



DOE AT
45

**PROVIDING SOLUTIONS
FOR THE NEW ENERGY ECONOMY**

U.S. Department of Energy Agency Financial Report Fiscal Year 2022



About This Report

The mission of the Department of Energy (DOE or Department) is to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions. DOE's *Fiscal Year (FY) 2022 Agency*

Financial Report (AFR) presents key financial and performance information in support of DOE's mission, and demonstrates DOE's accountability to the American people.

Agency Financial Report (AFR), <https://www.energy.gov/cfo/listings/agency-financial-reports>

The AFR is presented in three major sections:

- **Management's Discussion and Analysis** provides executive-level information on DOE's history, mission, organization, Secretarial priorities, analysis of financial statements, systems, controls and legal compliance and other management priorities facing the Department.
- **Financial Results** provides DOE's consolidated and combined financial statements and the Auditors' Report.
- **Other Information** provides the Inspector General's Statement of Management Challenges and other statutory reporting.
- DOE's financials are rolled into the annual **Financial Report of the United States Government**, <https://www.fiscal.treasury.gov/reports-statements/financial-report/>

The AFR meets the following reporting requirements:

- [Payment Integrity Information Act of 2019 \(PIIA\)](#)
- [Foundations for Evidence-Based Policymaking Act of 2018 \(Evidence Act\)](#)
- [Federal Civil Penalties Inflation Adjustment Act Improvements Act of 2015](#)
- [Digital Accountability and Transparency \(DATA\) Act of 2014](#)
- [Federal Information Security Modernization Act \(FISMA\) of 2014](#)
- [Government Performance and Results Act Modernization Act \(GPRAMA\) of 2010](#)
- [Reports Consolidation Act of 2000](#)
- [Federal Financial Management Improvement Act \(FFMIA\) of 1996](#)
- [Government Management Reform Act \(GMRA\) of 1994](#)
- [Government Performance and Results Act \(GPRA\) of 1993](#)
- [Federal Managers' Financial Integrity Act \(FMFIA\) of 1982](#)
- [Prompt Payment Act of 1982](#)

Annual Performance Report/Annual Performance Plan (APPR), <https://www.energy.gov/budget-performance>

The APPR provides detailed performance information and descriptions of results for each performance measure, and performance targets for the current and upcoming fiscal years, including performance measures related to the DOE Management Priorities as required by the GPRA Modernization Act of 2010.

Photo Captions: see inside back cover

Connect with DOE via social media:

- **Facebook** <https://www.facebook.com/energygov>
- **Flickr** <https://www.flickr.com/photos/departmentofenergy/>
- **Instagram** <https://www.instagram.com/energy/>
- **LinkedIn** <https://www.linkedin.com/company/u-s--department-of-energy>
- **Pinterest** <https://www.pinterest.com/energy/>
- **Twitter** <https://twitter.com/ENERGY>
- **Vimeo** <https://vimeo.com/energygov>
- **YouTube** <https://www.youtube.com/c/EnergyGov>



Table of Contents

Fiscal Year 2022 Front Cover	Front Cover
About This Report	2
Table of Contents	3
Message from the Secretary of Energy	5
Management's Discussion and Analysis	9
Agency Highlights (Unaudited)	10
FY 2022 DOE Highlight: Energy Initiatives	11
Organizational Structure	12
Financial Resources	13
Human Capital Resources and FY 2022 Financial Management Report Card	14
Major Laboratories and Field Facilities	15
Program Performance (Unaudited)	16
Drive U.S. Energy Innovation and Deployment on a Path to Net-Zero Emissions by 2050	16
Strengthen the Nation's Energy Security, Resiliency, Affordability, and Reliability	21
Advance Science Discovery and National Laboratory Innovation	25
Ensure America's Nuclear Security by Harnessing Unparalleled Science and Technology Capabilities	28
Promote Equity and Energy Justice	31
Advance Clean-Up of Radioactive and Chemical Waste Management	38
Operational Excellence	39
Management's Analysis, Assurances and Priorities	42
Analysis of Financial Statements (Unaudited)	42
Chart 1: FY 2022 Total Liabilities Breakdown by Funded/Unfunded	43
Chart 2: FY 2022 Significant Changes in Assets	43
Chart 3: FY 2022 Significant Changes in Liabilities	44
Chart 4: Composition of Environmental Cleanup and Disposal Liability	44
Chart 5: FY 2022 Changes in Contractor Employee Pension and Other Postretirement Benefit Plans	45
Chart 6: Elements of Net Cost	46
Chart 7: FY 2022 Program Costs (Gross)	46
Chart 8: FY 2022 Major Elements of Costs Not Assigned	47
Chart 9: Research & Development	47
Chart 10: New Obligations and Upward Adjustments (Total)	48
Chart 11: IIJA Resources, Obligations and Outlays	49
Chart 12: IRA Resources and Obligations	49
FY 2022 DOE Highlight: Clean Energy Corps	50
Analysis of Systems, Controls, and Legal Compliance (Unaudited), Management Assurances	51
Management Priorities (Unaudited)	53
Financial Management Systems Plan (Unaudited)	75
FY 2022 DOE Highlight: Bipartisan Infrastructure Law	77
Financial Results	79
Message from the Deputy Chief Financial Officer	80
Financial Statements, Footnotes, and Consolidating Schedules	81
Principal Statements	82
Notes to the Consolidated and Combined Financial Statements	87
Note 1. Summary of Significant Accounting Policies	87
Note 2. Non-Entity Assets	91
Note 3. Fund Balance with Treasury	91

Note 4. Investments	92
Note 5. Accounts Receivable, Net	92
Note 6. Loans Receivable, Net and Loan Guarantee Liabilities	93
Note 7. Inventory, Net	99
Note 8. Property, Plant, and Equipment, Net	100
Note 9. Other Assets	100
Note 10. Regulatory Assets	102
Note 11. Liabilities Not Covered by Budgetary Resources	103
Note 12. Debt	103
Note 13. Environmental and Disposal Liabilities	105
Note 14. Other Liabilities	108
Note 15. Advances from Others and Deferred Revenue	111
Note 16. Pension and Other Actuarial Liabilities	112
Note 17. Leases	118
Note 18. Contingencies and Commitments	119
Note 19. Dedicated Collections	123
Note 20. Program Costs and Earned Revenues by Major Program	126
Note 21. Costs Not Assigned to Programs	127
Note 22. Inter-Entity Costs	128
Note 23. Combined Statements of Budgetary Resources	129
Note 24. Custodial Activities	130
Note 25. Reconciliation of Net Cost to Net Outlays	131
Note 26. Reclassification of Financial Statement Line Items for Financial Report Compilation Process	133
Consolidating and Combining Schedules	136
Required Supplementary Information (RSI, Unaudited)	146
FY 2022 DOE Highlight: Frontier Supercomputer	152
Auditors' Report: Memorandum from the Inspector General	153
Auditors' Report: Independent Auditors' Report	155
Other Information (Unaudited)	163
FY 2022 Summary of Financial Statement Audit and Management Assurances	164
Department of Energy's Management Challenges – Report of the Inspector General	165
Payment Integrity Reporting (FY 2022 Reporting of FY 2021 Payments)	175
Grants Programs	178
Climate-Related Risks	178
FY 2022 DOE Highlight: Strategic Petroleum Reserve	179
Civil Monetary Penalty Adjustment for Inflation: FERC and DOE	183
Other Statutory Reporting – Management's Response to Audit Reports	185
Glossary of Acronyms and Abbreviations	186
Photo Captions and Additional Information	194
Fiscal Year 2022 Back Cover	Back Cover





Message from the Secretary of Energy



I am pleased to present the United States Department of Energy's (DOE) Fiscal Year (FY) 2022 Agency Financial Report. This report provides DOE's key performance and financial information and demonstrates DOE's commitment to meeting the Administration's priorities by:

- 1) Driving U.S. Energy Innovation and Deployment on a Path to Net-Zero Emissions by 2050;
- 2) Advancing Scientific Discovery;
- 3) Strengthening and Modernizing National Nuclear Security;
- 4) Creating New Jobs and Research Opportunities in the Energy Economy; and
- 5) Building a Modern, Sustainable Cybersecurity Infrastructure.

DOE made progress in achieving each of these priorities in FY 2022 through continued investments in scientific research, clean energy, nuclear security, and environmental cleanup, all while facing the ongoing challenges related to the climate, racial equity, inequalities in the economy, and significant disruptions caused by the effects of the COVID-19 pandemic. Here are a few of the many achievements DOE made in FY 2022:

Driving U.S. Energy Innovation and Deployment on a Path to Net-Zero Emissions by 2050

In FY 2022, the Office of the Under Secretary for Science and Innovation stewarded the launch of four new Energy Earthshots. The Energy Earthshots are bold research, development, and demonstration targets to drive innovation breakthroughs in key areas to decarbonize our economy. Building on the two launched in FY 2021, Hydrogen Shot and Long Duration Storage Shot, DOE now has six Energy Earthshots. The Carbon Negative Shot, launched November 5, 2021, is targeting atmospheric carbon dioxide removal for less than \$100/net metric ton in one decade. The Enhanced Geothermal Shot, announced on September 9, 2022, and Floating Offshore Wind Shot, announced on September 15, 2022, are both targeting \$45/megawatt hour levelized cost of electricity by 2035. The Industrial Heat Shot, launched September 21, 2022, has a goal to have cost competitive industrial heat decarbonization technologies with over 85 percent lower greenhouse gas emissions by 2035.

Two historic climate laws enacted in FY 2022—the Bipartisan Infrastructure Law and Inflation Reduction Act—provided \$98 billion to DOE to tackle the climate crisis and invest in a more equitable clean energy future for the American people. During FY 2022, more than \$25 billion of the total funding was appropriated to the Office of Clean Energy Demonstrations (OCED). As a result, DOE established OCED in December 2021 with a mission to deliver clean energy demonstration projects at scale in partnership with the private sector to accelerate deployment, market adoption, and the equitable transition to a decarbonized energy system. OCED is a multi-technology office that will prove the value of new technologies in the real world and deliver economic, social, and environmental benefits to local communities across the Nation. To ensure the success of these demonstration projects, OCED is also standing up a demonstration center of excellence for project management oversight.

Advancing Scientific Discovery

In FY 2022, researchers at the Office of Science's Oak Ridge National Laboratory, and Joint Genome Institute collaborated with researchers at Northwestern University and LanzaTech to engineer a microorganism capable of converting carbon dioxide from stack gas emissions to a range of commodity chemicals, including acetone and isopropanol.

In FY 2022, the Office of Electricity awarded a Phase III Small Business Innovation Research (SBIR) cooperative agreement to Brains4Drones to apply its artificial intelligence technology on drones to mitigate against wildfires. The Brains4Drones project focused on adapting drone-based solutions to mitigate fire risks at distribution lines by inspecting hard-to-access terrain.

Strengthening and Modernizing National Nuclear Security

For the 25th consecutive year, the National Nuclear Security Administration's (NNSA) science-based Stockpile Stewardship Program enabled DOE and the Department of Defense to report to the President that the U.S. nuclear weapons stockpile remains safe, secure, and effective, without the use of nuclear explosive testing. NNSA's ongoing warhead modernization activities ensure that the U.S. nuclear weapons stockpile continues to meet Department of Defense requirements while enhancing safety and security through alteration, modification, and life extension programs.

In FY 2022, NNSA completed seven line-item infrastructure modernization projects with a total project cost of \$1.3 billion. These infrastructure projects are necessary to design, deliver, strengthen, and maintain the nuclear weapon stockpile.

Creating New Jobs and Research Opportunities in the Energy Economy

In FY 2022, DOE continued to collaborate and strengthen its capabilities to identify new jobs and research opportunities while expanding its outreach for communities who have been disproportionately impacted in the Energy Sector of the Economy. The Office of the Chief Information Officer (OCIO), Office of the Chief Financial Officer (OCFO), and the Office of Management assisted the Office of Economic Impact and Diversity (ED) to track all DOE investments, on a monthly basis, to identify which investments are matched to census tracts designated as disadvantaged or Tribal disadvantaged. OCIO also developed Smart Search, an algorithm that allows contracting officers and the Office of Small and Disadvantaged Business Utilization personnel to search a database of over 2,000 disadvantaged small businesses, Historically Black Colleges and Universities, and other Minority Serving Institutions with the purpose of connecting them to resources and opportunities within DOE.

The Administration's Justice40 initiative established a goal that 40 percent of the overall benefits of certain Federal Government investments, including in climate and clean energy, flow to disadvantaged communities. In FY 2022, ED developed several products to share information for the Justice40 initiative. DOE publicly released a list of 144 Justice40 Covered Programs across DOE offices. The programs include career skills training, grants for research, technical assistance, outreach, and opportunities to participate in DOE initiatives. DOE also hosted its first ever Justice Week. The five-day event convened external and internal stakeholders to discuss the Department's justice and equity efforts and the best path toward a new energy system through equity-centered solutions.

Building a Modern, Sustainable Cybersecurity Infrastructure

In FY 2022, DOE's Grid Modernization Laboratory Consortium, as part of the Grid Modernization Initiative, completed Phase I of the Optimized Security and Energy Management (BLOSEM) Unified Testing Platform (UTP). The BLOSEM UTP is a first-of-its-kind testing platform that enables systemic performance evaluation of blockchain-based concepts for grid cybersecurity applications. In Phase I, two functions of the platform were successfully demonstrated: Supply Chain Security, Life Cycle Monitoring, and Real-Time Auditing; and Distributed Energy Resources Coordination and Control.

Further, OCIO initiated a Technology Business Management implementation effort based on a cost model developed by the OCFO to better understand the Department's total cost of ownership and drive value-based decision-making on IT investments. Also in 2022, DOE announced the release of the Scaling IT Modernization Playbook. This project was premised on developing plans for action to scale IT modernization from individual pockets of success to cultures, environments, and tools that enable IT modernization across enterprises.

Other DOE Achievements

In FY 2022, the Office of Nuclear Energy (NE) continued advancing nuclear technology development through investments in the Small Modular Reactor Research and Development Program, and Advanced Reactor Demonstration Program. One of the Office of Nuclear Energy's partners, NuScale Power LLC, received Nuclear Regulatory Commission approval of a Design Certification for a 50 megawatt electric Small Modular Reactor design which will allow potential customers to reference this design in site-specific licensing actions as the technology is domestically deployed. A jointly supported NE and the Office of Energy Efficiency and Renewable Energy project with Constellation Energy will break ground on the installation of the first domestic nuclear powered low-temperature electrolyzer at the Nine Mile Point nuclear power plant, demonstrating an important step in advancing the technical feasibility and scale-up of clean hydrogen production utilizing nuclear energy. Additionally, DOE's National Reactor Innovation Center began the Advanced Construction Technologies Initiative, which is developing three advanced construction technologies that could significantly decrease the cost and schedule for construction of advanced reactors.

In FY 2022, the Department kicked off the exascale computing era with the successful deployment of Frontier, the Nation's first exascale supercomputer at Oak Ridge National Laboratory. Frontier, built by Hewlett Packard Enterprise and Advance Micro Devices, broke the exaflop barrier by achieving 1.102 exaflops on the high performance Linpack benchmark in May 2022, regaining the top spot on the Top500 list of the world's fastest computers. The hard work of our community, especially DOE's National Laboratories, to prepare the application software to run on these machines paid off, with two application codes meeting their key performance parameters running on Frontier. DOE and our scientific community are poised to leverage the power of Frontier to accelerate scientific discovery, advance clean energy technology, and ensure our national security.

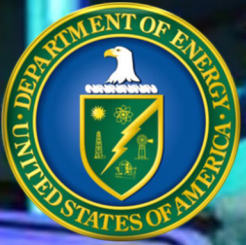
The independent public accounting firm KPMG LLP conducted an audit of the FY 2022 DOE financial statements contained in this report and issued an unmodified audit opinion for the 16th consecutive year. Based on internal evaluations, I can provide reasonable assurance that the financial and performance information contained in this report is complete and reliable, and accurately describes the results achieved by the Department in FY 2022.

DOE has continued its excellence in operations throughout the enterprise due to the hard work and resilience of its dedicated Federal and contractor workforce and the successes in this report would not have been possible without them.



Jennifer M. Granholm
Secretary of Energy
November 15, 2022

This Page Intentionally Left Blank



Management's Discussion and Analysis



Agency Highlights (Unaudited)

MISSION

The mission of the Energy Department is to ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions.

History

The Department of Energy's lineage can be traced back to the [Manhattan Project](#) and the race to develop the atomic bomb during World War II. Following the war, Congress created the [Atomic Energy Commission](#) (Commission) in 1946 to oversee the sprawling nuclear scientific and industrial complex supporting the Manhattan Project and to maintain civilian Government control over atomic research and development (R&D). During the early Cold War years, the Commission focused on designing and producing nuclear weapons and developing nuclear reactors for naval propulsion. The creation of the Commission ended the exclusive Government use of the atom and began the growth of the commercial nuclear power industry, with the Commission having authority to regulate the new industry.

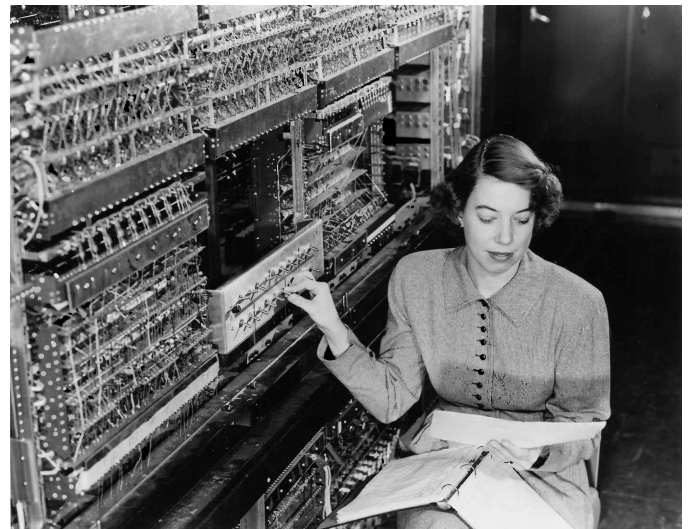
In response to changing needs and an extended energy crisis, the Congress passed the Department of Energy Organization Act in 1977, creating one of the most diverse agencies in the Federal Government. That legislation brought together for the first time, not only most of the Government's energy programs, but also science and technology programs and defense responsibilities that included the design, construction and testing of nuclear weapons. The Department provided the framework for a comprehensive and balanced national energy plan by coordinating and administering the energy functions of the Federal Government. The Department undertook responsibility for long-term, high-risk R&D of energy technology, Federal power marketing, energy conservation activities, the nuclear weapons programs, certain energy regulatory programs, and a central energy data collection and analysis program.

Over its history, the Department has shifted its emphasis and focus as the energy and security needs of the Nation have changed. During the late 1970s, the Department emphasized energy development and regulation but shifted to nuclear weapons research, development and production during the 1980s. With the end of the Cold War, DOE focused on environmental cleanup of the nuclear weapons complex, as well as nonproliferation and stewardship of the nuclear stockpile. Today, the Department is committed to meeting America's energy, nuclear security and environmental challenges through science and technology innovation.

DOE marked its 45th anniversary in 2022. For more information, visit <https://www.energy.gov>.



Historical photo: In 1937, Bonneville Dam, located 40 miles east of Portland, Oregon, in the Columbia River Gorge, was dedicated before an estimated crowd of 20,000 people. Power from early hydroelectric dams like Bonneville helped fuel the northwest economy and brought electricity to rural areas. Photo posted at <https://twitter.com/energy>.

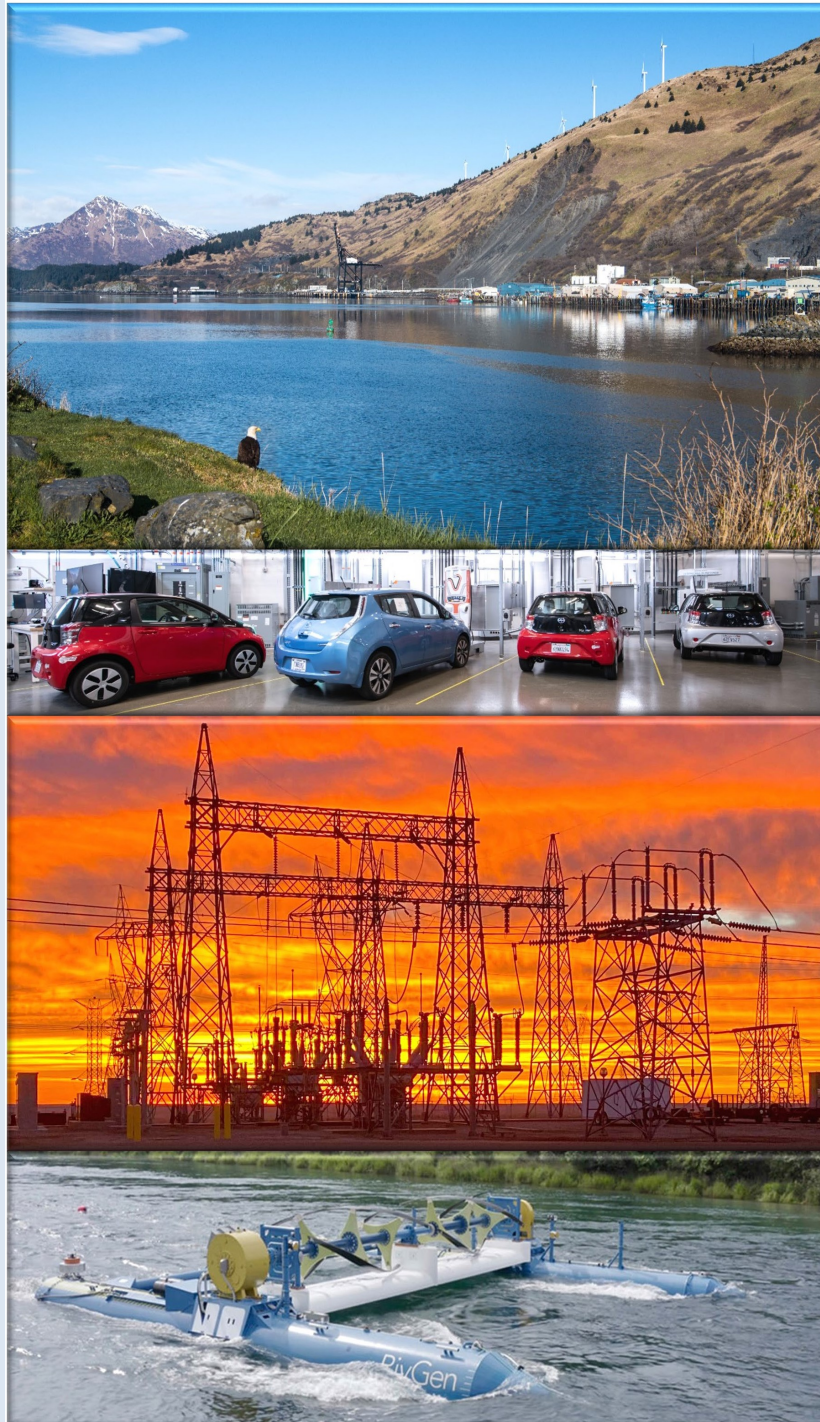


Historical photo: AVIDAC, Argonne's first digital computer, began operation in January 1953. It was built by the Physics Division for \$250,000. Pictured is pioneer Argonne computer scientist Jean F. Hall. AVIDAC (Argonne Version of the Institute's Digital Automatic Computer) was based on the IAS (Institute for Advanced Study) architecture developed by John von Neumann. Photo courtesy Argonne National Laboratory, posted at <https://twitter.com/energy>.

FY 2022 DOE Highlight: Energy Initiatives

The **Inflation Reduction Act**, signed by President Biden on August 16, 2022, contains energy initiatives to build a clean energy economy, reduce pollution, and lower energy costs for American families. For more information, visit <https://www.whitehouse.gov/briefing-room/statements-releases/2022/08/15/by-the-numbers-the-inflation-reduction-act/>.

- **Top Photo** – A bald eagle looks over St. Paul Harbor in Kodiak, Alaska, and **wind turns** on the ridgeline.
- **Photo 2** – NREL’s Optimization and Control Lab’s electric vehicle grid integration research bays perform advanced high power chargers to determine how they can be added to the grid, potentially combining buildings and **EV charging**.
- **Photo 3** – Fort Thompson **Electric Substation** in South Dakota.
- **Bottom Photo** – Native Village of Igiugig Diesel-Powered Microgrid used to capture **water power**.

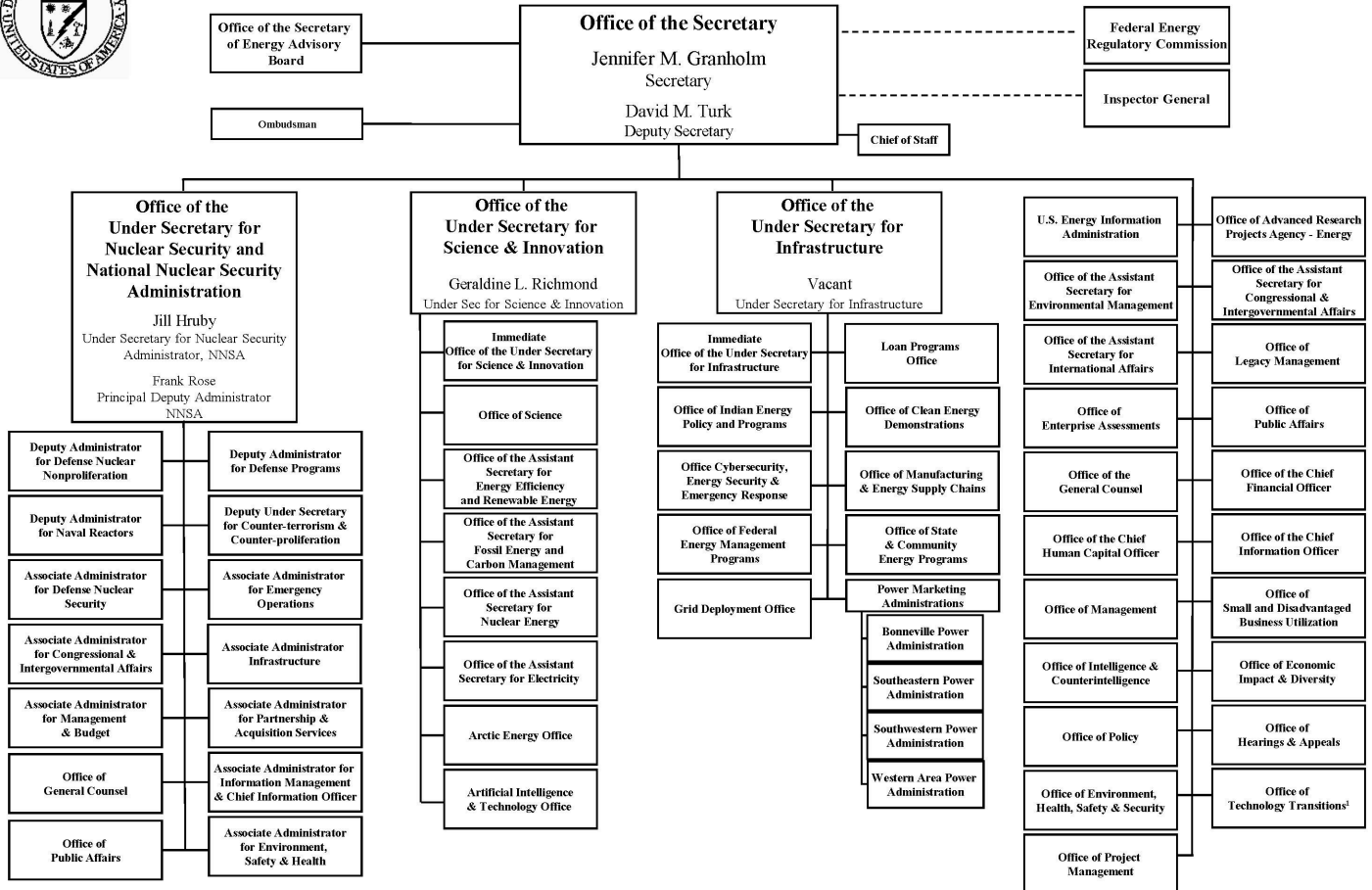


Organizational Structure

Organizational structure as of August 2022. For more information, visit <https://www.energy.gov/organization-chart>.



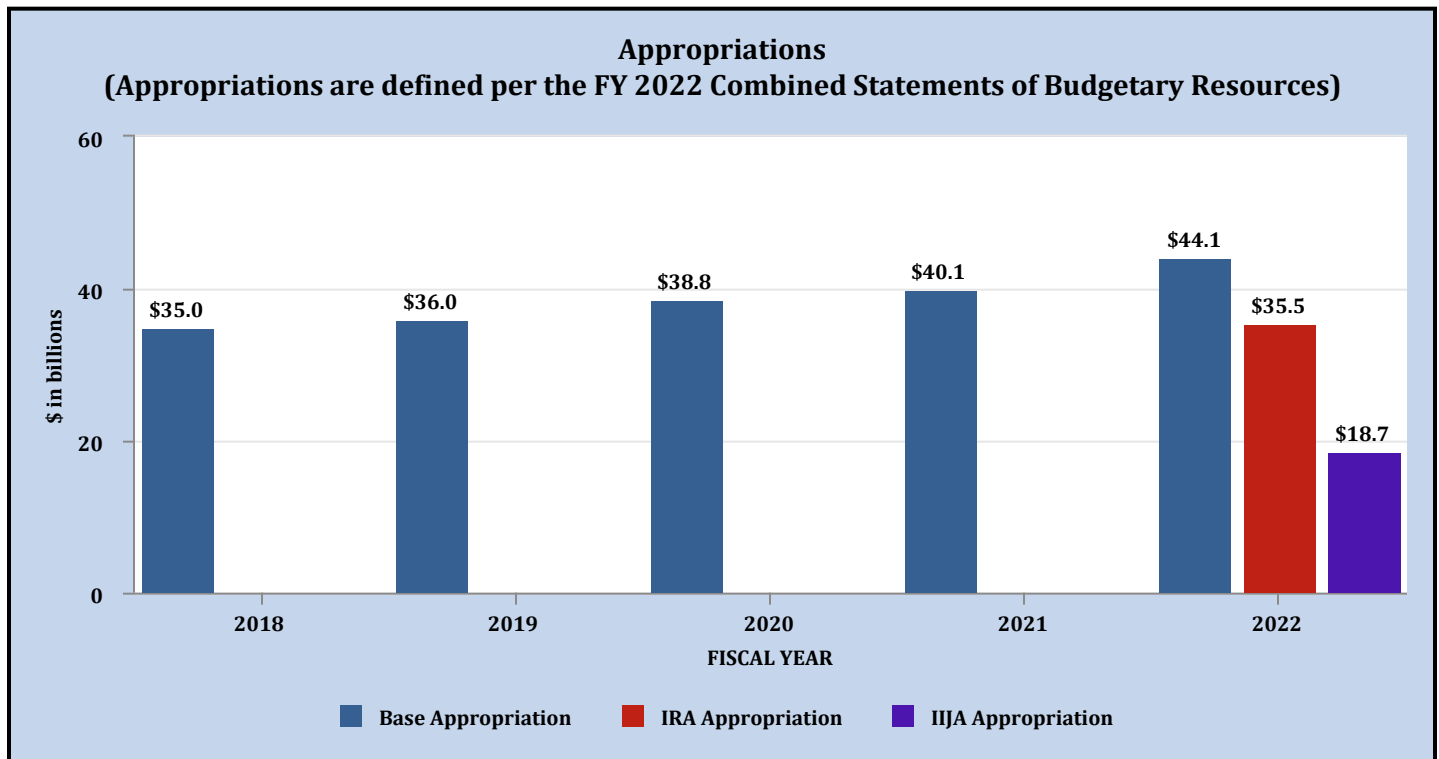
DEPARTMENT OF ENERGY



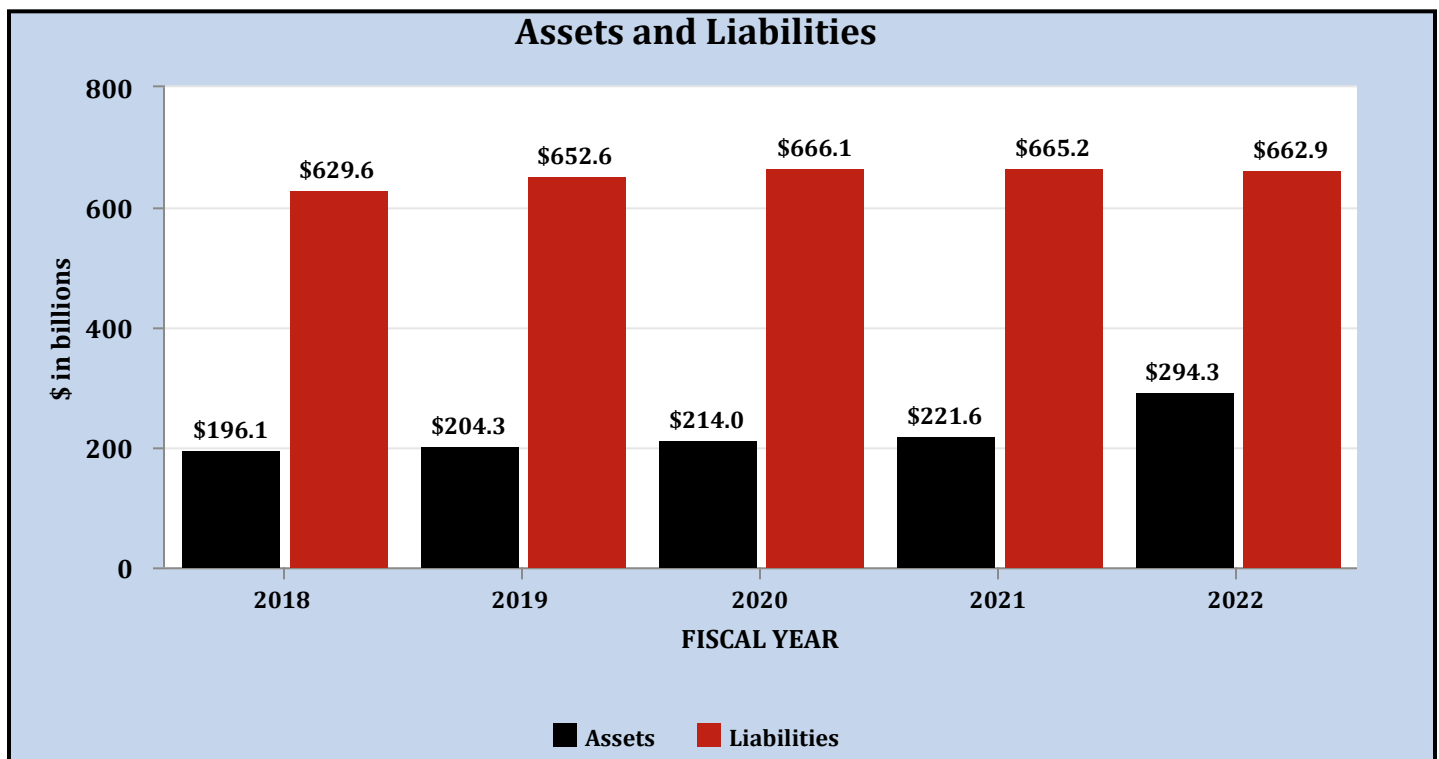
¹ The director of the Office of Technology Transitions also serves as DOE's Technology Transfer Coordinator who reports to the Secretary of Energy

August 2022

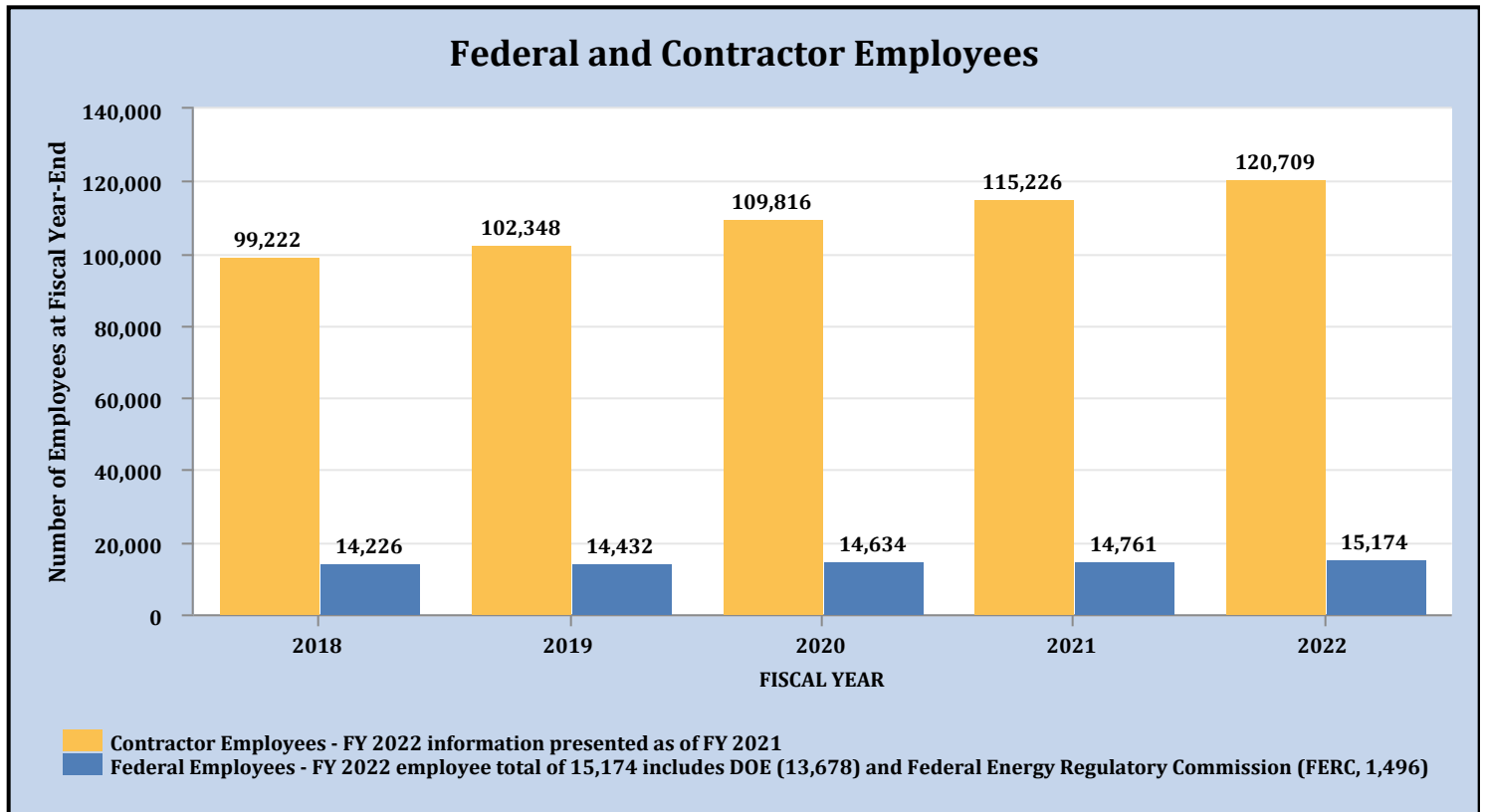
Financial Resources



Appropriations amounts are net of adjustments and include appropriated receipts, transfers, reductions, and temporarily not available. The \$44.1 billion of FY 2022 appropriations shown above differs from the budget scorekeeping amount of \$41.9 billion due to the FY 2022's CR Annualized basis included a reduction of \$2.2 million in recurring rescission that was incorporated into the Continuing Resolution (CR) calculation.



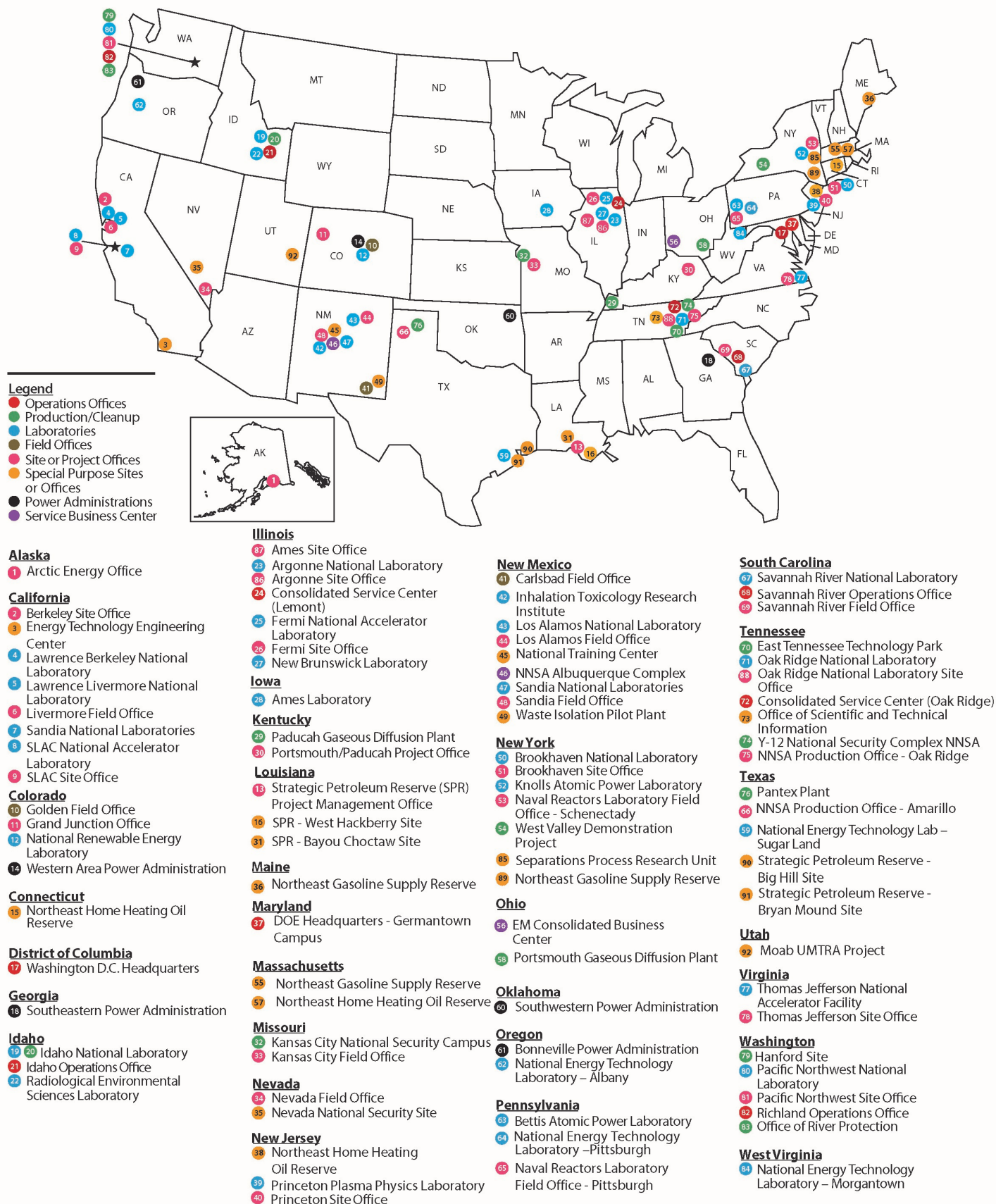
Human Capital Resources



FY 2022 Financial Management Report Card

COMPLIANCE		REQUIREMENT OR INITIATIVE	SUPPORTING INDICATORS (see page references for more detail)
YES	NO		
✓		Government Management Reform Act (GMRA) of 1994 – Financial Statement Audit	Unmodified Audit Opinion (see pages 153-162)
✓		Federal Managers’ Financial Integrity Act (FMFIA) of 1982 – Internal Controls (Section II) – Financial Systems (Section IV)	No Material Weaknesses (Section II) (see pages 51-52 and 164) Financial Systems generally conform to (Section IV) requirements and no FISMA significant deficiencies identified (see pages 51-52 and 164)
✓		Appendix A to OMB Circular No. A-123, Management of Reporting and Data Integrity Risk (2018)	No Material Weaknesses (see pages 51-52 and 164)
✓		Federal Financial Management Improvement Act (FFMIA) of 1996	Substantially comply with Federal financial management system requirements (see pages 51-52 and 164)
✓		Federal Information Security Modernization Act (FISMA) of 2014	Substantially comply with FISMA requirements as evidenced by annual FISMA reporting data (see pages 51-52 and 164)
✓		Payment Integrity Information Act of 2019 (PIIA)	<1% overall Erroneous Payment Rate and not susceptible to significant improper payments (see pages 175-177)

Major Laboratories and Field Facilities



Program Performance (Unaudited)

FY 2022 results and outcomes for DOE programs, as aligned with the strategic goals presented in the 2022-2026 Department of Energy (DOE) Strategic Plan, are summarized within this report. A detailed discussion of results for the Department's FY 2022 performance goals, assessment methodologies, metrics, external reviews, and documentation of performance data are presented in the *FY 2022 DOE Annual Performance Report*. Additional performance information is available at <http://energy.gov/about-us/budget-performance>.

Drive U.S. Energy Innovation and Deployment on a Path to Net-Zero Emissions by 2050

Participating Programs	Clean Energy Demonstrations; Electricity; Energy Efficiency and Renewable Energy; Fossil Energy and Carbon Management; Loan Programs Office; Nuclear Energy; Policy; Science
-------------------------------	--

The Biden-Harris Administration's Long-Term Strategy calls for the United States to achieve a clean energy economy with net-zero emissions no later than 2050, with an interim target of reducing greenhouse gas emissions 50-52 percent below 2005 levels by 2030. To meet this challenge, the U.S. Department of Energy (DOE) facilitates unprecedented advances in scientific research, applied energy R&D, and the deployment and commercialization of clean energy technologies. Examples of FY 2022 program accomplishments in these areas include:

Drive innovation of cost-efficient and affordable clean technologies and solutions through Research, Development, Demonstration and Deployment (RDD&D) and Carbon Management

Office of Energy Efficiency and Renewable Energy (EERE)

EERE supported a major breakthrough in the development of cost-effective electric heat pumps to help decarbonize the building sector. Through the Cold Climate Heat Pump Technology Challenge, one of nine partner manufacturers demonstrated performance of a heat pump that delivers 100 percent heating at 5°F, which could unlock \$500 in utility bill savings for households.

