative View of Offices Reporting to Assistant Secretary for Power & Electricity



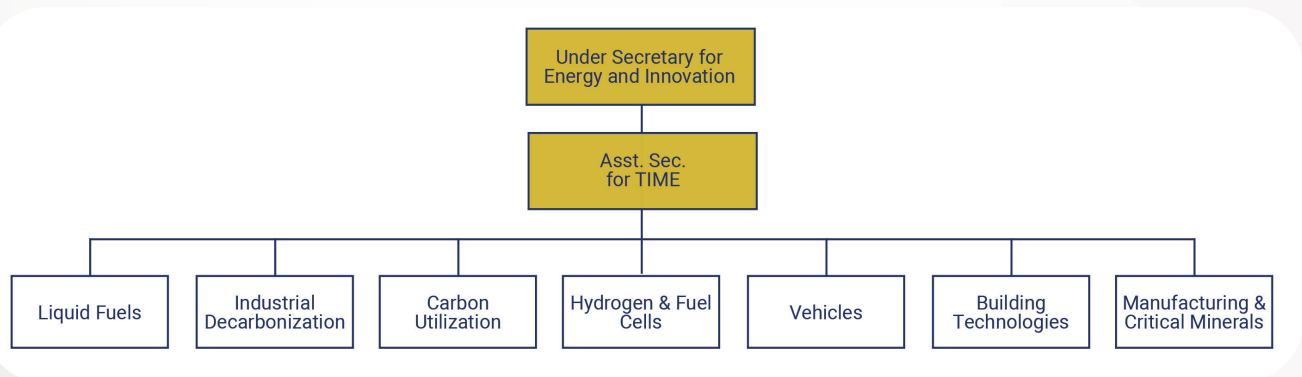
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O-3. Create an Assistant Secretary for Transportation, Industrial, Manufacturing and Efficiency (TIME) to align hard to decarbonize sectors, reporting to the Under Secretary for Energy & Innovation.

Like power generation, the Department’s innovation work on decarbonization has been split by fuel between the Office of Energy Efficiency and Renewable Energy (EERE) and the Office of Fossil Energy & Carbon Management (FECM). In addition, the Energy Act of 2020 and IIJA provided the Department with significant new authorities and funding relating to industrial decarbonization, manufacturing and critical minerals. While critical minerals and hydrogen activities have been traditionally split between the fossil and renewable energy offices, integrating them under the same Assistant Secretary is likely to lead to better performance and efficiency for these related efforts. These innovation efforts should be well-coordinated with the Department of Transportation, the Department of Commerce, and the Department of the Interior when relevant, to ensure cohesive utilization of taxpayer resources.

As is the case for power & electricity, a Deputy Assistant Secretary can be assigned to each program activity to ensure interoffice collaboration and crosscuts are performed effectively. Figure 9 shows a recommended structure for the Assistant Secretary for TIME, with PAS positions again highlighted in yellow.

Figure 9: Illustrative View of Offices Reporting to Assistant Secretary for Power & Electricity



O-4. Reduce the number of offices and initiatives that report directly to the Secretary.

The Secretary should be focused on implementing department-wide strategic priorities, yet supervisory responsibilities of the Office of the Secretary have steadily accumulated over time. The most recent organizational chart shows the Office of the Secretary supervising 21 different offices beyond the main responsibility of strategic leadership and supervisory responsibility of the Under Secretaries and their program offices.

Often, Congress directs the Secretary to oversee a function or a newly created office to ensure that it is viewed as a departmental priority. As a result, the Office of the Secretary has become a hodgepodge of statutorily created offices, various advisory functions and internal initiatives that have no clear home. For example, Congress has statutorily required the Energy Information Administration, ARPA-E and the Office of Technology Transitions, among others,

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to report directly to the Secretary. These direct reports should be reduced in number through reassignment, consolidation or possible elimination to enable the Office of the Secretary to concentrate on top issues of importance.

Reforms to Promote Demonstration and Deployment

Recommendations for Funding Solicitations

The Department's primary funding mechanisms are grants and cooperative agreements awarded through competitive solicitations. The applied energy programs also contract the national laboratories to carry out specific research and analyses scoped by the programs themselves.

Congress has expanded the types of entities intended to seek DOE funding as demonstration programs are designed to be carried out by industry, outside of the traditional realm of laboratories and universities. As a result, many potential recipients are not accustomed to the bureaucracy of applying for, receiving and managing federal awards. For many funding opportunities, only the largest and most established applicants have the wherewithal to apply and win an award, which can crowd out small innovative companies.

Policy Recommendation P-2: Streamline Department funding competitions to encourage new applicants. The Department should minimize application requirements that are unrelated to the technical merits of the project to ensure funding decisions are free from political or social influence.

The Department should seek ways to remove unneeded complexity to make it easier to contract and partner with the Department. By making applications more straightforward and with less bureaucratic requirements, the Department will increase the diversity of applications, types of entities applying and innovative approaches to result in better outcomes. At the same time, the Department needs to tighten its review processes to ensure that awards do not inadvertently create a national security threat or compromise energy security.