EERE research improved electric vehicle (EV) battery costs to under \$130/kilowatt-hour (kWh) at the pack level making progress towards the overall goal of \$90/kWh by 2028, an endpoint target that will enable cost competitive market entry of EVs by reducing the cost of EV batteries by approximately 70 percent (roughly \$14,000) from FY 2012. In addition, a major FY 2022 milestone was met in validating a biofuels pathway at engineering scale with a price of <\$3 per gasoline gallon equivalent (GGE) that has at least a 60 percent reduction in greenhouse gas (GHG) emissions. DOE supported T2C-Energy to further develop the THRIFTS process which converts anaerobic digester produced biogas (or landfill gas) into drop-in diesel meeting American Society for Testing and Materials (ASTM) D975 specification for \$2.91/GGE while reducing

GHG emissions by 130 percent when compared to petroleum diesel.

Office of Fossil Energy and Carbon Management (FECM)

Carbon Storage: Five Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Projects are completing field development activities. The CarbonSAFE Phase III projects are developing Underground Injection Control (UIC) Class VI injection wells for commercial storage facilities. Phase III includes the acquisition, analysis, and development of information to fully characterize storage complexes at six locations across the Nation to demonstrate storage resources for commercial volumes of Carbon Dioxide (CO₂). In FY 2022, these projects completed drilling of Class VI injection wells, seismic surveys, and reservoir modeling to define the area of review. They are in various stages of developing and submitting applications for and receiving authorizations to construct UIC Class VI permits for proposed injection wells at the site(s). Each project has completed their National Environmental Policy Act (NEPA) Environmental Information Volume (EIV) and are commencing NEPA analyses.

Rare Earth Element Pilot Facilities: In FY 2022, the Office of Fossil Energy and Carbon Management (FECM)/ National Energy Technology Laboratory (NETL) completed the construction of two additional first-of-a-kind (FOAK) small-scale rare earth element (REE) pilot facilities for processing lignite and acid mine drainage (AMD) to produce high purity REEs and critical minerals and materials (CMMs) from these unconventional or secondary feedstocks. These small pilot-scale facilities build on the success of prior bench-scale studies, and serve as a step in preparing for design, construction and operation of demonstration-scale and potentially commercial-scale facilities needed within the next few years to enable diversification of our domestic CMM (including REE) supply chains. To further enhance the economic viability of U.S. domestic CMM production, six Research, Development, Deployment, and Demonstration (RDD&D) projects were initiated in FY 2022 to accelerate the development of advanced, reduced cost, processing circuits leading to the

production of high purity rare earth metals for use in our Nation's Clean Energy and national defense industries.

Office of Electricity (OE)

Cost Competitive and Long Duration Storage

Technologies: OE achieved its FY 2022 Energy Storage milestone to demonstrate an enhanced novel aqueous soluble organic flow battery with a projected system cost of less than \$175 per kWh for a projected 1 Megawatt/4 Megawatt-hour system. OE also developed new materials and processes to advance sodium-based technologies—from novel sodium conducting membranes to sodium-based flow battery catholytes. OE developed novel freeze-thaw technology enabling batteries to potentially operate as seasonal storage assets. OE received the R&D 100 Award for developing the world's first iron nitride soft magnetic cores for power converters.

Advanced Conductors SBIR Projects: OE and the Advanced Manufacturing Office co-funded several Small Business Innovation Research (SBIR) projects under the Conductivity-enhanced materials for Affordable Breakthrough Leapfrog Electric and thermal applications (CABLE) initiative. Two OE-led projects under the Electricity Delivery System SBIR subtopic were successfully completed: QuesTek Innovations, developing advanced aluminum conductors for overhead transmission applications, and Mainstream Engineering, developing advanced copper conductors for underground and undersea applications.

Office of Nuclear Energy (NE)

Recovery of High Assay Low-Enriched Uranium

(HALEU): Using a molten salt based pyro-processing technology, HALEU materials can be generated from the Experimental Breeder Reactor-II (EBR-II) driver fuels. In FY 2022, 300 kilograms of HALEU was produced from the process at Idaho National Laboratory. Most advanced reactor concepts under development require HALEU fuel yet there are no commercial suppliers of HALEU in the U.S. The HALEU products from EBR-II have been recognized as a potential source of feedstock for advanced fast spectrum reactors in the near term.

Office of Clean Energy Demonstrations (OCED)

In partnership with the Loan Programs Office (LPO) and the Office of Technology Transitions (OTT), OCED kicked-off the development of Demonstration and Deployment Pathways to build a shared DOE and industry perspective on what it will take to achieve private sector lift-off for key clean energy technology areas.

Office of Policy (OP)

OP conducted a modeling analysis to inform DOE RDD&D investments in attaining Administration climate and energy goals. The analysis underpinned scenario development for the U.S. Long-Term Strategy for net zero GHG emissions by 2050, as well as an analysis of pathways to achieve a 100 percent clean electric grid by 2035.

Office of Science (SC)

Researchers at Northwestern University, Oak Ridge National Laboratory (ORNL), Joint Genome Institute (JGI), and LanzaTech engineered a microorganism capable of converting CO₂ from stack gas emissions to a range of commodity chemicals, including acetone and isopropanol. The work is being deployed at LanzaTech facilities at commercial scale to simultaneously produce a broad range of commodity chemicals directly from stack gas CO₂ and reduce facility emissions.

Accelerate deployment of clean technologies at scale and pace

Office of Energy Efficiency and Renewable Energy (EERE)

The Geothermal Technology Office's launch of the Wells of Opportunity: ReAmplify initiative, aims to establish the commercial viability of geothermal energy production in existing oil and gas wells by utilizing abandoned oil and gas wells for geothermal heating, cooling, and power production while creating opportunities for oil and gas workers to transition to careers in renewable energy.

The Wind Energy Technologies Office made strides in increasing wind energy production by developing taller wind turbine towers with two companies focused on on-site manufacturing with spiral welding techniques for towers and 3D printing for customizable concrete tower bases.

The Better Buildings Initiative is a market transformation program through which partners collaboratively pursue ambitious energy, waste, water, and GHG reduction goals. The more than 900 program partners represent more than 35 of the country's Fortune 100 companies, more than 10 of the top 25 U.S. employers, 14 percent of the U.S. manufacturing energy footprint, and 13 percent of total commercial building space, as well as more than 100 state and local governments spanning the Nation. Since the start of the Better Buildings Initiative, partners have collectively saved: 2.5Qbtu of energy, equivalent to 155 million metric tons of CO₂ avoided.

Office of Fossil Energy and Carbon Management (FECM)

Hydrogen with Carbon Management: The NETL Reversible Solid Oxide Fuel Cell (R-SOFC) research group advanced R-SOFC technology for electricity and/or hydrogen production in the modern grid by reducing the long-term degradation of SOFC components and thereby decreasing lifetime system costs. Using NETL's Joule Supercomputer, NETL simulated the degradation of thousands of possible combinations of electrode compositions and microstructures operating at different temperatures and loads under fuel cell and electrolysis operation modes. Using machine learning, the thousands of simulations are analyzed to identify how the electrode features and operating conditions can be tailored to increase the long-term stability of a given R-SOFC system.

The production of oxygen and its use in gasification and oxycombustion technologies is an important step and cost factor for many technologies, including gasification and reforming technologies for hydrogen production. With support from FECM, Los Alamos National Laboratory (LANL) successfully designed and fabricated asymmetric polybenzimidazole (PBI)- derived carbon molecular sieve (CMS) hollow fiber membranes (HFMs) that are resistant to collapse and contain optimizable selective layer and porous support morphologies. Optimization of these PBI-CMS HFMs will enable the development of an energy efficient modular air separation unit (ASU) that can be integrated into a cost-competitive, small scale (1-5 Megawatts electric [MWe]), near-zero emission gasification systems.

FECM also completed a pathway analysis to identify current baseline costs and necessary R&D efforts to achieve carbon neutral hydrogen production from carbon-based feedstocks. The report published by NETL is titled, *Comparison of Commercial, State-of-the-Art, Fossil-Based Hydrogen Production Technologies*, and is available at NETL's website.

Carbon Capture: Multiple Front End Engineering Design (FEED) studies have been completed for the utility sector that developed cost of carbon capture to be installed at the specific FEED study locations. This work will enable final investment decisions to be made which will result in accelerated deployment of these technologies. Additionally, Pre-FEED and FEED studies specific for Hydrogen (H₂) production for steam methane reforming (SMR) and autothermal reforming (ATR) facilities have been awarded by FECM. With the passage of the Inflation Reduction Act of 2022 (IRA) these studies are playing an important role in facilitating progress toward achieving the goals of the Hydrogen Shot and ultimately commercial deployment.

Office of Electricity (OE)

Learning to Adapt and Control for Complex Power

Systems (LACC): A framework for controlling utility-scale renewable assets was developed under this OE-supported project to adaptively ride through system disturbances and increase the security and reliability of modern power grids. Compared to traditional controllers, LACC is faster, more reliable, and less expensive, while reducing impacts of current introduced by outages during a severe fault by more than 40 percent. Ultimately, the LACC controller will allow more renewable resources to connect to the grid.

Holistic platform to plan for and manage behind-the-meter distributed energy resources (DERs) to support grid services: A platform for distribution utilities demonstration of aggregated DER use cases for peak load reduction, load shaping, distribution network management, and ancillary services showed the platform can provide utilities with a visibility and management tool for DERs to relieve congestion while also delivering grid services to markets. This promising platform was acquired by a commercial entity, anticipating that a greater industry impact will result.

Office of Clean Energy Demonstrations (OCED)

OCED partnered with the Environmental Protection Agency (EPA) to create the new Environmental Justice Thriving Communities Technical Assistance Centers (EJ TCTACs). This partnership will ensure that the awards made to create the EJ TCTACs will be an integral component of government-wide collaborative efforts to support partners with capacity constraints, including underserved communities and rural/remote communities, in accessing federal resources and funding sources, and engaging in decision-making processes to address environmental and energy justice challenges. Through this technical assistance, clean energy technology demonstration and deployment will be accelerated through community-led projects.

Office of Nuclear Energy (NE)

Accelerating Nuclear Deployment: NE supports research, development, and demonstration of existing and advanced reactor designs and technologies to enable industry to address technical and regulatory challenges associated with maintaining the existing fleet of nuclear reactors. In FY 2022, NuScale Power, LLC, received Nuclear Regulatory Commission (NRC) approval of a Design Certification for a 50 mega-watt electric (MWe) Small Modular Reactor (SMR) design which will allow potential customers to reference this design in site-specific licensing actions as the technology is domestically deployed. A jointly supported NE and EERE project with Constellation Energy will break ground on the installation of the first nuclear powered low-temperature electrolyzer at the Nine Mile Point nuclear power plant demonstrating an important step in advancing the technical feasibility and scale-up of clean hydrogen production utilizing nuclear energy. Additionally, the National Reactor Innovation Center initiated the Advanced Construction Technologies Initiative which is developing three advanced construction technologies that could significantly decrease the cost and schedule for construction of advanced reactors.

Loan Programs Office (LPO)

During FY 2022, LPO issued four conditional commitments for loans under the Title 17 and Advanced Technology Vehicles Manufacturing (ATVM) programs. Two Title 17 commitments were made for over \$1.5 billion in total which in aggregate will avoid CO₂ emissions by over 1,125,000 tons annually. Two ATVM commitments were made for over \$2.6 billion that will help capitalize the US battery supply chain and support in total the domestic manufacture of over 1.2 million electric vehicles annually. Also in FY 2022, LPO continued to build a potential pipeline of loans, with over \$86.5 billion in active applications by the end of the year under the Title 17 and ATVM programs.

Engage internationally to achieve global decarbonization and energy security while expanding markets for U.S. clean energy goods and services

Office of Energy Efficiency and Renewable Energy (EERE)

EERE engaged in multilateral initiatives (e.g., IEA Technology Collaboration Programmes, Clean Energy Ministerial & Mission Innovation, etc.) across clean energy technologies. These multi-country collaborations sped progress on global decarbonization by better aligning global codes and standards and supporting market development of clean energy technologies, and by sharing policy and industry implementation lessons learned. These collaborations also complemented DOE's 2022 implementation activities under many recently reinvigorated bilateral partnerships on clean energy, including with Canada, Denmark, Germany, and India.

Office of Nuclear Energy (NE)

Ukraine: As part of Russia's war on Ukraine, Russia occupied the Ukrainian Zaporizhzhia Nuclear Power Plant (ZNPP) and conducted widescale attacks against the Ukrainian energy grid, endangering offsite power supplies for ZNPP and Ukraine's other NPPs. In addition, the war has disrupted supply chains, leading to shortages of supplies needed for normal plant operations. In March 2022, Energoatom asked the U.S. government for assistance in procuring essential supplies such as diesel fuel for the NPP emergency backup generators and chemicals used in water production/treatment and electrical systems maintenance and operation. In April, NE's International Nuclear Energy Cooperation (INEC) Initiative successfully contracted with Eastern European firms to procure and transport into Ukraine some of the most critically needed supplies; i.e. diesel fuel and sulfuric acid. INEC continues to monitor the situation to identify other ways to support the continued safe operation of Ukraine's nuclear fleet. In addition, INEC continues to implement long-running assistance activities begun in prior years.

Office of Clean Energy Demonstrations (OCED)

In September, OCED attended and played a key role in the Global Clean Energy Action Forum (GCEAF) in Pittsburgh where a dozen countries came together to surpass the International Energy Agency's funding goal for \$90 billion worth of clean energy demonstration projects, and committed \$94 billion towards the goal. Also at GCEAF and in support of President Biden's \$90 billion challenge, OCED organized a roundtable with several other countries that represent over 90 percent of global public investments in clean energy innovation to share their program design and lessons learned in an intimate, off-the-record discussion to help inform how each invests in demonstration projects.

Office of Electricity (OE)

U.S.-India Collaborative for Smart Distribution System with Storage (UI-ASSIST): OE is supporting Washington State University and their 15 U.S. university and industry partners in a joint research project with India to advance

the development of the electric distribution systems in both the United States and India. UI-ASSIST focuses on providing affordable, clean energy while maintaining grid reliability and resiliency, and is promoting grid innovations that will promote economic growth and energy security in both countries.

Office of Policy (OP)

OP conducted analysis that underpinned scenario development for the U.S. Long-Term Strategy for net zero GHG emissions by 2050 submitted by President Biden to the United Nations Framework Convention on Climate Change (UNFCCC). Office of Policy led DOE's new supply chain and energy industrial base strategy, which includes actions to increase global presence of U.S. clean energy technologies.

Catalyze clean energy solutions for job creation and economic growth, including with a robust place-based focus

Office of Energy Efficiency and Renewable Energy (EERE)

EERE was able to catalyze clean energy solutions for job creation and economic growth, including with a robust place-based focus in a variety of ways across this past year, but these examples stand out: the Solar Energy Technology Office issued a funding opportunity to support clean energy workforce partnerships to support improved access to career-track training for disadvantaged workers. EERE developed the Battery Workforce Initiative—a joint effort between the Vehicle Technologies Office (VTO) and the Advance Manufacturing Office (AMO) to develop national training standards, in partnership with industry and labor stakeholders, for the emerging battery supply chain. EERE also incorporated new language focused on Diversity, Equity, Inclusion, and Accessibility (DEIA) for its funding opportunities starting in May 2021; to date, over \$700 million of EERE selected awards include a plan to address these issues and include more diversity in workforce development.

Office of Fossil Energy and Carbon Management (FECM)

Carbon Ore, Rare Earth, and Critical Mineral (CORE-CM) Initiatives: In FY 2022, FECM/NETL initiated 13 place-based CORE-CM initiatives around the country to assess the potential to establish critical mineral and material (CMM) supply chains from unconventional and secondary resources like coal and coal byproducts, in existing coal basins, where the communities are being impacted by the energy transition. The CORE-CM regional coalitions are working to develop standard methods and protocols to assess these unconventional sources, identifying the potential for the use of existing infrastructure, and identifying workforce, environmental justice, and social implications of CMM supply chain development in the regions.

Office of Electricity (OE)

Chronological AC Power Flow Automated Generation (C-PAGE): The C-PAGE tool advances renewable integration efficiency by automatically creating realistic, reliable, and economic planning models for long-term planning studies of renewable integrations and reducing the model preparation time from months to minutes. This OE-supported tool has been recognized by industry, was used by Western Electric Coordinating Council (WECC) to develop 2,032 renewable planning base cases, and has been selected by the Power Company of New Mexico (PNM) to support transmission planning studies.

Office of Clean Energy Demonstrations (OCED)

OCED is working in close collaboration across DOE to support the Justice40 Initiative (Justice40), which established the goal that 40 percent of overall benefits of certain Federal investments—including those in climate change and clean energy—flow to underserved and overburdened communities. To support this, OCED required applicants to submit a Community Benefits Plan in both of the Funding Opportunity Announcements (FOAs) it issued in FY 2022 (Hydrogen Hubs and Carbon Capture Demonstrations Program). Community Benefits Plans are based on a set of four core policy priorities: investing in America's workforce; engaging communities and labor; advancing diversity, equity, inclusion, and accessibility; and implementing Justice40. These key principles, when incorporated comprehensively into project proposals and executed upon, will help ensure broadly shared prosperity in the clean energy transition.

Office of Policy (OP)

OP launched the Communities Local Energy Action Program (LEAP) Pilot initiative which partners with communities across the Nation to build community-driven action plans for clean energy-related economic development; LEAP provides \$16 million for technical assistance to low-income, energy burdened communities that are experiencing either direct environmental justice impacts or direct economic impacts from a shift away from historical reliance on fossil fuels.

OP developed guidance to integrate job quality and labor standards into DOE infrastructure spending, including requirements for Infrastructure Investment and Jobs Act (IIJA) FOA applicants to address job creation and economic growth, with a focus on equity and place-based solutions. The IIJA is also known as the Bipartisan Infrastructure Law (BIL).

Loan Programs Office (LPO)

LPO made conditional commitments for \$4.2 billion in new loans, across six states, expected to create 7,550 construction and 5,300 operations jobs. LPO also amended the Title 17 solicitation to include the regional variation exemption for deployment of same or similar technologies, per the Energy Act of 2020.

Strengthen the Nation's Energy Security, Resiliency, Affordability, and Reliability

Participating Programs

Cybersecurity, Energy Security, and Emergency Response; Electricity; Energy Efficiency and Renewable Energy; Fossil Energy and Carbon Management; National Nuclear Security Administration; Nuclear Energy

Each of DOE's objectives within this goal are aimed at fulfilling the mission of the National Climate Strategy to keep America on track to reducing emissions and deploying the technology and infrastructure necessary to achieve net-zero emissions no later than 2050 by guiding improvements to energy supply chain resilience, revitalize and rebuild domestic manufacturing capacity for the energy sector, and advance the fight against climate change. DOE leads the implementation of consolidated interim storage as an important component of a waste management system that will enable near-term consolidation and temporary storage of spent nuclear fuel. Examples of FY 2022 program accomplishments in these areas include:

Develop and deploy innovative solutions to harden energy infrastructure against physical threats including climate change

Office of Electricity (OE)

Flexible Transformer Validation: OE, General Electric (GE), and Cooperative Energy have completed field validation of the world's first flexible transformer that adapts to a range of voltage ratios and impedance levels. Results include over 99.5 percent efficiency with size and weight within 120 percent of comparable conventional large power transformers (LPTs). Flexible transformers significantly reduce the manufacturing cost and time needed for custom-made transformers. By allowing damaged transformers to be replaced more quickly, flexible transformers will be an important tool in increasing the grid's resilience to extreme weather events or cyber incidents.

Validated resilient operations of networked microgrids (RONM) software capabilities: The resilience benefit from the software solution for networking microgrids was clearly quantified during a simulated outage event on a distribution utility feeder circuit serving a remote community, which showed that close to two-thirds of the load can be supported. This is a significant increase, as only about 22 percent of the load could be supported with the same microgrids operating in isolation. The software has been deployed on an industry-sponsored platform to transition its use by utilities in rapid recovery during extreme weather events.

SBIR Phase III Wildfire Mitigation: In May 2022, OE awarded a Phase III SBIR cooperative agreement to Brains4Drones (Plano, TX) to apply their artificial intelligence (AI) technology on drones to mitigate against wildfires. The Brains4Drones project focused on adapting drone-based solutions to mitigate fire risks at distribution lines in hard-to-access terrain by performing powerline, equipment, and vegetation inspections. Brains4Drones developed AI algorithms, integrated the necessary sensors for defect detection and developed prototypes that specifically gathered and curated real-time information on potential hazards. The technology was adapted to utility needs and was field demonstrated in September 2022, by Consumers Power, an electric cooperative utility in Oregon.

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

CESER worked across the energy sector on emergency response incidents and fuel supply issues including executing over 150 million barrels in Presidentially authorized emergency Strategic Petroleum Reserve (SPR) sales, along with over 24 million barrels in emergency SPR exchanges, and 38 million barrels in Congressionally mandated SPR sales.

Office of Policy (OP)

OP led DOE's efforts to provide background information for the White House in advance of the June presidential determinations which provided DOE with the authority to use the Defense Production Act (DPA) to accelerate the manufacturing and deployment of five clean energy technologies: solar; heat pumps; transformers and electric grid components; clean hydrogen components; and insulation. Office of Policy also helped DOE stand up a new Manufacturing & Energy Supply Chains office, which will administer Defense Production Act funding and activity.

Office of Fossil Energy and Carbon Management (FECM)

Natural Gas Sensors: FECM is developing advanced, low-cost, accurate sensors for ensuring the efficiency, integrity and reliability of the Nation's new and existing natural gas and oil infrastructure. FECM has successfully completed a pilot-scale field test of optical fiber sensors applied both inside and outside a natural gas pipeline for distributed vibration, temperature, flow rate, gas leak, and pressure monitoring in 18- and 8-inch outer diameter (OD), high-pressure natural gas pipelines. Multiple provisional patents have resulted.

Advance adoption of solutions to prevent and respond to cyber vulnerabilities and incidents

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

CESER awarded six new projects totaling \$12 million for university-based research, development, and demonstration of flexible cyber-physical platforms tools, and technologies that will help secure the Nation's electric power systems. CESER established \$15 million awards each with National Rural Electric Cooperative Association (NRECA) and American Public Power Association (APPA) to deploy technologies that provide cyber visibility, detection, and response capabilities for energy delivery systems. APPA and NRECA are coordinating technology deployments with their respective members to improve their resiliency and security.

CESER released Version 2.1 (V2.1) of the Cybersecurity Capability Maturity Model (C2M2), a tool designed to help companies evaluate their cybersecurity capabilities and optimize their security investments. V2.1 reflects important refinements to the model based on real-world pilot testing and public comments. CESER led the revision of the model leveraging the guidance and feedback of the Energy Sector C2M2 Working Group, which included 145 cybersecurity experts representing 77 energy sector and cybersecurity organizations.

DOE in partnership with the National Association of State Energy Officials (NASEO), released an Energy Emergency Response Playbook to provide state and territory energy officials with a starting point for energy emergency response planning. The playbook includes a framework for evaluating energy emergencies, guidance, and templates for response actions, as well as planning, monitoring, and response resources. The playbook is designed to be customized by states and align with their State Energy Security Plans (SESPs).

CESER also supported a number of training and workforce efforts in FY 2022. Over 4,000 state energy officials, governors, energy advisors, public utility commissioners, state legislators, and emergency managers participated in CESER-supported events and training for energy security, resilience and cybersecurity planning in FY 2022. Over 40 exercises focused on improving energy resilience, security and cybersecurity. These included expanding the scenarios addressed to include post-quantum and Distributed Energy Resources.

Office of Energy Efficiency and Renewable Energy (EERE)

EERE invested in development of cybersecurity solutions consistent with EERE's Cybersecurity Multiyear Program Plan, so that new clean technologies are "secure by design." For example, the Advance Manufacturing Office continued support for the Cybersecurity Manufacturing Innovation Institute (CyManII), which released a public roadmap in

May 2022 with its 63 public sector, private sector, university, and institutional partners.

Office of Fossil Energy and Carbon Management (FECM)

Optimized Security and Energy Management (BLOSEM) Unified Testing Platform (UTP): NETL and Grid Modernization Laboratory Consortium (GMLC) partners National Renewable Energy Laboratory (NREL), Ames Laboratory, SLAC National Accelerator Laboratory (SLAC) and Pacific Northwest National Laboratory (PNNL) completed Phase I of the Optimized Security and Energy Management (BLOSEM) Unified Testing Platform (UTP). This project was co-funded by FECM, OE, and Office of Nuclear Energy (NE) as part of the Grid Modernization Initiative and included input from industry and academia advisors. The BLOSEM UTP is a first-of-a-kind testing platform that enables systematic performance evaluation of blockchain-based concepts for grid cybersecurity applications. It is interoperable and reconfigurable to demonstrate a wide variety of use cases and blockchain environments. In Phase I, two use cases were successfully demonstrated: Supply Chain Security, Life Cycle Monitoring, and Real-Time Auditing; and Distributed Energy Resources (DER) Coordination and Control.

National Nuclear Security Administration (NNSA)

NNSA upgraded cybersecurity capabilities to enhance continuous system monitoring, cyberthreat detection, and rapid investigation and response. These improvements are critical to preventing and responding to cyber incidents. NNSA is implementing programs to test and validate the organizational cybersecurity posture through exercises, red team events to assess organization security, and penetration testing. These investments help identify and address cyber program gaps. NNSA conducted an independent third-party cybersecurity assessment. The assessment identified opportunities to improve program performance. Investments in the cyber program, today and over the next several years, will address those issues and align with the Administration's cyber priorities.

Secure the supply chain for a robust clean energy transition

Office of Electricity (OE)

Grid Deployments and Field Validations:

OE-supported staff co-led IEEE 1547.9, the first standard for grid interconnection of energy storage systems. OE published the first comprehensive review paper on cyberphysical security of energy storage systems titled *Cyberphysical Security of Grid Battery Energy Storage Systems*. OE developed a dispatchable working prototype of a power electronic system to support multiple secondary use energy storage technologies.

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

As the Sector Risk Management Agency (SRMA) for the energy sector, DOE partnered with the Electricity

Subsector Coordinating Council (ESCC) on critical issues on energy resilience and cybersecurity including launching a Supply Chain Tiger Team in response to concerns repeatedly expressed by the electric utilities regarding increased supply chain risk, with a focus on distribution transformers.

Another key supply chain effort CESER leads is the Cyber Testing for Resilient Industrial Control System (CyTRICS™) program. In FY 2022, CESER expanded its partnership with energy system vendors, labs, and utilities to identify and mitigate cyber vulnerabilities, increasing the scope, capability, and impact of the testing effort.

Additionally, CESER in partnership with industry and inter-agency stakeholders jointly developed and delivered a set of new supply chain cybersecurity resources including 20 new enumerations of control system security vulnerabilities, a set of energy sector reference architectures and security profiles, an interactive matrix of security standards, and a National Cyber-Informed Engineering Strategy – which provides a holistic approach to integrate cybersecurity considerations into the conception, design, build, and operation of any physical system that has digital connectivity, monitoring, or control.

Office of Policy (OP)

In collaboration with the National Labs, DOE offices, federal agencies, and the White House, the Office of Policy led the development of “America’s Strategy to Secure the Supply Chain for a Robust Clean Energy Transition,” including 13 deep-dive supply chain assessments. It included more than 40 specific actions the US government will take and 20 recommendations for Congressional action. Office of Policy also supported the Presidential Declaration to invoke Defense Production Act (DPA) for five critical clean energy technologies. With CESER, the Office of Policy co-led DOE participation in Electric Sector Coordinating Committee Tiger Team on power sector supply chain concerns.

Office of Energy Efficiency and Renewable Energy (EERE)

EERE has a strong history in developing and supporting domestic supply chains for critical materials. In FY 2022, EERE-supported Marshalltown Research Lab licensed a Critical Materials Institute (CMI) technology to produce extractants that improve the efficiency of producing separated rare earth oxides needed for magnets used in electric vehicles and offshore wind turbines. EERE-supported Rio Tinto opened a lithium demonstration plant in April 2021 that leverages CMI-technology to recover lithium from mine waste at its Boron mine site. In May 2022, Rio Tinto also started producing tellurium at its Kennecott copper operation in Utah, supplying thin film photovoltaic solar panels. Rio Tinto is continuing to partner with CMI to economically recover tellurium from copper refining waste. EERE-supported Momentum Technologies raised \$20 million in growth funding in December 2021 to build battery recycling plants, leveraging a technology developed by CMI and scaled in partnership with Momentum Technologies.

Office of Fossil Energy and Carbon Management (FECM)

H₂ Production, Transportation and Storage: The Natural Gas Decarbonization and Hydrogen Technologies (NGDHT) program was formally initiated in the 2022 Omnibus and the program coordinates with other DOE offices to support the transition towards a clean hydrogen-enabled economy through the decarbonization of natural gas conversion, transportation, and storage. The NGDHT program addresses methane utilization challenges through transformational concepts for clean H₂ production from domestic natural gas resources, the suitability of existing natural gas pipelines and infrastructure for H₂ transportation, and identification of underground storage infrastructure to handle high volume fractions of H₂.

Office of Nuclear Energy (NE)

TRISO Fuel: Through cost-shared partnerships with industry, NE is establishing a multiple-producer market for tri-structural isotropic (TRISO) fuel. In FY 2022, X-energy completed a \$40 million award with DOE, through which they commissioned a pilot-scale TRISO fuel fabrication facility at the ORNL, which is paving the way for their commercial scale TRISO fuel fabrication facility, planned for construction in Oak Ridge, Tennessee, under the Xe-100 Advanced Reactor Demonstration Program (ARDP) award with the OCED.

Support an effective emergency response capability in the federal government for responding to critical energy events

Office of Fossil Energy and Carbon Management (FECM)

Office of Environment, Security, Safety and Health (ESS&H): In FY 2022, FECM had the opportunity to engage more effectively with internal/external stakeholders in all phases of emergency management to ensure technical guidance is available and readiness is aligned to meet the needs of all hazard response. FECM also performed accountability tests to ensure management and employee physical accountability on a quarterly basis. FECM also strengthened personnel awareness of what to do when faced with a catastrophe or emergency. FECM provided support and guidance with incident and environmental investigations.

Office of Nuclear Energy (NE)

Implemented Cyber Security: In FY 2022, as part of its early steps to effectively support activities required by the President’s Executive Order 14028, *Improving the Nation’s Cybersecurity*, the Office of Nuclear Energy working with its partners at the Idaho National Laboratory (INL), accelerated the acquisition of state-of-the-art network firewall devices. These new devices replaced numerous legacy and end-of-life devices and will better serve INL customers by allowing network users to access information technology services more securely, efficiently, and with greater reliability to support DOE’s mission.

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

CESER spent 85 days activated responding to three hurricanes, one tropical storm, severe winter weather, flooding, wildfire, sargassum seaweed overgrowth in the United States Virgin Islands, and four National Special Security Events. Additionally, CESER deployed seven members of the specialized Catastrophic Incident Response Team (CIRT) to assist with restoration by conducting damage assessments in Florida and Puerto Rico after Hurricanes Fiona and Ian. Situational and damage assessment capabilities were expanded with the implementation of tools to include Survey 123 and a multi-modal communication platform for responders. In addition, CESER trained and deployed Surge Capacity Force members in coordination with the Federal Emergency Management Agency (FEMA) to assist in post disaster relief efforts.

CESER participated in a two-day tabletop exercise in San Juan, Puerto Rico hosted by the Department of Economic Development and Commerce. The exercise brought together CESER, FEMA, and Puerto Rico's utilities and emergency management to discuss actions around an island wide power outage due to an earthquake. This was the first opportunity for CESER to discuss and highlight its emergency response capabilities and potential support to Puerto Rico after a major incident. The relationships and understandings gained during the exercise significantly contributed to the efficient restoration of power after Hurricane Fiona in September.

Additionally, CESER successfully took on all of the Department's emergency authorities to include the Defense Production Act, Federal Power Act 202c waivers, and the Jones Act. In FY 2022, CESER used the authorities to mitigate power generation issues due to extreme heat and wildfires in California, and to address various supply chain challenges.

Implement consolidated interim storage for the Nation's nuclear waste

Office of Nuclear Energy (NE)

Consolidated Interim Storage: DOE launched a new initiative to implement a Federal consolidated interim storage capability for spent nuclear fuel following a consent-based siting process. For the first phase of this process, DOE published a Request for Information (RFI) seeking public input on its approach, released a summary of the feedback that was received, and issued a funding opportunity announcement to support further community engagement.

Advance Science Discovery and National Laboratory Innovation

Participating Programs

Energy Efficiency and Renewable Energy; Environmental Management; Fossil Energy and Carbon Management; National Nuclear Security Administration; Nuclear Energy; Science; Technology Transitions

DOE advances the Nation's pre-eminence in scientific discovery and technology innovation through support for cutting-edge basic research, global leadership in emerging technology areas, and partnership with the private sector and partner countries to transition new discoveries to deployable technologies in fields of strategic importance through the continued stewardship of the National Laboratories and the development and operation of a suite of world-class facilities for research and training the next generation of diverse, skilled scientists and engineers. Examples of FY 2022 program accomplishments in these areas include:

Advance basic scientific understanding and identify new methods and tools to further discovery

Office of Science (SC)

The Solenoid Tracker at the Relativistic Heavy Ion Collider (STAR) collaboration, a DOE scientific user facility at Brookhaven National Laboratory (BNL), demonstrated for the first time experimentally the Breit-Wheeler Effect. In 1934, physicists Gregory Breit and John Wheeler predicted that collisions of photons could create matter and antimatter and suggested doing so by accelerating heavy ions. By measuring and thoroughly analyzing the near miss-collisions of heavy ions that produce electron-positron pairs, the STAR team found that the high-precision data was consistent with particles being generated by real photon interactions.

ORNL has demonstrated the recovery of promethium-147, an important radioisotope for U.S. industrial applications previously only produced in Russia, from the radiological waste generated during production of plutonium-238. Promethium-147 is a radioisotope used to measure the thickness of thin plastic films in cell phones, as a power source for nuclear batteries, and in medical imaging applications. ORNL minimizes its radiological legacy while providing a domestic source for critically needed radioisotopes, promoting U.S. economic resilience.

The LUX-ZEPLIN (LZ) collaboration, managed by Lawrence Berkeley National Laboratory (LBNL) and located a mile underground at the Sanford Underground Research Facility in South Dakota, announced their first results after an initial 60 days of data collection. The results demonstrated that LZ is already the world's most sensitive detector of dark matter—the elusive, as yet undetected particles thought to account for about 85 percent of the matter in the universe. When the full data set is complete after 1,000 days of exposure, the LZ experiment is

expected to have improved on the sensitivity of the previous generation of detectors by a factor of 50.

Office of Environmental Management (EM)

EM successfully completed 100 percent design of the Advanced Manufacturing Collaborative Facility. EM approved the start of site/civil construction and long lead procurements.

Office of Nuclear Energy (NE)

Nuclear Energy Advanced Modeling and Simulation (NEAMS): The NEAMS program has made cutting edge advanced reactor modeling tools easier and faster for industry and universities to access and use on high-performance computing systems. The Nuclear Computation Resource Center provides access to the Idaho National Laboratory's (INL) high-performance computing resources and made significant improvements to the laboratory's software request, licensing, and use approvals that has reduced user inputs to a single access request with approval tracking integrated with INL's business systems, completing full approval of 61 percent of the 1,700 requests within four weeks. In addition, significant improvements were made to the Multiphysics Object-Oriented Simulation Environment (MOOSE) code to directly address speed and flexibility needs requested by industry and NRC staff to support full adoption of the NEAMS advanced reactor modeling toolset.

Lead globally in key innovation and national security areas including clean energy technologies artificial intelligence, quantum information sciences, microelectronics, advanced computing, particle accelerator technologies, and next generation biology and biosecurity

Office of Science (SC)

The exascale computing era dawned with the achievement of two important milestones. First, Frontier, the Nation's first exascale system deployed at ORNL, was independently confirmed to have broken the exaflop ceiling by achieving 1.102 exaflops on the high performance Linpack benchmark in May 2022, regaining the top spot on the Top500 list of the World's most powerful computers. Second, two exascale application codes met their threshold key performance parameters running on Frontier.

X-ray light and neutron scientific user facilities contributed to the Nation's effort to combat COVID through structural studies of SARS CoV-2 proteins. Pfizer scientists used x-

ray facility capabilities to determine certain structural properties of their vaccine, Comirnaty, and to develop their antiviral, Paxlovid. GlaxoSmithKline and Vir Biotechnology also used x-ray facilities to help develop an antibody therapeutic, Sotrovimab, that received FDA emergency use authorization.

Office of Energy Efficiency and Renewable Energy (EERE)

EERE was a leader in key innovation on clean energy technologies over the course of this past year. The Hydrogen Fuels Technology Office and Solar Energy Technologies Office partnered with the Artificial Intelligence & Technology Office (AITO) and other agencies to support fellowships with the Frontier Development Lab Artificial Intelligence Challenge. Researchers with the program worked to advance hydrogen production pathways, optimize concentrating solar power designs, develop subsurface science for electricity infrastructure resilience, and address other key challenge areas.

Office of Fossil Energy and Carbon Management (FECM)

Artificial Intelligence and Machine Learning: In FY 2022, FECM launched the cloud based alpha prototype of AI Integrated Development Environment (IDE) which will let researchers access a full suite of AI resources needed to attain breakthroughs in priority technology areas defined by FECM Vision. FECM developed and completed the FECM AI Infrastructure Plan that lays out the second and third phases of this effort allowing researchers and industrial partners to take full advantage of the IDE in a secure, fully compliant environment.

National Nuclear Security Administration (NNSA)

Strategic Partnerships: NNSA laboratories partners with industry, government, and academia to ensure that (a) NNSA investments are optimally leveraged; (b) the nation's best technology and methods are employed to support the NNSA mission; and (c) NNSA can contribute to Whole-of-Government solutions for national and global issues. In FY 2022, Sandia National Laboratories (SNL) conducted 3D simulations of additively manufactured energetic materials (AMEMs) using High Performance Computing (HPC) clusters. SNL will use the simulations to understand the mechanical response and chemical reactivity of AMEMs to better predict their effectiveness. This partnership leveraged expertise in computational modeling of reactive flows and previously simulated mesoscale reactive material microstructures and responses. The work has the potential to enable agile and responsive design capabilities for explosive components that are currently nonexistent. SNL also provided a flexible modeling approach to accommodate a variety of bioagent detection concepts with a focus on the real-time sensing of bioagent releases in urban environments and analyzed mobile and stationary sensors as well as systems used for triggering and confirmatory roles.

At Lawrence Livermore National Laboratory (LLNL), partnership activities involving a team of LLNL scientists have demonstrated a new geometry for a neutron source platform for the National Ignition Facility (NIF), called the

inverted-corona platform, which does not rely on spherically symmetric laser irradiation. This new tool has significantly less-stringent laser-symmetry requirements than conventional laser driven neutron sources on NIF. The improved stability of this new neutron source platform geometry equates to a significant new capability that can be applied to current stockpile stewardship applications, as well as nuclear effects testing and forensics applications.

Commercialize innovations to improve the lives of Americans and the world

Office of Technology Transitions (OTT)

Commercialization Executives: In FY 2022, OTT was the lead coordinator of the Memorandum of Understanding (MOU) for Vehicle to Everything, which will bring together cutting-edge resources from DOE, DOE National Laboratories, state and local governments, utilities, and private entities to demonstrate and evaluate technical and economic feasibility as we integrate bidirectional charging into energy infrastructure. DOE program office participants in the Vehicle to Everything MOU include DOE's Vehicle Technologies Office, OE, OTT, and CESER.

Market Analysis: In February 2022, DOE released the OTT-authored report on the "Competitiveness and Commercialization of Energy Technologies" as part of the Department's response to Executive Order 14017 on America's Supply Chains. This report provides a clear framework to identify commercialization opportunities for US-developed technologies, support US leadership in clean energy sectors, and pursue national economic, climate, and security goals.

Technology Commercialization Fund (TCF): OTT engaged in discussions with funding offices and DOE National Laboratories to identify challenges and propose solutions for the TCF. Leveraging these identified improvement opportunities for 2022, OTT selected seven projects with eight DOE partner offices totaling \$18.4 million in award funds for projects addressing core barriers and known gaps impeding national laboratory commercialization.

Energy Program for Innovation Clusters (EPIC): OTT implemented a competitive funding program for incubators supporting energy innovation clusters. Based on feedback from prior awardees and a RFI, EPIC was restructured to be a 3-phase incubator prize with startup pitch competitions and the potential for DOE program office bonus prizes. This allows a more streamlined application process to reach more competitors and a platform for DOE program offices to quickly deploy funding to support incubators and energy technology entrepreneurs. OTT has partnered with five DOE program offices with the potential for more DOE offices to leverage the EPIC platform.

College Outreach: OTT continues to engage with future leaders to develop skills to identify energy technology, assess its market potential, and propose a strategy for commercialization. OTT and DOE National Labs launched the EnergyTech University Prize program in which 180 teams from 113 schools competed for cash prizes. Program participants reported a 71 percent increased interest in energy-related careers and 79 percent increased knowledge of skills required for technology commercialization. OTT also continued its summer entrepreneurship program, which offers undergraduate students internships at DOE labs. Students undergo intensive training in commercialization of technology through the Energy I-Corps Curriculum. Nineteen students participated with 35 percent receiving internship extensions, offers, or are in the process of receiving offers.

National Nuclear Security Administration (NNSA)

Strategic Partnerships: In FY 2022, LLNL established an Incubator to advance artificial intelligence. This partnership includes Google, IBM, and NVIDIA, and will facilitate discussions and form future collaborations around hardware, software, tools, and utilities to accelerate AI for applied science. Also in 2022, Chiplytics, a hardware security company building exploring technology that provides insight into the microelectronic supply chain, announced its official launch (note: Chiplytics' technology was built through collaboration with NNSA and SNL). At Los Alamos National Laboratory (LANL), a nonexclusive license with Advent Technologies enabled the manufacture of membrane electrode assemblies for fuel cell products. Nevada National Security Site (NNSS) executed a Cooperative Research and Development Agreement (CRADA) with Plumarea to develop a low-cost capability for methane detection for environmental and hazard analysis. Finally, Y-12 National Security Complex and Pantex Plant's management and operating contractor executed its first CRADA since 2016 focused on manufacturing solutions and materials applications.

Office of Science (SC)

Launched in FY 2019, the Innovation Network for Fusion Energy (INFUSE) is a public private partnership program that continues to draw attention from the growing fusion private sector. In FY 2022, a major modification to the program allowed companies to partner directly with U.S. universities, a first for a DOE voucher-style program. To date, 62 awards totaling \$12.4 million have been made to 19 unique private companies partnering with nine DOE labs and eight U.S. universities.

SC issued a new suite of technology transfer awards resulting from its annual call for Accelerator Stewardship and Accelerator Development proposals. The 12 collaborative projects supported involve scientists from 32 U.S. institutions—including 13 companies such as ProNova Solutions, BAE Systems, RMD, and CPI— and will contribute to the development of faster cancer therapies, automated systems for security applications, ultrafast laser systems, and novel superconductors. The new awards join a portfolio of projects advancing particle accelerator technology for medical, security, environmental, and industrial applications that bring together DOE's National Labs and private companies to pursue collaborative R&D leading to new products.

Ensure America's Nuclear Security by Harnessing Unparalleled Science and Technology Capabilities

Participating Programs

National Nuclear Security Administration; Nuclear Energy

DOE enhances the security and safety of the Nation through its national security endeavors: maintaining a safe, secure, and effective nuclear weapons stockpile that will deter any adversary and guarantee the defense of the Nation and its allies; managing the research, development, and production activities and associated infrastructure needed to meet national nuclear security requirements; accelerating and expanding efforts to reduce the global threat posed by nuclear weapons, nuclear proliferation, and unsecured or excess nuclear materials; and, providing safe and effective nuclear propulsion for the U.S. Navy. Examples of FY 2022 program accomplishments in these areas include:

Design, deliver, and maintain a safe, secure, reliable, and effective nuclear stockpile in support of the Nation's integrated deterrent

National Nuclear Security Administration (NNSA) Stockpile Research, Technology, and Engineering (SRT&E)

The Office of Research, Development, Test and Evaluation's critical national security responsibilities yielded major accomplishments in FY 2022 to sustain and modernize the stockpile and the production complex. The Inertial Confinement Fusion (ICF) program made significant strides reproducing historically successful FY 2021 experimental results, which has led to identification of target capsule features critical to >1 megajoules (MJ) fusion yield performance. Advance Simulation and Computing (ASC) delivered improved Pu aging models and evaluations. Initial age-aware models will be used to update lifetime assessments in future Annual Assessment Reports (AARs) for the nuclear weapons stockpile. Advanced Manufacturing Development and Weapon Technology Development made significant advancements in maturing a specialized thermal spray capability, enabling more streamlined components, and is projected to have a cost savings over the alternative method also being considered.

Stockpile Stewardship: The NNSA's science-based Stockpile Stewardship Program supported DOE and the Department of Defense (DoD) to report to the President for the 25th consecutive year that the U.S. nuclear weapons stockpile remains safe, secure, and effective, without the use of nuclear explosive testing.

B61-12 Life Extension Program (LEP): The B61-12 Life Extension Program (LEP) completed its first production unit in November 2021 and entered Phase 6.6, Full Rate Production, in June 2022. The LEP addresses multiple components that are nearing end of life, in addition to

addressing military requirements for reliability, service life, field maintenance, safety, and use control. With the addition of an Air Force procured tail-kit assembly, the B61-12 LEP will consolidate and replace the B61-3, -4, -7, and -10 bomb variants. B61-12 LEP production will continue through FY 2025.