Funding competitions have been straightforward in the past for organizations and researchers seeking to apply. In general, applicants must demonstrate a sound technical approach, innovative solution and the requisite personnel to carry it out. For demonstration projects, financial feasibility must also be factored in before selections are made.

Anecdotally, recent applicants have reported that requirements and the effort required to submit a response have risen under the Biden Administration as the Department has added new requirements into the process, making applications unnecessarily complex. These additional criteria go above and beyond the traditional "policy factors" that the Department can take into account when making individual and overall selections, such as ensuring non-duplicative funding, variation of technical approaches, regional representation and location specific factors. One example is the emphasis on mandatory community benefit plans, with the Department assigning as much as 20% of the evaluation for demonstration projects. In some cases, their weighting is equal to the technical evaluation sections.

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While support from the community remains critical to long term success for future deployments of new technologies, community benefit plans should not be a significant portion of the quantitative evaluation criteria. The Department should instead remain focused on assessing technological innovation, due diligence and fiscal propriety—not promoting social policy. Placing significant emphasis on mandatory community benefit plans is unnecessary to determine which projects are best positioned for federal demonstration project funding.

This is in addition to other Biden Administration initiatives on diversity, equity and inclusion, collective bargaining and Justice40. Applicants have noted that the Department has been inconsistent applying the evaluation criteria across competitions. This is true even as existing regulations specifically disallow government funds from being spent to either support or oppose collective bargaining. The Department should not direct industry on how to do projects or mandate certain human resources policies.

Recommendations to Accelerate Innovation

The Department has a number of offices, tools and dedicated funding to advance innovation and potential commercialization. However, these tend to leave gaps between offices like ARPA-E, OCED and the traditional applied energy and scientific research offices. These gaps exist due to the fact that recent R&D breakthroughs may not neatly fit in energy program roadmaps.

Policy Recommendation P-3: Implement “early-success, early advancement” or “rapid prototyping” initiatives to accelerate promising, high-impact technologies. The Department should identify R&D with proven early success and then provide additional funding to achieve well-defined milestones on a rapid timeframe. Setting aside a percentage of discretionary funding for rapid innovation will promote end-to-end innovation, complementing other funding tools such as ARPA-E.

Rapid prototyping can accelerate promising developments based on well-defined sprint objectives, moving high impact technologies, materials and novel methods rapidly up the technology readiness level (TRL) ladder. Rapid prototyping can address the gap between initiatives with similar goals but tightly restricted participants such as ARPA-E’s SCALEUP, which is restricted to past ARPA-E or other DOE awardees and Laboratory-Directed Research & Development (LDRD) projects at the national laboratories.³³ Illustrative examples for rapid prototyping exploration could include fusion energy technologies, novel materials for extreme environments and aspects of quantum computing. Rapid prototyping complements, rather than replaces, other mechanisms like Small Business Innovation Research (SBIR) funds, LDRDs or ARPA-E activities.

Rapid prototyping has the potential to be more flexible than the Department’s existing mechanisms and would respond better to scientific, engineering and technology developments as they occur. In recent years the Department has increased the use of prizes and American Made Challenge competitions and the SCALEUP program through ARPA-E to leverage alumni technologies for additional follow-on funding. ARPA-E itself is often cast as the one place in the Department where innovation can happen more quickly than the usual pace of government. There is significant opportunity across program offices to foster end-to-end

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innovation, including rapidly identifying and advancing promising innovations as they arise. Importantly, rapid prototyping should not cannibalize funding for SCALEUP, SBIR or LDRDs. The organizational funding structures should be determined at the Under Secretary level.

Recommendations to Minimize Permitting and Intergovernmental Delays

The Department has already begun to face challenges to expedite project permitting to align with other aspects of project selections, including state level coordination. Success during this period of enhanced federal funding will depend on the Department fully embracing its permitting coordination role to get steel in the ground and ensure these taxpayer-funded investments do not languish.

Recommendation P-4: The Department must coordinate with other federal agencies and use every tool at its disposal to expedite permitting for demonstration projects, which frequently require authorizations from multiple agencies. Accordingly, the Department should designate a Director-level position within the Office of the Secretary to manage interagency permitting needs to prevent bureaucratic delays. Further, the Department should extend its existing R&D categorical exclusion to include demonstration projects.

The Department will need to manage permitting requirements closely with awardees, local governments and communities for demonstration projects. Many of the large demonstration projects will require environmental permitting approvals from multiple agencies. While the Department may issue funding awards, the Department does not control the entirety of the permitting process for its awardees. Therefore, success will depend on interagency coordination to ensure projects do not suffer from avoidable delays. There have already been anecdotal instances where there is confusion between the Department and at least one manufacturing demonstration award recipient in regard to what work can move forward prior to receiving approval and what is predicated on it. The Federal Permitting Improvement Steering Council (FPISC) was created in 2019 to support this challenge but it has not been as effective as hoped. Concurrently, the Council of Environmental Quality (CEQ) and the National Economic Council (NEC) in recent years have not played as significant of an interagency coordinating role as it had in the Bush and Trump Administrations. This coordination should be a significant focus of the energy and environment portfolio within the Executive Office of the President.