W80-4 Life Extension Program (LEP): The W80-4 Life Extension Program (LEP) completed initial joint Long Range Stand Off Weapon/W80-4 testing and component Baseline Design Reviews in preparation for transition to Phase 6.4, Production Engineering, in FY 2023. Delivery of the first production unit is scheduled for FY 2027 supporting U.S. Air Force achieving initial operational capability in FY 2030. This first production unit date was updated in June 2022 by the Nuclear Weapons Council because the program had experienced delays due to technical issues, COVID, and supply chain challenges. W80-4 LEP production is expected to continue through FY 2031.

W93 Program: The W93 entered Phase 2, Feasibility Study and Design Operations in mid-FY 2022. The W93 will address future Navy ballistic missile warhead requirements and incorporate modern technologies to improve safety, security, and flexibility to address future threats.

Infrastructure Modernization and Improvements: NNSA has 30 post-Analysis-of-Alternatives infrastructure projects valued at \$34.4 billion that are underway at seven sites. These projects are necessary to design, deliver, and maintain a safe, secure, reliable, and effective nuclear stockpile by providing modern, responsive infrastructure. NNSA performed \$1.9 billion worth of capital asset work, including \$800 million of design and \$1.1 billion of construction. NNSA completed six projects or subprojects with a Total Project Cost (TPC) of \$1.3 billion, which were delivered under budget by \$108 million. Four projects were ahead of schedule.

The NNSA Office of Infrastructure completed the Emergency Operations Center (EOC) at Lawrence Livermore National Laboratory, which is the first of 10 projects under the Enhanced Minor Construction and Commercial Standards (EMC2) pilot, which is testing faster, more cost effective approaches for non-complex construction projects under \$50 million. NNSA purchased the LeMond Carbon Facility – now the John M. Googin Technology Development Facility – using NNSA's first ever Option to Purchase Agreement in support of Y-12 Development work and the exit of a significantly deteriorated facility more quickly and inexpensively than new construction. NNSA completed 31 Recapitalization

projects year to date, including the TA-IV District Chilled Water System Upgrades at SNL, which will provide redundancy, cost, and energy savings, and more effective cooling systems for the buildings in this TA-IV.

Secure Transportation Asset: The Secure Transportation Asset (STA) provides safe, secure transport of the Nation's nuclear weapons, weapon components, and special nuclear material (SNM) throughout the nuclear security enterprise to meet national security requirements and support DOE/NNSA missions. In FY 2022, STA continued its record of 100 percent safe and secure shipments without compromise, loss of components, or release of radioactive material. This record is enabled by the core components of the STA security concept of specialized vehicles, secure trailers, specially trained Federal Agents, and leading-edge communication systems. STA completed the Test Article 2 over-the-road test and initiated the developmental engineering release phase for the Mobile Guardian Transporter (MGT), which is the replacement for the current Safeguard Transporter.

Production Modernization: In FY 2022, NNSA continued Pit production activities at Los Alamos and Savannah River Site to fulfill the requirement to restore the Nation's capability to produce 80 pits per year. Initiatives included continuing engineering evaluations of pit production processes at Los Alamos National Laboratory (LANL) to support process qualification and product certification enabling war reserve pit production and, the Savannah River Plutonium Processing Facility project achieved CD-3A Approval, Long Lead Procurement and Site Preparation, for Savannah River Plutonium Processing Facility Main Process Building Subproject in August 2022. NNSA also continued to meet tritium production requirements for national security while working to increase supply chain reliability, flexibility, and resiliency.

Forge and deliver cutting-edge solutions to shape and enable future arms control and nonproliferation regimes, increase strategic stability, counter nuclear terrorism, disrupt emerging threats, and advance the safe, secure, and peaceful use of nuclear energy

National Nuclear Security Administration (NNSA)

Global Material Security (GMS): In FY 2022, NNSA partnered with hospitals, universities, and industry to provide voluntary security enhancements for high-activity radioactive sources. NNSA has secured over 2,450 buildings containing radiological materials and has recovered nearly 98,000 radioactive sources worldwide. NNSA has replaced 271 cesium devices in the U.S. and 42 cesium or cobalt devices internationally with x-ray devices. NNSA also led international nuclear security initiatives to improve cybersecurity, mitigate insider threats, address needs on counter/unmanned aerial systems, and improve transportation security with nearly 60 countries. NNSA equipped 24 crossing points with radiation detection systems in 10 countries and provided

16 mobile detection systems to foreign law enforcement partners.

Defense Nuclear Nonproliferation Research and Development (DNN R&D): In FY 2022, NNSA provided technical support to the U.S. Air Force for the launch and early on-orbit testing of two nuclear detonation detection sensor suites integrated on a Department of Defense Space Test Program satellite as part of the national capability for global nuclear monitoring. NNSA completed four field campaigns in conjunction with interagency partners at testbeds designed to test technologies developed to improve U.S. capabilities to detect and monitor foreign nuclear material production and weapons development activity. NNSA also successfully conducted collection campaigns against Defense Programs' experiments to prepare for future subcritical tests. NNSA completed two data centers, providing high-performance computing capability to develop next-generation uranium enrichment models and technical expertise. Finally, NNSA transitioned algorithms to an interagency partner which used the capability to provide critical insights on the war in Ukraine.

Material Management and Minimization (M3):

As of 2022, NNSA converted or verified the shutdown of 108 highly enriched uranium (HEU) facilities worldwide, including the recent conversion of Kazakhstan's IVG.1M reactor. Since 1996, NNSA has removed or confirmed the disposition of 7,288 kilograms (kg) of weapons-usable nuclear material (HEU and plutonium). Another major nonproliferation achievement in FY 2022 was the United States' implementation of a ban on exports of HEU for the purpose of medical isotope production, following a certification by the Secretaries of Energy and Health and Human Services. Moreover, NNSA completed the disposition of a cumulative total of 166.8 metric tons (MT) of surplus weapon-grade uranium and converted a cumulative total of 1,273.1 kg of plutonium into oxide in preparation for final disposition. During FY 2022, the Surplus Plutonium Disposition (SPD) project at Savannah River Site (SRS) completed 75 percent of project design activities in support of the disposition of 34 MT of surplus plutonium.

Nonproliferation and Arms Control (NPAC): During 2022, NNSA transferred five safeguard tools and technologies, including: Horseshoe Secure Digital (SD) Card Shield prototypes and design files for Next Generation Surveillance System, uranium-233 isotope dilution mass spectrometry standard to the European Commission Joint Research Centre at Geel, Belgium, software for analytical method for measuring uranium and plutonium particles by laser ablation multicollector isotope mass spectrometers for the Network of Analytical Laboratories, hardware for Unattended Cylinder Verification Station to monitor gas centrifuge facilities, and a deep learning algorithm to improve review of surveillance images.

Nuclear Incident Response/Nuclear Emergency

Support Team: NNSA's Nuclear Emergency Support Team (NEST) provided preventative radiological/nuclear detection and analytical support to 46 national-level security events, including the 2022 Presidential State of the Union, New Year's Eve celebrations in Las Vegas and New York City, Super Bowl LVI, the 2022 Independence Day celebration on the National Mall, and the 77th Session of the United Nations General Assembly. NEST also deployed in support of 14 unscheduled radiological/nuclear emergencies and has provided continuous support to radiological sensor monitoring and deployment in response to Russia's further invasion of Ukraine. NNSA completed the fielding of new tools and training for the Federal Bureau of Investigation's (FBI) regional render safe teams.

Nuclear Threat Science: NNSA increased its assessment capabilities in support of the broader U.S. Government's counter-weapons of mass destruction (CWMD) device mission by successfully executing a planned series of foundational science material characterization experiments, developing, and delivering two specialized trainings to the operational community, and completing its formulation of a dynamic tool suite designed to further strengthen the nation's nuclear incident response posture.

National Technical Nuclear Forensics: NNSA participated in seven interagency exercises for pre- and post-detonation nuclear forensics. NNSA completed installation of pre-detonation nuclear forensic analysis capacity to support the National Nuclear Material Archive. NNSA effectively maintained cooperative relationships with international partners for nuclear forensics technical exchanges. NNSA improved nuclear forensics infrastructure, equipment, technology, and capabilities through increased investments. NNSA participated in multiple bilateral and trilateral technical exchanges with the United Kingdom and France under the Nuclear Threat Reduction (NTR) framework to improve its mission capabilities and bolster national security priorities.

Counterterrorism Response and Capacity Building:

NNSA advanced U.S. nuclear threat reduction and emergency preparedness policy objectives through engagements with domestic and international organizations and foreign partners, bolstering global response capabilities and reinforcing mechanisms for cooperation. NNSA advanced radiological/nuclear emergency preparedness response worldwide by conducting over 50 virtual or in-person training events on a variety of nuclear security topics.

Office of Nuclear Energy (NE)

Advanced Reactor Safeguards: In FY 2022, the Advanced Reactor Safeguards program completed the design, cost estimate, and testing of a deliberate motion algorithm that fuses radar and video analytics capable of providing low-cost reliable detection with low nuisance alarm rates.

Advanced Test Reactor: In March 2022, the Advanced Test Reactor (ATR) successfully completed the sixth Core Internals Changeout (CIC) of the reactor. This was a major overhaul to replace all the components within the Beryllium reflector region of the reactor. These major outages occur every 10-to-20 years with the last CIC performed in 2004. The thermal irradiation capabilities provided by ATR support the foundation of U.S. nuclear energy research infrastructure. The CIC process maintains these capabilities at peak efficiency.

Harness the atom to safely, reliably, and affordably power a global fleet that enables unrivaled responsiveness, endurance, stealth, and warfighting capability

National Nuclear Security Administration (NNSA)

S8G Prototype Refueling Overhaul: Completed restoration and reassembly of the new design reactor head area, installation and initial energization of a unique Type II Instrumentation and Control system, and testing of new processed cooling water system towers to support the continuation of the land based prototype reactor. The S8G Prototype provides a cost-effective test and evaluation platform, for new technologies, materials, and components before they are introduced to the fleet, and a vital training platform for reactor plant operators.

Spent Fuel Handling Recapitalization Project (SFHP): Reached over 200,000 cubic yards of concrete poured for the Naval Spent Fuel Handling Facility. The facility will deliver increased reliability, capability and capacity of naval spent nuclear fuel handling activities, resulting in an increase to the Navy's responsiveness and agility to fulfill military missions worldwide.

Promote Equity and Energy Justice

Participating Programs	Artificial Intelligence and Technology; Chief Information Officer; Economic Impact and Diversity; Electricity; Energy Efficiency and Renewable Energy; Environmental Management; Fossil Energy and Carbon Management; Indian Energy; Legacy Management; Loan Programs Office; Management; National Nuclear Security Administration; Nuclear Energy; Policy; Science; Small & Disadvantaged Business Utilization
-------------------------------	---

DOE commits to the successful implementation of initiatives that support underrepresented groups, disadvantaged communities, and the DOE Federal workforce to ensure that equity is enduringly inherent in the Department's policies and activities by embedding equity in the agency's hiring, procurement, financial assistance, research and development (R&D), and demonstration and deployment activities, as well as cross-agency investment in the foregoing workstreams, and developing ample metrics to baseline the agency's current activities and create milestones for subsequent achievement. Examples of FY 2022 program accomplishments in these areas include:

Advance equity in DOE's procurement, funding, R&D and D&D processes and activities

Office of Management (MA)

To advance the goals of Executive Order (EO) 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, DOE developed provisions for use in assistance agreements that encourage companies, universities and non-profit organizations receiving federal funds to develop robust DEIA policies and to increase subawards to entities from underserved communities. The provisions will advance Administration initiatives for equity, Justice40, Made-In-America, improving the Nation's infrastructure, and increasing clean energy jobs.

Additionally, guidance was issued for DOE Management and Operating and Major Site and Facility contractors that is designed to increase subcontracts to companies from underserved communities and to remove barriers for members of these communities. DOE collaborated with the Office of Federal Procurement Policy to sponsor a crowdsourcing campaign on *"Shaping Solutions to Address Barriers to Equity in Federal Procurement"* to support the government-wide effort to advance equity in federal agency programs. The results of the crowdsourcing campaign are being used to inform executive branch agencies' initiatives related to EO 13985, including addressing barriers that restrict historically underserved groups from full and equal participation in the Federal marketplace.

Furthermore, to advance the goals of EO 13985, DOE designated a government-wide AbilityOne Representative

(ABOR) to lead DOE efforts to increase federal contracting opportunities for Americans with Disabilities under the AbilityOne Program which is one of the largest sources of employment in the U.S. for people who are blind or have significant disabilities, employing more than 45,000 individuals, including approximately 3,000 veterans. DOE has implemented a strategy with DOE Management and Operating and Major Site and Facility contractors designed to increase subcontracting opportunities from AbilityOne contractors.

DOE continues to engage with DOE Management and Operating and Major Site and Facility contractors to leverage existing Diversity Plans to increase participation from underserved communities. Diversity Plans are required for contracts awarded to DOE Management and Operating and Major Site and Facility contractors to obtain the contractor's commitment to diversity sensitivity and inclusiveness in all aspects of its business practices, the workplace, and relations with the community at large. DOE Management and Operating and Major Site and Facility contractors are encouraged to be innovative.

Office of Science (SC)

In FY 2022, SC launched the Reaching a New Energy Sciences Workforce (RENEW) initiative to build foundations for SC research and training at institutions historically underrepresented in the SC research portfolio and to create new pathways and opportunities for STEM training for students from groups underrepresented in the U.S. S&T ecosystem. Funded at \$30 million in FY 2022, this cross-SC initiative is piloting new partnerships and new models of support for students and faculty that directly address barriers to participation in SC-supported STEM fields. The scope of SC's solicitations was informed by over a dozen community listening sessions held in FY 2022. With each funding opportunity announcement, SC programs conducted public webinars to broaden engagement with perspective applicants.

Office of Economic Impact and Diversity (ED)

ED led the efforts on the DOE Equity Action Plan (EAP), which was publicly released in April 2022. The EAP includes five priority goals to advance equity: addressing gaps in data collection to facilitate data-informed decision-making; increasing opportunities for new applicants to DOE funding opportunities; increasing participation in DOE R&D and financial assistance programs; expanding strategic Tribal and stakeholder engagement across DOE programs; and improving access and equity in DOE's Weatherization Assistance Program. Beginning in

September 2022, Office of Civil Rights (OCR) administered pre-award civil rights compliance questionnaires to 10 DOE financial assistance selectees. These selectees came from two funding opportunity announcement pools.

In June 2022, the Civil Rights Division held three virtual workshops for DOE program offices that included an hour-long training on conducting a Limited English Proficiency assessment of program office activities and provided an overview of online Limited English Proficiency resources. From September 12-16th, ED hosted DOE's first-ever Justice Week, which included an Equity in Procurement Town Hall attended by over 400 external stakeholders. During the week of September 26th, ED shared the Departmental vision on equity; Diversity, Equity, Inclusion, and Accessibility (DEIA); and Justice40 to an audience of National Lab energy justice experts assembled by the Pacific Northwest National Laboratory (PNNL). Attendees included leadership and staff from the DOE laboratories during the Energy, Equity, and Environmental Justice Summit.

Office of Small and Disadvantaged Business Utilization (OSDBU)

OSDBU established an Acquisition Forecast Improvement Working Group to develop new and improved DOE Business Forecast to attract new entrants, and expand the DOE and NNSA partner base, as well as create greater equity in procurement and financial assistance actions. OSDBU coordinated on more than fifteen major DOE and NNSA acquisition strategies to ensure maximum practicable opportunities were provided to small businesses, including small disadvantaged, woman-owned, veteran-owned, and historical underutilized business zone small businesses. OSDBU issued a survey to the DOE and NNSA complex on ways to enhance the DOE Mentor Protégé Program, which is an incubator program for diversifying the DOE partner base.

OSDBU co-hosted or participated in sixty-nine small business outreach events providing information on how to do business with DOE as well as participating in match-making sessions with industry stakeholders. OSDBU led more than 1,000 one-on-one small business consultations on doing business with the Department. OSDBU incorporated artificial intelligence into OSDBU industry engagement activities with the deployment of a chatbot to field initial inquiries on doing business with DOE.

Office of Nuclear Energy (NE)

Nuclear Energy University Program: NE-sponsored funding opportunity announcements support the Department's priorities to combat the climate crisis, create clean energy jobs with the free and fair chance to join a union and bargain collectively, and promote equity and environmental justice by delivering innovative clean energy technologies for nuclear energy systems. In fiscal year 2022, NE's university programs awarded five Nuclear Energy University Program (NEUP) research and development (R&D), one Integrated Research Project (IRP), two infrastructure support, and one Distinguished Early Career Program (DECP) cooperative agreements and grants to minority-serving institutions (MSIs). Eleven MSI

prime and sub-awardees are supported through these projects, advancing equity in the Department's R&D processes and activities.

DEIA Work Group: In 2022, NE established a DEIA work group to provide a vehicle for research discussion and collaboration to focus the work more intentionally on equity in NE's funding workstreams. The work group provides an avenue for staff involved to engage with equity work including three studies funded in 2022 with an explicit equity or environmental justice focus.

Office of Energy Efficiency and Renewable Energy (EERE)

EERE was able to advance equity in DOE's procurement, funding, R&D and D&D processes and activities over the course of this past year. Examples of this work included: implementing a pilot Cooperative Construction Contracting Approach (CCCA) at NREL; developing the DEIA language now included in department templates for Funding Opportunity Announcements; and obtaining the first ever National Laboratory AbilityOne Pledge from NREL - incorporating AbilityOne into their acquisition strategy. The new CCCA approach requires the construction partner to propose and implement a DEIA plan and raises the NREL small business set aside to 67 percent.

Office of Fossil Energy and Carbon Management (FECM)

FECM announced a Funding Opportunity Announcement (FOA) from within the Division of Methane Mitigation Technologies (DMMT) on the order of \$32 million in funding toward the research and development of new monitoring, measurement, and mitigation technologies to help detect, quantify, and reduce methane emissions across oil and natural gas producing regions of the United States. The projects awarded through this FOA will help ensure an efficient, resilient, and leak-tight U.S. natural gas infrastructure, while supporting President Biden's National goal to cut global methane emissions by 30 percent from 2020 levels by 2030. The FOA was designed to: strengthen prosperity by expanding good-paying jobs; encourage participation from underserved populations, racial minorities, and women; and, enhance participation consistent with objectives under the Justice40 Initiative. Also, the Office of Communications incorporated approved equity and justice language into other press releases announcing FECM funding opportunities.

Office of Environmental Management (EM)

EM expanded the EM Minority Serving Institutions Partnership Program (EM MSIPP) to include the Technology, Curriculum, and Professional Development Program and the Shared Interest Research Partnership Program, instituted a Post-Doctoral Research Program, and a Graduate Fellowship Program. Furthermore, facilitated minority serving institution students to perform DOE-EM related hands-on research, as well as participate in summer internship assignments at DOE laboratories and sites through both the EM MSIPP and DOE-EM Florida International University (FIU) cooperative agreement.

EM also successfully developed and delivered a DOE-wide Tribal consultation training for leadership and staff to enhance interactions and understanding while collaborating with Tribal Nations. EM obligated approximately 10 percent of procurements to small, disadvantaged businesses through EM's direct small business prime contracts and large business prime contractor subcontracts.

Office of Policy (OP)

OP ensured all domestic energy design, technical assistance and documents it reviewed included a focus on equity, justice, and quality jobs. Also, Office of Policy took the lead in drafting and vetting for the Secretary a memo laying out "DOE Principles for a Robust Clean Energy Economy," including: Clean Energy Deployment and Emissions Reductions; Quality Job Creation, Including the Opportunity for Family-Sustaining Union Jobs; Justice and Equity; Domestic Manufacturing and Supply Chains; and Private Sector Uptake of Clean Energy Technologies.

Increase access to affordable, sustainable, and reliable energy for disadvantaged communities

Office of Energy Efficiency and Renewable Energy (EERE)

EERE continued to invest in the Energy Transitions Initiative, spending more than \$10 million in FY 2022 to support remote, island, and islanded communities from Massachusetts to Alaska and Guam seeking a resilient clean energy transition. EERE also incorporated new language focused on Diversity, Equity and Inclusion for its funding opportunities starting in May 2021; to date, over \$700 million of EERE selected awards include a plan to address these issues. In addition, EERE made a strong push in FY 2022 to recruit reviewers with expertise in DEIA, Workforce, and Energy Justice; with over 170 such reviewers now in our cadre, the focus on disadvantaged communities will continue to grow. Major FY 2022 successes include (1) the Inclusive Energy Innovation Prize in partnership with DOE's Office of Economic Impact and Diversity, which funded 18 Phase One winners (of over 200 applicants) with \$3.4 million for ongoing and/or proposed activities related to climate and clean energy that support, build trust, and strengthen relationships and partnerships with disadvantaged communities; (2) the 17 businesses funded under the EERE crosscutting community partnering Small Business Innovation Research (SBIR) topic; and (3) the expansion of EERE's Industrial Assessment Center program, with 40 percent of centers now located at Minority Serving Institutions (MSIs) or in partnership with Historically Black Colleges and Universities (HBCUs).

Office of Economic Impact and Diversity (ED)

In August 2022, DOE hosted a Justice40 Kickoff public webinar for the DOE community and external stakeholders. ED presented the Department's Justice40 Strategy, and several DOE program offices spoke of their efforts to support the Justice40 Initiative. The Office of

Minority Programs (OMP), ED, hosted nine Technical Assistance (TA) webinars from March 2022 through May 2022 to advance equity in DOE's procurement. These TA webinars supported 938 Small Businesses, 327 Minority Business Enterprises (MBEs), and 83 Minority Serving Institutions (MSIs). OMP also hosted four TA webinars in partnership with DOE National Laboratories from February 2022 to May 2022. These webinars garnered 429 attendees from MBEs, MSIs, and Small Businesses.

Office of Electricity (OE)

Grid Deployments and Field Validations: OE supported commissioning of a microgrid with new zinc-manganese dioxide batteries in the Navajo Nation (in collaboration with the Navajo Tribal Utility Authority).

Office of Indian Energy Policy and Programs (IE)

Since 2010, IE has been exclusively supporting American Indian and Alaska Native Communities in pursuing affordable, sustainable, and reliable energy. In March 2022, the IE announced \$9 million in funding to 13 American Indian and Alaska Native communities. These projects, selected for negotiation, are estimated to result in 3.3 megawatts of new clean energy generation and provide a combined \$48.5 million in savings over the life of the systems to these communities. Building on these investments, the IE issued notices of intent in May 2022 to issue two funding opportunities valued at \$35 million, specifically geared toward affordable, sustainable, and reliable energy for American Indian and Alaska Native communities.

Loan Programs Office (LPO)

LPO expanded outreach to target Tribal and historically disadvantaged communities and to match these opportunities with developers and potential investors who have specific interests in these communities.

Ensure 40 percent of the overall benefits of relevant federal investments are delivered to disadvantaged communities

Office of Economic Impact and Diversity (ED)

In December 2021, DOE delivered to the Office of Management and Budget (OMB) a methodology for calculating benefits accruing to disadvantaged communities for 75 Justice40 covered programs. This methodology included a description of the 165 metrics that the Department developed to measure covered program benefits. In FY 2022, DOE continued to synthesize benefits metrics and report on the distribution of funding to disadvantaged communities on the Department's Energy Justice Dashboard (BETA) which is available online.

In FY 2022, the ED-led Justice40 Community of Practice continued to meet monthly to address challenges and opportunities associated with the Justice40 Initiative. The Community of Practice involves approximately 50 participants who represent all DOE program offices and several support offices. The Community of Practice

continues to reflect the Department's commitment to the execution of the Justice40 Initiative and its full capacity to address the challenges the initiative presents.

In February 2022, ED launched the Equity, Energy and Environmental Justice (EEEJ) group with representatives from a dozen program offices. The group continues to meet bimonthly to continue engagement and support EEEJ work across the Department in the following areas: Embedding Justice40/equity into project evaluation (e.g., accountability framework); Hiring approaches for stakeholder engagement, program design, and policy development; Leveraging work within DOE and at the interagency level to facilitate deeper community transformation; Continued focus on sharing best practices and problem solving; and, Standard Operating Procedures (SOPs) on Justice40/equity to support programs.

In FY 2022, ED developed several products to facilitate sharing Justice40-related information for both internal and external stakeholders. These include: a brand-new Department of Energy Justice40 webpage to provide information for both internal and external stakeholders; a new Disadvantaged Communities Reporter and Mapping Tool to help internal and external stakeholders visualize the location of disadvantaged communities to be targeted for Justice40 covered investments and related benefits; a Comprehensive Justice40 Technical Guidance document to assist program managers with integrating the principles of Justice40 into program design; and a General Justice40 Guidance for DOE Funding Participants on how to align program funding implementation with the principles of Justice40.

In July 2022, DOE publicly released its list of 144 Justice40 Covered Programs across 22 DOE offices. The Justice40 Covered Program rollout, led by ED, included a letter from Secretary Granholm touting the Department's commitment to Justice40 implementation; a general guidance document highlighting the Agency's top policy priorities to advancing an equitable clean energy future; the Disadvantaged Communities Reporter tool, which allow users to explore and produce reports on the census tracts DOE has categorized as disadvantaged communities; an Environmental Justice explainer; and a Justice40 Fact Sheet. All of these items can be found at DOE's Justice40-Initiative webpage.

Loan Programs Office (LPO)

LPO amended the Title 17 solicitation to improve accessibility to borrowers, capture policy factors related to job quality, responsible contractor standards, workforce diversity, equity, inclusion, and accessibility goals, and underserved or disadvantaged community hiring goals.

Office of the Chief Information Officer (OCIO)

OCIO met its small business Federal contracting goal awarding 54.15 percent in Federal contract dollars to small businesses totaling \$53,508,350.

In FY 2022, the OCIO, with support from the Office of the Chief Financial Officer, and the Office of Management, created and implemented a process for the Economic

Diversity (ED) organization to track all DOE investments (contracts, grants, and agreements), on a monthly basis, using a DOE Justice40 Dashboard map of the U.S., based on Principal Place of Performance. This additional process designates which investments have Justice40 relevance to enable Agency users or the public in order to identify which investments are matched to census tracts designated as disadvantaged or Tribal disadvantaged. This supports the calculation of DOE performance against the 40 percent goal.

OCIO also completed two Artificial Intelligence (AI) initiatives in support of Justice40, while also assisting the Office of Small and Disadvantaged Business Utilization (OSDBU). OCIO's Office of Architecture, Engineering, Technology & Innovation developed Smart Search, a search algorithm that provides contracting officers and OSDBU personnel with the ability to search a database of over 2,000 disadvantaged small businesses, HBCUs, and MSIs with the purpose of connecting them to resources and opportunities within DOE. A Conversational AI solution was also developed, saving DOE \$14,000 and 188 Federal and contractor hours per month.

Office of Nuclear Energy (NE)

Nuclear Energy Funding Opportunity: In FY 2022, NE released a funding opportunity entitled Cooperative Agreement to Facilitate Coordination Between DOE-NE and Energy Communities, Vital Constituencies, and Educational Groups that allocates \$1.6 million directly to nuclear energy communities, educational nonprofits, and other key stakeholder groups, and will leverage the Justice40 framework in the application and selection process for awards.

Office of Environmental Management (EM)

EM introduced and presented the Justice40 Initiative to stakeholders at various EM sites. Interactions with stakeholders include presentations, listening sessions, conference calls, and in person or virtual meetings. EM completed all actions in the OMB Interim Implementation Guidance for the Justice40 Initiative and successfully developed an EM webpage showcasing EM efforts under the Justice40 Initiative.

Office of Management (MA)

To facilitate achievement of the Justice40 goal, DOE developed provisions for use in assistance agreements that encourage companies, universities and non-profit organizations receiving federal funds to develop robust DEIA policies and to increase subawards to entities from underserved communities. The provisions will advance Administration initiatives for equity and Justice40 while improving the Nation's infrastructure and increasing clean energy jobs. In addition, DOE Management and Operating and Major Site and Facility contractors award approximately \$2.5 billion dollars annually to small businesses. To leverage this opportunity, DOE issued guidance for DOE Management and Operating (M&O) and Major Site and Facility contractors that is designed to increase subcontracts to companies from underserved communities and to remove barriers for members of these communities.

Office of Legacy Management (LM)

LM's Justice40 activities primarily include Long-Term Surveillance and Maintenance (LTS&M) at sites on or adjacent to Native American and Alaska Native (NAAN) Communities. In FY 2022, LTS&M was conducted at 12 sites on or adjacent to NAAN Communities. Execution of LTS&M ensures environmental remedies remain protective of human health and the environment for these communities who have historically experienced disproportionate impacts. Additionally, Justice40 activities include outreach, grants, and cooperative agreements with NAAN Communities and Minority Serving Institutions (MSIs). In FY 2022, LM completed over 125 engagements and over 50 memorandums of understanding/agreements with NAAN Communities. These grants and cooperative agreements fostered fair treatment and meaningful involvement of all affected people and ensured no group of people bear a disproportionate share of environmental impacts.

Support economic development, including through clean economy opportunities for workers in communities and industries in transition

Office of Policy (OP)

OP wrote and released the 2022 U.S. Energy & Employment Report (USEER), a comprehensive description of U.S. energy-related jobs by subsector and demographics. The report is based on tens of thousands of surveys of private energy employers and is used by public and private entities to plan for the future in the energy sector. The Office of Policy drafted a guide to community reinvestment and Federal assistance for energy communities for the Energy Communities Interagency Working Group, which circulated the draft for further iteration, interagency input, and publication. To support the Department's community outreach, IJA implementation, and private sector-to-community matchmaking, the Office of Policy led the creation of an index of 500 plus rural communities (including many energy communities) that have applied for some form of energy-related assistance from the Federal government since January 1, 2020, illustrating the types of projects that can be developed in rural communities.

Enhance engagement and energy economic development opportunities in tribal communities

Office of Indian Energy Policy and Programs (IE)

In accordance with the President's January 26, 2021, Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships, DOE and IE take our commitment to strengthening Tribal sovereignty and self-governance seriously. Regular, meaningful, and robust consultation with American Indian and Alaska Native communities is a prerequisite for strong Nation-to-Nation relationships between the United States, its Federal agencies, and Tribes. To that end, the Office of Indian

Energy participated in a virtual consultation session on the Bipartisan Infrastructure Law (March 2022), conducted two listening sessions on energy access and reliability (November 2021 and July 2022), and conducted a funding and financing roundtable discussion with Tribes (May 2021). IE met virtually with Tribal Leaders in the Northwest in June 2022. In addition, IE disseminated Tribal energy related information through a robust electronic email newsletter with over 20,000 subscribers, initiated Facebook and Twitter accounts to expand engagement, and maintains an extensive website for Tribes, highlighting Tribal project success stories, upcoming events, and funding opportunities.

Loan Programs Office (LPO)

LPO amended the Tribal Energy Loan Guarantee Program (TELGP) Solicitation to include direct lending, eliminate application fees, as well as other improvements in response to feedback from Tribal leaders. LPO has also partnered with several Tribal NGO's and has added outreach staff to increase awareness of the TELGP program.

Support diversity and equity among researchers, projects, entrepreneurs, and the National Laboratories

Office of Economic Impact and Diversity (ED)

ED's Office of Minority Programs (OMP) cohosted Awareness, Interest, and Access Webinars with PNNL, NREL, and INL. These partnerships and webinar objectives aimed to bring awareness of commercialization innovations and current STEM outreach initiatives to spark interest and increasing access to current and upcoming University Partnerships, Talent Acquisition, and Small Business Programs with PNNL, NREL and INL. OMP also oversaw financial assistance projects supporting over 1,110 participants in STEM pipeline development, over 450 participants in Energy Workforce Training programs, and over 80 scholarships.

ED supported the inclusion of Community Benefits Plans as part of program scoring for Funding Opportunity Announcements (FOAs). Community Benefits Plans must include stakeholder outreach; Justice40 implementation; DEIA; and job creation action plans. ED is currently supporting 38 Bipartisan Infrastructure Law provisions (\$57.9 billion) by creating a FOA template that includes DEIA action plans. The Community Benefits Plan requirement is 15-20 percent of all applicant's scores for demonstration and deployment FOAs. In addition to DEIA, applications must include additional components related to quality jobs, Justice40 initiative, and community benefits.

ED supported the training and recruitment of merit reviewers for the Community Benefits Plan requirement, including a review and scoring of action plans using a scoring rubric.

Office of Management (MA)

DOE developed provisions for use in assistance agreements to facilitate achievement of the Administration's goals. The provisions will encourage companies, universities and non-profit organizations receiving federal funds to develop robust DEIA policies and to increase subawards to entities from underserved communities. To leverage DOE investments through the National Laboratories, DOE issued guidance for DOE Management and Operating contractors managing National Laboratories that will facilitate increases in subcontracts to companies from underserved communities and removing barriers for members of these communities.

DOE continues to engage with DOE Management and Operating and Major Site and Facility contractors to leverage existing Diversity Plans to increase participation from underserved communities. Diversity Plans are required for contracts awarded to DOE Management and Operating and Major Site and Facility contractors to obtain the contractor's commitment to diversity sensitivity and inclusiveness in all aspects of its business practices, the workplace, and relations with the community at large. DOE Management and Operating and Major Site and Facility contractors are encouraged to be innovative.

Office of Science (SC)

SC announced the selection of three teams to develop the first Urban Integrated Field Laboratories (IFLs). The labs in Baltimore, MD, Chicago, IL, and the Texas Gulf Coast will be partnerships among DOE labs and academic institutions, including Minority Serving Institutions (MSI). These Urban IFLs will expand understanding of climate and weather events and their impact on urban systems and develop approaches to using this knowledge to empower historically underserved and disadvantaged communities that live in urban environments. Significant participation from MSIs will provide new opportunities at these institutions to inspire, train, and support leading scientists who have an appreciation for the global climate and energy challenges of the 21st century.

Phase II SBIR/STTR awards to women-owned small businesses (WOSB) and socially and economically disadvantaged small businesses (SEDSB) significantly increased in FY 2022 over FY 2021. WOSB awards increased to 13.9 percent of all awards from 4.1 percent, while SEDSB awards increased to 11.5 percent of all awards from 5.2 percent. The increased participation by WOSBs and SEDSBs is a result of efforts by the SBIR/STTR Programs to expand outreach and increase application assistance measures, as well as through support to sponsoring DOE program offices in making data-informed decisions when assessing program policy factors in award selection.

National Nuclear Security Administration (NNSA)

NNSA enables diversity in the workforce through internal and external programs and initiatives. NNSA expanded the Minority Serving Institutions Partnership Program (MSIPP), which has a primary mission to create and foster a sustainable STEM-pipeline that prepares a diverse workforce of world class talent through strategic

partnerships between Minority Serving Institutions (MSIs) and the nuclear security enterprise (NSE). In FY 2022, MSIPP funded 26 consortia consisting of 49 MSIs and 13 NSE sites. NNSA implemented a new MSI Internship Program, supporting 87 interns across the NSE. Hosted an inaugural MSIPP NSE Career Day, which was attended by 122 students, leading to over 240 interactions with hiring managers and enterprise practitioners.

Also, NNSA conducted a DEIA Climate Assessment across NNSA to understand DEIA strengths and challenges; implemented an DEIA Executive Board to further initiatives that align with the Executive Order and DOE DEIA Strategic Plan; embedded DEIA curriculum in our NNSA 1st Year program for new employees, our required Supervisory program, and offered all employees training in Unconscious Bias, Bystander Intervention, and Sustaining a Culture of Workplace civility; and NNSA partnered with Employee Resource Groups (ERG) to promote competitive leadership development programs and learning activities to ensure opportunities are made available to under-represented communities in NNSA.

Office of Artificial Intelligence and Technology (AITO)

AITO hosted AI 101 & AI Ethics Training for DOE Leadership which consisted of four 90-minute sessions facilitated by Pacific Northwest National Laboratory and SNL. The training consisted of discussions on the current state of the art in machine learning and deep learning, responsible and trustworthy AI concepts, equity considerations for AI, and a catalog of what is and what is not possible. In addition, there was an emphasis on data characteristics, ethics, and evaluation criteria for determining essential factors for investing in artificial intelligence (AI).

The Responsible and Trustworthy Artificial Intelligence Taskforce, as a cross-cutting team, developed DOE's first of its kind Principles and Guidelines for Advancing Responsible and Trustworthy Artificial Intelligence. These principles set out DOE's commitment to ethical AI and lay the foundation for our Guidelines for the Development and Implementation of Responsible and Trustworthy AI.

Development, in consultation with National Institute of Standards and Technology, DOE's AI Risk Management Playbook (AI RMP) was released externally and is an interactive reference guide that contains recommended mitigations to advance responsible and trustworthy AI use and development. Although the AI RMP is not a binding document, it encompasses some of the most common AI risks and preventive considerations, including AI equity.

Office of Energy Efficiency and Renewable Energy (EERE)

EERE worked with the National Renewable Energy Laboratory (NREL) to expand their commitment to supporting diversity and equity among researchers. Their increased outreach and engagement with university offices and programs that support students from populations underrepresented in STEM, has built a stronger and more intentional pathway to NREL intern programs and is developing the future generation of researchers. EERE led

the effort to develop FOA criteria requiring applicants and projects to demonstrate their DEIA plans as part of their applications which enables EERE R&D funding to be accessible to a more diverse group of stakeholders developing the U.S. clean energy economy. NREL expanded the diversity of its executive leadership team this year with the hire of two new leaders. EERE's Golden Field Office issued the first IIJA award to a Service-Disabled Veteran-Owned small business, for critical EERE IIJA implementation support. EERE is on-target to exceed its FY 2022 small business goals as is EERE's NREL.

Office of Fossil Energy and Carbon Management (FECM)

FECM has expanded the University Training and Research (UTR) program to include a humanities-driven STEM (HDSTEM) component. HDSTEM is intended to provide learners with new ways of recognizing the impacts of their technical disciplines, resulting in an increased capacity to make decisions based on diverse points of view and historical environmental, social, and economic contexts.

Through this expansion of the UTR Program, which seeks to support interdisciplinary HDSTEM curriculum at U.S. colleges and universities, FECM aims to help build a diverse, inclusive workforce capable of effectively working toward the demonstration and deployment of technologies that reduce emissions, address climate change, and ultimately advance the adoption of clean energy technologies. Individuals with interdisciplinary skills can become leaders in providing solutions to today's complex problems and create a healthy environment, vibrant communities, and robust economy for our future.

FECM continued to oversee the Mickey Leland Energy Fellowship (MLEF) program, which is a 10-week summer educational program that offers opportunities for STEM majors to gain hands-on research experience at the Department of Energy under the mentorship of a DOE scientist, engineer, research, or program manager. The program was created in 1995 to provide opportunities for underrepresented minorities in STEM. The mission of this program has evolved to emphasize building a diverse pipeline of future STEM professionals with a focus on recruiting students from underrepresented communities within the United States. To date, over 1,000 students have completed the MLEF program, including 49 in the MLEF Class of 2022.

Advance Clean-Up of Radioactive and Chemical Waste

Participating Programs

Environmental Management, Legacy Management

DOE is responsible for one of the largest environmental remediation efforts in the world, completing cleanup of radioactive and chemical contamination left behind by six decades of weapons production and energy research during the Manhattan Project and the Cold War. Examples of FY 2022 program accomplishments in these areas include:

Support environmental remediation

Office of Environmental Management (EM)

Hanford: EM successfully completed construction and startup of testing of all Direct Feed Low Activity Waste facilities needed to begin vitrification of tank waste and completed preparations to begin heat-up of the Waste Treatment and Immobilization Project (WTP) Melter 1 and initiated Melter 1 heat up in September 2022. EM completed building and testing of the Tank-Side Cesium Removal (TSCR) system and started pretreating waste in FY 2022.

Savannah River Site (SRS): EM successfully treated 3.8 million gallons (Mgal) of tank waste through the Savannah River Site Salt Waste Processing Facility (SWPF) to date. EM continued construction of saltstone disposal unit (SDU) 8 and SDU 9. Each SDU will increase Salt Waste Processing Facility (SWPF) disposal capacity by 34 million gallons.

Idaho: EM successfully completed the confirmatory test run of the Idaho Integrated Waste Treatment Unit (IWTU) on July 27th with a total of 137k gallons of simulant processed. EM completed the DOE readiness assessment and working toward startup of radiological operations.

Waste Isolation Pilot Plant (WIPP): EM successfully completed 30 of 30 shipments of transuranic waste to the Waste Isolation Pilot Plant (WIPP) from EM to Los Alamos, New Mexico.

Portsmouth: EM successfully completed demolition of the first of three former enrichment processing buildings and completed excavation of the X-231B landfill.

Brookhaven National Laboratory: EM successfully completed disposition of all post-demolition waste from the High Flux Beam Reactor Exhaust Stack Demolition Project by 2nd quarter of FY 2022, resulting in the completion of EM's 92nd cleanup site.

Paducah: EM completed disposition of 40 percent (to date) of R-114 refrigerant. On schedule to complete disposition by the end of FY 2026.

Lawrence Livermore National Laboratory (LLNL): EM successfully completed removal of the Livermore Pool Reactor from within Building 280 and awarded an Interagency Agreement to demolish Building 280. EM completed demolition of Building 175 and commenced demolition of Building 251.

Oak Ridge: EM demolished the Criticality Experiment Laboratory and retrieved 6.5 tons of mercury from deactivation efforts at the Y-12 National Security Complex (Y-12). EM also began demolition on Bulk Shielding Reactor at Oak Ridge National Laboratory (ORNL). EM is actively addressing nearly 20 excess and contaminated facilities at ORNL and Y-12 to prepare them for near-term demolition.

Office of Legacy Management (LM)

Long-Term Surveillance and Maintenance (LTS&M):

LM conducted LTS&M activities at 101 sites to monitor the environmental remedies in accordance with legal agreements. LTS&M activities were completed by employing sound program and project management, engineering, and science-based solutions. The sites within LM's responsibility include those remediated under various regulatory frameworks including the Formerly Utilized Sites Remedial Action Program, Defense Decontamination and Decommissioning Program, Comprehensive Environmental Response, Compensation, and Liability Act of 1978, Resource Conservation and Recovery Act, and Uranium Mill Tailings Radiation Control Act of 1978.

Defense-Related Uranium Mine (DRUM): This year LM's DRUM program continued inventorying mines and safeguarding hazardous mine features on public lands. In FY 2022, LM conducted 348 inventories. Cumulatively, LM achieved a major milestone in FY 2022, inventorying its 2,000th mine on public lands. Additionally, LM completed the first five inventories of 209 planned on Tribal lands. Also, in FY 2022, LM safeguarded 35 hazardous mine features. These 35 safeguarding actions contributed to LM achieving another major milestone in FY 2022, safeguarding 500 physical hazards, since program inception, at DRUM sites on public lands.

Operational Excellence

Participating Programs

Chief Financial Officer; Chief Human Capital Officer; Chief Information Officer; Economic Impact and Diversity; Enterprise Assessments; Environment, Health, Safety, and Security; Management

DOE achieves mission success through sustained commitment to performance-based management and expectations of excellence from DOE headquarters to every field office, laboratory, and production facility. DOE does so by recruiting and retaining a highly qualified, capable, diverse, and flexible federal workforce; using funds appropriately and efficiently, while minimizing and mitigating potential financial and operational risks to the American taxpayer; and conducting a rigorous program of internal, independent oversight of line management activities. Examples of FY 2022 program accomplishments in these areas include:

Attract, manage, train, and retain the best federal workforce to meet future mission needs

Office of the Chief Human Capital Officer (HC)

Hiring Efficiency and HR IT Solutions: HC partnered with the Office of the Undersecretary for Infrastructure (S3) and ED to develop the public facing DOE Applicant Portal; a first of its kind applicant portal to focus the Clean Energy Corps' (CEC) recruitment, marketing, and outreach efforts to one central location to attract a diverse applicant pool from outside of the Federal government and provide those interested with an easy way to identify interest in IJJA and IRA opportunities. 36,000 CEC applicants were recruited within the DOE Applicant Portal. The internal LEVER system was used to conduct 2,700 core competency bias-informed interviews resulting in the fastest time to hire for agencies conducting IJJA hiring. More than 110 candidates were identified for IJJA positions in the onboarding process. The average time to hire for base positions within the 80-day target and 51 days for IJJA positions.

DOE transitioned to USA Staffing to streamline communication with hiring managers on recruitment products and improve efficiency of recruitment actions. The Onboarding feature of USA Staffing, provided greater efficiency and automation of issuance of job offers and onboarding documents. 75 percent of the onboarding packages were submitted for processing on the first day of employment, where previously these actions took a week or more to complete. As of September 2022, there have been over 2,766 applicants hired with more than 2,753 entry on duty documents electronically processed via the Onboarding module.

As a part of DOE's Return to Work initiative, DOE updated the HR system of record, CHRIS, to include additional duty location codes for duty station changes to accurately identify duty stations for newly categorized Remote Workers. To date, over 1,100 mass actions have been processed for 16 DOE organizational elements. In support of the IJJA special direct hiring authority, DOE created a new special employment program code in CHRIS to easily identify employees hired under this authority to address tracking and reporting requirements.

Workforce Planning: HC partnered with the Office of Economic Impact and Diversity and S3 to create CEC Recruitment and Outreach Plans. The partners also attended over 70 in-person and virtual hiring events in support of CEC hiring and DOE's Veteran, Persons with Disabilities, and Military Spouse Hiring Goals. HC partnered with the Office of Environment, Health, Safety, and Security to streamline the security and suitability process for positions not requiring a clearance at DOE Headquarters; launched a first ever shared tracking system and decreased adjudication time by 70 percent.

Employee Development and Retention: HC expanded access to high-quality development opportunities through improved marketing and targeted delivery of high-demand courses. HC delivered over 100 instructor-led courses to over 2,800 students with each course achieving an average evaluation score of 9 out of 10; and two leadership development training opportunities comprised of almost 50 employees. Enrollment in three government-wide leadership development programs (Leadership for a Democratic Society, Excellence in Government Fellows Program, and the Senior Executive Fellows Program) increased by 92 percent compared to FY 2021 enrollments. HC leveraged best practices and innovative strategies to help strengthen employee engagement across the Department. DOE's employee engagement score, as measured by the Federal Employee Viewpoint Survey (FEVS) Employee Engagement Index, remains a strength at 77 percent positive.

Office of Economic Impact and Diversity (ED)

ED established a standalone Division for the Office of Diversity, Equity, Inclusion, and Accessibility (ODEIA), with four Full-Time Equivalents (FTEs). ED led efforts and assembled a DOE team to submit DOE's first Diversity, Equity, Inclusion, and Accessibility Strategic Plan to the White House Domestic Policy Council, OPM, EEOC, and OMB, per Executive Order 14035.

PROGRAM PERFORMANCE (Unaudited)

ED established a new DEIA Senior Leadership Council for accountability, visibility, and support, as well as a new community of practice of DEIA practitioners to advance DEIA efforts throughout the Department.

ED hosted its first DOE-wide DEIA Town Hall with the Energy Secretary and Deputy Secretary to provide an overview of the DEIA Strategic Plan and reinforce the support from senior leadership. The Town Hall was part of DOE's first-ever Justice Week, which also included a panel of DEIA promising practices and an open house for highlighting Employee Resource Groups (ERGs).

ED partnered with the Office of the Chief Human Capital Officer (HC) and the Office of the Undersecretary for Infrastructure (S3) on the establishment of Clean Energy Corps (CEC), a DOE hiring program to support the work related to investments from the IIJA and IRA. ED trained all CEC interviewers (Interview Corps) in assessing candidate core competencies and mitigating biases in interviews, including a training video. ED created and provided a resource guide to assist the Interview Corps in identifying and mitigating biases in resume reviews. ED created and provided an outreach template, which requires all IIJA/IRA program offices hiring for CEC to submit a diverse outreach plan with targeted strategies.

ED trained all new employees within the Senior Executive Service (SES) on implicit bias mitigation, with development of required DEIA training for all 2,000+ DOE supervisors.

ED established two new Employee Resource Groups (ERGs) for Native Americans and people with disabilities, including allies. There are now nine total ERGs at the DOE, and ED is continuing to provide guidance and ongoing support for retention and engagement. ERGs have also participated in outreach efforts to connect with diverse candidates and external stakeholders.

Use taxpayer funds efficiently and improve visibility into how funds are being used

Office of the Chief Financial Officer (OCFO)

In FY 2022, IIJA and IRA provided the Department with more than \$60 billion and \$35.5 billion, respectively, for management and execution over the next decade. This funding, combined with annual appropriations, represents the largest influx of funding in a single year in the Department's history. OCFO has taken initial planning steps for developing a dashboard that will provide enhanced data and visualization management on financial assistance funding opportunities, funding and reporting visibility, and performance metrics for DOE leadership, stakeholders, and the public.

In April 2022, OCFO led implementation of a revised approach for DOE-wide budgeting to enhance the Department's ability to strategically plan and implement long-term initiatives. The Planning, Programming,

Budgeting, and Execution (PPBE) process represents a significant change for DOE. PPBE will assess DOE's requirements in the context of the Department's strategic objectives, capabilities, capacity, and budget to determine cross-departmental achievements, gaps, barriers, opportunities for improvement, and potential near- and long-term budgetary implications. The result of this process will be a multi-year budget, also known as the Future-Years Energy Program (FYEP). This process will be initiated each year shortly following delivery of the budget request to OMB.

Office of the Chief Information Officer (OCIO)

DOE initiated a Technology Business Management (TBM) implementation effort to enhance transparency of IT spend. By mapping our IT spend to TBM, we are enabling OCIO to better understand the Department's total cost of ownership and drive value-based decision-making on IT investment.

OCIO increased Federal Information Technology Acquisition Reform Act (FITARA) Program efficiency and strengthened OCIO management and oversight through the May 2022 release of a ServiceNow based IT Acquisition Request tool. The tool reduces the number of emails required to complete a FITARA IT Acquisition approval; enables collaboration on each IT acquisition request; serves as a single location for data entry and a historical data repository; and automatically tracks status.

Office of Management (MA) and Office of the Chief Financial Officer (OCFO)

During FY 2022, MA and OCFO provided procurement and financial data sets on a monthly basis for a public-facing Energy Justice Dashboard tool in support of Executive Order 13985, and Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad." This effort directly supports the Justice40 Initiative. The visualization tool displays DOE-specific investments in communities across the country experiencing disproportionately high and adverse economic, human health, climate-related, environmental, and other cumulative impacts. The Dashboard data is updated monthly and provides a better understanding of DOE's funding and investments distribution while improving the visibility into how funds are being used to both internal and external audiences.

Monitor Departmental performance to ensure that program activities are executed in a safe and secure manner consistent with departmental direction

Office of Enterprise Assessments (EA)

EA completed over 65 independent assessments in the areas of cybersecurity, safeguards and security, nuclear safety, worker safety and health, and emergency management. These assessments provide objective and timely information to DOE senior leadership, contractor organizations, and other stakeholders on whether national security material and information assets are appropriately protected; and whether Departmental operations ensure the safety of its employees and the public. EA also

PROGRAM PERFORMANCE (Unaudited)

administers and implements DOE's safety and security enforcement program to promote contractor compliance with the Department's nuclear safety, worker safety and health, and classified information security requirements, and issued eight enforcement outcomes in FY 2022 to include two Notices of Violation and six Enforcement Letters.

EA's National Training Center (NTC) has issued over 23,290 completion certificates representing more than 200,000 student hours in the areas of security and safety-related training as well as professional development programs for the DOE Federal and contractor workforce. NTC has also collaborated on the new DOE-wide Learning Management System; and made transformational changes to Federal Technical Capability Program.

Office of Environment, Health, Safety, and Security (EHSS)

EHSS has deployed advanced analytical tools to support Department of Energy (DOE) line program efforts to minimize safety and environmental risks associated with the Department's operations. This includes a suite of machine learning tools that enable DOE practitioners to conduct more robust safety analyses and a Corporate Safety Dashboard to improve visibility into key performance metrics.

EHSS has also established a number of forums, including policy panels and working groups, to engage the field regarding safeguards and security policies. The policy panels and working groups provide a venue for topical area subject matter experts to identify potential improvements in the policies and share best practices and lessons learned in the implementation of the policies.

Management's Analysis, Assurances and Priorities

Analysis of Financial Statements (Unaudited)

The financial statements are prepared to report the financial position, financial condition, and results of operations, consistent with the requirements of 31 U.S.C. 3515(b). The statements are prepared from records of Federal entities in accordance with Federal generally

accepted accounting principles (GAAP) and the formats prescribed by OMB. Reports used to monitor and control budgetary resources are prepared from the same records. Users of the statements are advised that the statements are for a component of the U.S. Government.

Balance Sheet

The Department's total liabilities exceed total assets with the Unfunded Environmental Liabilities being the largest component of the liabilities.

Chart 1 provides a breakdown of the Department's liabilities showing funded and unfunded liabilities. Significant changes in Assets are detailed in **Chart 2**. Fund Balance with Treasury increased primarily due to increases in IJA and IRA funding. General Property, Plant and Equipment increased primarily due to increases in Construction work in process. Investments increased due to activity in Nuclear Waste Fund (NWF) and PMAs. Accounts Receivable increased due to oil sales at the SPR.

Significant changes in Liabilities are detailed in **Chart 3**. The increase in Environmental Liabilities is primarily due to modifications of liability estimates driven by changes in technical approach, scope of activities, regulatory and legal changes, and inflation adjustments. The increase in Advances from Others and Deferred Revenue with the Public is primarily due to NWF interest income on investments. Other Liabilities other than Intragovernmental decreased primarily due to fluctuations in liabilities related to contractor pension plans.

Chart 4 provides a detailed trend analysis of the changes in the Department's environmental liabilities balances over the past five years. Most of DOE's environmental liabilities are managed by the Environmental Management (EM) program which addresses the legacy of contamination from the nuclear weapons complex and includes managing thousands of contaminated facilities formerly used in the nuclear weapons program, overseeing the safe management of large quantities of radioactive waste and nuclear materials, and cleanup of large volumes of contaminated soil and water. The active facilities portion of the environmental liability includes anticipated remediation costs for active and surplus facilities managed by DOE's ongoing program operations which will ultimately require stabilization, deactivation, and

decommissioning. Other legacy liabilities are divided between environmental liabilities for active sites, including estimated cleanup; and the Office of Legacy Management (LM) for post-closure responsibilities, including surveillance and monitoring activities; soil and groundwater remediation; and disposition of excess material from sites after the EM program activities have been completed. The other legacy liabilities also include the Department's share of the estimated future costs of dispositioning its inventory of high-level waste and spent nuclear fuel (SNF). The Department's FY 2022 net costs and unfunded liability estimates decreased by \$4.8 billion for contractor pension plans and decreased by \$2.9 billion for contractor Postretirement Benefits (PRB) other than pension plans.

The major components of these estimate changes are shown in **Chart 5**. The most significant component of the change in the contractor pension plan net costs and liabilities resulted from an increase to the rate used to discount liabilities, offset by significant asset losses. The 240 basis point increase in the discount rate decreased the unfunded liability by approximately \$17.3 billion. The asset return loss of \$9.7 billion combined with the expected \$2.9 billion asset return during FY 2022 resulted in a \$12.6 billion increase in the unfunded liability. The actual pension asset return was approximately -18.9 percent versus a 5.75 percent expected return. The most significant components of the change in contractor PRB net costs and liabilities resulted from an increase in the rate used to discount the liability to present value and actual experience for per capita claims and medical trends. The change in the unfunded PRB liability due to assumption changes included a decrease of \$2.3 billion due to an increase in the rate used to discount the liabilities to present value combined with a decrease of \$0.3 billion due to changes in per capita claims and medical trend assumptions. The discount rate is based on the yields of high-quality fixed income securities as of September 30, 2022 and 2021.

Chart 1: FY 2022 Total Liabilities Breakdown by Funded/Unfunded

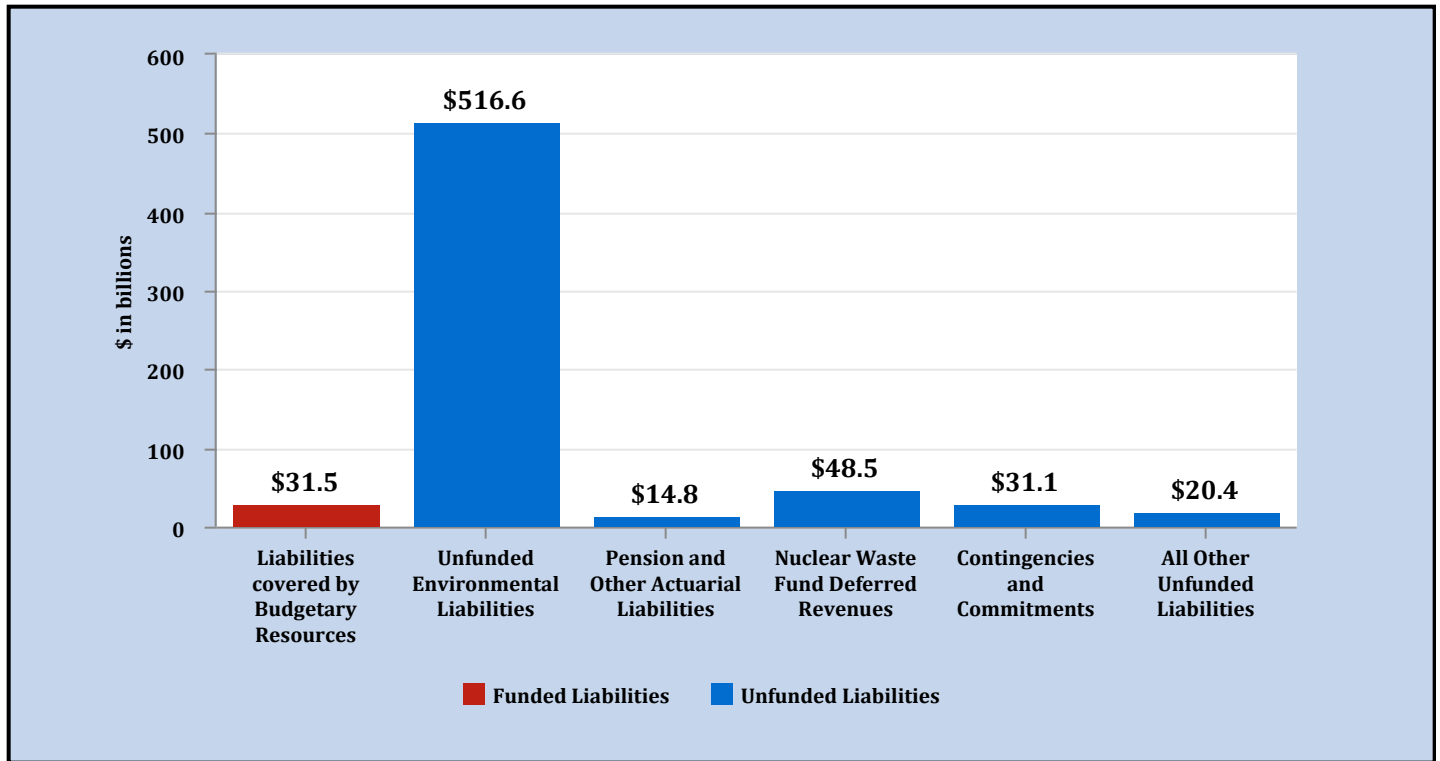


Chart 2: FY 2022 Significant Changes in Assets



Chart 3: FY 2022 Significant Changes in Liabilities

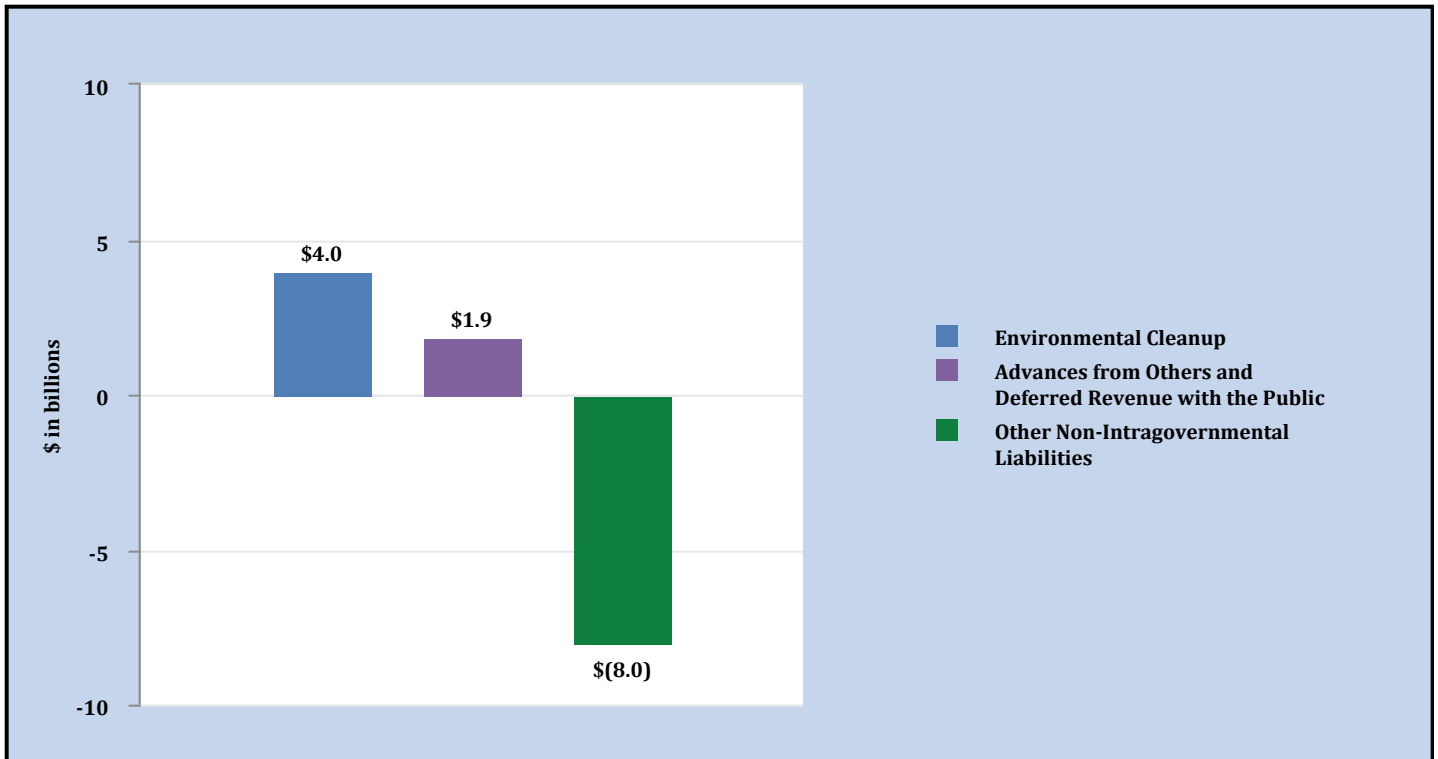


Chart 4: Composition of Environmental Cleanup and Disposal Liability

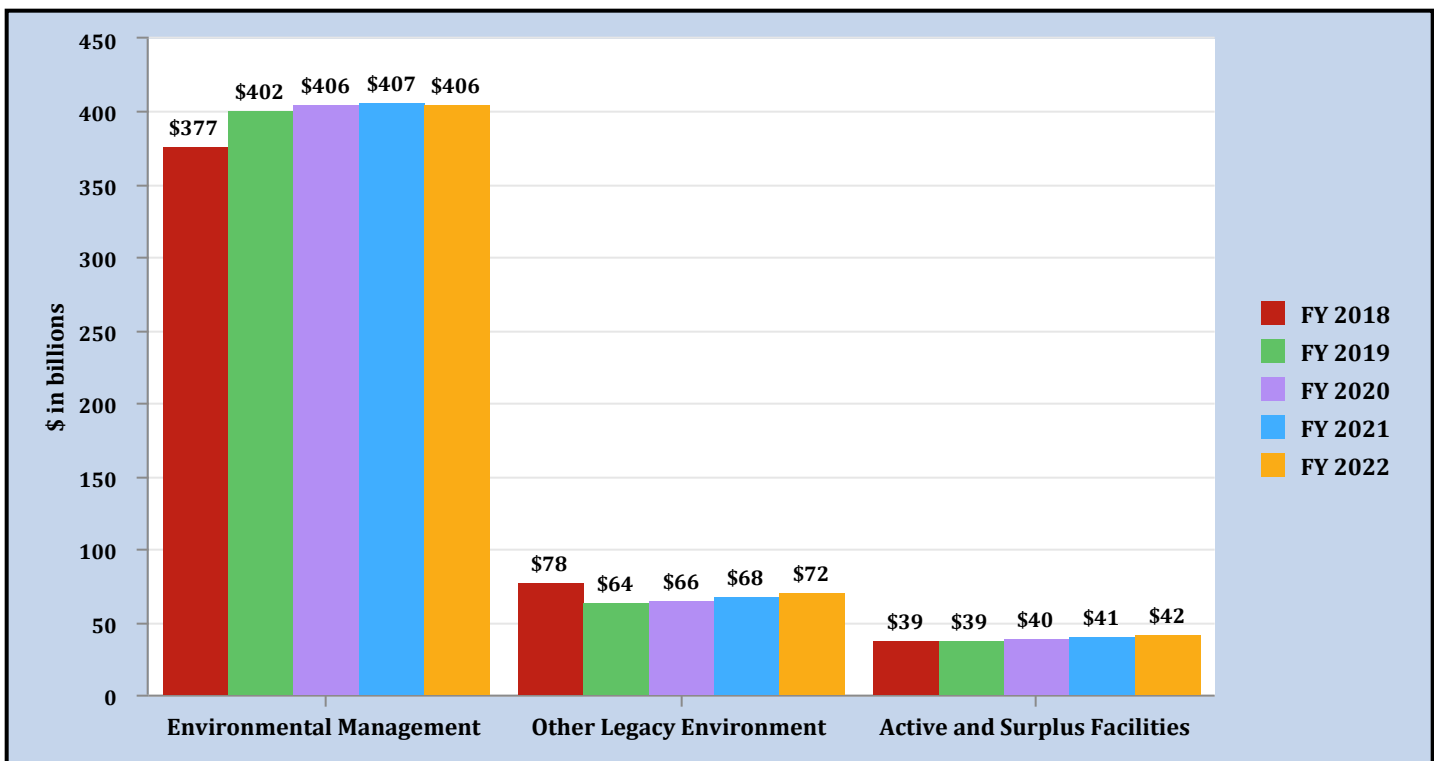
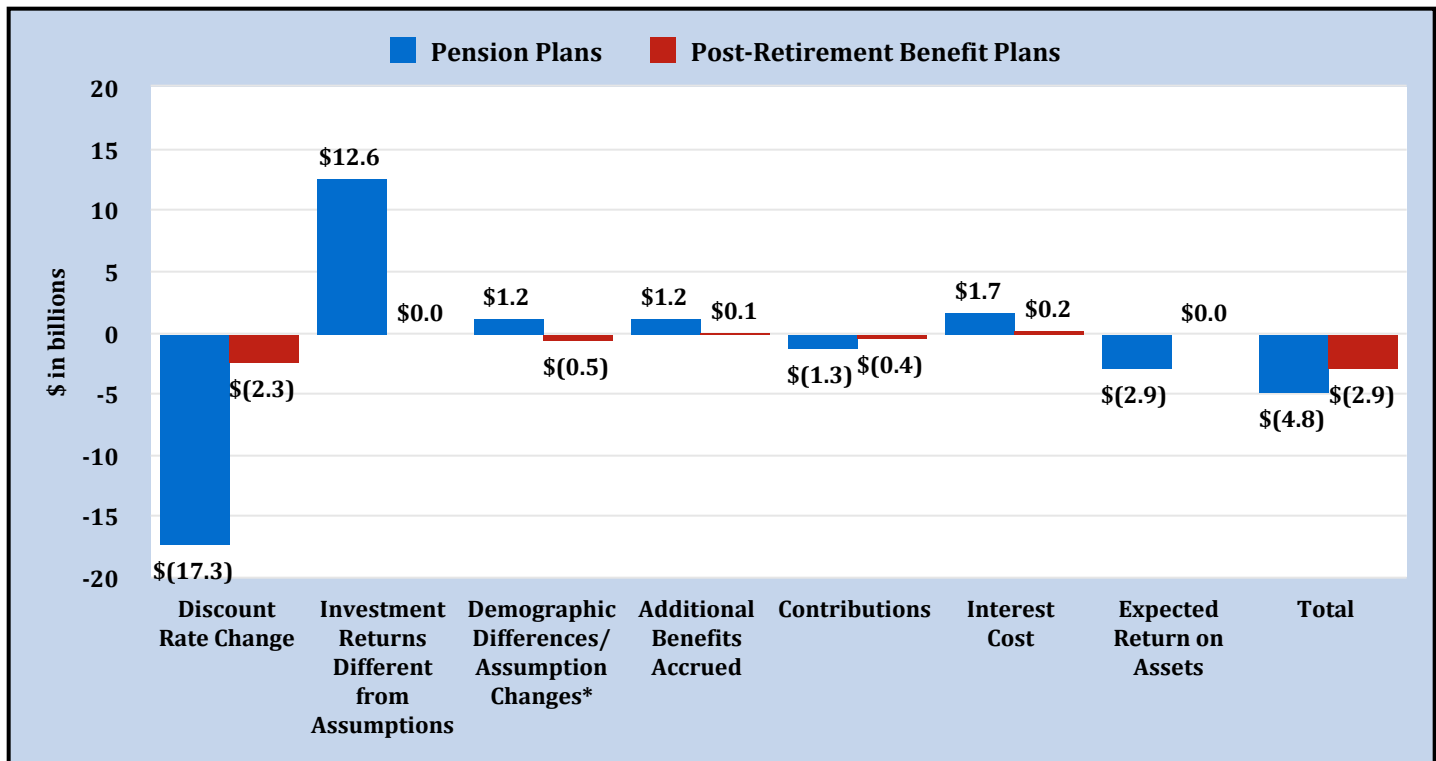


Chart 5: FY 2022 Changes in Contractor Employee Pension and Other Postretirement Benefit Plans

*Includes impact from the repeal of the excise tax for Postretirement Benefit Plans

Net Cost of Operations

The major elements of net cost are shown in **Chart 6**. A breakdown of program costs (gross) by the Department's three programmatic goals, reimbursable work and other programs is provided in **Chart 7**. The predominant change in the program costs in FY 2022 is related to the SPR oil sales.

The largest changes within Costs Not Assigned is attributable primarily to the change in the Occupational Illness Program and the Contractor Pension and PRB estimates **Chart 8**.

The Department's Research & Development (R&D) expenses are shown in **Chart 9**. These R&D expenses facilitate the creation, advancement, and deployment of new technologies and support the Department's mission to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions. Overall, Research & Development expenses increased by \$0.4 billion in FY 2022.

Chart 6: Elements of Net Cost

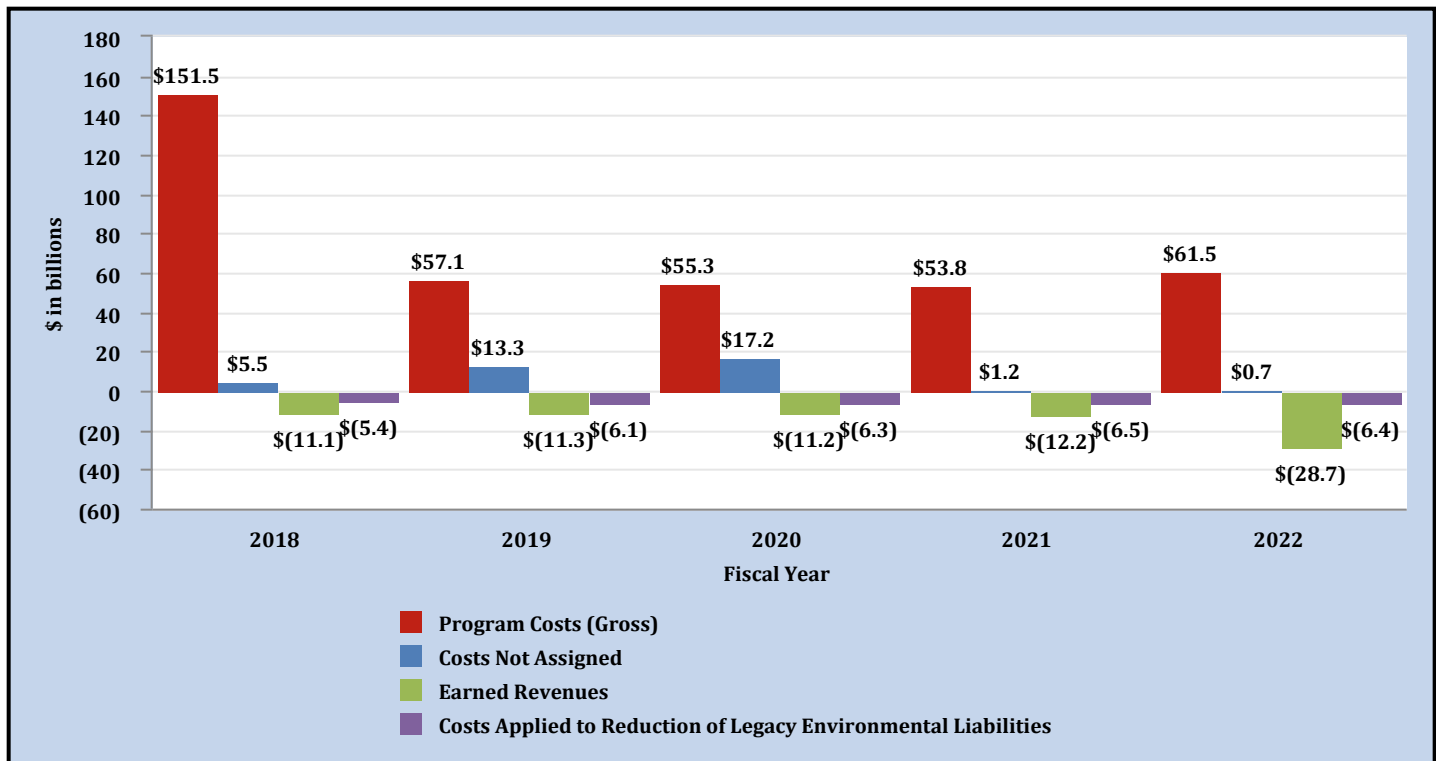


Chart 7: FY 2022 Program Costs (Gross)

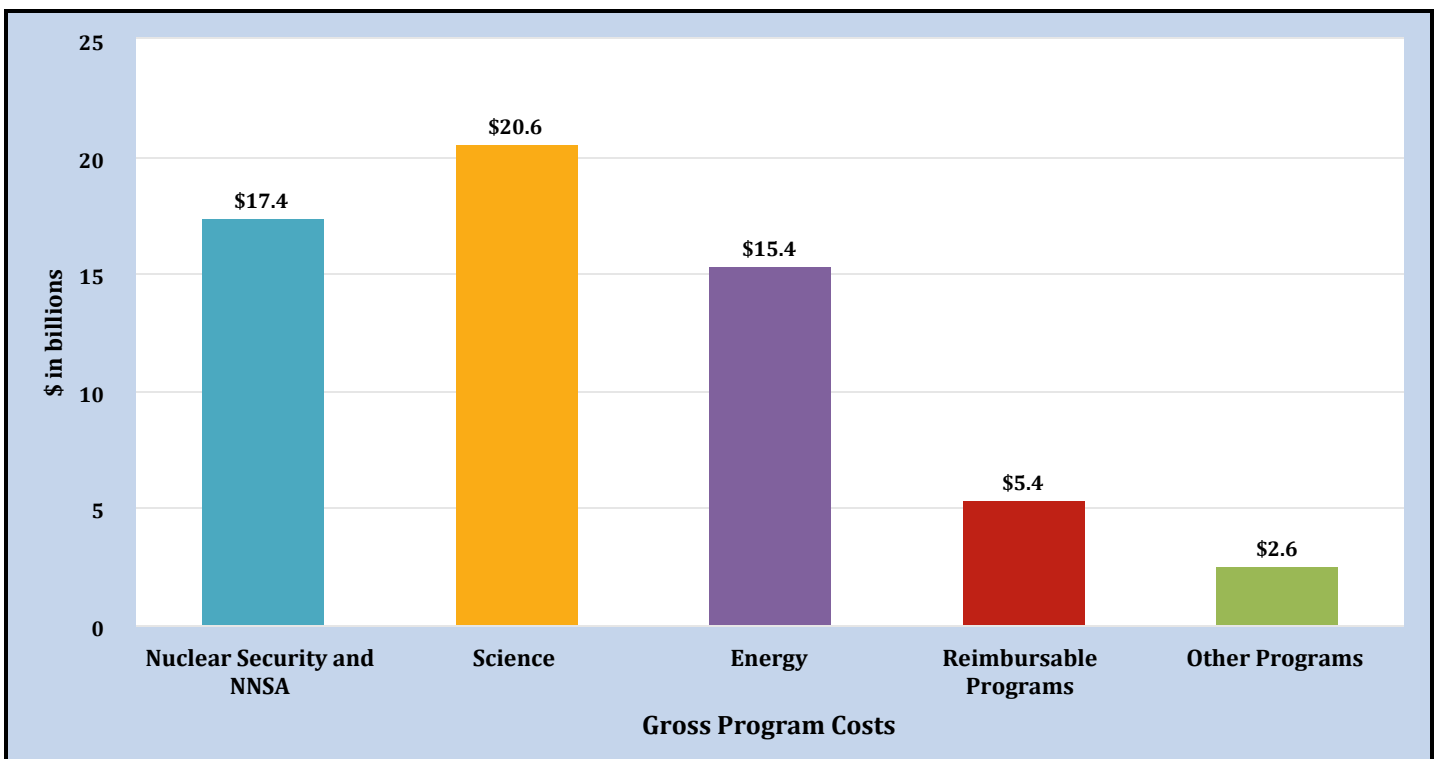


Chart 8: FY 2022 Major Elements of Costs Not Assigned

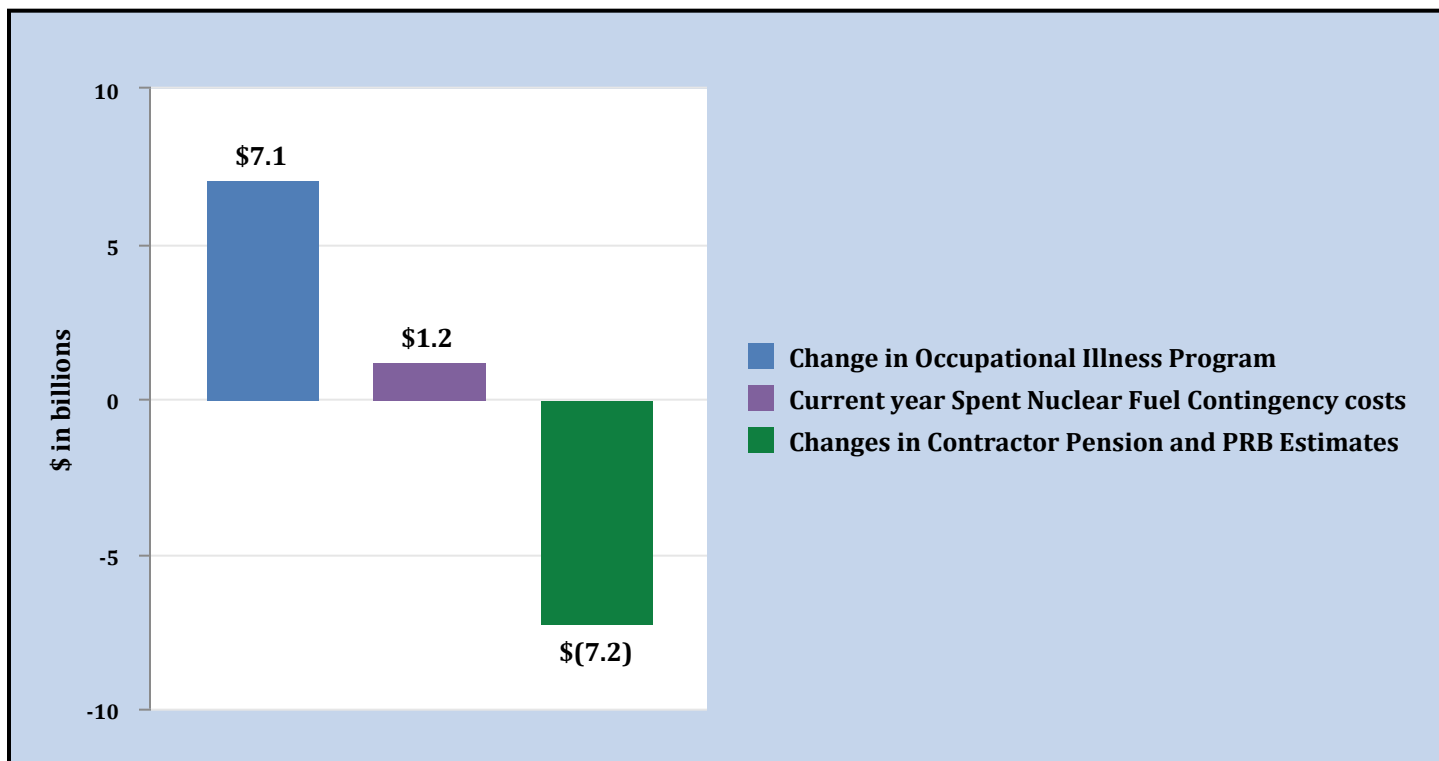
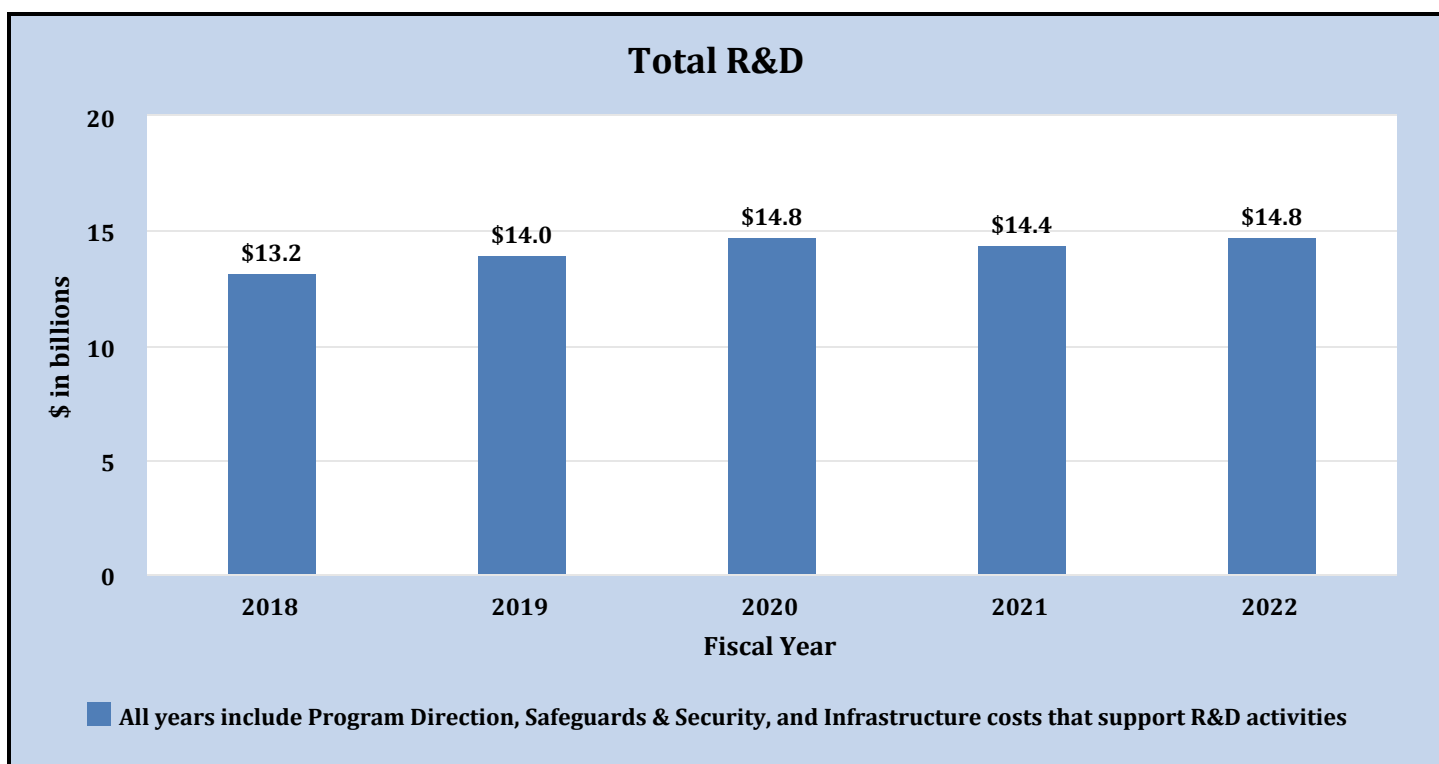


Chart 9: Research & Development



Budgetary Resources

The *Combined Statements of Budgetary Resources* provides information on the budgetary resources available to the Department for the year and the status of those resources at the end of the FY. The Department receives most of its funding from general Government funds administered by the Department of the Treasury (Treasury) and appropriated for DOE's use by Congress. Since budgetary accounting rules and financial accounting rules recognize certain transactions at different points in time, Appropriations Used on the *Consolidated Statements of Changes in Net Position* will not match costs for that period. The primary difference results from recognition of

costs related to changes in unfunded liability estimates. Budget authority from appropriations on the *Combined Statements of Budgetary Resources* increased in FY 2022 by \$58.2 billion.

As shown in **Chart 10**, the Department's New Obligations and Upward Adjustments increased in FY 2022 by \$8.4 billion.

The Department's Infrastructure Investment and Jobs Act (IIJA) Appropriations, Obligations and Outlays are detailed in **Chart 11** by Reporting Category.

Chart 10: New Obligations and Upward Adjustments (Total)

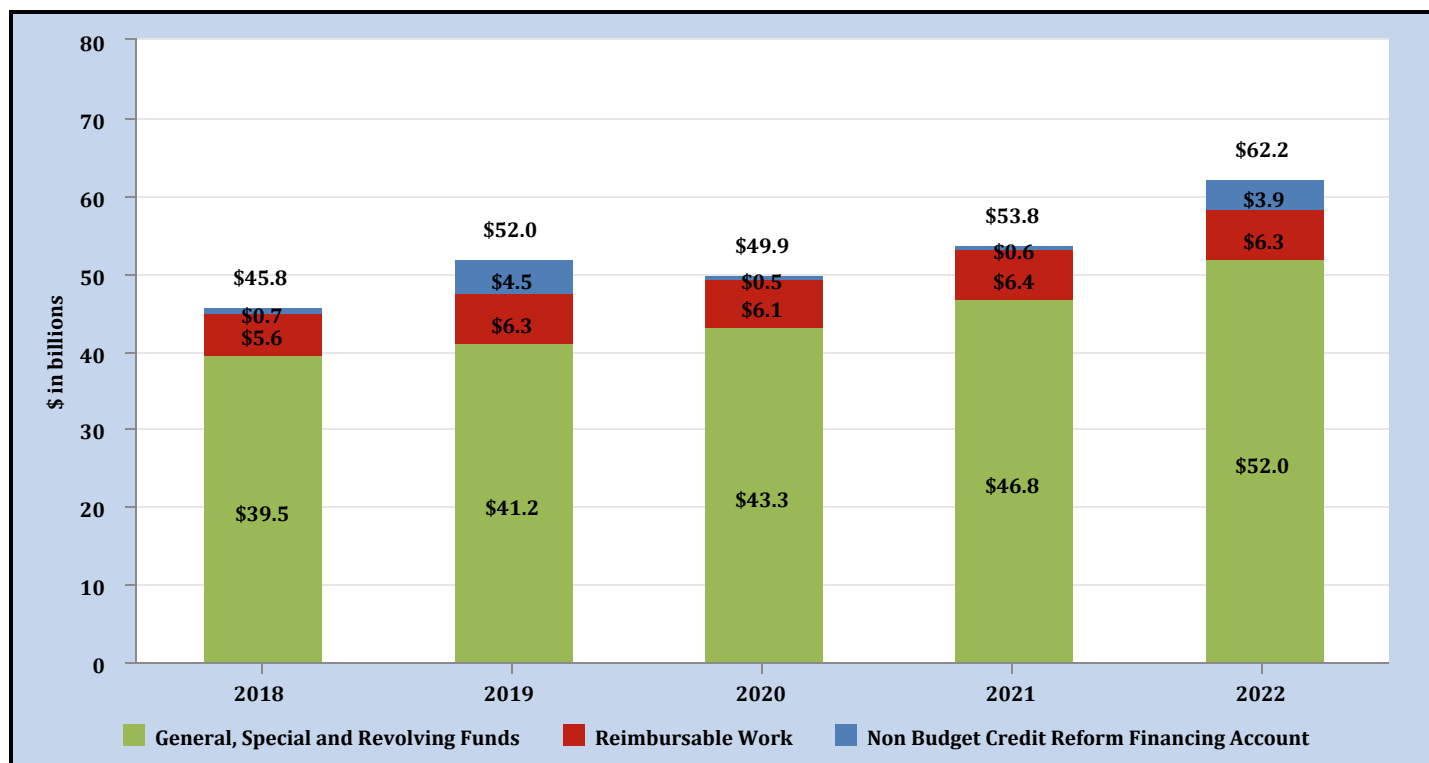


Chart 11: IIJA Resources, Obligations and Outlays

(\$ IN MILLIONS)	FY 2022 APPROPRIATION	TRANSFERS	OBLIGATIONS	OUTLAYS
Energy Efficiency and Renewable Energy	\$ 8,207	\$ (46)	\$ 529	\$ 5
Cybersecurity, Energy Security, and Emergency Response	150	—	11	2
Electricity	1,660	(3)	21	3
Nuclear Energy	1,200	(3)	4	1
Fossil Energy and Carbon Management	1,839	(7)	28	4
Carbon Dioxide Transportation Infrastructure Finance and Innovation Program Account	3	—	1	1
Office of Clean Energy Demonstrations	5,127	(10)	50	5
Construction, Rehabilitation, Operation and Maintenance - Western Area Power Administration	500	(86)	343	260
Colorado River Basin Power Marketing Fund account	—	85	38	21
Departmental Administration	—	19	2	—
Office of the Inspector General	—	19	—	—
Small Business Innovation Research/Small Business Technology Transfer	—	32	—	—
Totals	\$ 18,686	\$ —	\$ 1,027	\$ 302

Chart 12: IRA Resources and Obligations

(\$ IN MILLIONS)	FY 2022 APPROPRIATION	OBLIGATIONS
Enhanced Use of Defense Production Act	\$ 250	\$ —
Residential Efficiency and Electrification Rebates	4,300	—
High-Efficiency Electric Home Rebate Program	4,500	—
State-Based Home Energy Efficiency Contractor Training Grants	200	—
Assistance for Latest and Zero Building Energy Code Adoption	1,000	—
Department of Energy Loan Program	3,600	—
Advanced Technology Vehicle Manufacturing	3,000	—
Domestic Manufacturing Conversion Grants	2,000	—
Energy Infrastructure Reinvestment Financing	5,000	—
Tribal Energy Loan Guarantee Program	75	—
Transmission Facility Financing	2,000	—
Grants to Facilitate the Siting of Interstate Electricity Transmission Lines	760	—
Interregional and Offshore Wind Electricity Transmission Planning, Modeling, and Analysis	100	—
Advanced Industrial Facilities Deployment Program	5,812	—
Department of Energy Office of Inspector General Oversight	20	—
National Laboratory Infrastructure	2,000	1,306
Availability of High-Assay Low-Enriched Uranium	700	—
Environmental Reviews - Department of Energy	115	—
Environmental Reviews - Federal Energy Regulatory Commission	100	—
Totals	\$ 35,532	\$ 1,306

FY 2022 DOE Highlight: Clean Energy Corps

Pollinator-Friendly Solar is one of many stories detailing Clean Energy Corps accomplishments. For more information, visit <https://www.energy.gov/eere/solar/articles/buzzing-around-solar-pollinator-habitat-under-solar-arrays> and <https://www.energy.gov/CleanEnergyCorps>.