Federal permitting difficulties have now come to the forefront as a chokepoint for new energy projects and technologies, particularly in regard to the National Environmental Policy Act (NEPA).³⁴ Demonstration projects and those backed by federal guarantees should stand or fall based on technological and economic feasibility, not delays in federal permitting and interagency bureaucracy.

Permitting is one area where the Department can exert its authority to expedite the process within its jurisdiction and make significant strides by working with industry to ensure a predictable process. One area where the Department can accelerate permitting is through its existing categorical exclusion for Research and Development activities, which in its current form specifically excludes demonstration actions. The Department should extend this categorical exclusion to include demonstration projects funded by the Department.

“B3.6 SMALL-SCALE RESEARCH AND DEVELOPMENT, LABORATORY OPERATIONS, AND PILOT PROJECTS. Siting, construction, modification, operation, and decommissioning of facilities for small-scale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). *Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.*”³⁵(emphasis added)

The Department will be severely tested because of the volume and complexity of the demonstration projects. Further, many of them include novel technologies and configurations that have not been reviewed before. The Advanced Reactor Demonstration Program (ARDP) offers an example of the challenging permitting path ahead for other major demonstration programs. Launched and awarded under the Trump Administration prior to the Energy Act of 2020 and IIJA, The ARDP has experienced a lack of coordination between DOE and other federal agencies, namely the Nuclear Regulatory Commission (NRC). Without clear guidance, these first-of-a-kind projects face additional bureaucratic risk. Due to outstanding questions and concerns raised by the ARDP projects, the agencies ultimately signed a memorandum of understanding (MOU) for interagency coordination.³⁶

Because of these ongoing risk factors, the Department needs to centralize management and coordination at the highest level for the additional demonstration programs to mitigate future problems. A failure to fully address these risks would inevitably lead to a loss of congressional support for future demonstration project funding. The Department’s priority should be to avoid creating unnecessary hurdles for these projects. Appointing a director in the Office of the Secretary to manage timelines and performance of the portfolio at large and individual projects will be a critical factor for success. This is in stark contrast to current practices where NEPA is administered across offices throughout the DOE complex.

Policy Recommendation P-5: The Department should utilize block grant transmission & distribution funds to the states to support state-based decision making, rather than federally determined project-based competitions.

Consistent with the model of streamlining funding opportunities, the Department should leverage block grants to states to provide discretion as to how the funds will be spent to match the circumstances on the ground, while maintaining broad scoping authority at the federal level consistent with congressional intent. With substantial new funding for transmission and distribution, the Department should implement block grants to states for technical assistance and planning, rather than having separate, discrete grant competitions at the federal level. Block grants will increase speed and consistency compared to limited federal competitions or national laboratory administered technical assistance that many states are unaware exist.

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While the Federal Energy Regulatory Commission (FERC) has authority for interstate electric transmission and wholesale sale of power, states retain much of the authority and are where many decisions are made and implemented for the grid and electric power. States are key players in resilience planning and determine “convenience and necessity” for new power projects. This status makes states the most appropriate level of government to determine how the funds are to be spent to best match what is needed.

Conclusion

The recommendations in this report position the Department to promote a technology-inclusive view of the energy system as a whole. These recommendations go beyond the scope of past efforts to tweak the department’s structure while leaving the organization of the applied energy offices largely unchanged.

Today, the United States faces none of the same conditions characterized in the energy crisis of the 1970s that spurred the Department’s creation. The core challenges facing the U.S. energy sector today are how to best promote American technology abroad, advance energy innovation and thwart the influence of foreign adversaries over energy and mineral supply chains.

A new structure is essential so that the next Secretary of Energy has the tools at their disposal to lead strategically in a rapidly changing technology landscape. If implemented effectively, recently created programs could reduce emissions, lower energy costs to consumers, boost domestic manufacturing and allow the U.S. to retain its position as a global energy leader. A key focus should be on fostering better coordination within the Department, emphasizing the importance of managing change to build longevity and stability into the organizational structure.

These reforms are designed to maximize impact without requiring new authorizing legislation. Through this modernization effort, Administration priorities will become easier to implement while increasing budget transparency and accountability. Moreover, it will accelerate the advancement of energy technologies and facilitate industry relationships while unleashing American ingenuity. Finally, the recommendations made here are achievable and have potential to endure multiple Administrations, all without the need to further amend the Department of Energy Organization Act.

Finally, ClearPath will continue to work with interested parties on how to implement and put these recommendations into practice to ensure DOE helps the U.S. maintain its global energy leadership, better aligns with industry to advance its technology demonstration mission, and protects U.S. intellectual property from foreign adversaries.

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