Analysis of Systems, Controls, and Legal Compliance

(Unaudited)

Management Assurances



The Department of Energy (Department) leadership and management is responsible for establishing and maintaining an effective system of internal controls to meet the objectives of the Federal Managers' Financial Integrity Act of 1982 (FMFIA). To support the Department's management's responsibilities, an annual evaluation of management and financial system internal controls is required by Sections II and IV of FMFIA, and the Office of Management and Budget (OMB) Circular No. A-123, *Management's Responsibility for Enterprise Risk Management and Internal Control*. The annual assurances are made based on the results of these evaluations, which are reflected in reports and representations completed by senior accountable managers within the Department.

The Department completed an evaluation of management and financial system internal controls, and as of September 30, 2022, the Department provides reasonable assurance internal controls for the effectiveness and efficiency of operations, reliability of reporting for internal and external use, and compliance with applicable laws and regulations are operating effectively in design and operation. The evaluation of internal controls for reporting included processes supporting the Digital Accountability and Transparency Act of 2014 (DATA Act) and overall data quality contained in agency reports, as required by Appendix A of OMB Circular No. A-123 and Departmental requirements. The evaluation is an assessment of entity and process controls. The Department has reasonable assurance that processes are in place to identify risks and establish controls to mitigate identified risks. Evaluation results indicate the Department's financial systems generally conform to governmental financial systems requirements, and substantially comply with requirements of the Federal Financial Management Improvement Act of 1996 (FFMIA).

The Department has no material weaknesses to report as a result of the internal control evaluations. The Department continues work to address Management Priorities, which represent important strategic management issues the Department has in fulfilling responsibilities and initiatives to support the Administration in securing a better future for the Nation.

A handwritten signature in black ink, appearing to read 'J. Granholm'.

Jennifer M. Granholm
Secretary of Energy
November 15, 2022

Federal Managers' Financial Integrity Act

The Federal Managers' Financial Integrity Act of 1982 (FMFIA) requires agencies to establish internal controls and financial systems to provide reasonable assurance that the integrity of Federal programs and operations remains protected. This Act requires the head of the agency to provide an annual assurance statement detailing if the agency met this requirement, and if material weaknesses exist.

In response to FMFIA, the Department has an internal control program that holds managers accountable for the performance, productivity, operations, and integrity of programs through the use of internal controls. Each year, senior Department managers evaluate the adequacy of the internal controls surrounding activities and determine whether the controls conform to the principles and standards established by the Office of Management and Budget (OMB) and the Government Accountability Office (GAO). The results of these evaluations and other senior management information determine if there are internal control matters resulting in material weaknesses. The Departmental Internal Control and Assessment Review Council (DICARC) provides review and oversight of the internal control program and advises the Secretary on the Statement of Assurance.

OMB Circular No. A-123, Appendix A

OMB Circular No. A-123, Appendix A, requires agencies to conduct management assessment and evaluation of internal controls over reporting, which includes processes supporting the Digital Accountability and Transparency Act of 2014 (DATA Act), and overall data quality contained in agency reports. The evaluation requires an annual assessment of entity and process controls.

The Department's evaluation for Fiscal Year (FY) 2022 provides reasonable assurance that processes are in place to identify risks and establish controls to manage these risks.

Federal Financial Management Improvement Act

The Federal Financial Management Improvement Act of 1996 (FFMIA) improves Federal financial management and reporting by requiring financial management systems to comply substantially with three requirements:

1. Federal financial management system requirements;
2. Applicable Federal accounting standards; and
3. The United States Government Standard General Ledger (USSGL) at the transaction level.

This Act requires independent auditors to report on agency compliance with the three stated requirements as part of financial statement audit reports.

The Department evaluated agency financial management systems and determined they substantially comply with Federal financial management systems requirements, applicable Federal accounting standards, and the USSGL at the transaction level.

Management Priorities (Unaudited)

The Department of Energy (DOE or Department) conducts multiple complex and highly diverse missions. Although the Department is continually striving to improve the efficiency and effectiveness of programs and operations, there are specific areas meriting a higher level of focus and attention. These areas often require short- and long-term strategies for stable operations and represent the most daunting management priorities the Department faces in accomplishing the mission.

The Reports Consolidation Act of 2000 requires the Inspector General (IG) to prepare an annual statement summarizing the most serious management and performance challenges facing the Department. These challenges are included in the Other Information section of this report. In FY 2021, the Government Accountability Office (GAO) issued the biennial High Risk Series update,

which includes DOE management of contracts and major projects with costs of \$750 million or greater, and the U.S. Government's environmental liability, for which DOE shares responsibility with other Federal agencies.

After considering critical activities within the agency and areas found by the GAO and IG, the Department identified 10 management priorities representing the most important strategic management issues the Department has now and in the coming years. **Tables 1a-c** identify the GAO high-risk list issues, DOE management priorities, and IG challenge areas. In accordance with the Government Performance and Results Act Modernization Act of 2010 (GPRAMA), DOE includes performance measures related to the Management Priorities in DOE's Annual Performance Report/Annual Performance Plan.

Table 1a

GAO HIGH RISK LIST – GAO-21-119SP (as of March 2021; updated every two years)
<ul style="list-style-type: none"> Contract Management for the NNSA and EM Management of major (\$750 million or greater) projects and programs U.S. Government's Environmental Liability

Table 1b

DOE MANAGEMENT PRIORITIES
<ul style="list-style-type: none"> Contract and Major Project Management Safety and Security Cybersecurity Environmental Cleanup Nuclear Waste Disposal Infrastructure Human Capital Management and Diversity and Inclusion Climate Change Energy Justice Nuclear Stockpile Stewardship

Table 1c

IG CHALLENGE AREAS FY 2023
<ul style="list-style-type: none"> Cross-Cutting Challenges – Reducing Fraud, Waste, and Abuse: <ul style="list-style-type: none"> Implementing Effective Oversight of Expenditures under IJJA, CHIPS Act and IRA Using All Available Tools to Combat the Theft of Intellectual Property – Research Security Modernizing Oversight by Continuing to Access Systems and Data for the Purpose of Running Data Analytics Improving Audits of Costs Incurred and Claimed Building a Stronger Suspension and Debarment Program Enforcing the Mandatory Disclosure Rule Key Mission Element Challenges: <ul style="list-style-type: none"> Restoring Plutonium Pit Production Capability Managing Tank Waste Establishing DOE as a Federal Enterprise Leader in Developing and Deploying Artificial Intelligence

CONTRACT AND MAJOR PROJECT MANAGEMENT

Key Challenges: The Department is the largest civilian contracting workforce agency in the Federal Government and spends approximately 90 percent of the annual budget on contracts to operate scientific laboratories, engineering and production facilities, and environmental restoration sites, and to acquire capital assets. Contractors at DOE sites and laboratories perform critical missions, including maintaining nuclear weapons stockpiles, cleaning up radioactive and hazardous waste resulting from the legacy of the Manhattan Project, and conducting the world's most sophisticated basic and applied energy and scientific research activities. To conduct these missions, the Department manages large complex capital asset projects.

In 1990, GAO designated DOE's Contract Management—which includes contract administration and project management—as a high-risk area because of historical challenges with contracts and project execution. Since then, DOE has made significant improvements in project management. For example, from 2020 through 2022, DOE completed 94 percent of construction projects, with no more than a 10 percent increase over original cost baseline.

GAO published the most recent High-Risk List Update in March 2021 with the next update expected in 2023. GAO continues to focus on DOE contracts and major projects—those with an estimated cost of \$750 million or greater—under the purview of the National Nuclear Security

Administration (NNSA) and the Office of Environmental Management (EM). GAO highlighted steps taken by NNSA to monitor and address contract performance below expectations, re-establish a process for reviewing the effectiveness of field offices' contractor oversight, and manage contract documentation in a central recordkeeping system. GAO noted steps that EM has taken to improve capacity but noted EM needs to follow through on its actions related to leadership commitment. In 2019, GAO acknowledged DOE's demonstrated progress criterion by improving the Department's rating from "not met" to "partially met." In 2021, GAO improved the DOE's rating for the capacity criterion from "not met" to "partially met," recognizing actions both NNSA and EM made to improve capacities for managing contracts and projects.

The DOE IG continues to conduct annual audits and investigations of contractor performance. DOE evaluates issues and recommendations identified by the IG and takes appropriate action to mitigate risks for specific contractor performance findings. DOE is taking steps to validate that contractors are implementing agreed-upon corrective actions.

Departmental Initiatives: In FY 2022, DOE continued to make progress in addressing contract and major project management.

DOE efforts to address GAO criteria to improve contract and major project management included:

- Sustained leadership commitment to address contract and project management challenges;
- Improved acquisition planning for Management and Operating (M&O) and other major contracts to verify DOE has maintained a firm understanding of contract requirements and the ability to hold contractors accountable for contract objectives;
- Improved the quality of enterprise-wide cost information available to DOE managers and key partners;
- Applied DOE's contract and project management practices to the Department's major legacy projects;
- Continued implementation of requirements of the Program Management Improvement Accountability Act (PMIAA) and the Office of Management and Budget's (OMB) supplemental guidance, including appointment of a Program Management Improvement Officer (PMIO) and participation in Program Management Policy Council (PMPC); and
- Continued progress in implementing the President's Management Agenda Cross-Agency Priority Goal for Category Management (CM). In FY 2021, DOE conducted training, corrected data to ensure small business utilization properly reflected in Spend Under Management (SUM), and issued guidance for DOE CM policy to clarify implementation. In FY 2022, DOE continued conducting training, revised DOE CM policy to align with OMB's FY 2022 CM policy revision, and began developing clarification for the interaction of DOE CM and DOE small business policy.

DOE's ongoing efforts to improve include:

- Developing workforce by providing staffing with requisite skills, and resources to perform acquisition-related duties and responsibilities;
- Adopting the best commercial practices using technological innovations, and obtaining best-value goods and services to achieve efficiencies and avoid unnecessary spending;
- Defining requirements in measurable outcomes;
- Making use of single or multiple-award Indefinite Delivery Indefinite Quantity (IDIQ) contracting vehicles, to define and task the contractor to perform discrete scopes of work at the point in time when actual requirements arise;
- Using firm fixed-price contracts to define specific requirements, and provide industry with information for realistic price requirements;
- Identifying and aligning applicable contract incentives to appropriate performance measures;
- Using objective performance measures focusing on outcomes to balance considerations of cost control, schedule achievement, and technical performance;
- Providing prompt, accurate, and objective contractor performance assessment information in the Government-wide Contractor Performance Assessment Reporting System to hold poor-performing contractors accountable for performance failures, and rewarding high-performing contractors for success; and
- Implementing a Risk Assessment Tool for Contracting Officers to oversee and assess the effectiveness of a contractor's purchasing system at NNSA Laboratories and Facilities, in accordance with Federal Acquisition Regulation Subpart 44.3.

SAFETY & SECURITY

Key Challenges:

Safety

Maintaining the safety and health of the DOE Federal and contractor workforce and protecting the public and the environment during Departmental operations, while striving to enhance the Department's productivity to achieve mission objectives.

Security

Safeguarding and protecting national assets entrusted to DOE in an effective and efficient manner to support DOE mission success.

Departmental Initiatives: The Department continues ongoing efforts to maintain enterprise safety and health and to improve the safeguarding and protecting of national assets, including:

- **Safety & Security-Physical Infrastructure Maintenance:** Listed in the top five risks for the Department, building and facility updates need to be maintained and modernized to support not only the security of the mission but also the safety of employees, communities, and the environment.
- **Safety-Per- and Polyfluoroalkyl Substances (PFAS):** DOE is responding to concerns about the emerging environmental contaminants known as PFAS, a group

of synthesized chemicals that have been manufactured and used in a variety of industries since the 1940s. These chemicals are persistent in the environment and in the human body, and PFAS exposure can lead to adverse human health effects. Multiple DOE sites have discharged PFAS as a chemical agent in a fire suppression product, Aqueous Film Forming Foam, and other DOE operations and processes have released quantities of PFAS into the environment. DOE is supporting research on past PFAS operations, participating in policymaking and regulatory processes, and tracking the emerging scientific and technical approaches to measuring and remediating PFAS contamination.

- **Safety Culture:** Through the leadership support of the Department's Safety Culture Improvement Panel, DOE continues to focus on improving safety culture across the complex. Providing protections for DOE Federal and contractor whistleblowers and fostering a safety-conscious work environment encouraging workers to raise concerns without fear of reprisal are key examples of efforts to mitigate this risk and will continue.
- **Safety-Biological Health and Disease Prevention:** Working with our partners at the National Biosurveillance Integration Center (NBIC), an element of the Department of Homeland Security (DHS), the Department, as members of the NBIC Interagency Working Group (NIWG) has the opportunity to maintain awareness of and address challenges related to timely integration, analysis, and dissemination of biosurveillance information.
- **Integrated Safety Management (ISM):** While the Department continues focus on the safe execution of work, the need to be ever mindful of the importance of ISM cannot be minimized. DOE will evaluate the effectiveness of ISM implementation across the Department to identify and apply lessons learned to enable safe performance of work.
- **Safety-Departmental Regulatory Framework:** The Department operates under a robust standards-based regulatory framework comprised of rules, policies, orders, and technical standards providing for adequate protection of the public, the workers, and the environment. As a self-regulated entity, it is incumbent upon DOE to continually review and improve its framework by identifying and integrating lessons learned from industry best practices, updates to national consensus standards, and the Department's own implementation experience.
- **Security-Design Basis Threat (DBT):** DOE continues to update the DBT based on emerging threats identified by the intelligence community. The update provides performance metrics for sites and programs to identify and mitigate vulnerabilities posed by new threats in the protection of special nuclear material, personnel, and assets.
- **Security Risk Analysis and Design Basis Threat:** The Department updates risk analysis and vulnerability assessment processes to improve the complex's security postures. DOE is working to deploy cost-effective security measures consolidating and

improving nuclear material storage facilities and reducing security risks.

- DOE collaborates with Nuclear Regulatory Commission, Defense Threat Reduction Agency, and other Department of Defense (DoD) elements to develop a common basis for protection of nuclear weapons and special nuclear material at the national level and to improve communication and transparency with decision makers in Congress and the Executive Branch. The Department has placed an increased emphasis on development of security risk assessment processes for non-nuclear sites to address protection of critical infrastructure, high value assets and personnel.
- **Personnel Security:** DOE continues to work with other U.S. Departments and agencies to develop, implement, and evaluate improvements and efficiencies in personnel security.
- **Security-Unmanned Aircraft Systems:** DOE initiated development of a Counter Unmanned Aircraft System (CUAS) Design Reference for use complex-wide to educate programs and sites on the regulations, threats, risk assessment methodology, and implementation process for employing a CUAS capability. DOE is also developing a searchable database of U.S. Government sponsored CUAS performance test results providing sites with opportunities to procure the best fit CUAS systems based on operational requirements, performance, collateral effects, environmental considerations, safety, and cost.
- **Security-Classification and Protection of Information and Material:** DOE is responsible for implementation of the U.S. Government-wide program to classify and declassify nuclear weapons-related matter, i.e., information and material supporting the Nation's nuclear nonproliferation programs. DOE continues to improve training, communication, and computerized tools to advance the accuracy and productivity of classification determinations. DOE supports the National Declassification Center at the National Archives in safely releasing historical government documents of other agencies no longer meeting criteria for classification, for the benefit of an informed public, and in concert with other open government initiatives. The DOE effort has prevented the inadvertent release of classified nuclear weapons-related information at the National Archives.
- **Security-Insider Threat Program (ITP):** Under the auspices of the Office of Intelligence & Counterintelligence (IN), the Department is continuing to expand and refine its physical and technical capabilities for User Activity Monitoring (UAM) on classified networks. This work is resident within the IN-managed ITP Analysis and Referral Center (ARC). The ARC is also working to expand its UAM capability to unclassified networks within IN. Additionally, the Department is working on developing Insider Threat training for all employees and is working with elements across the enterprise to establish compliance with National-level ITP minimum requirements. Finally, the Department is preparing to revise DOE

Order 470.5, *Insider Threat Program*, to reflect program changes and lessons learned.

- **Security-Human Reliability Program:** The Department's Human Reliability Program (HRP) improvement efforts continue to progress with the Networked Employee Assurance Tool (NEAT) to streamline, automate, and standardize the HRP supervisory review process being piloted at Y-12 and Pantex. The Department continuously monitors HRP personnel under 10 C.F.R. § 712.11. Finally, the Department is evaluating the need for an internal Department directive on HRP or a technical standard vice relying on 10 C.F.R. Part 712, *Human Reliability Program*.
- **Foster Enterprise-Wide Security Solutions:** The Security Committee, including the Department's Chief Security Officers, continues to provide oversight and direction in a collaborative manner on aspects of the Security Management Priorities. Continuous guidance is provided on policies, security initiatives, and the Department's implementation of the Administration's initiatives.

ENVIRONMENTAL CLEANUP

Key Challenges: For more than 30 years, EM has cleaned-up the environmental legacy of decades of nuclear weapons production and government-sponsored energy research. While EM continues to make progress, the remaining work is technically complex, with associated high risks.

Technical and programmatic risks and uncertainties are inherent in DOE's cleanup projects. The legacy of the Manhattan Project, Cold War, and other nuclear fuels programs includes thousands of remaining excess contaminated facilities within the EM Program portfolio and in other DOE programs. The duration and diversity of past nuclear weapons research and development, testing, and production create a level of uncertainty regarding the amount and composition of waste, as well as the nature and extent of environmental contamination. As a result, characterization of legacy waste sites is performed in conjunction with planning and execution of cleanup activities, such as deactivating and decommissioning facilities, removing hazardous materials, stabilizing waste streams to prevent the release of such material to the environment and remediating sites in accordance with cleanup objectives and applicable legal agreements and regulations. Available disposal pathways for waste streams and nuclear materials are essential to fulfil many cleanup requirements and effectively manage environmental liabilities. Cleanup activities can continue for decades, often requiring first-of-a-kind solutions and/or facilities. The development and deployment of new technologies can strengthen EM's ability to characterize and treat waste, manage costs, and fulfill schedules.

Statutes, laws, and regulatory agreements or court orders govern EM's site cleanup work by establishing the scope of the work and the timeline for completing the work. Initial regulatory milestones were developed based on the best information available for a site, with the understanding that further characterization would be needed. As the

scope of the potential cleanup work is better defined, EM shares updated characterization data with the U.S. Environmental Protection Agency (EPA), state regulators, and other interested parties.

Departmental Initiatives: In FY 2022, EM continued pursuing numerous initiatives that address key challenges and improve performance. The ongoing initiatives supporting EM's mission include the implementation and development of various strategies, operations, technologies, and partnerships to advance the EM cleanup mission.

- At the Hanford Site, EM's Office of River Protection implemented the Waste Treatment and Immobilization Project (WTP) Direct-Feed Low-Activity Waste strategy and commenced operation of the Tank Side Cesium Removal (TSCR) system, including:
 - Completed construction and startup of testing of all WTP facilities needed to begin vitrification of tank waste and completed building and testing of the TSCR system and started pretreating waste in FY 2022; and
 - Completed preparations to begin heat-up of the WTP Melter 1.
- At the Savannah River Site, continued treating tank waste for final disposition:
 - Continued construction of Saltstone Disposal Unit (SDU) 8 and SDU 9. Each SDU will increase Salt Waste Processing Facility (SWPF) disposal capacity by 34 million gallons;
 - Started site preparation for construction of SDU 10;
 - Continued operation of the SWPF, treating approximately 3.8 million gallons of salt solution since the start of hot operations in October 2020; and
 - Continued activities to achieve an SWPF processing rate of up to nine million gallons of tank waste per year following the implementation of Next Generation Solvent (NGS).
- At the Idaho National Laboratory, continued preparations to treat tank waste:
 - Completed the confirmatory test run of the Idaho Integrated Waste Treatment Unit (IWTU) in July 2022 with a total of 137,000 gallons of simulant processed; and
 - Completed the DOE readiness assessment and working toward startup of radiological operations.
- At the Paducah and Portsmouth Gaseous Diffusion Plants, continued processing the inventory of depleted uranium hexafluoride (DUF6) to a more stable oxide form and completed disposition of 40 percent of the R-114 refrigerant at the Paducah site.
- At EM-Los Alamos, continued the transfer of Transuranic (TRU) waste to the Waste Isolation Pilot Plant (WIPP) to reduce the waste footprint at Los Alamos and fulfill annual regulatory drivers:
 - Completed 30 shipments of TRU waste to WIPP in FY 2022.
- At Brookhaven National Laboratory, completed disposition of all post-demolition waste from the High

Flux Beam Reactor Exhaust Stack Demolition Project, resulting in the completion of EM's 92nd cleanup site.

- At the Nevada National Security Site (NNSS), the EM Nevada Program continues to support cleanup activities across the DOE complex by providing disposal capacity and services for low-level waste, mixed low-level waste, and classified waste through at least 2030.
- At Oak Ridge, continued soil remediation activities at the East Tennessee Technology Park.

DOE's ongoing efforts to improve include significant decommissioning and demolition activities:

- At the Portsmouth site, completed demolition of Building X-326, the first of three former enrichment processing buildings, and completed excavation of the X-231B landfill;
- At the West Valley Demonstration Project, continued activities and began controlled demolition of the Main Plant Process Building (MPPB);
- At the Lawrence Livermore National Laboratory (LLNL), continued partnering with the National Nuclear Security Administration (NNSA) to complete facility stabilization activities:
 - Completed removal of the Livermore Pool Reactor from within Building 280 and awarded an inter-agency agreement to demolish Building 280;
 - Completed demolition of Building 175; and
 - Commenced demolition of Building 251.
- At the Oak Ridge Reservation, EM demolished the Criticality Experiment Laboratory;
 - Retrieved 6.5 tons of mercury from deactivation efforts at the Y-12 National Security Complex (Y-12);
 - Began demolition on Bulk Shielding Reactor at Oak Ridge National Laboratory (ORNL); and
 - Actively addressing nearly 20 excess and contaminated facilities at ORNL and Y-12 to prepare for near-term demolition.
- At the Moab site, disposed of approximately 950,000 tons of uranium mill tailings; and
- At the NNSS, the EM Nevada Program continued characterization and hazard reduction activities to prepare for upcoming demolition and closure work at two large, unique, and complex legacy nuclear facilities.

Given the scope and magnitude of the cleanup work to be tackled over the coming decades, it is essential for EM to be best-in-class when it comes to project management. In recent years, EM has made significant strides in strengthening its project management capabilities.

- Across the EM complex, EM strengthened the effectiveness of program management and continues to incorporate the concept of end-state contracting in major contracts and procurements to reinvigorate the sense of urgency and the completion mindset.
- EM also continues working with its sites to update Federal life-cycle cost estimates.
- In an effort to identify opportunities to increase efficiency and performance for every dollar invested in the EM Program to achieve maximum value, EM issued the *EM Strategic Vision 2022-2032* (EM Vision) in

FY 2022, outlining the planned accomplishments over the next decade, within EM's framework of regulatory compliance commitments and best business practices, and providing site-specific goals for the next decade. The EM Vision identifies cross-cutting, complex-wide strategic initiatives for the next decade to address safety and security; program and project management; and developing and improving acquisition tools, processes, and resources to increase consistency and efficiency in competing and awarding contracts. The EM Vision also focuses on maintaining and strengthening the constructive relationships EM has with regulators across the country and continuing meaningful discussion and ongoing engagement between Federal and state decision-makers and other external stakeholders. Other areas of focus for the EM Vision include: conducting infrastructure upgrades; building the next-generation workforce; developing new and innovative approaches to performing cleanup activities so EM can safely complete work in a more efficient and more cost-effective manner; and identifying opportunities to make strategic investments to reduce life-cycle costs, while accelerating project and program schedules.

- EM partnered with the National Laboratories, industry, academia, and the U.S. Army Corps of Engineers to integrate the best scientific and engineering resources into decision-making, so the selected technologies, design, and construction approaches accelerate project completion.
- EM continued the integration of acquisition, budget, and project management processes so contract statements of work and deliverables are based on clear project requirements, front-end planning, end-state contract objectives, and risk prioritization. Modifications to the contract and project baselines are managed through strict change-control processes.

NUCLEAR WASTE DISPOSAL

Key Challenges: The amended *Nuclear Waste Policy Act of 1982* (NWPA) makes DOE responsible for the management and disposal of High-Level Waste (HLW) and Spent Nuclear Fuel (SNF) to protect public health, safety, and the environment.

The NWPA authorizes the Secretary to enter into contracts with individuals who hold title to or generate SNF or HLW of domestic origin. In return for the payment by contract holders of fees established by the NWPA into the Nuclear Waste Fund, the Government was to begin disposing of SNF and HLW starting in 1998.

- Contract holders filed breach of contract suits and the Department was found to be in partial breach of the contracts and to be liable for damages resulting from the delay.
- As of September 30, 2022, the Judgment Fund paid approximately \$10.1 billion in settlements and judgments to contract holders:
 - Contract holders will continue to provide annual claims for added costs under the settlement agreements; and

- Annual payments pursuant to those agreements will continue until the Government has fulfilled SNF and HLW acceptance obligations.
- DOE reviews the claims and provides recommendations for approval to the Department of Justice (DOJ). DOE staff continues as the lead Government witness for the remaining unsettled cases as they are tried and continues to manage the Nuclear Waste Fund balance of approximately \$46 billion.
- In *National Association of Regulatory Utility Commissioners (NARUC) v. DOE*, the U.S. Court of Appeals for the D.C. Circuit ruled the Department's 2010 fee adequacy determination was legally inadequate and ordered the Department to issue a new fee adequacy evaluation in compliance with the court's opinion, by January 18, 2013. The Department issued and provided the court with an updated fee adequacy report by the deadline.
- NARUC and the Nuclear Energy Institute moved to reopen the appeal to challenge the report.
 - On November 19, 2013, the court issued a decision finding that the Department's 2013 fee adequacy report was "arbitrary and capricious" and ordered the Secretary to provide "to Congress a proposal to change the fee to zero until such time as either the Secretary chooses to comply with the NWPA as it is written, or until Congress enacts an alternative waste management plan."
 - On December 20, 2013, the court issued a mandate directing the Department to comply with the court's decision to reduce the fee to zero.
 - On January 3, 2014, the Department provided the court-mandated proposal to Congress to adjust the 1 mill per kilowatt-hour fee to zero.

Departmental Initiatives: In the Consolidated Appropriations Act, 2021, Congress appropriated funds to the Department for nuclear waste disposal activities, including interim storage activities. The accompanying Congressional reports requested the Department move forward under existing authority to identify potential sites for Federal interim storage facilities using a consent-based siting process. Appropriations for FY 2022 maintained that funding and direction.

- In December 2021, NE issued a Request for Information (RFI) on *Using a Consent-Based Siting Process To Identify Federal Interim Storage Facilities*, and received over 200 responses that have been publicly posted at www.energy.gov/consentbasedsiting. In addition, extensive outreach has been conducted to raise awareness of DOE's consent-based siting program through digital information distribution, public webinars, virtual and in-person presentations to interested stakeholders, technical organizations, community groups, non-governmental and governmental organizations, and others.
- To support this new work, in FY 2022, DOE began actively recruiting and hiring additional personnel in Federal, national laboratory, and contractor roles, and restructured the Office of Integrated Waste Management to establish a "consent-based siting team" to lead the consent-based siting effort.

Seven new Federal staff joined the program with expertise in social sciences, nuclear engineering, health physics, security, geospatial data, and procurement.

- To foster capacity building and workforce development, the Office of Integrated Waste Management is also pursuing Presidential Management Fellows, undergraduate interns, and is encouraging National Laboratory partners to similarly promote the utilization of post-doctoral researchers, interns, and cooperative students.
- DOE's ongoing efforts to advance the consent-based siting work include: (1) Issuing a summary analysis of responses to the RFI; and (2) Issuing a funding opportunity announcement to facilitate broad engagement and information exchange with communities and interested stakeholders.
- The Office of Integrated Waste Management shared information about its consent-based siting activities and plans through public presentations at technical conferences, invited panels and roundtables, meetings with community engagement panels focused on shutdown nuclear power plant sites, webinars, legislator working groups, and other forums.
- Simultaneously, NE continued ongoing technical work to support eventual interim storage, disposal, SNF transportation, and related future waste management program operations including: development of a knowledge management information repository; commencing multiple-car testing of the Atlas 12-axle railcar, buffer railcar, and rail escort vehicle; continuing development of an integrated safety and security monitoring system for rail shipments; placing a contract for fabrication and testing of the Fortis 8-axle railcar; maintaining current detailed data on the national SNF inventory and facilitating more efficient data collection with a new web-based data portal; resumption of nuclear power plant site infrastructure evaluations to identify options for transporting SNF from each location, completing three site visits in FY 2022; development and validation of software tools to support environmental analysis; and research to support continued safe storage and eventual disposal of SNF and high-level radioactive waste.
- NE continued engagement with State and Tribal government representatives to prepare for future large-scale SNF transportation through placing new five-year cooperative agreements to facilitate information exchange and coordination among States and Tribes, including: presenting technical information through DOE's National Transportation Stakeholders Forum Annual Meeting; ongoing development of a railcar safety inspection protocol for future DOE SNF shipments by rail; resumption of a working group to consider how DOE will provide training and technical resources to States and Tribes where SNF is transported; and multiple in-person and virtual meetings with State and Tribal representatives to share updates to Federal policy and program plans.

CYBERSECURITY

Key Challenges: Today's rapidly evolving cyber threat landscape presents unprecedented opportunities and challenges. Achieving a safe, secure, and resilient cyber environment requires DOE to take a risk-based approach through cost-effective investments and activities to reduce cyber risk. Cybersecurity is an enterprise-wide responsibility and demands an expanded view to encompass the broad scope of information sharing and information safeguarding. The Office of the Chief Information Officer (OCIO) leads the Information Technology (IT) and cyber governance for DOE which provides a forum for collaboration and coordination of key cyber policies and DOE enterprise-wide activities. The Cyber Council, chaired by the Deputy Secretary, reviews and evaluates significant enterprise IT and cyber-related policy issues before final decision by the Secretary.

In June 2018, OMB released a government reform plan to address the Federal cybersecurity workforce shortage. DOE recognizes the importance of attracting, developing, and retaining a highly skilled cybersecurity workforce. The Cybersecurity Workforce Working Group was established in coordination with the Office of the Chief Human Capital Officer (HC) to develop a DOE response and strategy to the OMB workforce initiative, which includes providing a cyber workforce gap analysis, streamlining the hiring of cyber talent, and standardizing training for cybersecurity employees. DOE is leveraging existing tools, such as DHS's Cybersecurity Workforce Toolkit and National Institute of Standards and Technology's (NIST) National Initiative for Cybersecurity Education (NICE) Capability Maturity Model. DOE continues to implement workforce improvements to develop and maintain crucial skillsets in employees and attract talent to build a sustainable and diverse workforce.

In May 2021, the President of the United States released Executive Order (EO) 14028, *Improving the Nation's Cybersecurity*, to harden the Nation's digital assets and infrastructure against cyberattacks. Following the release of EO 14028, OMB issued five memorandums to provide the Federal Government with additional guidance and requirements to meet specific cybersecurity standards and objectives. In alignment with EO 14028 and the OMB memorandums, DOE recognizes the need for increased transparency between the government and private sector, increased software supply chain security, and more rigorous processes and requirements for cyber incident response, to include Zero Trust Architecture (ZTA), Cloud Adoption, Endpoint Detection and Response, and event log requirements.

Departmental Initiatives: In FY 2022, the OCIO continued pursuing numerous initiatives to improve cybersecurity risk management, including:

- The OCIO-led Executive Order Program Management Office (PMO), supported by stakeholders from across the Department, developed and submitted DOE's ZTA and Cloud Adoption Plans.
- The EO PMO led a 28-day sprint to assess DOE Headquarters' (HQ) Zero Trust maturity and delivered the HQ ZTA Implementation Plan to OMB on

March 25, 2022, after receiving 96 percent of the DOE Program Offices plans. The EO PMO, Cyber Delivery, and Enterprise Architecture teams are assessing these plans for security and ZTA best practices, areas of improvement, gaps, and opportunities.

- The EO PMO is working with stakeholders to coordinate ZTA use cases and tabletop exercises to advance ZTA across the Department. OCIO continued to mature the Vulnerability Disclosure Program (VDP) and Crowdsourced Penetration Testing program to enhance enterprise operational visibility and discover and mitigate vulnerabilities. Providing external, internal, and targeted penetration testing for the enterprise has helped identify 117 critical vulnerabilities and over 51 high vulnerabilities in FY 2022. The VDP program has completed onboarding over 98 percent of DOE web domains well ahead of the Cybersecurity and Infrastructure Security Agency (CISA) mandated September 30, 2022 completion date.
- OCIO continued to improve the integration and use of the Threat Intelligence Platform solution enabling Automated Indicator Sharing (AIS) between the Integrated Joint Cybersecurity Coordination Center (IJCC3), DHS CISA, DOE National Labs, and various governmental partners. This platform provides DOE with the ability to share indicators of compromise (IOCs) and allows Cyber Threat Intelligence (CTI) analysts to enrich and contextualize IOCs from a variety of sources. Through this platform, thousands of IOCs have been identified, millions of IOCs have been automatically published, and 81 percent of DOE Sites have connected to the interface.
- DOE completed the transition from the Electronic Capital Planning and Investment Control (eCPIC) system to the Enterprise Cybersecurity Governance System (ECGS). Additionally, DOE is working to align IG audit findings and ECGS Plan of Action and Milestones (POA&Ms) through the Risk Register Program.
- OCIO completed a software pilot test in FY 2022 with 1,000 users from the National Labs and Power Marketing Administrations (PMAs) to provide derived (cryptographic) credentials to DOE mobile devices and other DOE Federal Information Processing Standards (FIPS) certified AAL2 and AAL3 containers. These cryptographic credentials, derived from Personal Identify Verification (PIV) cards, will extend the use of Multi-Factor Authentication (MFA) across DOE devices and containers. The project is proceeding to implementation and the award for 50,000 seats was issued on June 30, 2022.
- DOE continued to support the DHS CISA-led High Value Asset (HVA) Program for assessing the cybersecurity of DOE's self-identified 18 HVAs. The HVA program ensures HVA assessments continue to take place in a thorough and timely manner and oversees and monitors HVA POA&Ms for timely remediation. Additionally, several teams of DOE assessors have taken trainings to obtain certification under the CISA Assessment & Evaluation Standardization (AES) Program that will launch in

October 2022 to assess Non-Tier-1 HVAs beginning in FY 2023.

- OCIO continued to operate and enhance the DOE OCIO Information Communications Technology (ICT) Cyber Supply Chain Risk Management (ICT – C-SCRM) program in alignment with NIST, the North American Energy Reliability Corporation (NERC), Critical Infrastructure Protection (CIP) standards, and EO 14028 Section 4. The program provides risk assessments, risk treatment, and continuous monitoring of suppliers, products, and services.
 - Since July 2019, the DOE OCIO C-SCRM program has delivered over 3,600 assessments evaluating over 2,100 suppliers for over 50 entities across DOE. Assessments use validated open-source information, impact information from the entities and responses from suppliers so executives can make informed risk-based decisions.
- The DOE C-SCRM program has continuously evolved to meet updated regulations and added capabilities as part of its ongoing and iterative enhancement program. Enhancements to the program include, but are not limited to, adding new automated prescreen assessments, including supplier resiliency information, implementing over 100 technology enhancements to the DOE C-SCRM technology tool, and updating to align with Federal guidelines.
- The OCIO's Enterprise Cybersecurity Risk Management (ECRM) program continued to complete assessments on behalf of DOE Sites and Laboratories, as well as internal OCIO risk and investment decisions. The program facilitated DOE Site and Laboratory onboarding to the risk quantification platform. In FY 2022, the ECRM Program continued to evolve DOE's Cybersecurity Risk Register Program with an updated risk scoring methodology based on the Cybersecurity Framework (CSF) and NIST Special Publication (SP) 800-30 *Risk Matrix*. This new methodology aims to provide improved visibility into DOE's overall cyber risk posture to support leadership decisions. In addition, the ECRM program facilitated Community of Practice Working Sessions and Factor Analysis of Information Risk (FAIR) Methodology Trainings to begin development of Risk Assessment Blueprints and materials.
- DOE continued leveraging DHS's Continuous Diagnostics and Mitigation (CDM) Dynamic and Evolving Federal Enterprise Network Defense (DEFEND) Task Order Request (TOR) to procure and deploy cybersecurity tools across the Department.
 - Current CDM deployment efforts are focused on completing dashboard accreditation, starting data ingestion and integration, and overseeing hardware and software procurements and deployments of Asset Management capabilities at DEs/Sites.
 - By the end of FY 2022, DOE reached Enterprise visibility of six percent for both Vulnerability and Configuration Setting Management endpoints and Hardware Asset Management endpoints.
- OCIO provided on-demand recorded training videos to key cyber roles (e.g., Authorizing Officials or AO, Information System Security Officers, and Systems Owners) focusing on DOE-related policies and procedures to safeguard information and information systems. OCIO also hosted monthly Executive Lunch & Learn sessions for the cyber workforce designed to provide guidance, assistance, and support with managing, preventing, and responding to cyber risks. Additionally, Communities of Practice on OMB MAX were updated with notifications of events, trainings, and publications for respective cyber roles.
- OCIO provided cyber awareness efforts ensuring the DOE workforce is aware of current cyber threats and respective safeguards. Posters, Messages of the Day, and online resources were delivered. The annual October Cybersecurity Awareness Month campaign was executed and included weekly themes with associated learning activities focusing on making cyber awareness an inherent function of day-to-day operations.
- OCIO collaborated with Los Alamos National Laboratory (LANL) to host and deliver the bi-annual Cyber Fire training event. The events included participation from DOE, Federal, industry, academia, and international attendees. Virtual classes were taught by DOE expert instructors and included technical cyber incident response curriculum and collaborative exercises.
- The DOE Omni Technology Alliance Internship Program provides a paid 10-week summer opportunity for talented undergraduate and graduate students in Cybersecurity, IT, and other related fields. Interns will hold appointments at designated DOE sites to receive hands-on and real-world experience addressing cyber and IT challenges and receive mentorship from top professionals at DOE. In June 2022, 66 total interns were enrolled in the program.
- OCIO has placed significant emphasis on the resiliency and protection of energy Industrial Control Systems (ICS) from cyber intrusions, as well as the broader promotion of key technologies for information management, protection, and enablement across the energy sector. The Control Systems Working Group (CSWG) is the entity leading efforts to identify and execute high priority initiatives as determined by the CSWG Steering Committee in accordance with overall Department priorities and Control Systems cybersecurity strategy. Currently, the CSWG is tracking towards completing three high-priority initiatives: (1) Operational Technology (OT) Asset Inventory Analysis; (2) NNSA OT Assurance (OTA) AO Training Program; and (3) National Renewable Energy Laboratory (NREL) Net Zero Cloud Cybersecurity Pilot Phase 1.
- OCIO has launched a pilot to establish an Ongoing Authorization (OA) program. The program evaluates industry and Federal best practices while including guidelines and procedures for how OA could be rolled out to OCIO systems. The plan to implement OA aims to integrate with existing and future Assessment & Authorization (A&A) support and meet OCIO objectives. Implementing OA at DOE will provide ongoing risk awareness, streamlined continuous

monitoring processes, strategy improvement, and effective resource allocation.

- The OCIO supported the DHS Interagency Federal Mobility Group on International Travel Guidance through development of supporting guidance and best practices. In FY 2022, the OCIO finalized and issued the DOE Foreign Travel with Government Furnished Equipment (GFE) Memorandum to provide guidance for personnel with GFE while on foreign travel.

DOE's ongoing efforts to improve include:

- OCIO's Big Data Platform (BDP) is fully integrated into the iJC3 operations environment and provides for ingestion and storage of large data sets from across the DOE Enterprise that supports creation of analytics to enhance rapid analysis of, and response to, anomalies or suspected events. In FY 2022, OCIO continued to optimize BDP to provide faster search capabilities while reducing costs and completed the accreditation of the Hardened Cloud Enclave that provides a more secure and flexible environment.
- In FY 2022, OCIO continued development planning for an automated Federal Information Security Modernization Act (FISMA) data collection capability. OCIO also presented an updated FISMA dashboard to provide better visibility of the Department's key FISMA and EO metrics.
- In FY 2022, OCIO via the iJC3 started the process of transitioning the enterprise from the CISA EINSTEIN 3 Accelerated (E3A) Domain Name Server (DNS) Sinkhole capability to the new Protective DNS (PDNS) service. This process will continue throughout FY 2023.
- OCIO continues to support Department-wide implementation of DOE Order 205.1C, *DOE Cyber Security Program* and will continue to update DOE cybersecurity policies, other directives, and reference and resources to improve information sharing and reporting.
 - Based on new cybersecurity legislation, requirements, and mandates, in FY 2022, OCIO began planning for a full re-write of its standing Cyber Security Program Order, draft DOE Order 205.1D, *DOE Cyber Security Program*.

INFRASTRUCTURE

Key Challenges: DOE is responsible for a large portfolio of world-leading scientific and production assets, and the general-purpose infrastructure needed to operate and use these assets. While DOE made investments in world-class mission facilities, much of the supporting infrastructure, including office space, general laboratory spaces, maintenance shops, and utilities contributing to the mission and forming the backbone of the laboratory and production plant sites, is beyond design life and needs attention. Based on Department-wide facility assessments and data analyses, DOE is facing a systemic challenge of degrading infrastructure and high levels of deferred maintenance. To address these challenges, DOE focuses infrastructure management priorities on halting further increases in the level of deferred maintenance and reducing levels over time, improving facility condition and

functionality, and reducing the number of excess facilities in the Department's real property inventory.

A degrading infrastructure and excess contaminated facilities pose a risk to safety, security, and programmatic objectives. DOE faces challenges with the number of excess facilities throughout the complex and the need to deactivate, decontaminate, decommission, and demolish facilities in the near term. EM is the primary office responsible for performing necessary decontamination and final Deactivation and Decommissioning (D&D) of process-contaminated facilities.

Departmental Initiatives: In FY 2022, the Department continued to make progress in addressing infrastructure challenges by:

- Taking active leadership roles in developing interagency infrastructure management initiatives via the Federal Real Property Council (FRPC).
 - As chair of the FRPC Data Quality Working Group, the DOE led an interagency effort to establish real property data quality program that applies to all Federal Agencies. The DOE also developed its own real property data quality plan in accordance with this new requirement.
 - As chair of the FRPC Metrics Working Group, DOE led an interagency effort to develop a facility condition index rating scale to provide greater insight into infrastructure condition.
- Developing and deploying a new mobile app tool to help sites conduct infrastructure condition assessments, estimate the costs to make repairs, and integrate the results into the DOE's Facilities Information Management System.
- Developing and deploying a Life Cycle Cost Estimating tool. This tool helps facility managers plan for preventive maintenance, routine maintenance and repair, and facility replacement costs over the life-cycle of a building.
- Participating in several GAO engagements to understand and improve infrastructure management including:
 - GAO Engagement 105485 - Addressing Critical Maintenance for Federal Infrastructure;
 - GAO Engagement 105673 - Energy & Water Efficiency at Federal Facilities; and
 - GAO Engagement 105105 - Post Coronavirus Disease 2019 (COVID-19) Fed Space Planning.
- Supporting Program Office infrastructure planning and evaluations efforts. Program Office plans include reduction of deferred maintenance, removal of excess facilities, and proposals for potential construction of facilities.
 - NNSA's Asset Management Program uses supply chain management economies-of-scale to provide a centralized and efficient procurement approach to replacing mission-critical deteriorating infrastructure systems common throughout the enterprise. NNSA completed development of a 10-year plan to revitalize the deteriorating security technology and infrastructure across the enterprise.

- The Office of Science via its Science Laboratories Infrastructure program has initiated utility renewal projects at many of its laboratories to ensure reliability and reduce deferred maintenance.
- EM is making significant changes to improve its infrastructure by holding Deep Dive reviews to facilitate understanding and agreement of the future direction of each site's infrastructure and how it supports the EM mission, priorities, and goals.

In addition to these new initiatives, the DOE continues to:

- Improve its infrastructure planning efforts by issuing a Departmental Real Property Capital Plan to outline DOE's processes for infrastructure budgeting, performing needs assessments, conducting alternative analysis and life cycle cost estimates, prioritizing real property projects, and establishing metrics for success.
- Manage its new Bridge and Tunnel Management program by ensuring all DOE bridges, tunnels and culverts are inspected and evaluated in accordance with the requirements identified in DOE Order 437.1, Bridge and Tunnel Management.
- Track five-year infrastructure trends via the State of Facilities Annual Report.
- Maintain a close partnership between its real property office and its budget office to improve the way the Department integrates more detailed real property information into its Budgeting Process.

HUMAN CAPITAL MANAGEMENT & DIVERSITY AND INCLUSION

Key Challenges:

Human Capital Management

DOE requires an empowered and high performing Federal workforce to accomplish the mission. Key human capital challenges include:

- Competition for highly skilled talent;
- Risk to institutional knowledge due to retirement eligibility of the workforce;
- Vulnerability due to unplanned attrition;
- Workforce and leadership development gaps; and
- Employee engagement.

The Office of the Chief Human Capital Officer (HC), working with DOE Program and functional offices, identified five strategic human capital priority areas relating to leadership, people, and Human Resources (HR):

- Strategic Human Capital Planning
- Talent Management
- HR Service Delivery
- Execute Bipartisan Infrastructure Law (BIL) Hiring
- Ensure HC Capacity

Diversity and Inclusion

On June 25, 2021, President Biden issued EO 14035, *Diversity, Equity, Inclusion, and Accessibility in the Federal Workforce*, which applies the concept of "underserved communities" to the context of the Federal workforce. In so doing, the EO greatly expands the scope of individuals identified as underrepresented in the Federal workforce

and recognizes individuals may belong to more than one underserved community and face intersecting barriers. The EO outlines a historic effort to assess the status of Federal agency diversity, equity, inclusion, and accessibility efforts, as well as a data-driven approach to the identification of barriers to equal opportunity, with the goal of strengthening the Federal Government's ability to recruit, hire, develop, promote, and retain our Nation's talent and remove barriers to equal opportunity. This historic cross-cutting effort will allow the Department an opportunity to bring together subject matter experts from DOE Program and Staff Offices, NNSA, and PMAs to assess the status of DOE's Diversity, Equity, Inclusion, and Accessibility (DEIA) efforts and to identify barriers to equal opportunity. Key challenges for the DEIA EO include:

- Assessing the status of DOE's DEIA efforts through a comprehensive survey to address DEIA in general, recruitment, hiring, promotion, retention, professional development, pay and compensation policies, reasonable accommodation, training, safe workplaces and sexual harassment, and culture;
- Conducting a comprehensive data-driven assessment of equity in DOE's employment practices and culture, which includes the identification of promising practices, potential barriers, potential root causes, potential solutions, and resource capacity in the areas of recruitment, hiring, promotion, retention, professional development, performance evaluations, pay and compensation practices, reasonable accommodation access, safe workplaces and sexual harassment, and inclusive workplace culture; and
- Implementing the DOE-wide DEIA strategic plan that aligns with the Government-Wide DEIA Strategic Plan and establishes quarterly goals for strengthening DEIA initiatives and programs across the Department.

Departmental Initiatives:

Human Capital Management

DOE aligns actions with the Administration's goal to make government lean, accountable, and efficient. HC is driving human capital innovations to recruit, develop, engage, and retain a high-quality, diverse and inclusive workforce capable of meeting DOE's mission needs through the following strategic priorities.

Strategic Human Capital Planning: HC will develop and implement a Strategic Human Capital Plan to set the direction for innovative human capital management across the Department and promote strategies HC will execute to enable and empower the DOE workforce to meet mission requirements.

- Expand access to human capital data through a dynamic dashboard enabling data informed decision making.
- Partner with the Office of Economic Impact and Diversity (ED) and agency leadership to implement the DOE DEIA Strategic Plan to provide an environment that enables and empowers employees through purposeful commitment to core DEIA principles to promote organizational performance.

- Launch a Labor Management Council to engage stakeholders representing both Labor and Management in identifying solutions to support the DOE workforce and promote mission achievement.
- Continue the management of operational staffing plans for DOE program offices ensuring staffing allocations are properly aligned to support mission priorities, integrate implementation of hybrid/remote work as part of the return to work and streamline the hiring process.
- Integrate Staffing plans into the Corporate Human Resources Information System (CHRIS). The objective is to ensure a 1:1 ratio of positions comparing staffing plans to system information.
- Continue the use of the Human Capital Framework (HCF) as the set of strategic criteria for internal audits and evaluations of human capital programs and processes, focusing on three human capital management systems: Talent Management, Performance Culture, and Strategic Planning and Alignment.
- Complete the Human Capital Management Accountability Program (HCMAP) review for the PMA Shared Service Center (PMA SSC) and commence an assessment of its Talent Management System and the Strategic Planning and Alignment System for the Office of HR Operations and Compensation (OHROC).
- Continue to closely manage executive allocations, focus on filling existing Senior Executive Service (SES) positions with onboard talent, and manage SES allocations to operate in an efficient, and accountable manner.
- Continue to provide executive performance management guidance by releasing comprehensive opening and closing guidance, as well as providing updated training sessions to reaffirm effective practices and share lessons learned.

Talent Management: Support organizational performance through the development and delivery of innovative strategies that effectively develop, engage, and retain a high-performing, diverse and inclusive workforce.

- Develop and deliver strategies to strengthen workplace culture and employee engagement through improved data analysis, promotion of best practices, and strategies targeting key engagement drivers.
- Expand awareness of and access to quality learning and workforce development opportunities through expanded outreach with the DOE workforce, Employee Resource Groups, and the Department's training community.
- Continue to develop the functionality of the DOE Learning Management System (LMS) to promote the continuous upskilling and reskilling of the DOE workforce through the release of competency-based curriculums.
- Design and deliver informational sessions for DOE Federal employees who aspire to become a member of the SES to include the SES hiring process, DOE's recruitment methods, and strategies for developing and writing strong Executive Core Qualification (ECQ) narratives.

HR Service Delivery: HC will drive investment in needed upgrades to DOE's HR IT solutions to better support the employee lifecycle and facilitate more effective and efficient HR service delivery for all DOE employees.

- Examine existing Standard Operating Procedures (SOPs) and Policies for continuous improvement opportunities to improve the effectiveness and efficiency of the hiring process and reduce DOE's time-to-hire.
 - Partnering with the Office of Environment, Health, Safety and Security (EHSS), HC streamlined and implemented a security and suitability onboarding process for new DOE headquarters employees who do not require a security clearance.
- Expand outreach and collaboration with customers to ensure HC programs and services remain customer-centric and responsive to organizational needs.
 - Launched the classification initiative in BPA's Human Resource Specialist Center (HRSC) to ensure managers understand classification guidance and principles, as well as support a collaborative process when consulting on position descriptions.
- Established the Office of Recruitment and Advisory Services (ORAS) to align human resources advisory services and corporate recruitment and outreach functions. ORAS ensures these services are constructively integrated within the broad program needs of management, while ensuring that all personnel decisions, operations, activities, and transactions are in full compliance with applicable Federal rules, laws, requirements, regulations, and standards.
- Continue to promote the use of a resume-based method to recruit for SES positions to considerably shorten the hiring timeframe. The resume-based method requires the least amount of up-front work for applicants, allowing for a larger, more diverse applicant pool.
- Further the Department's focus on targeted outreach, expanding the advertisement of employment opportunities to diverse institutions and organizations to promote workforce diversity, uphold Merit System Principles, and ensure equal access to DOE employment opportunities, including positions in the SES.
 - Represented the Department in 60 targeted recruitment and outreach efforts designed to meet the agency's immediate and emerging workforce needs.
- Expand USA Staffing capabilities with implementation of USA Hire assessments in late FY 2022 and into early FY 2023. USA Hire will not only assist DOE with meeting the requirements of EO 13932, but it should also result in higher quality candidates on selection certificates.
- Establish a new Entry on Duty (EOD) Branch within OHROC to speed the processes for bringing new employees into DOE.

Execute BIL Hiring: Launched the BIL Hiring effort to fill 750 Clean Energy Corps (CEC) jobs.

- Authorized direct hire authority based on a critical mission need to fill CEC jobs.
- Developed and launched the DOE Applicant Portal, which provides DEIA outreach to the widest of applicant pools in the U.S. The applicant portal acts as a continuously open virtual career fair for DOE. Through collection of demographics and tagging of applicants based on skills, the portal makes it possible to undergo targeted hiring campaigns. Such also allows DOE to evaluate the success of targeted outreach by evaluating the increase of diversity of applicants.
- Developed and launched an applicant tracking system (LEVER) providing resume and interview support, system management, and assistance to interviewers and hiring managers.
- Developed and implemented a streamlined BIL Hiring Incentives process for Advance in Hire, Service Credit for Leave, and a Recruitment Bonus Incentive.
- Received and reviewed over 15,000 resumes.
- Trained a cadre of over 600 DOE employees incorporating awareness of unconscious bias when interviewing and reviewing resumes.
- Issued comprehensive guidance, templates, and scripts for conducting structured interviews and reference checks.
- Created and trained an Interview Team to conduct over 2,000 Core Competency Interviews (CCI) to assess a candidate's capabilities and skills using questions designed around three researched-based attributes that highly correlate to a person's success in a role—conscientiousness, partnering, and humility/learning orientation.
- Hired approximately 100 CEC employees.

Ensure HC Capacity: HC will examine internal organizational structures and work process while focusing on workforce culture and engagement initiatives to maximize employee performance.

- Deploy targeted engagement strategies to support HC leaders in developing and fostering a diverse, inclusive, and engaged HC workforce.
- Execute HC's strategic staffing plan to ensure priorities are properly resources and supported.
- Focus on improving its work culture using technology and innovation to improve the process.

Diversity and Inclusion

As the Nation's largest employer, the Federal Government must serve as the model for excellence for DEIA. DOE is committed to advancing the Administration's whole-of-government integration of DEIA through Department-wide DEIA strategic goals. During FY 2022, ED led the development of action plans on behalf of DOE for the following EOs: EO 14035 (DEIA), EO 13985 (equity), EO 14020 (gender equity), and EO 14031 (Asian Americans, Native Hawaiians, and Pacific Islanders, or AA and NHPI). ED launched the Department's cross-agency EO Teams, comprised of diverse senior leaders and employees, to identify and develop DOE goals in alignment with Government-wide priorities. ED is also taking the

lead in coordinating participation in interagency working groups that include DEIA, Minority Serving Institutions (MSIs), Equity, and Energy Justice.

In FY 2022, the Department continued to make progress in addressing DEIA efforts:

- **Building Capacity:** A key goal in FY 2021 was to strategically hire staff to advance DEIA initiatives, including the conduct of barrier analyses of DOE demographic data. During FY 2022, ED re-established a standalone Division for the Office of Diversity, Equity, Inclusion, and Accessibility (ODEIA). ODEIA currently has four FTEs (Deputy Director, Program Manager, Education Specialist, and DEIA Specialist). In April 2022, ED hired its second social scientist to elevate its capacity to collect and analyze DOE demographic data for purposes of barrier analysis related to Equal Employment Opportunity Commission's (EEOC) annual Management Directive 715 (MD-715) Report.
- **Clean Energy Corps (CEC):** Due to the unprecedented investment of \$62 billion from the *Bipartisan Infrastructure Law* and \$35 billion from the *Inflation Reduction Act in FY 2022*, DOE is experiencing a talent surge, with hundreds of new jobs becoming available to deploy next generation clean energy technology. ED and HC are supporting this effort by training 400+ DOE interviewers and resume reviewers on a DEIA-informed selection process and bias mitigation and requiring all relevant hiring offices to establish a diverse outreach strategy. ED also partnered with HC and the Office of the Under Secretary for Infrastructure (S-3) to create demographic data briefers for CEC hiring managers, in preparation for identifying outreach activities and casting a wide net of diverse applicants.
- **EO 14035 (DEIA):** Between August 2021 and March 2022, DOE's DEIA EO Team completed the following deliverables from the Domestic Policy Council, Office of Personnel Management (OPM), and EEOC: a survey to evaluate the use of DEIA promising practices at DOE; a self-assessment report on the current status of DEIA within DOE's talent processes; and DOE's first DEIA strategic plan. The strategic plan was developed as a result of integrating a crosswalk between: internal DOE analyses of promising practices and employee data; feedback from OPM on DOE's DEIA self-assessment; and aligning with the 11 priorities outlined in the Government-wide Strategic Plan to Advance DEIA in the Federal Workforce (released in November 2021). The plan was released in September 2022 (to the public and DOE staff) and highlighted at DOE's DEIA Town Hall with the Energy Secretary on September 12, 2022. The Town Hall is part of DOE's "Justice Week" program, highlighting EOs 13985 (equity) and 14008 (energy justice), and will include content for both internal and external audiences.
- **EO 13985 (Equity):** DOE released its Equity Action Plan in April 2022, designed to ensure that DOE eliminates barriers to access, transforms programs and policies to open even broader pathways for underrepresented groups to access DOE resources,

and stands up new programs to better serve communities. In furtherance of the new Equity Action Plan, DOE unveiled a commitment of up to \$102 million in funding and support for Historically Black Colleges and Universities (HBCUs) and other MSIs as foundations for world-class Science, Technology, Engineering, and Math (STEM) talent. DOE also released its framework for President Biden's Justice40 Initiative (Justice40), which establishes the goal that 40 percent of the overall benefits of Federal investments in climate and clean energy flow to frontline, underserved, and overburdened communities ("disadvantaged communities").

- **EO 14020 (Gender Equity):** The National Strategy on Gender Equity and Equality was released in October 2021, outlining 10 priorities for Federal Agencies. The DOE Gender Equity Team developed and submitted a draft action plan to the Gender Policy Council in April 2021. The plan included goals to improve gender equity related to DOE's talent processes, grants and funding opportunity awards, boosting participation in clean energy careers and job creation, responding to the climate crisis with a gender equity lens, and including the non-binary community within the larger framework of gender equity.
- **EO 14031 (White House Initiative on AA and NHPI Communities):** WHIAANHPI determined 14 policy priorities to advance equity, justice, and opportunities for Asian American (AA) and Native Hawaiian and Pacific Islander (NHPI) communities. DOE's goals are related to advancing economic opportunity, improving language access, supporting career advancement, engaging with stakeholders, and addressing barriers related to DOE programs and financial assistance.
- **Employee Resource Groups (ERGs):** DOE started to support the continuing maturity of ERGs as strategic partners to the DOE. DOE highlighted a networking session during Justice Week where DOE employees learned more about the ERGs and met the ERG leaders.
- In Spring 2022, ED conducted a comprehensive DOE workforce analysis that includes DOE employee profiles based on pay grade, gender, disability status, race/ethnicity, and other attributes and backgrounds in relation to completion of the FY 2021 EEOC MD-715 Report. The Report also includes applicant flow data analyses, the identification of potential barriers, and plans for addressing potential barriers.

DOE's ongoing efforts to improve include:

- **Building Capacity:** ODEIA continued to grow in FY 2022, including additional vacancies for DEIA Specialists (strategy, education, and engagement).
- **Clean Energy Corps:** ED and HC will support CEC hiring managers in developing outreach plans, utilizing underrepresentation data for CEC positions.
- **EO 14035 (DEIA):** DOE identified goals related to growing diverse representation, advancing equitable opportunities, strengthening inclusive environments, removing barriers to access, and building a sustainable structure for ongoing and continuous DEIA support. DOE kicked off its DEIA Senior Leadership Council of senior-level leaders in September 2022.

- **DEIA Learning and Organizational Development (L&OD):** As part of DOE's DEIA Strategy, ED will launch required supervisor trainings for mitigating implicit bias and discuss policies for DEIA accountability in performance goals for SES and GS-level supervisors.
- **EO 13985 (Equity):** With the release of its Equity Action Plan, DOE will focus on five priority actions related to data collection, increasing entrants for DOE funding opportunities, increasing participation in financial assistance programs, expanding Tribal and stakeholder engagement, and improving access and equity in DOE's Weatherization Assistance Program.
- **EO 14020 (Gender Equity):** DOE's final plan was submitted in July 2022 and will be released once approved by the Gender Policy Council.
- **EO 14031 (White House Initiative on AA and NHPI Communities):** DOE's final plan will be announced once approved by the WHIAANHPI leads.
- **EO 14045 (White House Hispanic Initiative) and EO 14050 (White House Black Initiative):** Two DOE EO teams were recently formed, with action plans required for both initiatives. Priorities will be focused on advancing equity and economic opportunities.
- **Employee Resource Groups:** ED will continue to support the maturity of ERGs through the development of an ERG policy in FY 2022, with guidance from DOE General Counsel.
- Similar to FY 2021, ED developed presentations in FY 2022 on the participation of various demographic groups in the DOE workforce. ED will continue to provide presentations to respective Employee Resource Groups for visibility and collaborating on actions to understand and address gaps, barriers, root causes, and potential solutions.

CLIMATE CHANGE

Key Challenges: The United States and the world face a profound climate crisis. The Fourth National Climate Assessment reports the Nation will increasingly experience more frequent, intense, and longer duration extreme weather events across all regions of the country, including extreme temperature and precipitation events, stronger hurricanes and storm surge, and droughts and wildfires.

- The National Oceanic and Atmospheric Administration (NOAA) reports damage costs to the Nation are already significant. The year 2020 set a historic record, with 22 separate events each costing over a billion dollars in damages, and a cumulative cost exceeding \$95 billion dollars.
- The impact of climate change on DOE and its operations and infrastructure is also significant and projected to increase with a changing climate.

EO 14008 *Tackling the Climate Crisis at Home and Abroad*, and related executive orders, establish requirements for Federal agencies to pursue action at home and abroad in order to avoid the most catastrophic impacts of this climate crisis and to seize the opportunity tackling climate change presents. Ambitious performance goals include putting the United States on a path to achieve net-zero emissions, economy-wide, by no later than 2050, a Carbon

Pollution-Free Electricity (CFE) sector by 2035, clean and zero-emission vehicles fleets, and zero-emission buildings.

Departmental Initiatives: In response to the climate crisis, and recent Administration climate requirements such as those contained in EO 14008, DOE developed and released the [2021 Climate Adaptation and Resilience Plan](#) and is developing a Sustainability Plan that will provide a framework for Departmental initiatives to address the climate crisis. The plans focus on the following Departmental initiatives, which include a continuation of ongoing activities, new initiatives supporting adaptation to current and projected impacts of climate change, and initiatives addressing climate mitigation and reducing energy demand and Greenhouse Gas (GHG) emissions. These Departmental initiatives include:

- **Assess vulnerabilities and implement resilience solutions at DOE sites:** Taking a proactive approach to climate change adaptation and resilience, DOE will reevaluate its vulnerability assessment processes, conduct and update site-level assessments, as well as develop and implement resilience plans. In this effort, each DOE site will identify its vulnerabilities by utilizing the latest climate science data and consulting stakeholders, and as needed develop resilience solutions that will roll up to the Departmental level to inform resource allocation and decision-making. This process will not only create a more climate resilient and adaptive Department but will enhance the resilience of neighboring communities.

DOE has made progress in these areas, including developing and releasing a Climate Adaptation and Resilience Plan, and developing a Sustainability Plan, and budget guidance for identifying priority climate investments. Greater effort and focus are needed for DOE to:

- Identify program and site vulnerabilities to climate change. DOE completed screenings and assessments at 51 percent of sites over the last several years. Beginning in FY 2021, all sites and offices will be required to conduct or update assessments and develop resilience plans at respective sites and offices within one year of issuance of the Climate Adaptation and Resilience Plan. These assessments and plans will be revised on at least a four-year cycle to include updated information, such as data from the latest National Climate Assessment (NCA).
- Develop and implement resilience plans. Across the DOE complex, resilience investments have been made to reduce vulnerabilities to a range of climate threats. All sites and offices will develop resilience plans to identify site level resilience solutions, and the potential costs and benefits of resilience investments.
- Enhance climate literacy within the DOE workforce. DOE recognizes a climate-ready organization requires a workforce that can safely and successfully adapt to climate change related challenges, identify and take advantage of new opportunities, and foster a culture of innovation. DOE is developing a resilient workforce with knowledge of climate impacts on-site operations, DOE communities, and worker health and safety. DOE is increasing employee's awareness of climate

vulnerabilities as well as tools, technology, and guidance available to address those risks. DOE plans to create a Climate Change Training and Resource Hub for access to climate change resources, which will include tools, technical resources, climate science information, and on-demand climate awareness training.

- Support Federal/DOE sustainable acquisition and procurement that reduces GHG emissions, promotes environmental stewardship, and supports resilient supply chains. DOE will build upon existing approaches and evaluate purchases to give preference to vendors, products, and services that enable DOE to be climate ready.
- Support supply chain development, including advanced materials, and critical materials.

In FY 2022, DOE continued to make progress:

- DOE issued guidance for sites to develop Vulnerability Assessments and Resilience Plans (VARPs), including a new Risk Assessment Tool for sites to use during the VARP process. This tool helps sites identify current hazards and assess future impacts of climate change. Along with ongoing technical assistance, these resources and trainings are being used to develop site VARPs and inform site level resilience solutions and planning.
- DOE collaborated with NOAA to provide online training, with hundreds of DOE Headquarters and field personnel trained since December 2021, to understand regional climate data and projections, and increase awareness of climate tools (e.g., Climate Explorer, Climate Resilience Toolkit).
- DOE submitted a report to the White House per EO 14017, that identifies supply chain risks for high-capacity batteries (e.g., electric vehicle batteries) and provides policy recommendations to address these risks.
- DOE program offices and sites completed VARPs on September 30, 2022.

DOE's ongoing efforts to improve include:

- DOE is developing a climate training program and a climate resource hub for DOE employees. DOE will leverage existing climate training from other agencies to create a "Climate 101" course for DOE employees, as well additional tailored annual climate training for job classifications that require them.
- **Enhance Climate Mitigation Actions:** The Administration's climate goals include net-zero greenhouse gas emissions by 2050, with GHG emissions from the power sector attaining the net-zero goal by 2035. Renewable energy, fossil energy with carbon capture and storage, nuclear energy, energy storage, and transmission and distribution technologies must all work together seamlessly to provide secure, reliable, resilient, affordable CFE. Fossil fuel use in the buildings, industry, and transportation sectors must be transitioned to electric power wherever possible. End-uses of electricity must also be made supportive of the grid, such as by enabling flexible, integrated support of the grid

through mechanisms such as vehicle to grid systems. DOE will support this by improving the cost and performance of electric end-use technologies for building space and water heating, electric vehicles, and industrial processes and integrating them with the grid with dynamic controls. DOE will continue to develop solar and geothermal sourced energy for heating building space and water. DOE will also pursue the transportation sector that is now the largest emitter of GHGs in the U.S. Technologies that address GHG emissions from transportation include electric vehicles, more efficient engines and vehicles, hydrogen transportation systems, and biofuels.

DOE has made progress in these areas, but much greater efforts are needed with a focus on:

- Advance CFE generation and use at DOE sites;
- Advance the demonstration of innovative CFE technologies at DOE sites;
- Lower the cost of carbon management technologies;
- Improve grid storage technologies, including long duration energy storage;
- Develop and deploy grid-interactive building technologies and systems;
- Transition to procurement of zero-emission vehicles at DOE facilities and sites;
- Increase the number of charging stations across the DOE complex;
- Strengthen grid security, reliability, resilience, and system integration;
- Transition to net-zero buildings beginning with DOE site pilot programs;
- Improve building energy efficiency, electrification, and grid integration; and
- Strengthen building, equipment and appliance efficiency standards and adoption at DOE sites.

In FY 2022, DOE continued to make progress:

- DOE published a 100-day review of the large-capacity-battery supply chain in 2021, which assessed and recommended establishing a resilient, secure, and economical domestic production and processing capabilities for large-capacity-battery. In FY 2022, the Department continues to revitalize and rebuild domestic manufacturing capacity and research and development applications that will lend to a circular economy and create a resilient, secure, and sustainable supply chain.
- DOE provided \$12 million to 13 Native American and Alaska Native communities in 2021 for projects that will reduce energy costs and increase energy security and resilience, which included additional cost share reductions for the first time. In FY 2022, the Department continues to explore opportunities to collaborate with Tribes to deploy CFE on DOE lands and/or adjacent Tribal lands.
- In February 2022, DOE published a comprehensive plan for building a secure and resilient energy sector. "America's Strategy to Secure the Supply Chain for a Robust Clean Energy Transition" lays out the challenges and

opportunities faced by the U.S. energy supply chain, immediate and strategic actions, congressional recommendations, and a deep dive of a few specific technologies.

- In February 2022, DOE launched the Sustainable Climate-Ready Sites (SCRS) program Pilot. The SCRS recognizes and rewards site achievements in 15 categories. These include natural and cultural resource stewardship, sustainability, climate resilience, and environmental justice. SCRS responds to DOE's commitments in the DOE Climate Adaptation and Resilience Plan to weave land use planning and ecosystem health into DOE's approach to climate change resilience and mitigation. SCRS will enable DOE to highlight innovations in climate resilience planning and assess how these activities are integrated with the broader environmental and sustainability efforts at each site. In 2022, the Pilot is collecting data on current site practices. The longer-term goal is to identify opportunities for improvement and recognize progress.
- DOE funded replacement of natural gas fired boiler at one of its sites with an electricity powered boiler. The new system will be approximately 99 percent efficient.
- In July 2022, Secretary Granholm issued a CFE Roadmap that articulates DOE's strategy to meet the EO 14057 CFE dual goals of 100 percent net-annual CFE by 2030 and 50 percent 24/7 CFE. It will do this by establishing ambitious annual performance targets and objectives, developing aggressive program-specific implementation plans, and identifying short and long-term actions to demonstrate continuous progress.
- DOE program offices developed program specific CFE implementation plans in September 2022. To support the planning effort, the Office of Management is conducting a series of CFE webinar to provide guidance and address questions and issues.

DOE's ongoing efforts to improve include:

- DOE is positioning itself to meet aggressive goals in EO 14057 for a net-zero portfolio of facilities, infrastructure, and sites by 2045 and a 50 percent reduction in GHG emissions from 2008 levels from its sites by 2032. Net-zero efforts require DOE to integrate several simultaneous efforts - improving the condition of real property portfolios to meet mission needs, operating in an environmentally and socially sustainable manner, improving conditions for disadvantaged communities, becoming energy and water secure, mitigating climate risks to mission essential facilities, and reducing GHG emissions to avoid further climate threats. DOE is integrating expanded requirements that focus specifically on GHG emissions from its buildings and campuses into its annual site sustainability planning process. Expanded guidance for DOE's 2023 site sustainability plans was issued in September 2022.

- DOE is assessing the potential to deploy Small Modular Reactors (SMR) and microreactors to decarbonize DOE's electricity supply and partner with private industry to deploy these technologies at remote locations.
- DOE is increasing on-site renewable energy projects. For example, one DOE site is in discussions with its utility provider to determine the feasibility of installing a 10 megawatts solar field to mitigate GHG emissions, reduce operating costs, and increase resilience.
- DOE is collaborating with industry to decarbonize buildings through a Better Buildings Low Carbon Pilot. This pilot sets commitments and shares pathways to low- and no-carbon emission buildings. Over the next two years, DOE is working with interested partners to demonstrate real world pathways to achieve low carbon emissions from building and manufacturing operations and share these solutions with the market. Partners are working with DOE to demonstrate what is possible, remaining challenges, and successful solutions.
- DOE is in the process of electrifying its fleet. For example, in the Spring of 2022, DOE ordered more than 250 electric vehicles to replace older gas fueled light-duty vehicles. Over the next year, DOE will more than double the number of zero-emission vehicles and install a network of electric charging stations across DOE sites. One DOE site, NREL is on track to be the first Federal site to achieve a 100 percent zero-emission motor vehicle fleet within the next two years. Another DOE site, WIPP is working to convert all of its industrial and underground vehicles to electric-only.
- DOE conducted the third Congressionally mandated nationwide assessment on the observed and projected impacts of climate change on water supplies for hydroelectric power. This assessment informed operational system changes and addressed vulnerability and risk from drought, decreased snowpack, elevated river temperatures, and flooding.
- NNSA is establishing an Energy Resilient Infrastructure and Climate Adaptation (ERICA) initiative to improve mission delivery resiliency. The initiative will be a critical element of NNSA's multi-faceted strategy to identify, prioritize, and implement infrastructure investments that increase energy resilience, energy security, and sustainability in support of the agency's national security missions. ERICA will start in FY 2023 and include various types of projects including renewable energy generation, battery storage, and other power and water system upgrades.
- DOE and the National Laboratories are serving in a lead role in support of the U.S. Global Change Research Program's development of the congressionally mandated Fifth NCA. The NCA represents an assessment of the science of climate change and variability and its impacts across the

United States, including the energy system, now and throughout this century.

- ***Institutionalize Climate Considerations Across DOE Policies, Directives, and Processes:*** To ensure the Department operates in a consistent and efficient manner, DOE orders, directives, and policies must be examined and updated to institutionalize climate mitigation and adaptation/resilience actions across the complex while also addressing potential energy, environment, and environmental justice impacts. DOE commits to integrate climate information that reflects the current understanding of global climate change into its mission, programs, and management functions and decision points for managing its procurement, real property, public lands and waters, and financial programs including where appropriate, identifying opportunities to realign resources and needs for new resources.

DOE has made progress in these areas, but much greater efforts are needed to:

- Use DOE procurement mechanisms to purchase products and services that are resilient and have a low carbon footprint;
- Map out entry points of climate information into management functions and responsibilities that effect funding or contracts;
- Identify opportunities to incorporate climate criteria in grant and loan program solicitations; and
- Establish formal standards and processes to ensure policies and directives are implemented in a comprehensive and consistent way that integrates climate adaptation and resilience into Departmental guidance for standard operating procedures, including clear direction to DOE operating contractors.

In FY 2022, DOE continued to make progress:

- In March 2022, the Department announced new building energy code requirements for all new buildings and major retrofits constructed by the Federal government effective April 2023. The new requirements include compliance with the 2021 International Energy Conservation Code (IECC) and the 2019 American Society of Heating, Refrigerating, and Air Conditioning Engineers Standard 90.1 building energy codes. DOE estimates that this measure will save the Federal government \$4.2 million dollars in operating costs within the first year of implementation.
- In April 2022, DOE issued a policy memorandum which sets requirements for Departmental elements to meet the latest American Society of Heating, Refrigerating and Air-Conditioning Engineers' (ASHRAE) Energy Standard in new building design, to design new buildings as net-zero emissions buildings, to consider local climate risks in building design, and more. DOE plans to incorporate these requirements into the next revision of Order 413.3B, Program and Project Management for the Acquisition of Capital Assets.

- The Department completed the Energy Science Center laboratory/office/conference building. The 140,000 square foot building meets high-performance sustainable building standards and features an energy- and water-reducing design that takes advantage of ample natural light and uses waste-heat energy generated by high-performance computers housed in an adjacent building.
- Within NNSA, the October 25, 2021, *Department of Energy Climate Adaptation and Resilience Plan and Vulnerability Assessment and Resilience Planning Implementation* memo advances the integration of climate adaptation and mitigation into NNSA policies, programs, operations, decision making, and established the NNSA Climate Adaptation and Resilience Working Group.

DOE's ongoing efforts to improve include:

- DOE is updating DOE Order 436.1, *Departmental Sustainability*. The updated Order will institutionalize sustainability and climate resilience planning at DOE, as well as integrate new sustainability requirements.
- **Provide Climate Tools, Technical Support, and Climate Science Information:** DOE recognizes a climate-ready organization requires a workforce that can safely and successfully adapt to climate change related challenges, identify, and take advantage of new opportunities, and foster a culture of innovation. Employees should be aware of climate tools, technology, and guidance available to address those risks. This will help employees develop the skills and climate knowledge necessary to manage and protect the Department's physical assets, operations, and its workforce in a changing climate.

DOE has made progress in these areas, but much greater efforts are needed to:

- Train DOE employee on climate mitigation, adaptation, and resilience;
- Develop and deploy climate resilience tools, methods, and information;
- Enhance building codes for resilience;
- Provide downscaled climate science projections for local decision-making; and
- Provide adaptation and resilience support for DOE and Environmental Justice Communities.

In FY 2022, DOE continued to make progress:

- DOE worked with a cohort of six sites to provide support for its Technical Resilience Navigator (TRN), which helps sites identify critical energy and water systems and prioritize solutions that reduce risks. Workshop sessions were held from September 2021 through May 2022 to provide instruction on the use of the TRN tool, enhance understanding of vulnerabilities in their energy and water systems, develop solutions to reduce risk, and integrate this knowledge throughout planning and continuity processes.

- The Department launched the Center for Climate Resilience and Decision Science. This Center will serve as a focal point for DOE, other Federal agencies, industry, and communities in accessing the data, information, and tools necessary to pursue effective climate resilience planning. This will include a climate data portal, currently under development, that will provide communities, industry, and other stakeholders with broad access to local-scale projections of future climate impacts, which they can use to inform vulnerability assessments and the development of resilience plans. The Center's strong emphasis on incorporating community end-user feedback into the design of future models and climate impact datasets will ensure the strongest connection between laboratory science and its real-world use and application.
- DOE National Laboratories have created many tools to advance climate planning. For example, DOE's Energy Exascale Earth System Model (E3SM) links Earth system and energy models into simulation projects to investigate energy-relevant science using code optimized for DOE's advanced computers.
- As a part of the Department's celebration of Earth Day, DOE sponsored a range of activities to bring greater awareness and support for responsible climate and sustainability action. These activities included: a release of a video by DOE's Chief Sustainability Officer detailing the actions the Department is taking to combat the climate crisis; the release of materials to promote climate action by the DOE workforce; an infographic and blog post to explain DOE's Climate Adaptation and Resilience Plan; a bingo game with resources for families to take climate action at home; and a guidebook to help people live more sustainably. This guidebook includes resources and activities to lower individual's carbon footprints and encourages employees to incorporate sustainable climate friendly habits at home, in their commute, while making purchases, and in other everyday activities.
- DOE launched the Communities LEAP (Local Energy Action Program) Pilot to help environmental justice communities and communities with ties to fossil fuel industries access the economic and environmental benefits of clean energy and clean energy manufacturing. The program will provide services up to a total of \$16 million to help develop community-driven plans to more effectively leverage public and private sector resources to reduce local air pollution, increase energy resilience, lower utility costs and energy burdens, and create good-paying jobs.

DOE's ongoing efforts to improve include:

- As part of the Bipartisan Infrastructure Law implementation, DOE is engaging in meaningful, ongoing listening sessions with communities with environmental justice concerns. DOE is also working to incorporate environmental justice language into DOE requests for information and funding opportunity announcements.
- DOE is participating on the Climate Smart Infrastructure (CSI) Interagency Working Group (IWG) Subcommittee on Climate Science, Data, and Information, led by the Office of Science and Technology Policy (OSTP) and NOAA. The Subcommittee is established to provide more advanced, accessible climate-related risk information and data by informing/shaping a READI (Resilience and Adaptation Information) Geographic Information System (GIS) based Portal that can support infrastructure climate reviews for agencies and grantees.

- **Advance Deployment of Emerging Climate Technologies:** To address the climate crisis, 100 percent clean energy technologies must be deployed at large scale, meeting all energy supply and end-uses by 2050. This requires an increase in domestic production and deployment of sustainable and resilient clean energy supply and end-use technologies. Approaches are needed that will accelerate the deployment of technologies. In addition, approaches are required to develop a more resilient, sustainable, secure, and diverse supply chain, such as implementing approaches to encompass greater domestic production as well as identifying and diversifying supply chain sources, while simultaneously supporting small businesses, and encouraging economic growth in neighboring environmental justice communities.

DOE has made progress in these areas, but much greater efforts are needed to:

- Develop and deploy innovative climate technologies, materials, manufacturing processes, and advanced technologies at DOE sites;
- Support purchasing preference for Made in America Climate-Ready Products and Services;
- Advance manufacturing process technology development;
- Foster technology transfer to U.S. companies;
- Advance Manufacturing Consortia and strengthen Technical Partnerships; and
- Provide technical assistance to state and local government/communities.

In FY 2022, DOE continued to make progress:

- In May 2022, Secretary Granholm announced \$38 million to begin decarbonizing four of DOE's 17 National Laboratories in support of President Biden's goal to reach net-zero greenhouse gas emissions no later than 2050. The Net Zero Labs (NZL) Pilot Initiative will lay the foundation for one of the first-ever models for addressing hard-to-decarbonize industries and is expected to be a

foundation of net-zero solutions that can be replicated at facilities across DOE, the Federal Government, and state and local governments.

- DOE is supporting several nuclear demonstration test bed projects. In March 2022, DOE completed the conceptual design of two National Reactor Innovation Center test beds to enable the testing and development of advanced reactor concepts.

DOE's ongoing efforts to improve include:

- DOE is creating an entrepreneurial pipeline to accelerate the development of emerging climate change technologies within energy and environmental justice communities by providing educational opportunities such as internships. Over 800 students from MSIs have started applications to participate in DOE's 2022 Minority Educational Institutions Student Partnership Program (MEISPP) as of April 2022. Over 1,200 Minority/Small Businesses, MSIs, students, and others have attended ED's Minority Programs outreach events since January 2022.
- DOE is partnering with the Council on Environmental Quality, General Services Administration (GSA), DoD, Department of State (DOS), and two National Laboratories to pilot an aggregated federal procurement initiative for CFE to demonstrate new and novel approaches to U.S. Government (USG) CFE procurement. The pilots will help illustrate how the USG can overcome existing technological, organizational, and market barriers to USG CFE procurement and meet the dual USG goals of 100 percent annual CFE procurement and 50 percent hourly CFE match by 2030.

ENERGY JUSTICE

Key Challenges: On January 27, 2021, President Biden issued EO 14008, *Tackling the Climate Crisis at Home and Abroad*, which established the historic Justice40, a whole of government effort establishing the goal that 40 percent of the overall benefits of climate and clean energy investments flow to disadvantaged communities. The ambitious and historic initiative allows the Department to deepen its current environmental justice efforts and provide an unprecedented opportunity to expand its equity footprint through diverse programs. Key challenges for Justice40 relate to its scope. For DOE, those challenges include:

- Identification of investments that fall within Justice40;
- Identification of potential communities considered to be disadvantaged communities pursuant to the EO;
- Measurement of investment benefits with respect to specific DOE programs, pursuant to the EO;
- Determination of percentage of benefits of covered programs that accrue in disadvantaged communities, versus the benefits of all covered programs; and
- Full implementation of the initiative across all DOE programs, including research and development programs.

Departmental Initiatives: In FY 2022, ED continues to lead the implementation of Justice40 on behalf of the Department. On July 20, 2021, the OMB, National Climate Advisor, and the Council on Environmental Quality provided interim guidance on the implementation of Justice40 (Interim Guidance). The Interim Guidance provides a broad framework for identifying disadvantaged communities and sets a timeline for agencies to develop a methodology for measuring the benefits of Justice40 investments.

To assist agencies in implementing Justice40, the Interim Guidance listed 21 Justice40 pilot covered programs, which included five DOE programs:

- Weatherization Assistance Program;
- Solar Energy Technologies Office (National Community Solar Partnership);
- Vehicles Technologies Office (Clean Cities);
- EM, Los Alamos; and
- Advanced Manufacturing Office (Industrial Assessment Centers).

On December 17, 2021, DOE delivered to OMB a methodology for calculating benefits accruing to disadvantaged communities for 75 Justice40 covered programs. This methodology included a description of the 165 metrics that the Department developed to measure covered program benefits. In FY 2022, DOE continued to synthesize benefits metrics and report on the distribution of funding to disadvantaged communities on the Department's [Energy Justice Dashboard \(BETA\)](#).

In FY 2022, ED led the Justice40 Community of Practice, continued to meet monthly to address challenges and opportunities associated with Justice40. The Community of Practice involves approximately 50 participants who represent all DOE program offices and several support offices. The Community of Practice continues to reflect the Department's commitment to the execution of Justice40 and its full capacity to address the challenges the initiative presents.

DOE has a history of supporting disadvantaged communities. Efforts include the statutory Office of Minority Economic Impact (OMEI) programs supporting minority communities, minority businesses, and minority serving institutions. DOE also maintains the Office of Small and Disadvantaged Business Utilization, the Office of Indian Energy Policy and Programs, and the Office of Legacy Management. EM and the Office of Energy Efficiency and Renewable Energy (EERE) make major investments in both community efforts and research and development to address long-term challenges. DOE staff and program offices directly or indirectly support covered programs in areas falling within Justice40, including:

- Climate change;
- Clean energy and energy efficiency;
- Clean transportation;
- Affordable and sustainable housing;
- Training and workforce development (related to climate, natural disasters, environment, clean energy, clean transportation, housing, water and wastewater infrastructure, and legacy pollution reduction, including in energy communities);

- Remediation and reduction of legacy pollution; and
- Clean water and waste infrastructure.

Justice40 FY 2022 Program Highlights included:

- ED's annual program for summer interns throughout DOE. The MEISPP offers talented graduate and undergraduate students summer internships across DOE and the National Laboratories. Student opportunities include a 10-week opportunity to gain life experiences related to engineering, science, policy, business, government, and law. Students work side-by-side with scientists, engineers, and other professionals to develop professional skills and enhance leadership capabilities.
- EERE continued support of the development of clean energy technologies, including quantum computing, to help solve advanced challenges.
- EERE's continued work on the development of clean energy technologies related to innovative vehicle power train operation for natural gas-fueled hybrid electric buses in stop-and-go situations.
- EERE's ongoing work on the development of a light duty vehicle with 20 percent fuel consumption reduction based on vehicle dynamic control technologies and automation.
- EERE's pursuit in support of energy efficient building technologies retrofits, as well as advanced technologies for new building construction.

Selected Justice40 FY 2022 programs and initiatives include:

- The [Communities LEAP Pilot](#) opens up \$16 million for community-driven clean energy transition technical assistance to low-income, energy-burdened communities that are also experiencing either direct environmental justice impacts, or direct economic impacts from a shift away from historical reliance on fossil fuels.
- [Inclusive Energy Innovation Prize](#) provides \$2.5 million to fund up to 10 organizations to pursue ongoing and/or proposed activities related to climate and clean energy that support, build trust, and strengthen relationships and partnerships with disadvantaged communities.
- [Energy Storage for Social Equity Initiative](#) (ES4SE) is a \$9 million effort to help up to 15 underserved and frontline communities leverage energy storage as a means of increasing resilience and maximizing energy flexibility.
- The Office of Science is targeting increased investments in Science, Technology, Engineering, and Math (STEM) research and workforce development at HBCUs.
- EM will expand funding for partnerships with Minority Serving Institutions by over nine-fold to include \$43 million to support apprenticeships for HBCU students and development programs for HBCU faculty at six of our National Labs. This effort replicates the existing, successful model of the HBCU program at Savannah River National Lab, which has established workforce contracts in environmental cleanup with South Carolina State University and Denmark Technical College.

- The Wind Energy Technology Office increased diversity for the 2023 Collegiate Wind Competition (CWC) where participants develop preliminary designs for a prototype wind turbine and a hypothetical wind farm. Thirty colleges and universities were selected to participate including two community colleges, 12 minority-serving institutions, eight Hispanic-Serving Institutions, and six Asian American and Native American Pacific Islander-Serving Institutions.

On February 15, 2022, DOE launched the Equity, Energy and Environmental Justice (EEEJ) group with representatives from a dozen program offices. The group continues to meet bimonthly to continue engagement and support EEEJ work across the Department in the following areas:

- Embedding Justice40/equity into project evaluation (e.g., accountability framework);
- Hiring approaches for stakeholder engagement, program design, and policy development;
- Leveraging work within DOE and at the interagency level to facilitate deeper community transformation;
- Continued focus on sharing best practices and problem solving; and
- Standard Operating Procedures (SOPs) on Justice40/equity to support programs.

In FY 2022, ED developed several products to facilitate sharing Justice40-related information for both internal and external stakeholders. These include:

- Launching a brand-new Department of Energy Justice40 webpage to provide information for both internal and external stakeholders. The website can be accessed at www.energy.gov/justice40;
- Developing a new [Disadvantaged Communities Reporter and Mapping Tool](#) to help internal and external stakeholders visualize the location of disadvantaged communities to be targeted for Justice40 covered investments and related benefits;
- Developing a Comprehensive Justice40 Technical Guidance document to assist program managers with integrating the principles of Justice40 into program design; and
- Continuing to develop General Justice40 Guidance for DOE Funding Participants on how to align program funding implementation with the principles of Justice40.

From September 12-16, 2022, ED hosted DOE's first ever Justice Week. The week included:

- A DEIA town hall with Secretary Granholm and Deputy Secretary Turk, and introduction of the Department's DEIA Council Members, DEIA strategic plan, and Employee Resource Groups;
- A deep dive into EO 13985, *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, DOE's [Equity Action Plan](#), and procurement goals;
- Highlights of the Department's [Justice40](#) milestones; and
- How the Department enables meaningful community engagement.

On July 25, 2022, DOE publicly released its list of 144 Justice40 Covered Programs across 22 DOE offices. The Justice40 Covered Program rollout included a letter from Secretary Granholm touting the Department's commitment to Justice40 implementation; a general guidance document highlighting the Agency's top policy priorities to advancing an equitable clean energy future; the Disadvantaged Communities Reporter tool, which allow users to explore and produce reports on the census tracts DOE has categorized as Disadvantaged Communities; an Environmental Justice explainer; and a Justice40 Fact Sheet. All of these items can be found at: <https://www.energy.gov/diversity/justice40-initiative>.

On August 17, 2022, DOE hosted a Justice40 Kickoff public webinar. Secretary Granholm and the Director of the Office of Economic Impact & Diversity welcomed members of the DOE and Energy Justice communities. The Deputy Director for Energy Justice presented the Department's Justice40 Strategy, and several DOE programs (Weatherization and Intergovernmental Programs Office, Geothermal Technologies Office, Vehicle Technologies Office, Office of Science) spoke of their efforts to support the Justice40.

NUCLEAR STOCKPILE STEWARDSHIP

Key Challenges: One of NNSA's three overarching missions is to ensure the safety, security, and effectiveness of the U.S. nuclear weapons stockpile in support of the Nation's nuclear deterrent. This mission is carried out by NNSA's Office of Defense Programs (DP) through the Stockpile Stewardship Program (SSP). The SSP was established to maintain the active stockpile; execute warhead acquisition programs as required to meet DoD requirements; maintain and upgrade NNSA laboratory and production infrastructure; develop and maintain the underpinning science and engineering; and ensure a highly trained and skilled workforce. Since the inception of the SSP, this mission has been accomplished without requiring nuclear explosive testing through the application of specialized science, technology, engineering, and manufacturing.

- To provide a credible nuclear deterrent, the U.S. must maintain the current stockpile of nuclear weapons, extend the life of the stockpile, and sustain the nuclear deterrent in the long term through the modernization of laboratory and production infrastructure.
- Sustained long-term support is critical for continued alignment of warhead acquisitions with DoD platform requirements.
 - The weapons comprising the U.S. nuclear stockpile are annually assessed to be safe, reliable, effective, and secure. NNSA's infrastructure is adequate to support the needs of the current stockpile. However, continued science and infrastructure investments are needed to ensure the stockpile continues to meet these requirements.
 - Replacement, not just life extension, of components, subsystems, buildings, and equipment is required. Over half of NNSA's facilities are more than 40 years old, and roughly one-third date back to the early Cold War era.

- NNSA's ability to execute its mission depends on a modern, flexible, and resilient nuclear security infrastructure.
- NNSA executes its long-standing nuclear modernization efforts in conjunction with DoD delivery platforms, the nuclear weapons required for those platforms, and the NNSA infrastructure needed to produce and maintain those weapons. This approach provides NNSA the flexibility to implement new policy decisions related to nuclear modernization as the U.S. understands the changing international threats facing the U.S. and its allies and partners.
 - The U.S. must continue to invest in the weapons and infrastructure modernization programs to provide the capabilities needed to ensure the deterrent's viability into the future. For these reasons, NNSA continues to look for innovative ways to meet emerging challenges on a timescale that does not put our nuclear deterrent at risk and to enhance our science, technology, and engineering capabilities to improve the production processes efficiency and effectiveness.

Departmental Initiatives: Nuclear deterrence has been, and currently remains, the cornerstone of our Nation's security posture, and its credibility serves as the ultimate insurance policy against a nuclear attack. NNSA's central mission is to sustain the Nation's nuclear weapons stockpile and industrial base, to provide the tools of deterrence to our Nation's military and allies.

Defense Programs pursued numerous initiatives and accomplished achievements in FY 2022 to improve performance and address the challenges impacting Stockpile Stewardship. Ongoing initiatives supporting DP's mission include the implementation and development of various strategies, operations, technologies, and partnerships.

- For the 26th consecutive year, the science-based SSP allowed DOE and DoD to certify the safety, security, and effectiveness of the U.S. nuclear weapons stockpile to the President. The annual stockpile assessment process evaluated the state of weapons by conducting stockpile maintenance, surveillance, experiments, simulations, and utilizing other sources to update the technical basis of each weapon system.
- The Office of Secure Transportation maintained its spotless record by accomplishing 100 percent of assigned missions safely and securely, with no mission degradation despite the operational challenges inherent during the COVID-19 pandemic.
- The B61-12 completed its first production unit in November 2021 and entered Phase 6.6, Full Rate Production, in June 2022.
 - The B61-12 Life Extension Program (LEP) addresses multiple components that are nearing end-of-life, in addition to military requirements for reliability, service life, field maintenance, safety, and use control.
 - With the addition of an Air Force-procured tail kit assembly, the B61-12 LEP will consolidate and replace the B61-3, -4, -7, and -10 bomb variants.

- B61-12 LEP production activities will continue through FY 2025.
- The W88 Alt 370 met its Initial Operational Capability (IOC) deliverables to the U.S. Navy in January 2022 and entered Phase 6.6, Full Rate Production in June 2022.
 - The W88 Alt 370 modernizes the arming, fuzing, and firing assembly; improves surety; replaces the conventional high explosive and associated materials; and incorporates a lightning arrestor connector, trainers, joint test assemblies, and associated handling gear.
 - W88 Alt 370 production activities will continue through FY 2026.
- The W80-4 LEP completed initial joint Long Range Stand Off Weapon/W80-4 testing and component Baseline Design Reviews in preparation for transition to Phase 6.4, Production Engineering, in FY 2023.
 - Key design requirements extend the service life, replace critical non-nuclear components along with reuse of the W80-1 pit, and incorporate modern safety features.
 - The W80-4 LEP is expected to be completed by FY 2031.
- The W87-1 Modification Program is completing the Weapon Design and Cost Report and is preparing to enter Phase 6.3, Development Engineering.
 - The W87-1 will be deployed alongside the W87-0 on the Ground-Based Strategic Deterrent (GBSD), and will replace the aging W78 warhead by modifying the existing legacy W87-0 design.
 - The W87-1 Modification Program will meet DoD and NNSA requirements for performance, safety, and security and is planned to deploy as part of the GBSD by 2030.
- The W93 entered Phase 2, Feasibility Study and Design Options, in mid FY 2022.
 - The W93 will address future Navy ballistic missile warhead requirements and incorporate modern technologies to improve safety, security, and flexibility to address future threats.
 - The W93 will deploy in the Mk7 reentry body and inform the associated DoD Mk7 program activities.
- NNSA continued to meet tritium production requirements for national security while working to increase supply chain reliability, flexibility, and resiliency. NNSA continued to execute our successful strategic plan for tritium, partnering with Tennessee Valley Authority (TVA) to use both Watts Bar reactors to meet current requirements and to maintain schedule for increased production capacity for future requirements.
 - Commenced irradiation of 1,792 Tritium-Producing Burnable Absorber Rods (TPBARs) in Fuel Cycle #18 at Watts Bar Unit 1 with expected completion in May 2023.
 - Completed irradiation of 544 TPBARs in Fuel Cycle #4 in Watts Bar Unit 2 in February 2022 and commenced irradiation of 1,104 TPBARs in Fuel Cycle #5 in June 2022.

- Pit production activities continued at Los Alamos and Savannah River Site to fulfill the requirement to produce not less than 80 pits per year (ppy) as close to 2030 as possible. Initiatives include:
 - Reconfiguring Technical Area 55 (TA-55) Plutonium Facility-4 (PF-4) for efficient pit production by completing the ongoing equipment installations and facility modification to optimize the pit production process flow and establish the capacity for a reliable 30 War Reserve (WR) ppy production rate.
 - LANL is actively supporting a knowledge transfer program for the Savannah River Site pit production mission with subject matter expertise.
 - A multi-year training and qualification process will be undertaken to ensure the necessary people, processes, procedures, and commodities are in place to meet the minimum 50 ppy requirement at Savannah River Site.
- In November 2021, NNSA completed the Radiological Utility Office Building Equipment Installation Phase 2 project, two months ahead of schedule and \$120 million under budget. This enhanced the analytical chemistry and material characterization capabilities that support plutonium missions at LANL and the Nuclear Security Enterprise complex.
- The Exascale Computing Facility Modernization (ECFM) project completed construction in May 2022.
 - The ECFM project modified the existing High Performance Computing (HPC) center at LLNL to accommodate the increased infrastructure demands of future exascale computing platforms, via upgrades to the facility's electrical, cooling, and mechanical capabilities.
 - The existing cooling tower complex was expanded for additional cooling, and the electrical system was upgraded to allow additional power for HPC.

Financial Management Systems Plan (Unaudited)

Corporate Business Systems

The Department's enterprise-wide Corporate Business Systems (CBS, information technology systems) consist of financial, budgetary, procurement, and personnel systems. These systems are supported by a data warehouse linking common data elements from each of the Department's business systems and support external and internal reporting. The major business systems include:

- Budget: Budget Formulation and Distribution System (BFADS) (*formerly FDS 2.0*)
- Financial: Standard Accounting and Reporting System (STARS)
- Personnel: Corporate Human Resource Information System (CHRIS)
- Procurement: Strategic Integrated Procurement Enterprise System (STRIPES)
- Data Linking: Integrated Data Warehouse (IDW)/iPortal
- Travel Processing: Services outsourced through the General Services Administration (GSA) eTravel Services contract, using a system called Concur Government Edition
- Payroll Processing: Automated Time and Attendance Production System (ATAAPS) along with internal systems for collating internal data which is then outsourced to be serviced by Defense Finance and Accounting Service (DFAS)

Current Systems

Budget Formulation and Distribution System (BFADS) (formerly FDS 2.0) – BFADS is the Department's budgetary funds formulation and distribution system providing the capability to capture and report all formulation activities, including Passback and settlement, and to record, distribute, and execute appropriations, apportionments, allotments, allocations, and ancillary processes such as reprogramming and appropriation transfers. BFADS integrates with STARS, IDW, and field office reimbursable work systems. FY 2022 BFADS activities include:

- Completed migration of BFADS production environments into the Azure cloud
- Provided training for users on the budget formulation functionality
- Created an Execution reporting strategy document
- Created additional reporting needed for Formulation processes and made requested modifications to other Formulation processes
- Actively maintained the required security posture and upgraded to the most current quarterly Oracle patch set
- Completed upgrade to Hyperion, Oracle Data Integrator (ODI), and WebLogic
- Rebranded FDS 2.0 to BFADS to more adequately reflect the functionality provided for both execution and formulation activities

Looking forward to FY 2023, BFADS will focus on the next update for Hyperion and implementing Multi-Factor

Authentication (MFA). System functionality and technical enhancements will continue, as well as maintaining a rigorous security posture.

Standard Accounting and Reporting System (STARS) – STARS is the Department's financial management system, providing accounting, reporting, and performance measurement services. STARS integrates with procurement, funds distribution, travel, and human resources systems. FY 2022 STARS activities include:

- Migrated STARS and SEPA production environments to Azure cloud
- Implemented Treasury's Business Event Type Code (BETC) modifications
- Coordinated and implemented the GSA Unique Entity Identifier (UEI) solution
- Implemented Treasury's G-Invoicing solution, including the configuration of Oracle's Buyer Work Center
- Supported Treasury FY 2022 Standard General Ledger (SGL) changes

Future STARS activities include migration of inflight orders into Treasury's G-Invoicing platform, implementation of MFA, and supporting the upgrade of the STARS Oracle database from version 12c to 19C.

Corporate Human Resource Information System (CHRIS) – CHRIS is DOE's Human Resources (HR) system. CHRIS improves operational HR efficiencies, reduces paperwork, and provides the strategic information needed to make informed human resource management decisions. FY 2022 CHRIS activities include:

- Migrated CHRIS production and development environments to the Azure cloud
- Worked on re-implementing customizations for the CHRIS upgrade from PeopleSoft 9.1 to PeopleSoft 9.2
- Implemented Position Management in CHRIS 9.1
- Supported HC Mass Pay Preparations
- Implemented required update in CHRIS 9.1 to support the Infrastructure Investment and Jobs Act (IIJA)
- Implemented OPM-mandated updates in CHRIS 9.1
- Supported and enhanced functionality and reporting based on user requirements

In FY 2023, CHRIS will finalize the upgrade process for PeopleSoft 9.2, plan OneID/MFA implementation, and evaluate the possible Windows upgrade from 2016 to 2019.

Strategic Integrated Procurement Enterprise System (STRIPES) – STRIPES is DOE's procurement and contracts management system, automating all procurement and contract activities associated with planning, awarding, and administering various unclassified acquisition and financial assistance instruments. STRIPES is integrated with STARS and IDW, and connects DOE with the General Services Administration (GSA) Integrated Award

Environment (IAE) systems, which includes the System for Award Management (SAM), Federal Procurement Data System – Next Generation (FPDS-NG), and SAM.gov's Contracts Opportunities. STRIPES also interfaces with Grants.gov and Unison's FedConnect. FY 2022 STRIPES activities include:

- Migrated production and QA environments to the Azure cloud
- Assisted Office of Finance and Accounting and Office of Management on the OMB Infrastructure and G-Invoicing initiatives and implemented changes for G-invoicing
- Provided support to the acquisition and financial assistance DATA ACT Audit
- Conducted and created general/targeted user training Webinars
- Implemented changes related to GSA's UEI initiative

In FY 2023, STRIPES plans to focus on upgrading to PRISM 7.5, implementing MFA, and where possible, standardizing contract closeout processes across program offices.

Integrated Data Warehouse (IDW)/iPortal – IDW is a central data warehouse linking common data elements from multiple DOE corporate business applications, providing reporting to DOE executives, managers, and staff, including access to business applications, personalized dashboards, messaging, discussion boards. FY 2022 IDW activities include:

- Completed the roll out of the Oracle Analytics Server (OAS) module of the BI reporting tool thereby adding visualization capabilities to reports and dashboards
- Continued efforts of creating and enhancing reporting subject areas, standard reports/dashboards, collaboration tools, developing ad hoc queries and data inquiries in support of department wide program needs
- Provided data in support of the Justice 40 initiative

- Performed infrastructure optimization in the cloud
- Provided support and enhanced functionality for additional tools such as AMERICA, iBenefits, ANA, Small Business and Conference Management
- Performed annual subject area and reports cleanup
- Continued to provide support to users at Headquarters, program offices and DOE sites for assistance with standard reports and dashboards, collaboration tools, developing ad hoc queries and data inquiries

In FY 2023, OCFO will begin modifying existing dashboards and reports to include visualization capabilities provided by OAS, and develop training on OAS to the general DOE user community.

Additional Efforts Underway

In FY 2023, in support of Infrastructure Investment and Jobs Act (IIJA) and Inflation Reduction Act (IRA) OCFO will use data collection tools to develop a new dashboard with visualization to support the reporting of lifecycle funding for IIJA and IRA. CBS will continue expanding the use of Robotic Process Automation (RPA) technology throughout the systems to further optimize system functionality. Systems functionalities will be evaluated with the focus on operational efficiency, and RPA solutions will be proposed to stakeholders.

Office of CBS will continue examining optimization opportunities for the cloud infrastructure. In particular, Office of CBS will analyze and design system architecture for containerization as a step to realization of immutable infrastructure. Furthermore, the Office of CBS will begin to phase in replacement of all self-signed certificates with managed ones to strengthen communications within the boundaries of CBS systems. Finally, the Office of CBS will begin to integrate all financial applications with OneID to comply with the requirement for multi-factor authentication (MFA) and identity and access management (IAM).

FY 2022 DOE Highlight: Bipartisan Infrastructure Law

Joint Office of Energy and Transportation is one of many stories detailing Clean Energy Corps accomplishments. Catch Secretary Granholm and Secretary Buttigieg's conversation at <https://youtu.be/K3NFGlgceMg>. For more information, visit:

- <https://www.energy.gov/eere/vehicles/transportation-fact-week>
- <https://www.energy.gov/articles/doe-and-dot-launch-joint-effort-build-out-nationwide-electric-vehicle-charging-network>
- <https://www.energy.gov/articles/icymi-secretaries-granholm-and-buttigieg-announce-joint-effort-buildout-national-electric> <https://www.energy.gov/articles/charged-ready-go>
- <https://www.energy.gov/CleanEnergyCorps>



Secretary Buttigieg and Secretary Granholm traveled to RS Automotive in Takoma Park to make the announcement of the Joint Office of Energy and Transportation, a direct result of the Bipartisan Infrastructure Law to establish a national network of 500,000 electric vehicle chargers. They arrived in an electric Ford Mustang Mach-E with Buttigieg behind the wheel. Catch their conversation! Learn more at www.energy.gov

Brett Lake, U.S. Department of Energy

This Page Intentionally Left Blank



Financial Results





Message from the Deputy Chief Financial Officer



For the 16th consecutive year, I am pleased to report DOE has received an unmodified audit opinion on its financial statements from the independent public accounting firm of KPMG LLP. The audit identified no material weaknesses and no instances of noncompliance with laws and regulations, nor instances in which DOE's financial management stewardship and systems did not comply with governmental financial requirements. This reflects an important measure of the integrity and reliability of DOE's overall focus and compliance for financial management. DOE's senior leadership recognize the importance of accurate and timely financial information for decision-making, and I commend the Department's financial management community for achieving this major accomplishment.


In FY 2022, the CFO community met mission goals and provided high-caliber financial management and fiscal stewardship exemplified by many achievements:

- Implemented the Federally-mandated G-Invoicing for Interagency Agreements in readiness for Go-Live after September 30, 2022
- Developed a framework to mature and scale the Robotic Processing Automation (RPA) program to enable both centralized and federated approaches that will harness efficiencies and provide opportunities to train OCFO workforce
- Completed upgrades to STARS, STRIPES, Budget Formulation and Distribution System, and iBenefits, DOE's pension and benefit management system
- Ideated and planned the Infrastructure Investment and Jobs Act (IIJA) dashboard that will be an evidenced-based data management tool for decision-making
- Completed migration of administrative IT systems supporting financial management, HR, contracting, and reporting from an on-premise data center to a government cloud provider; cloud cost and performance optimization is still ongoing
- Upskilled the financial management workforce through trainings focused on data analytics and robotics, including participation on the CFO Council Workforce Team's initiative to implement a government-wide data analytics upskilling initiative; conducted 55 financial management webinars with a total attendance of over 2,350 participants, including headquarters, field, and contractor staff
- Successfully implemented the DOE Congressional Justifications System; produced the FY 2022 and FY 2023 Congressional budgets and currently using for the FY 2024 OMB budget

Areas of Focus for the OCFO in FY 2023:

- Implementing the CHIPS and Science Act over the next five years to help the U.S. regain a leading position in semiconductor chip manufacturing
- Deploying significant IIJA and Inflation Reduction Act (IRA) funding to execute the provisions of the Acts; mitigating increased risk for potential fraud and enabling financial management staff to ramp up to support the provisions
- Planning and sustaining a workforce in financial management that will be ready for new challenges and skillsets to adapt to a technology-based environment

DOE's CFO community continues to manage taxpayer dollars wisely, demonstrated by these notable successes. In FY 2023, the Department is committed to building on these successes, continuing to deliver superior financial stewardship and management through a sustained focus on DOE's mission and delivering results.


Christopher S. Johns
Deputy Chief Financial Officer
November 15, 2022

Financial Statements, Footnotes, and Consolidating Schedules

Introduction to Principal Statements

The Department's financial statements have been prepared to report the financial position and results of operations of the Department of Energy (the Department or DOE), pursuant to the requirements of the Chief Financial Officers Act of 1990, the Government Management Reform Act of 1994, and the OMB Circular A-136, *Financial Reporting Requirements*.

The responsibility for the integrity of the financial information included in these statements rests with the management of the Department. The audit of the Department's principal financial statements was performed by an independent certified public accounting firm selected by the Department's Inspector General. The auditors' report issued by the independent certified public accounting firm is included in this report.

The following provides a brief description of the nature of each required financial statement.

Consolidated Balance Sheets

The *Consolidated Balance Sheets* present, as of a specific time, amounts of future economic benefits owned or managed by the Department (assets), amounts owed by the Department (liabilities), and residual amounts retained by the Department comprising the difference (net position).

Consolidated Statements of Net Cost

The *Consolidated Statements of Net Cost* summarize the Department's costs by the major programs of the Department. All costs reported reflect full costs, except for certain indirect costs, which are reported within the Other Programs line of the statements. The costs for each line are reduced by earned revenues to arrive at net costs.

Consolidated Statements of Changes in Net Position

The *Consolidated Statements of Changes in Net Position* identify appropriated funds used as a financing source for goods, services or capital acquisitions. These statements present the accounting events that caused changes in the net position section of the Consolidated Balance Sheets from the beginning to the end of the reporting periods.

Combined Statements of Budgetary Resources

The *Combined Statements of Budgetary Resources* identify the Department's budgetary authority. Federal law gives budgetary authority to agencies to incur financial obligations that will eventually result in outlays or expenditures. Budgetary authority that the Department receives includes appropriations, borrowing authority, contract authority and spending authority from offsetting collections. The *Combined Statements of Budgetary Resources* provide information on budgetary resources available to the Department during the year and the status of those resources at the end of the year. Detail on the amounts shown in the *Combined Statements of Budgetary Resources* is included in the Required Supplementary Information section on the schedule of Budgetary Resources by Major Account.

Consolidated Statements of Custodial Activities

The *Consolidated Statements of Custodial Activities* identify revenues collected by the Department on behalf of others. These revenues primarily result from Power Marketing Administrations that sell power generated by hydroelectric facilities owned by Department of Defense (DoD), U.S. Army Corps of Engineers (USACE), and the Department of the Interior (DOI).

Notes to the Consolidated and Combined Financial Statements

The notes to the consolidated and combined financial statements provide a detailed explanation for activity that is included in the line items of each statement. The notes also provide information to support the valuation and computation of the financial statement activity.

Consolidating and Combining Schedules

The consolidating and combining schedules separate the Department's financial activity by the independent organizations that are included in the financial statement line items. The independent organizations include Power Marketing Administrations (PMA) and the Federal Energy Regulatory Commission (FERC). The consolidating schedules also identify intradepartmental activity that is eliminated during the financial statement preparation process. Intradepartmental activity is not eliminated from the combining schedules.

CONSOLIDATED AND COMBINED FINANCIAL STATEMENTS

Principal Statements

U.S. Department of Energy Consolidated Balance Sheets

As of September 30, 2022 and 2021

(\$ IN MILLIONS)	FY 2022	FY 2021
ASSETS: ^(Note 2)		
Intragovernmental Assets:		
Fund Balance with Treasury ^(Note 3)	\$ 117,665	\$ 48,846
Investments, Net ^(Note 4)	49,005	46,092
Accounts Receivable, Net ^(Note 5)	628	547
Advances and Prepayments	4	12
Other Assets ^(Note 9)	—	—
Total Intragovernmental Assets	\$ 167,302	\$ 95,497
Other than Intragovernmental:		
Cash	\$ 128	\$ 172
Accounts Receivable, Net ^(Note 5)	5,292	3,025
Loans Receivable, Net ^(Note 6)	15,445	16,339
Inventory, Net ^(Note 7)	45,012	49,306
General Property, Plant, and Equipment, Net ^(Note 8)	46,771	43,159
Advances and Prepayments	630	580
Other Assets ^(Note 9 & 10)	13,717	13,472
Total Other than Intragovernmental	\$ 126,995	\$ 126,053
Total Assets	\$ 294,297	\$ 221,550
LIABILITIES: ^(Note 11)		
Intragovernmental Liabilities:		
Accounts Payable	\$ 149	\$ 147
Debt ^(Note 12)	21,691	22,614
Advances from Others and Deferred Revenue ^(Note 15)	216	230
Other Liabilities ^(Note 14)	4,965	4,592
Total Intragovernmental Liabilities	\$ 27,021	\$ 27,583
Other than Intragovernmental:		
Accounts Payable	\$ 5,075	\$ 4,812
Federal Debt and Interest Payable ^(Notes 12)	5,101	5,082
Federal Employee Benefits Payable	424	282
Environmental and Disposal Liabilities ^(Note 13)	519,660	515,645
Loan Guarantee Liabilities ^(Note 6)	89	98
Advances from Others and Deferred Revenue ^(Note 15)	50,659	48,772
Other Liabilities ^(Notes 14, 15, 16, 17, 18)	54,906	62,919
Total Other than Intragovernmental	\$ 635,914	\$ 637,610
Total Liabilities	\$ 662,935	\$ 665,193
NET POSITION: ^(Note 26)		
Unexpended Appropriations (Consolidated)		
Unexpended Appropriations - Funds from Dedicated Collections ^(Note 19)	\$ 200	\$ 27
Unexpended Appropriations - Funds from Other than Dedicated Collections	92,870	34,928
Cumulative Results of Operations (Consolidated)		
Cumulative Results of Operations - Funds from Dedicated Collections ^(Note 19)	(13,002)	(14,004)
Cumulative Results of Operations - Funds from Other than Dedicated Collections	(448,706)	(464,594)
Total Net Position	\$ (368,638)	\$ (443,643)
Total Liabilities and Net Position	\$ 294,297	\$ 221,550

The accompanying notes are an integral part of these statements.

CONSOLIDATED AND COMBINED FINANCIAL STATEMENTS

U.S. Department of Energy Consolidated Statements of Net Cost

For the Years Ended September 30, 2022 and 2021

(\$ IN MILLIONS)	FY 2022	FY 2021
MAJOR PROGRAMS: <small>(Note 20)</small>		
Nuclear Security and NNSA		
Program Costs	\$ 17,443	\$ 15,264
Less: Earned Revenues	(14)	(16)
Net Cost of Nuclear Security and NNSA	\$ 17,429	\$ 15,248
Science		
Program Costs	\$ 20,645	\$ 20,497
Less: Earned Revenues	(96)	(93)
Net Cost of Science	\$ 20,549	\$ 20,404
Energy		
Program Costs	\$ 15,393	\$ 10,476
Less: Earned Revenues	(22,648)	(6,429)
Net Cost of Energy	\$ (7,255)	\$ 4,047
Net Cost of Major Programs	\$ 30,723	\$ 39,699
OTHER PROGRAMS: <small>(Note 20)</small>		
Reimbursable Programs		
Program Costs	\$ 5,422	\$ 5,239
Less: Earned Revenues	(5,430)	(5,223)
Net Cost of Reimbursable Programs	\$ (8)	\$ 16
Other Programs		
Program Costs	\$ 2,599	\$ 2,371
Less: Earned Revenues	(467)	(429)
Net Cost of Other Programs	\$ 2,132	\$ 1,942
Costs Applied to Reduction of Legacy Environmental Liabilities <small>(Notes 13 and 20)</small>	\$ (6,436)	\$ (6,451)
Costs Not Assigned to Programs <small>(Note 21)</small>	\$ 721	\$ 1,213
Net Cost of Operations	\$ 27,132	\$ 36,419

The accompanying notes are an integral part of these statements.

CONSOLIDATED AND COMBINED FINANCIAL STATEMENTS

U.S. Department of Energy Consolidated Statements of Changes in Net Position

For the Years Ended September 30, 2022 and 2021

(\$ IN MILLIONS)	FUNDS FROM DEDICATED COLLECTIONS (Note 19)	ALL OTHER FUNDS	ELIMINATIONS	CONSOLIDATED
	FY 2022			
UNEXPENDED APPROPRIATIONS: (Note 26)				
Beginning Balances	\$ 27	\$ 34,928	\$ —	\$ 34,955
Appropriations Received (Note 23)	\$ 527	\$ 97,980	\$ —	\$ 98,507
Appropriations Transferred - In/Out	(1)	22	—	21
Other Adjustments	2	(279)	—	(277)
Appropriations Used	(355)	(39,781)	—	(40,136)
Net Change in Unexpended Appropriations	\$ 173	\$ 57,942	\$ —	\$ 58,115
Total Unexpended Appropriations	\$ 200	\$ 92,870	\$ —	\$ 93,070
CUMULATIVE RESULTS OF OPERATIONS: (Note 26)				
Beginning Balances	\$ (14,004)	\$ (464,594)	\$ —	\$ (478,598)
Other Adjustments	\$ —	\$ —	\$ —	\$ —
Appropriations Used	355	39,781	—	40,136
Non-Exchange Revenue	1	—	—	1
Donations and Forfeitures of Cash	—	21	—	21
Transfers - In/Out Without Reimbursement	(501)	(2)	—	(503)
Donations and Forfeitures of Property	16	1	—	17
Imputed Financing (Notes 22 and 25)	10	8,220	—	8,230
Other	(3,548)	(332)	—	(3,880)
Net Cost of Operations	\$ 4,669	\$ (31,801)	\$ —	\$ (27,132)
Net Change in Cumulative Results of Operations	\$ 1,002	\$ 15,888	\$ —	\$ 16,890
Total Cumulative Results of Operations	\$ (13,002)	\$ (448,706)	\$ —	\$ (461,708)
Net Position	\$ (12,802)	\$ (355,836)	\$ —	\$ (368,638)
	FY 2021			
UNEXPENDED APPROPRIATIONS: (Note 26)				
Beginning Balances	\$ 9	\$ 32,757	\$ —	\$ 32,766
Appropriations Received (Note 23)	\$ 27	\$ 41,284	\$ —	\$ 41,311
Appropriations Transferred - In/Out	—	3	—	3
Other Adjustments	—	(2,315)	—	(2,315)
Appropriations Used	(9)	(36,801)	—	(36,810)
Net Change in Unexpended Appropriations	\$ 18	\$ 2,171	\$ —	\$ 2,189
Total Unexpended Appropriations	\$ 27	\$ 34,928	\$ —	\$ 34,955
CUMULATIVE RESULTS OF OPERATIONS: (Note 26)				
Beginning Balances	\$ (12,942)	\$ (471,926)	\$ —	\$ (484,868)
Other Adjustments	\$ —	\$ (18)	\$ —	\$ (18)
Appropriations Used	9	36,801	—	36,810
Non-Exchange Revenue	5	1	—	6
Donations and Forfeitures of Cash	—	6	—	6
Transfers - In/Out Without Reimbursement	(535)	9	—	(526)
Donations and Forfeitures of Property	36	2	—	38
Imputed Financing (Notes 22)	10	7,838	—	7,848
Other	(1,206)	(269)	—	(1,475)
Net Cost of Operations	\$ 619	\$ (37,038)	\$ —	\$ (36,419)
Net Change in Cumulative Results of Operations	\$ (1,062)	\$ 7,332	\$ —	\$ 6,270
Total Cumulative Results of Operations	\$ (14,004)	\$ (464,594)	\$ —	\$ (478,598)
Net Position	\$ (13,977)	\$ (429,666)	\$ —	\$ (443,643)

The accompanying notes are an integral part of these statements.

CONSOLIDATED AND COMBINED FINANCIAL STATEMENTS

U.S. Department of Energy Combined Statements of Budgetary Resources

For the Years Ended September 30, 2022 and 2021

(\$ IN MILLIONS)	BUDGETARY	NON- BUDGETARY CREDIT REFORM FINANCING ACCOUNTS	BUDGETARY	NON- BUDGETARY CREDIT REFORM FINANCING ACCOUNTS
	FY 2022		FY 2021	
BUDGETARY RESOURCES:				
Unobligated Balance from Prior Year Budget Authority, Net ^(Note 23)	\$ 8,715	\$ 762	\$ 10,177	\$ 670
Appropriations ^(Note 23)	98,350	—	40,123	—
Borrowing authority	739	3,235	737	113
Contract authority	1,270	—	2,379	—
Spending Authority from Offsetting Collections	20,908	871	7,733	838
Total Budgetary Resources	\$ 129,982	\$ 4,868	\$ 61,149	\$ 1,621
STATUS OF BUDGETARY RESOURCES:				
New Obligations and Upward Adjustments (Total)	\$ 58,269	\$ 3,909	\$ 53,181	\$ 644
Unobligated Balance, End of Year:				
Apportioned, Unexpired Accounts	\$ 37,188	\$ 15	\$ 7,353	\$ 17
Exempt from Apportionment, Unexpired Accounts	12	—	13	—
Unapportioned, Unexpired Accounts	34,423	944	526	960
Unexpired, Unobligated Balance, End of Year	\$ 71,623	\$ 959	\$ 7,892	\$ 977
Expired, Unobligated Balance, End of Year ^(Note 23)	90	—	76	—
Unobligated Balance, End of Year (Total)	\$ 71,713	\$ 959	\$ 7,968	\$ 977
Total Budgetary Resources	\$ 129,982	\$ 4,868	\$ 61,149	\$ 1,621
OUTLAYS, NET				
Outlays, Net (Total) ^(Note 25)	\$ 28,944	\$ —	\$ 37,302	\$ —
Distributed Offsetting Receipts (-) ^(Note 25)	(6,128)	(393)	(3,612)	—
Agency Outlays, Net ^(Note 25)	\$ 22,816	\$ (393)	\$ 33,690	\$ —
Disbursements, Net (Total)	\$ —	\$ (814)	\$ —	\$ 616

The accompanying notes are an integral part of these statements.

CONSOLIDATED AND COMBINED FINANCIAL STATEMENTS

U.S. Department of Energy Consolidated Statements of Custodial Activities

For the Years Ended September 30, 2022 and 2021

(\$ IN MILLIONS)	FY 2022	FY 2021
SOURCES OF COLLECTIONS:		
Cash Collections: ^(Note 24)		
Power Marketing Administrations	\$ 544	\$ 619
Federal Energy Regulatory Commission	43	63
Total Cash Collections	\$ 587	\$ 682
Accrual Adjustment	(2)	3
Total Custodial Revenue	\$ 585	\$ 685
DISPOSITION OF REVENUE:		
Transferred to Others:		
Bureau of Reclamation	\$ (162)	\$ (184)
Department of the Treasury	(228)	(288)
Army Corps of Engineers	(197)	(194)
Others	(3)	(6)
Decrease/(Increase) in Amounts to be Transferred	5	(13)
Net Custodial Activity	\$ —	\$ —

The accompanying notes are an integral part of these statements.

Notes to the Consolidated and Combined Financial Statements

1. Summary of Significant Accounting Policies

A. BASIS OF PRESENTATION

These consolidated and combined financial statements have been prepared to report the financial position and results of operations of the United States (U.S.) Department of Energy. The statements were prepared from the books and records of the Department in accordance with United States generally accepted accounting principles issued by the Federal Accounting Standards Advisory Board (FASAB) and presentation guidelines in Office of Management and Budget (OMB) Circular A-136, *Financial Reporting Requirements*. Additionally, certain records are presented in accordance with standards established by the Financial Accounting Standards Board (FASB).

Accounting standards require all reporting entities to disclose that accounting standards allow certain presentations and disclosures to be modified, if needed, to prevent the disclosure of classified information per *Statement of Federal Financial Accounting Standards* (SFFAS) 56, Classified Activities.

B. DESCRIPTION OF REPORTING ENTITY

The accompanying financial statements include activities and operations of the United States Department of Energy. In accordance with SFFAS 47, *Reporting Entity*, DOE has included all consolidation entities for which it is accountable in the accompanying financial statements and DOE does not have relationships requiring disclosure as a disclosure entity or related party.

The Department is a cabinet-level agency of the Executive Branch of the U.S. Government. The Department is not subject to Federal, state, or local income taxes. The Department's Headquarters organizations are located in Washington, D.C. and Germantown, Maryland, and consist of an executive management structure that includes the Secretary; the Deputy Secretary; the Under Secretary for Science and Innovation; the Under Secretary for Infrastructure; the Under Secretary for Nuclear Security/ National Nuclear Security Administration; Secretarial staff organizations; program organizations that provide technical direction and support for the Department's principal programmatic missions; and the PMAs (Bonneville Power Administration, Southeastern Power Administration, Southwestern Power Administration, and Western Area Power Administration) whose primary offices are located in the region served by each PMA. The Department also includes the Federal Energy Regulatory Commission (FERC), which is an independent organization responsible for regulating the transmission and sale of natural gas for resale in interstate commerce, for regulating the transmission and wholesale of electricity in interstate commerce, and the licensing of hydroelectric power projects.

The Department has a field structure comprised of operational offices, field offices, primary offices and operations of the PMAs, laboratories, and other facilities. The majority of the Department's environmental cleanup, energy research and development, and testing and production activities are carried out by major contractors. These contractors operate, maintain, or support the Department's Government-owned facilities. The Department indemnifies these contractors against financial responsibility from nuclear accidents under the provisions of the Price-Anderson Act.

These contractors have unique contractual relationships with the Department. In most cases, their charts of accounts and accounting systems are integrated with the Department's accounting system through a home office-branch office type of arrangement. Additionally, the Department is responsible for reimbursing the allowable costs of contractor contributions to certain defined benefit pension plans, as well as postretirement benefits such as medical care and life insurance, for the employees of these contractors. As a result, the Department's financial statements reflect not only the costs incurred by these contractors, but also include certain contractor assets (e.g., employee advances and prepaid pension costs) and liabilities (e.g., accounts payable, accrued expenses including payroll and benefits, and pension and other actuarial liabilities) that would not be reflected in the financial statements of other Federal agencies that do not have these unique contractual relationships.

C. BASIS OF ACCOUNTING

Transactions are recorded on the accrual and budgetary bases of accounting. Under the accrual basis, revenues are recognized when earned and expenses are recognized when liabilities are incurred, without regard to receipt or payment of cash. Budgetary accounting facilitates compliance with legal constraints and controls over the use of Federal funds. All material intradepartmental balances and transactions have been eliminated in the *Consolidated Balance Sheets, Consolidated Statements of Net Cost, Consolidated Statements of Changes in Net Position, and Consolidated Statements of Custodial Activities*. The *Combined Statements of Budgetary Resources* are prepared on a combined basis and do not include intradepartmental eliminations.

Throughout these financial statements, assets, liabilities, earned revenue, and costs have been classified according to the type of entity with which the transactions were made. Intragovernmental assets and liabilities are those from or to other Federal entities. Intragovernmental earned revenue represents collections or accruals of revenue from other Federal entities. Intragovernmental costs are payments or accruals for goods and services provided by other Federal entities, and costs incurred by other Federal entities as a result of the Department's programs.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

D. FUND BALANCE WITH U.S. TREASURY

Funds with the U.S. Department of the Treasury (Treasury) primarily represent general and revolving funds that are available to pay current liabilities and finance authorized purchases. Disbursements and receipts are processed by Treasury, and the Department's records are reconciled with those of Treasury (see [Note 3](#)).

E. INVESTMENTS AND RELATED INTEREST, NET

All investments are reported at cost net of amortized premiums and discounts as it is the Department's intent to hold the investments to maturity. Premiums and discounts are amortized using the effective interest yield method (see [Note 4](#)).

F. ACCOUNTS RECEIVABLE, NET

Intragovernmental accounts receivable represent amounts due from other Federal agencies. The amounts due for non-intragovernmental (non-Federal) receivables are stated net of an allowance for uncollectible accounts. The estimate of the allowance is based on past experience in the collection of receivables and an analysis of the outstanding balances (see [Note 5](#)).

G. CASH

The Cash amount includes cash held in escrow that is restricted to fund operations, maintenance, rehabilitation, and modernization activities at hydroelectric generating facilities. This amount also includes cash held in a margin account with Bonneville Power Administration's (BPA) financial futures broker.

H. DIRECT LOANS AND LOAN GUARANTEES, NET

The Department has one loan that was obligated and disbursed prior to FY 1992, and is presented net of an allowance for loss. All loans obligated after FY 1992 are presented on a present value basis in compliance with the Federal Credit Reform Act of 1990. The present value of the loans is revalued on an annual basis (see [Note 6](#)).

Interest expense on the U.S. Treasury Bureau of the Fiscal Service (BFS) and U.S. Treasury Federal Financing Bank (FFB) debt is calculated in accordance with OMB Circular A-11, Sections 185.32, 185.34 and 185.35 using the Credit Subsidy Calculator. Capitalized interest receivables on loans with FFB are reclassified to principal outstanding on the capitalization date.

I. INVENTORY, NET

Stockpile materials are recorded at historical cost in accordance with SFFAS 3, *Accounting for Inventory and Related Property*, except for certain nuclear materials identified as surplus or excess to the Department's needs. These nuclear materials are recorded at their net realizable value (see [Note 7](#)).

J. GENERAL PROPERTY, PLANT, AND EQUIPMENT, NET

Property, plant, and equipment that are purchased, constructed, or fabricated in-house, including major modifications or improvements, are capitalized at cost. The Department's property, plant, and equipment capitalization threshold, except as noted below, is

\$500,000. The capitalization threshold for the Nuclear Waste Fund is \$50,000. The capitalization thresholds for the PMAs and FERC range from \$5,000 to \$100,000 or may depend on whether particular equipment is considered a major unit of property, which is capitalized upon purchase, or a minor unit, which is generally expensed. The capitalization threshold for internal use software is \$750,000, except for the PMAs and FERC, which use thresholds ranging from \$5,000 to \$500,000 and leasehold improvements over \$250,000 for the FERC (see [Note 8](#)).

Costs of construction are accumulated as construction work in process. Upon completion or beneficial occupancy or use, the cost is transferred to the appropriate property account. The Department does not capitalize property, plant, and equipment related to environmental management facilities storage and processing of the Department's environmental legacy wastes.

Depreciation expense is generally computed using the straight-line method. The units of production method is used only in special cases where applicable, such as depreciating automotive equipment on a mileage basis and construction equipment on an hourly use basis. In accordance with SFFAS 6, *Accounting for Property, Plant, and Equipment*, land is a non-depreciable asset, whereas depreciation is calculated for land improvements. The ranges of service lives are generally as follows:

- Structures and Facilities: 25 – 50 years
- Automated Data Processing Software: 3 – 7 years
- Equipment: 5 – 40 years
- Land rights for a specified period or 50 years, whichever is less

K. LIABILITIES

Liabilities represent amounts of monies or other resources likely to be paid by the Department as a result of a transaction or event that has already occurred. However, no liability can be paid by the Department absent an authorized appropriation. Liabilities for which an appropriation has not been enacted are, therefore, classified as not covered by budgetary resources (see [Note 11](#)), and there is no certainty that the appropriations will be enacted. Also, liabilities of the Department that are not contract based can be abrogated by the Government acting in its sovereign capacity.

L. FUNDS FROM DEDICATED COLLECTIONS

Funds from dedicated collections are financed by specifically identified revenues provided to the Government by non-Federal sources, often supplemented by other financing sources, which remain available over time. These specifically identified revenues and other financing sources are required by statute to be used for designated activities, benefits, or purposes, and must be accounted for separately from the Government's general revenues (see [Note 19](#)).

M. FEDERAL EMPLOYEE BENEFITS PAYABLE

The FECA (Federal Employees' Compensation Act) actuarial liability represents the liability for future

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

workers' compensation benefits, which includes the expected liability for disability, survivors, and medical benefits to employees who are injured, or become ill, in the course of Federal employment and to the survivors of employees killed on the job. This liability is calculated annually by the Department of Labor (DOL) for financial reporting purposes. The Department also accrues an estimated liability for earned, but unpaid, and unfunded annual leave which is \$330 million for FY 2022.

N. ACCRUED ANNUAL, SICK, AND OTHER LEAVE

Federal Employees: Federal employees' annual leave is accrued as it is earned, and the accrual is reduced annually for actual leave taken. Each year, the accrued annual leave balance is adjusted to reflect the latest pay rates. To the extent that current-year or prior-year appropriations are not available to fund annual leave earned but not taken, funding will be obtained from future financing sources. Sick leave and other types of non-vested leave are expensed as taken.

Contractor Employees: The Department accrues annual leave for contractor employees. Unlike leave for most of the Department's Federal employees, this is a funded liability rather than an unfunded liability.

O. RETIREMENT PLANS

Federal Employees: There are two primary retirement systems for Federal employees. Employees hired prior to January 1, 1984, may participate in the Civil Service Retirement System (CSRS). On January 1, 1984, the Federal Employees Retirement System (FERS) went into effect pursuant to Public Law 99-335. Most employees hired after December 31, 1983, are automatically covered by FERS and Social Security. Employees hired prior to January 1, 1984, elected to either join FERS and Social Security or remain in CSRS. All employees are eligible to contribute to the Federal Thrift Savings Plan (TSP). For employees covered by FERS, a TSP account is automatically established to which the Department is required to contribute one percent of gross pay and match employee contributions up to an additional four percent. For most employees hired since December 31, 1983, the Department also contributes the employer's matching share for Social Security. The Department does not report CSRS or FERS assets, accumulated plan benefits, or unfunded liabilities, if any, applicable to its employees. Reporting such amounts is the responsibility of the Office of Personnel Management (OPM). The Department does report, as an imputed financing source and a program expense, the difference between its contributions to Federal employee pension and other retirement benefits and the estimated actuarial costs as computed by OPM. The PMAs make additional annual contributions to Treasury to ensure that all postretirement benefit programs provided to their employees are fully funded and such costs are both recovered through rates and properly expensed.

Contractor Employees: The Department is contractually responsible for reimbursing its major contractors who sponsor employee defined benefit pension plans for the

costs of contractor employee retiree benefits because these are allowable costs under their contracts. Most of these contractors sponsor defined benefit pension plans under which these plans promise to pay employees specified benefits, such as a percentage of the final average pay for each year of service. The Department does not sponsor and is not the fiduciary of contractor employee defined benefit plans. Contractors are required to make contributions to their plans as required by the Internal Revenue Code and the Employee Retirement Income Security Act (ERISA), as amended. For qualified defined benefit pension plans, the Department's current funding policy is to reimburse contractors for the minimum required contributions made, absent the Department's agreement to reimburse at a different level. For nonqualified plans, the funding policy is pay-as-you-go. Employer contributions are calculated to ensure that plan assets are sufficient to provide for accrued benefits of contractor employees. The level of contributions is dependent on plan provisions and actuarial assumptions about the future, such as interest rates, employee turnover and mortality, age of retirement, and compensation increases. The Department's major contractors also sponsor postretirement benefits (PRB) other than pensions consisting of predominantly postretirement health care benefits which are generally funded on a pay-as-you-go basis. Since the Department is responsible for the allowable costs of funding these contractor pension and PRB plans, it reports assets and liabilities for these plans (see [Note 16](#)).

P. NET COST OF OPERATIONS

Program costs are summarized in the *Consolidated Statements of Net Cost* by the Department's major programs (see [Note 20](#)). Full costs are reduced by exchange (earned) revenues to arrive at net operating cost.

Q. REVENUES AND OTHER FINANCING SOURCES

The Department receives the majority of the funding needed to perform its mission through Congressional appropriations. These appropriations may be used, within statutory limits, for operating and capital expenditures. In addition to appropriations, other financing sources include exchange and non-exchange revenues and imputed financing sources. The Department also collects custodial revenues on behalf of others.

Exchange and Non-Exchange Revenues: In accordance with Federal Government accounting standards, the Department classifies revenues as either exchange (earned) or non-exchange. Exchange revenues are those that derive from transactions in which the Government provides value to the public or another Government entity at a price. Non-exchange revenues derive from the Government's sovereign right to demand payment, including fines and penalties. Non-exchange revenues also include interest earned on investments funded from amounts remaining from the privatization of the U.S. Enrichment Corporation Fund (see [Note 4](#)). These revenues are not considered to reduce the cost of the Department's operations and are reported on the *Consolidated Statements of Changes in Net Position*.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Imputed Financing Sources: In certain instances, program costs of the Department are paid out of the funds appropriated to other Federal agencies. For example, certain costs of retirement programs are paid by OPM, and certain legal judgments against the Department are paid from the Judgment Fund maintained by Treasury. When costs are incurred by other Federal entities as a result of the Department's programs, the Department recognizes these amounts on the *Consolidated Statements of Net Cost*. In addition, these amounts are recognized as imputed financing sources on the *Consolidated Statements of Changes in Net Position* (see [Notes 22](#) and [25](#)).

Custodial Revenues: The Department collects certain revenues on behalf of others, which are designated as custodial revenues. The Department incurs virtually no costs to generate these revenues, nor can it use these revenues to finance its operations. The revenues are returned to Treasury and others and are reported on the *Consolidated Statements of Custodial Activities* (see [Note 24](#)).

R. USE OF ESTIMATES

The preparation of financial statements requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Significant items subject to such estimates and assumptions include present value of loan receivables, including the allowance for subsidy cost; estimated lives of general property, plant and equipment; environmental cleanup and disposal liabilities; pension and other actuarial liabilities; contingencies and commitments; cost accruals; and estimated accrued unbilled revenues for PMAs. Actual results could differ from these estimates.

S. COMPARATIVE DATA

During FY 2022, the Debt footnote (see [Note 12](#)) was revised to align with new guidance in OMB Circular A-136. In addition, certain other FY 2021 amounts have been reclassified to conform to the FY 2022 presentation.

T. PARENT-CHILD REPORTING

The Department is a party to allocation transfers with other Federal agencies as both a transferring (parent) entity and/or a receiving (child) entity. Allocation transfers are legal delegations by one department of its authority to obligate budget authority and outlay funds to another department. A separate fund account (allocation account) is created in the Treasury as a subset of the parent fund account for tracking and reporting purposes. All allocation transfers of balances are credited to this account, and subsequent obligations and outlays incurred by the child entity are charged to this allocation account as it executes the delegated activity on behalf of the parent entity. Generally, all financial activity related to these allocation transfers (e.g., budget authority, obligations, outlays) is reported in the financial statements of the parent entity, from which the underlying legislative authority, appropriations and budget apportionments are derived. The Department receives allocation transfers, as a child entity, from the Department of Transportation. Additionally, the Department allocates funds, as the parent, to the USACE.

2. Non-Entity Assets

(\$ IN MILLIONS)	FY 2022	FY 2021
Intragovernmental		
Inventories - Department of Defense stockpile oil ^(Notes 7)	123	123
Other	6	11
Subtotal	\$ 129	\$ 134
Inventories - Oil held for others ^(Notes 7 and 14)	—	70
Other	8	9
Total non-entity assets	\$ 137	\$ 213
Total entity assets	\$ 294,160	\$ 221,337
Total assets	\$ 294,297	\$ 221,550

Assets in the possession of the Department that are not available for its use are considered non-entity assets.

3. Fund Balance with Treasury

(\$ IN MILLIONS)	FY 2022	FY 2021
Status of Fund Balance With Treasury		
Unobligated balance:		
Available	\$ 37,230	\$ 7,398
Unavailable	34,642	1,586
Obligated balance not yet disbursed	46,908	37,812
Borrowing authority not yet converted to fund balance	(3,475)	(853)
Borrowing resources invested in Treasury securities	(951)	(320)
Non-Budgetary Fund Balance with Treasury	3,311	3,223
Total Fund Balance with Treasury	\$ 117,665	\$ 48,846

Unobligated balance and Obligated balance not yet disbursed amounts reported above differ from related amounts in the Combined Statements of Budgetary Resources (SBR) because budgetary balances on the SBR are supported by amounts other than the Fund Balance with Treasury. These amounts include contract authority, transfers of invested balances payable, realized authority to be transferred from invested balances, and budgetary resources temporarily precluded or reduced.

Borrowing authority not yet converted to fund balance represents unobligated and obligated amounts recorded that will be funded by future borrowings. Borrowing

resources invested in Treasury securities represents unobligated and obligated amounts that will be redeemed in the future to pay program costs as they arise. Non-Budgetary Fund Balance with Treasury includes special fund receipt accounts, deposit funds, and clearing and suspense account balances awaiting disposition or reclassification.

Unobligated balance amounts may be available in future years which are included in Category C – Apportioned for future years as specified on the annual OMB SF-132 (Apportionment and Reapportionment Schedule).

4. Investments

(\$ IN MILLIONS)	FACE VALUE	UNAMORTIZED PREMIUM (DISCOUNT)	INTEREST RECEIVABLE	INVESTMENTS, NET	UNREALIZED MARKET GAINS (LOSSES)	MARKET VALUE
FY 2022						
Intragovernmental Non-Marketable						
Nuclear Waste Fund	\$ 56,632	\$ (10,728)	\$ 111	\$ 46,015	\$ (125)	\$ 45,890
D&D Fund	771	(3)	1	769	(2)	767
U.S. Enrichment Corporation Fund	606	—	4	610	(1)	609
Power Marketing Administrations	1,619	(8)	—	1,611	—	1,611
Total investments and related interest, net	\$ 59,628	\$ (10,739)	\$ 116	\$ 49,005	\$ (128)	\$ 48,877
FY 2021						
Intragovernmental Non-Marketable						
Nuclear Waste Fund	\$ 55,318	\$ (11,135)	\$ 112	\$ 44,295	\$ 8,065	\$ 52,360
D&D Fund	344	1	2	347	2	349
U.S. Enrichment Corporation Fund	1,430	5	15	1,450	—	1,450
Power Marketing Administrations	—	—	—	—	—	—
Total investments and related interest, net	\$ 57,092	\$ (11,129)	\$ 129	\$ 46,092	\$ 8,067	\$ 54,159

Pursuant to statutory authorizations, the Department invests monies in Treasury securities. The Department's investments primarily involve the NWF and the Uranium Enrichment Decontamination and Decommissioning (D&D) Fund. Fees collected from owners and generators of spent nuclear fuel (SNF) and high-level radioactive waste and fees collected from domestic utilities are deposited into the respective funds. Funds in excess of those needed to pay current program costs are invested in Treasury securities.

Upon privatization of the U.S. Enrichment Corporation Fund (USEC) on July 28, 1998, OMB and Treasury designated the Department as successor to USEC for purposes of disposition of balances remaining in the USEC Fund. These funds are invested in Treasury securities.

The Federal Government does not set aside assets to pay for expenditures associated with the NWF and UED&D funds for which the Department holds Treasury securities. These Treasury securities are an asset to the Department and a liability to Treasury. Because the Department and Treasury are both parts of the Federal Government, these assets and liabilities offset each other from the standpoint of the Federal Government as a whole. For this reason, they do not represent an asset or a liability in the U.S. Government-wide financial statements. Treasury securities provide the Department with ability to draw upon the Treasury to make expenditures, subject to available appropriations and OMB apportionments. When the Department requires redemption of these securities, the Federal Government finances those expenditures out of accumulated cash balances by raising taxes or other receipts, by borrowing from the public, repaying less debt, or by curtailing other expenditures. This is the same way the Federal Government finances all other expenditures.

5. Accounts Receivable, Net

(\$ IN MILLIONS)	FY 2022			FY 2021		
	RECEIVABLE	ALLOWANCE	NET	RECEIVABLE	ALLOWANCE	NET
Intragovernmental	\$ 628	\$ —	\$ 628	\$ 547	\$ —	\$ 547
Nuclear Waste Fund	\$ 2,436	\$ —	\$ 2,436	\$ 2,420	\$ —	\$ 2,420
Power Marketing Administrations	704	(1)	703	507	(1)	506
Other	2,190	(37)	2,153	184	(85)	99
Subtotal	\$ 5,330	\$ (38)	\$ 5,292	\$ 3,111	\$ (86)	\$ 3,025
Total accounts receivable, net	\$ 5,958	\$ (38)	\$ 5,920	\$ 3,658	\$ (86)	\$ 3,572

Intragovernmental accounts receivable primarily represent amounts due from other Federal agencies for reimbursable work performed pursuant to the Economy Act, Atomic Energy Act, and other statutory authority.

Non-intragovernmental receivables primarily represent fees due from owners and generators of SNF that

contribute resources to the NWF. The NWF receivables are supported by contracts and are comprised of amounts due for two types of fees to be paid to the Department for disposal services: (a) a one-time charge for SNF existing prior to April 7, 1983; and (b) a per kWh fee on all net electricity generated and sold by civilian nuclear power reactors after April 7, 1983. The Department ceased the

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

per kWh portion of the fee in 2014. However, the receivables associated with the one-time charges remain and continue to earn interest each year.

For PMAs, receivables due from the public primarily arise from the sale of power and transmission services. The

other receivables balance primarily resulted from the Strategic Petroleum Reserve's (SPR) oil sale deliveries during the month of September that were part of the President's Emergency Oil sale program. It also includes reimbursable work billings, trade receivables, and other miscellaneous balances.

6. Loans Receivable, Net and Loan Guarantee Liabilities

(\$ IN MILLIONS)	FY 2022	FY 2021
Pre-FCRA loans	\$ 1	\$ 1
FCRA Direct loans		
ATVM	—	1,028
Title XVII	15,444	15,310
Total direct loans and 100% guarantee loans, net *	\$ 15,445	\$ 16,339
FCRA Guarantee loans (guaranteed value)		
Title XVII	1,321	1,439
Total direct loans and loan guarantees, net	\$ 16,766	\$ 17,778

* Net means disbursements net of interest, repayments, recoveries and allowance for subsidy

PRE-FCRA LOANS

As of September 30, 2022, and September 30, 2021, the Department has one loan outstanding that was issued prior to the Federal Credit Reform Act of 1990 (FCRA). The loan is presented net of an allowance for loss of \$0.6 million and \$0.7 million as of September 30, 2022, and September 30, 2021, respectively. The balance is rounded on the face of this footnote.

FCRA DIRECT LOANS AND LOAN GUARANTEES

The Department's direct loans and loan guarantees made and issued, post-FY 1991, are subject to FCRA. These FCRA loans and loan guarantees are valued at the net present value of expected future cash flows, discounted at the interest rate of Treasury marketable securities. The net present value of the FCRA loans and loan guarantees are not necessarily representative of proceeds that might be expected if these loans were sold on the open market. The subsidy costs for FCRA loans and loan guarantees, which include interest rate differentials, delinquencies, defaults, fees and other cash flow items, are intended to estimate the long-term cost to the U.S. Government of such loans and loan guarantees. These costs are recognized in the year the loan or loan guarantee is disbursed. A subsidy re-estimate is performed annually as of September 30. The subsidy re-estimates take into account factors that may have affected the estimated cash flows. Any increase in the subsidy resulting from the re-estimate is recognized as a subsidy expense.

For direct loans, interest revenue is accrued on a monthly basis on the loan balance outstanding at the interest rate assigned to that loan at the time of disbursement, net of any interest on non-performing loans over 90 days.

The Department operates the following FCRA direct loan and loan guarantee programs:

- Advanced Technology Vehicles Manufacturing (ATVM) Loan Program

- Title XVII Innovative Clean Energy Loan Guarantee Program:
 - Section 1703 - Innovative Clean Energy
 - Section 1705 - American Recovery and Reinvestment Act (ARRA)
 - Section 1706 - Energy Infrastructure Reinvestment (EIR) Program
- Tribal Energy Loan Guarantee Program (TELGP)
- Carbon Dioxide Transportation Infrastructure Financing Innovation (CIFIA) Program - (BIL Section 40304)

ATVM

Section 136 of the Energy Independence and Security Act of 2007, which established the ATVM Loan Program, authorized the Department to make direct loans to support the establishment of manufacturing facilities for the production of advanced technology vehicles and components for such vehicles. The ATVM direct loans to such manufacturers are available to finance the cost of re-equipping, expanding, or establishing such manufacturing facilities and for the costs of engineering integration associated with such vehicles and components. The Bipartisan Infrastructure Law (BIL), enacted on November 15, 2021 expanded the scope of the ATVM loan program to support not only facilities for the manufacturing of light-duty vehicles and their components, but also medium and heavy-duty vehicle, locomotives, maritime vessels including offshore wind vessels, aviation, and hyperloop, subject to receipt of future appropriations.

The FY 2009 Continuing Resolution (CR) enacted on September 30, 2008, appropriated \$7.5 billion to support a maximum of \$25 billion in loans under the ATVM Loan Program.

The Inflation Reduction Act (IRA), enacted on August 16, 2022, removed the maximum loan authority cap provided by the 2009 CR and appropriated an additional \$3 billion available through September 30, 2028 to support the

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

subsidy and administrative costs of direct loans under ATVM, including direct loans for the categories added by the BIL.

The ATVM Loan Program makes direct loans that are funded by the FFB with interest rates that are equal to the cost of funds to the Treasury for obligations of comparable maturity. The subsidy cost for an ATVM direct loan is comprised of default subsidy, financing subsidy, and fees. The loan and subsidy are obligated at the time the Department offers a Conditional Commitment to an applicant.

In determining the subsidies, the Department estimates a base borrower interest rate from the budget assumption yield curve used to discount cash flows that generates a zero-financing subsidy when determining the final subsidy cost at the point of obligation. This base interest rate is used for calculating the subsidy cost only. Actual interest rates that borrowers pay are not affected. During the interest rate re-estimate, the actual interest rates and the discount rates are updated and will true-up the difference in the Treasury interest rates assumed in the original subsidy cost, and the actual Treasury rates at the point of disbursement, when the borrower interest rates are set. The Department received a contingent financial interest and warrants in connection with the sales of defaulted ATVM loans. The Department has determined that the contingent financial interest has no value until certain conditions occur. The warrants have been determined to have no value at this time.

During FY 2022, one borrower under the ATVM program repaid its debt obligation in full. As of September 30, 2022, the ATVM program has two active projects.

As of September 30, 2022, the Department obligated approximately \$8.5 billion in closed loans under the ATVM Loan Program for six borrowers. Of this sum, the Department disbursed \$7.3 billion and de-obligated \$1.2 billion. Additionally, the Department has obligated funds to prospective borrowers via Conditional Commitments totaling approximately \$2.5 billion.

INNOVATIVE CLEAN ENERGY LOAN PROGRAM

The Energy Policy Act of 2005 (EPA05), P.L. 109-58 authorized the Department to issue loan guarantees to eligible projects that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases" and "employ new or significantly improved technologies as compared to technologies in service in the U.S. at the time the guarantee is issued." Title XVII of EPA05 provided broad authority for the Department to guarantee loans for projects that satisfy the above criteria if "there is reasonable prospect of repayment of the principal and interest on the obligation by the borrower." Since the introduction of Title XVII in 2005, further legislation has designed the program to support a number of emergent energy sectors via loan guarantees including fossil energy, nuclear energy generation, front-end nuclear, renewable energy and energy efficiency. Most recently, the BIL enacted in FY 2022, expanded the scope of Section

1703 program to target additional sectors including critical minerals processing, manufacturing, recycling, and removing the innovation requirement for State Energy Financing Institution supported projects.

The IRA, also enacted in FY 2022, provides \$40 billion in loan guarantee authority as well as \$3.5 billion for credit subsidy costs and \$0.1 billion for administrative expenses, available through September 30, 2026, to support these loans. This new loan authority and corresponding appropriation is open to all currently eligible for Title XVII Innovative Clean Energy technology categories.

In addition to the program under Section 1703 of Title XVII (Section 1703 program), the American Recovery and Reinvestment Act established a program under Section 1705 of Title XVII (Section 1705 program) that permitted the Department to issue loan guarantees for certain renewable energy systems, electric power transmission systems, and leading edge biofuel projects that commenced construction on or before September 30, 2011, and also appropriated \$6 billion to pay for the subsidy costs for the loan guarantees of such projects. Public Law 111-47 required \$2.0 billion of the subsidy funds to be transferred to the Department of Transportation to fund the "Cash for Clunkers" program. Public Law 111-226 required \$1.5 billion of the subsidy funds to be rescinded. Public Law 111-203 required \$0.5 billion of the subsidy to be rescinded and returned to the U.S. Treasury (Dodd-Frank). In FY 2021, Public Law 116-260 rescinded an additional \$0.4 billion of remaining Section 1705 subsidy funds. The loan guarantee authority for Sections 1703 and 1705 and the subsidy for loan guarantees issued under Section 1705 are obligated at the time the loan guarantee is issued by the Department.

Both the Section 1703 and 1705 programs are authorized to issue loan guarantees for up to 100 percent of a debt obligation, which must not exceed 80 percent of eligible project costs. In cases where the Department issues a 100 percent guarantee, the regulations implementing Title XVII requires that the FFB provide the funding. Guarantees by the Department of 100 percent of loans made by the FFB constitute direct loans under FCRA. For the purpose of determining the subsidy, the Department models these loan guarantees as direct loans to reflect the economic reality to the Federal Government as a whole. Under Title XVII, the subsidy cost for a direct loan or a loan guarantee is comprised of default subsidy and financing subsidy. We note that the Department collects fees designed to offset the cost of administering the Title XVII loan program, and that such fees are not considered when calculating the subsidy cost.

In implementing the Section 1705 program, the Department also established the Financial Institution Partnership Program (FIPP) which supported loans for conventional renewable energy generation projects with commercial financing. Under FIPP, the Department provided a guarantee for up to 80 percent of a loan. The goal of FIPP was to leverage the human and financial capital of private sector financial institutions in

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

accelerating the loan application process, while balancing risk between the Department and private sector partners participating in the program. The subsidy related to FIPP loans was obligated at the time the loan guarantees closed.

In determining the subsidy for FFB direct loans the Department estimates a base borrower interest rate from the budget assumption yield curve used to discount cash flows that generates a zero-financing subsidy when determining the final subsidy cost at the point of obligation. The Department then adds a spread to that interest rate estimate to reflect any spread that the FFB or DOE may charge. This base interest rate is used for calculating the subsidy cost only. Actual interest rates that borrowers pay are not affected. During the interest rate re-estimate, the actual interest rates and the discount rates are updated and will true-up the difference in the Treasury interest rates assumed in the original subsidy cost, and the actual Treasury rates at the point of disbursement, when the interest rates payable by the borrower are set. As of September 30, 2022, under the Section 1703 program, the Department has obligated approximately \$12.1 billion for two projects, of which \$11.2 billion has been disbursed.

As of September 30, 2022, under the Section 1703 program, Conditional Commitments to issue loan guarantees have been issued for one project totaling \$1.0 billion.

As of September 30, 2022, under the Section 1705 program, the Department has obligated approximately \$13.3 billion for 23 projects (the Department initially obligated approximately \$15.8 billion for 28 projects, but subsequently de-obligated approximately \$2.5 billion). Seventeen of 23 projects received 100 percent guarantees of loans and six projects received partial guarantees of loans under FIPP. The Department obligated approximately \$9.1 billion to the projects receiving 100 percent guarantees under the Section 1705 program and has disbursed approximately \$9.1 billion. The Department obligated approximately \$4.2 billion to the six FIPP projects and has disbursed approximately \$4.1 billion.

TELGP

The TELGP authorized under EPLA (25 USC 3502(c)) a loan guarantee program that permits DOE to guarantee third party and FFB loans made to a federally recognized Indian tribe including Alaska Native village or regional or village corporations; or a Tribal Energy Development Organization (TEDCO) that is wholly or substantially owned by a federally recognized Indian tribe or Alaska Native Corporation for energy development. Under the Consolidated Appropriations Act, 2017, Public Law 115-31, Congress made initial appropriation of credit subsidy and loan guarantee authority available. A solicitation outlining the rules of the loan program was issued on June 12, 2018.

After the enactment of the IRA in 2022, the TELGP program has received expanded loan guarantee authority

of up to \$20 billion as well as \$75 million to carry out the program. The IRA also allows TELGP borrowers to access FFB for loan proceeds while maintaining the option of working with third-party lenders as well.

As of September 30, 2022, under the TELGP, no loan guarantees have been obligated. Any appropriated credit subsidy amounts shall be obligated at conditional commitment.

CIFIA

Section 40304 of the BIL established the Carbon Dioxide Transportation Infrastructure Finance and Innovation Program (CIFIA). CIFIA is intended to provide capital, including debt financing, to large-capacity, common-carrier carbon dioxide transport projects. These projects may include pipelines, rail, shipping and other transport methods. Prospective CIFIA projects may apply for direct loans from the U.S. Treasury or loan guarantees of a third-party lender.

The BIL appropriates \$3 million for administrative costs, in FY 2022, which is available until expended. The BIL further appropriates an additional \$2.097 billion to carry out the program, including administrative costs, in FY 2023, also available until expended.

LPO, in partnership with DOE's Office of Fossil Energy and Carbon Management, will implement the program. A guidance document for CIFIA Loan application was released on October 5, 2022 and further guidance on CIFIA Future Growth Grants will be released in FY 2023.

EIR (1706)

The IRA expands the scope of the original Title XVII language, which targets innovative energy projects that avoid, reduce or sequester greenhouse gases, via a new loan program. The Energy Infrastructure Reinvestment (EIR) Program or Section 1706 is established to provide loan guarantees to projects that retool, repower, repurpose, or replace energy infrastructure that has ceased operations, or enable operating energy infrastructure to avoid, reduce, utilize, or sequester air pollutants or anthropogenic emissions of greenhouse gases. The IRA appropriates \$5 billion through September 30, 2026, to carry out EIR, with a total loan authority cap of \$250 billion.

Loan Program Office plans to provide initial implementing guidance and collect public comment on program design for EIR in its upcoming Title XVII rulemaking, which was the subject of a recent Request for Information. Potential projects could include repurposing shuttered fossil energy facilities for clean energy production, retooling infrastructure from power plants that have ceased operations for new clean energy uses, or updating operating energy infrastructure with emissions control technologies, including carbon capture, utilization, and storage (CCUS).

As this program is newly established, it has not obligated any authority as of September 30, 2022.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Direct Loans and 100 percent Loan Guarantees Obligated and Disbursed Post 1991

(\$ IN MILLIONS)	LOANS RECEIVABLE GROSS	INTEREST RECEIVABLE	ALLOWANCE FOR SUBSIDY COST (PRESENT VALUE)	VALUE OF ASSETS RELATED TO LOANS, NET	DISBURSED IN FISCAL YEAR
FY 2022					
ATVM	\$ —	\$ —	\$ —	\$ —	\$ —
Title XVII	15,682	73	(311)	15,444	464
Total Loans	\$ 15,682	\$ 73	\$ (311)	\$ 15,444	\$ 464
FY 2021					
ATVM	\$ 1,101	\$ 1	\$ (74)	\$ 1,028	\$ —
Title XVII	15,699	73	(462)	15,310	1,547
Total loans	\$ 16,800	\$ 74	\$ (536)	\$ 16,338	\$ 1,547

Subsidy Expense for Direct Loans and 100 percent Loan Guarantees by Program and Component

(\$ IN MILLIONS)	INTEREST DIFFERENTIAL	DEFAULTS	FEES AND OTHER COLLECTIONS	OTHER	TOTAL
FY 2022					
Subsidy expense for new direct loans disbursed*					
ATVM	\$ —	\$ —	\$ —	\$ —	\$ —
Title XVII	\$ (19)	\$ 9	\$ —	\$ —	\$ (10)
Total	\$ (19)	\$ 9	\$ —	\$ —	\$ (10)
	INTEREST RE-ESTIMATES	TECHNICAL RE-ESTIMATES	TOTAL RE-ESTIMATES	TOTAL MODIFICATIONS	TOTAL DIRECT LOAN SUBSIDY EXPENSE
Re-estimates and Modifications					
ATVM	\$ —	\$ (81)	\$ (81)	\$ —	\$ (81)
Title XVII	(262)	66	(196)	—	(206)
Total	\$ (262)	\$ (15)	\$ (277)	\$ —	\$ (287)

(\$ IN MILLIONS)	INTEREST DIFFERENTIAL	DEFAULTS	FEES AND OTHER COLLECTIONS	OTHER	TOTAL
FY 2021					
Subsidy expense for new direct loans disbursed*					
Title XVII	\$ (72)	\$ 27	\$ —	\$ —	\$ (45)
Total	\$ (72)	\$ 27	\$ —	\$ —	\$ (45)
	INTEREST RE-ESTIMATES	TECHNICAL RE-ESTIMATES	TOTAL RE-ESTIMATES	TOTAL MODIFICATIONS	TOTAL DIRECT LOAN SUBSIDY EXPENSE
Re-estimates and Modifications					
ATVM	\$ —	\$ (11)	\$ (11)	\$ —	\$ (11)
Title XVII	(358)	(39)	(397)	—	(442)
Total	\$ (358)	\$ (50)	\$ (408)	\$ —	\$ (453)

* New disbursements of existing loan obligations

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Subsidy Rates for FCRA Direct Loans by Program and Component

	INTEREST DIFFERENTIAL	DEFAULTS	FEES AND OTHER COLLECTIONS	OTHER	TOTAL
FY 2022					
ATVM	0.120%	5.210%	-0.100%	0.000%	5.230%
Title XVII	-5.877%	2.204%	0.000%	0.000%	-3.673%
FY 2021					
ATVM	0.000%	0.000%	0.000%	0.000%	0.000%
Title XVII	0.000%	0.000%	0.000%	0.000%	0.000%

Rates are the weighted-average of the individual loan subsidy rates for that program. The subsidy rates disclosed pertain only to the current year's cohorts. These rates cannot be applied to the direct loans disbursed during the current reporting year to yield the subsidy

expense. The subsidy expense for new loans reported in the current year could result from disbursements of loans from both current year cohorts and prior-year(s) cohorts. The subsidy expense reported in the current year also includes re-estimates.

Schedule for Reconciling Subsidy Cost Allowance Balances (Post-1991 Direct Loans and 100 Percent Loan Guarantees)

(\$ IN MILLIONS)	FY 2022	FY 2021
Beginning balance of the subsidy cost allowance	\$ 536	\$ 949
Add: subsidy expense for direct loans disbursed during the reporting years by component		
Interest rate differential costs	\$ (19)	\$ (72)
Default costs (net of recoveries)	9	27
Total of the above subsidy components	\$ (10)	\$ (45)
Adjustments:		
(a) Modification adjustment transfer	—	—
(b) Subsidy allowance amortization	62	40
Ending balance of subsidy cost allowance before re-estimates	\$ 588	\$ 944
Add or subtract subsidy re-estimates by component:		
Interest rate re-estimates	(262)	(358)
Technical/default re-estimates	(15)	(50)
Ending balance of subsidy cost allowance	\$ 311	\$ 536

Guaranteed Loans Outstanding

(\$ IN MILLIONS)	PRINCIPAL OF GUARANTEED LOANS FACE VALUE	AMOUNT OF OUTSTANDING PRINCIPAL GUARANTEED
FY 2022		
Title XVII	\$ 1,651	\$ 1,321
FY 2021		
Title XVII	\$ 1,799	\$ 1,439

Liability for Loan Guarantees, Present Value Method

(\$ IN MILLIONS)	FY 2022	FY 2021
Title XVII	\$ 89	\$ 98

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Subsidy Expense for New Loan Guarantees by Program and Component

(\$ IN MILLIONS)	INTEREST DIFFERENTIAL	DEFAULTS	FEEs AND OTHER COLLECTIONS	OTHER	TOTAL
FY 2022					
Subsidy expense for new loan guarantees Title XVII	\$ —	\$ —	\$ —	\$ —	\$ —
	INTEREST RE-ESTIMATES	TECHNICAL RE-ESTIMATES	TOTAL RE-ESTIMATES		TOTAL GUARANTEE SUBSIDY EXPENSE
Re-estimates Title XVII	\$ —	\$ (12)	\$ (12)		\$ (12)
(\$ IN MILLIONS)	INTEREST SUPPLEMENTS	DEFAULTS	FEEs AND OTHER COLLECTIONS	OTHER	TOTAL
FY 2021					
Subsidy expense for new loan guarantees Title XVII	\$ —	\$ —	\$ —	\$ —	\$ —
	INTEREST RE-ESTIMATES	TECHNICAL RE-ESTIMATES	TOTAL RE-ESTIMATES		TOTAL GUARANTEE SUBSIDY EXPENSE
Re-estimates Title XVII	\$ —	\$ (23)	\$ (23)		\$ (23)

Schedule for Reconciling Loan Guarantee Liability Balances (Post-1991 Loan Guarantees)

(\$ IN MILLIONS)	FY 2022	FY 2021
Beginning balance of the loan guarantee liabilities	\$ 98	\$ 117
Add interest expense on entity borrowings	3	4
Less downward re-estimates	(12)	(23)
Ending balance of the loan guarantee liabilities	\$ 89	\$ 98

Administrative Expenses

(\$ IN MILLIONS)	FY 2022	FY 2021
Direct loan program - ATVM	\$ 9	\$ 5
Loan guarantee program - Title XVII	\$ 45	\$ 36

Loans Receivable

(\$ IN MILLIONS)	FY 2022	FY 2021
Loans Receivable, start of year	\$ 16,800	\$ 16,031
Plus Loan Disbursements	464	1,547
Less Principal Payments Received	(1,519)	(712)
Plus/Less Capitalized Interest	(63)	(66)
Ending balance of loan guarantee liability	\$ 15,682	\$ 16,800

7. Inventory, Net

(\$ IN MILLIONS)	FY 2022	FY 2021
Strategic Petroleum, Northeast Home Heating Oil and Gasoline Supply Reserves	\$ 13,166	\$ 18,844
Nuclear Materials	31,067	29,720
Other Inventory	779	742
Total inventory, net	\$ 45,012	\$ 49,306

Inventory includes stockpile materials consisting of crude oil and gasoline held in the SPR, ultra-low sulfur diesel held in the Northeast Home Heating Oil Reserve, refined petroleum in the Northeast Gasoline Supply Reserve, and nuclear materials. Other inventory consists primarily of operating materials and supplies.

STRATEGIC PETROLEUM RESERVE

The SPR consists of crude oil stored in salt domes, terminals, and pipelines. As of September 30, 2022, the SPR contained crude oil with a historical cost of \$12.9 billion. The SPR provides a response mechanism should a severe oil disruption occur. Included in the SPR is six million barrels of crude oil held for future DoD use. The Department of Defense Appropriations Act, 1993, authorized the Department to acquire, transport, store, and prepare for ultimate drawdown of crude oil for DoD. Of the \$12.9 billion, the crude oil purchased with DoD funding is commingled with the Department's stock and is valued at its historical cost of \$123 million at September 30, 2022 (see [Notes 2](#) and [14](#)).

Beginning in FY 2017 and ending in FY 2028, the Department will conduct a series of oil sales authorized by the Bipartisan Budget Act of 2015, 21st Century Cures Act of 2015 (Cures Act), Fixing America's Surface Transportation Act of 2015 (FAST), Tax Cuts and Jobs Act of 2017, Bipartisan Budget Act of 2018, Consolidated Appropriations Act of 2018, and the America's Water Infrastructure Act of 2018. The Bipartisan Budget Act of 2015 authorizes selling enough oil from FY 2017 to FY 2021 to raise \$1.4 billion to modernize the SPR, subject to prior appropriation, and to sell a total 58 million barrels of oil from FY 2018 to FY 2025 to raise revenue for the General Treasury. The second law (Cures Act) authorizes the sale of 25 million barrels to fund National Institutes of Health (NIH) innovation projects. The third law (FAST) authorizes the sale of an additional 66 million barrels of oil from FY 2023 to 2025 (or raising \$5 billion, whichever comes first) to fund highway programs.

The Tax Cuts and Jobs Act of 2017, Bipartisan Budget Act of 2018, Consolidated Appropriations Act of 2018, and the America's Water Infrastructure Act of 2018 have expanded the overall sales volume by authorizing 122 million additional barrels to be sold between FY 2020 and FY 2028. As of September 30, 2022, stockpile materials held for sale of crude oil are valued at \$30.64 per barrel.

During FY 2022, the SPR held two oil exchanges. The Winter Competitive Oil Exchange delivered 4.8 million barrels of crude oil out of the SPR. The Winter

Supplemental Oil Exchange delivered 19.6 million barrels of crude oil out of the SPR.

On March 31, 2022, President Biden announced that the SPR would release up to one million barrels of crude oil a day for six months totaling 180 million barrels of crude oil. During FY 2022, the SPR conducted multiple oil sales in response to the President's Directive. As of September 30, 2022, the SPR sold over 108.6 million barrels of crude oil with \$11 billion collected.

On June 3, 2020, a foreign lease agreement was signed with the Commonwealth of Australia (COA) to store up to 25 million barrels at the SPR Big Hill site. The COA stored 1.7 million barrels with the SPR which was commingled with the Department's stock. As of September 30, 2022, the COA sold their 1.7 million barrels of crude oil as part of their participation in the International Energy Agency collection action in response to the Russian/Ukraine conflict.

NORTHEAST HOME HEATING OIL RESERVE

The Northeast Home Heating Oil Reserve was established in FY 2000 pursuant to the Energy Policy and Conservation Act of 1975. The Reserve contains petroleum distillate in the New England geographical area. The historical cost of the reserve was \$141 million as of September 30, 2022.

NORTHEAST GASOLINE SUPPLY RESERVE

The Northeast Gasoline Supply Reserve was established in FY 2014 pursuant to the Energy Policy and Conservation Act of 1975. The Reserve contains refined petroleum product in the New York Harbor area and the Boston/Northern New England area. The historical cost of the product contained in the reserve was \$122 million as of September 30, 2022.

NUCLEAR MATERIALS

Nuclear materials include plutonium (weapon-grade, fuel-grade), uranium (highly enriched uranium [HEU], low enriched uranium [LEU], natural uranium, and depleted uranium), tritium, and other materials including those in the custody of the DOD as allowed under Presidential Directive. Nuclear materials are used in weapons and components, naval and other reactors, and research and development.

As of September 30, 2022, the Department has natural uranium inventories of 3,704 metric tons (MTU) of uranium hexafluoride (UF₆). This material can be divided into two stockpiles of material: U.S. origin (1,960 MTU of UF₆) and Russian origin material (1,744 MTU of UF₆). This

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

includes the Reclassified US Origin (142.3 MTU of UF6) to Russian and Canadian. The nuclear materials inventory includes numerous items for which future use and disposition decisions have not been made. Decisions will be made through analysis of the economic benefits and costs, and the environmental impacts of the various use and disposition alternatives. The carrying value of these items is not significant to the nuclear materials stockpile inventory balance. The Department will recognize disposition liabilities and record the material at net realizable value when disposal as waste is identified as the most likely alternative and disposition costs can be reasonably estimated. Inventory values are reduced by costs associated with disposition, decay, or damage. Under a declaration by the Nuclear Weapons Council and an announcement by the President in 1995, 174.3 MTU of

the Department's HEU was identified as Surplus Fissile Material - S94. Analysis of this 174.3 MTU identified 154 MTU that was appropriate for downblending. In 2005, Secretary of Energy Bodman announced that, over the coming decades, another 200 MTU of HEU would be removed from use as fissile material in weapons. The majority of this 200 MTU was set aside for naval reactors and other HEU reactors, but analysis identified about 28 MTU for downblending. Finally, another 4 MTU of HEU not included in these declarations, has been identified for downblending. All totaled, 186 MTU HEU will be dispositioned through downblending, where 165.4 MTU has been completed at the end of FY 2022.

8. Property, Plant, and Equipment, Net

(\$ IN MILLIONS)	ACQUISITION COSTS	ACCUMULATED DEPRECIATION	NETBOOK VALUE	ACQUISITION COSTS	ACCUMULATED DEPRECIATION	NETBOOK VALUE
	FY 2022			FY 2021		
Land and Land improvements	\$ 2,692	\$ (1,271)	\$ 1,421	\$ 2,591	\$ (1,198)	\$ 1,393
Structures and facilities	57,619	(37,973)	19,646	56,101	(36,729)	19,372
Internal use software	1,286	(904)	382	1,249	(894)	355
Equipment	23,082	(14,310)	8,772	22,032	(13,914)	8,118
Natural Resources	143	(23)	120	133	(22)	111
Construction work in process	16,430	—	16,430	13,810	—	13,810
Total general property, plant & equipment	\$ 101,252	\$ (54,481)	\$ 46,771	\$ 95,916	\$ (52,757)	\$ 43,159

(\$ IN MILLIONS)	PP&E	ACCUMULATED DEPRECIATION	NET PP&E
PP&E Balance beginning of year	\$ 95,916	\$ (52,757)	\$ 43,159
Capitalized acquisitions from the public	6,642	—	6,642
Capitalized acquisitions from the government agencies	60	—	60
Dispositions	(277)	277	—
Revaluations	(1,089)	—	(1,089)
Depreciation/Amortization	—	(2,001)	(2,001)
Total PP&E Balance at end of year	\$ 101,252	\$ (54,481)	\$ 46,771

9. Other Assets

(\$ IN MILLIONS)	FY 2022	FY 2021
Other than Intragovernmental		
Regulatory assets ^(Note 10)	\$ 8,954	\$ 9,340
Operating non-federal generation	3,205	3,360
Other	1,558	772
Total other assets	\$ 13,717	\$ 13,472

OPERATING NON-FEDERAL GENERATION

BPA is party to long-term contracts for BPA to acquire all of the generating capability of Energy Northwest's Columbia Generating Station (CGS) and Lewis County Public Utility District's Cowlitz Falls Hydroelectric Project.

CGS is a non-Federal nuclear power plant owned and operated by Energy Northwest, a joint operating agency of the state of Washington. The current license termination dates for CGS and the Cowlitz Falls Project are in December 2043 and May 2036, respectively. BPA has

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

acquired the output of the Cowlitz Falls Project through June 30, 2032. These contracts require that BPA meet all of the facilities' operating, maintenance and debt service costs (see [Note 12](#)). The assets are amortized on a straight-line basis through their respective license termination dates to program costs.

OTHER

This amount includes BPA's asset for non-Federal nuclear decommissioning trusts, lease-purchase trust funds, derivative instruments that represent unrealized gains, and funding agreements for certain joint transmission projects. In addition, this amount includes

Western Area Power Administration's (WAPA) long-term power rights which are not directly identifiable to a specific WAPA-owned facility and are owned and used by WAPA in operations. Power rights are amortized over 40 years.

The balance also includes oil owed to the SPR for loaning oil to oil companies under the Hurricane Ida, FY 2021 Winter Exchange, and the Supplemental emergency oil exchange programs. Amounts due include base and premium barrels.

10. Regulatory Assets

(\$ IN MILLIONS)	FY 2022	FY 2021
Refinanced and additional appropriated capital	\$ 5,133	\$ 5,215
Residential exchange programs scheduled and refund amounts	1,514	1,722
Non-operating facilities	1,463	1,543
Conservation and fish and wildlife measures	315	377
Other regulatory assets	529	483
Total regulatory assets ^(Note 9)	\$ 8,954	\$ 9,340

The Department's PMAs record certain amounts as assets in accordance with the Financial Accounting Standards Board's Accounting Standards Codification (FASB ASC) 980, *Regulated Operations*. The provisions of this standard require that regulated enterprises reflect rate actions of the regulator in their financial statements, when appropriate. These rate actions can provide reasonable assurance of the existence of an asset, reduce or eliminate the value of an asset, or impose a liability on a regulated enterprise. In order to defer incurred costs under this standard, a regulated entity must have the statutory authority to establish rates that recover all costs, and those rates must be charged to, and collected from, customers.

REFINANCED AND ADDITIONAL APPROPRIATED CAPITAL

BPA is responsible for repaying the Treasury for transmission and power generating assets that were funded by appropriations, including those of the USACE and Bureau of Reclamation (BOR). In accordance with accounting guidance for regulated operations, BPA records a regulatory asset based on this deferred cost that must be repaid to the Treasury for those assets owned by the USACE and BOR. This regulatory asset is amortized to program costs over a period of 50 years on a straight-line method based on the estimated service lives of the assets. BPA's trial balance also includes a regulatory asset and a corresponding intragovernmental debt for refinanced and additional appropriations owed to the Treasury. Under the BPA Refinancing Section of the Omnibus Consolidated Rescissions and Appropriations Act of 1996 (Refinancing Act), 16 U.S.C. 838(l), BPA refinanced its unpaid capital appropriations as of September 30, 1996, and is responsible for the repayment of additional appropriated capital investment after the Refinancing Act (see [Note 14](#)).

RESIDENTIAL EXCHANGE PROGRAM (REP) SCHEDULED AMOUNTS

Under the provisions of the 2012 Residential Exchange Program (REP) Settlement Agreement, BPA's investor-owned utilities customers (IOUs) receive a fixed schedule of benefit payments (Scheduled Amounts) that are being recovered in rates through 2028. These amounts amortize to program costs (see [Note 14](#)).

NON-OPERATING FACILITIES

BPA is responsible for repayment of debt for terminated Energy Northwest Nuclear Projects 1 and 3. These assets are amortized to program costs through 2043. BPA is also responsible for the repayment of the Northern Wasco Hydro Project for which BPA ceased its participation as recipient of the project's electric power. These assets are amortized to program costs through 2025 (see [Note 12](#)).

FISH AND WILDLIFE AND CONSERVATION MEASURES

Fish and wildlife measures consist of deferred fish and wildlife project expenses to be recovered in future rates. These costs are amortized to program costs over a period of 15 years. Conservation measures consist of the costs of deferred energy conservation measures to be recovered in future rates. These costs are amortized to program costs over periods of 12 or 20 years.

OTHER REGULATORY ASSETS

Other regulatory assets for BPA primarily include costs to be recovered in future rates for preliminary construction and related activities for the former I-5 Corridor Reinforcement Project (amortized through FY 2024); decommissioning and site restoration costs that reflect amounts to be recovered in future rates for funding the asset retirement obligation (ARO) liability related to the former Trojan nuclear facility; decommissioning and site restoration costs representing unrealized losses in the non-Federal nuclear decommissioning trust assets for CGS; and spacer damper replacement program costs to replace deteriorated spacer dampers on certain transmission lines (amortized over a period of 25 or 30 years).

11. Liabilities Not Covered by Budgetary Resources

(\$ IN MILLIONS)	FY 2022	FY 2021
Intragovernmental		
Debt	\$ 5,755	\$ 5,705
Appropriated capital and other adjustments	3,891	3,324
Future reimbursements to the Treasury Judgment Fund	410	410
Other	38	40
Total Intragovernmental	\$ 10,094	\$ 9,479
Federal debt held by the public ^(Note 12)	5,101	5,082
Federal employee benefits payable	422	281
Environmental liabilities ^(Note 13)	516,621	512,742
Nuclear Waste Fund deferred revenues ^(Note 15)	48,452	46,716
Other liabilities		
Contingencies and commitments ^(Note 18)	31,093	30,963
Pension and other actuarial liabilities ^(Notes 14 & 16)	14,804	22,336
Residential exchange - scheduled amounts ^(Note 14)	1,514	1,722
Environment, safety, and health compliance activities ^(Note 14)	1,653	1,994
Energy savings performance contracts and utility energy service contracts ^(Note 14)	435	475
Capital leases ^(Note 17)	78	57
Other	62	73
Total liabilities not covered by budgetary resources	\$ 630,329	\$ 631,920
Total liabilities covered by budgetary resources	31,525	32,133
Total liabilities not requiring budgetary resources	1,081	1,140
Total liabilities	\$ 662,935	\$ 665,193

12. Debt

(\$ IN MILLIONS)	BEGINNING BALANCE	NET BORROWINGS	ENDING BALANCE	BEGINNING BALANCE	NET BORROWINGS	ENDING BALANCE
	FY 2022			FY 2021		
Debt Owed to the Federal Financing Bank	\$ 15,612	\$ (393)	\$ 15,219	\$ 15,448	\$ 164	\$ 15,612
Debt Owed to Treasury other than FFB	7,002	(530)	6,472	6,659	343	7,002
Debt Owed to the Public	5,082	19	5,101	5,078	4	5,082
Total debt	\$ 27,696	\$ (904)	\$ 26,792	\$ 27,185	\$ 511	\$ 27,696

DEBT OWED TO THE FFB

To finance its loan programs, the Department is required to use the FFB for the ATVM program and the 100 percent loan guarantees of the Title XVII program. As of September 30, 2022 and 2021, the maturity range of the debt was from October 3, 2022 to April 3, 2045 and October 4, 2021 to April 3, 2045, respectively. The interest rate range was from 1.356 percent to 3.00 percent as of September 30, 2022 and 2021. All debt from the FFB is considered covered by budgetary resources as there is no congressional action necessary to pay the debt.

DEBT OWED TO TREASURY OTHER THAN FFB

BPA is authorized by Congress to issue and sell bonds to the Treasury, and to have outstanding at any time up to \$13.7 billion aggregate principal amount of bonds. Beginning in FY 2028, an additional \$4.0 billion of Treasury borrowing authority will be available. Of the \$13.7 billion in borrowing authority currently available, \$1.3 billion is available for electric power conservation and renewable resources, including capital investment at the Federal Columbia River Power System (FCRPS) hydroelectric facilities owned by the USACE and BOR, and \$12.5 billion is available for BPA's transmission capital program and to implement BPA's authorities under the Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act). Of the total Treasury borrowing authority available at any one time (\$13.7 billion through fiscal year 2027 and \$17.7 billion

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

beginning in fiscal year 2028), \$750 million can be issued to finance Northwest Power Act-related expenses. The interest on BPA's outstanding bonds is set at rates comparable to rates on debt issued by other comparable Federal government institutions at the time of issuance. Bonds can be issued with call options.

As of September 30, 2022 and 2021, BPA had no bonds outstanding related to Northwest Power Act expenses. As of September 30, 2022, \$626 million of variable-rate bonds were callable by BPA at par value on their interest repricing dates, which occurs every three or six months.

The remaining \$5.1 billion of bonds are callable by BPA at a premium or discount, which is calculated based on the current government agency rates for the remaining term to maturity at the time the bonds are called. As of September 30, 2021, \$531 million of variable-rate bonds were outstanding.

WAPA has authority to borrow up to \$3.3 billion from the Treasury for planning, constructing, financing, operating, or maintaining new or upgraded electric power transmission lines and facilities; and for delivering or facilitating the delivery of power generated by renewable energy.

The Department is authorized to borrow from Treasury if cash previously collected is not enough to cover interest expense and other items related to the ATVM and Title XVII loan programs. As of September 30, 2022, the maturity range of the debt was September 30, 2040 to September 30, 2048 and the interest rate range was 1.356 percent to 3.00 percent. As of September 30, 2021, the maturity range of the debt was September 30, 2024 to September 30, 2048 and the interest rate range was 1.356 percent to 3.00 percent. Borrowings from Treasury related to ATVM and Title XVII loan programs are considered covered by budgetary resources as there is no congressional action necessary to pay the debt.

DEBT OWED TO THE PUBLIC

Debt held by the public primarily includes liabilities associated with BPA purchased generating capability discussed in [Note 10](#); the non-operating facilities for which BPA bears responsibility discussed in [Note 10](#); and customer prepaid power purchases.

As of September 30, 2022 and 2021, Energy Northwest could borrow \$110 million under a line-of-credit borrowing arrangement with a banking institution. As of September 30, 2022, and 2021, Energy Northwest had no amounts outstanding on this line of credit.

During fiscal year 2013, BPA entered into agreements with four regional consumer-owned utilities for the advance payment of portions of their power purchases. Under this program, customers purchased prepaid power in blocks through FY 2028. For each block purchased, BPA repays the prepayment, with interest, as monthly fixed credits on the customers' power bills.

In March 2013, BPA received \$340 million representing \$474 million in scheduled credits for blocks purchased by customers. BPA accounts for the prepayment proceeds as a financing transaction and reports the value of the obligations associated with the fixed credits as a prepayment liability. The prepaid liability is reduced and the credits are applied as power is delivered through FY 2028. As of September 30, 2022, BPA's remaining liability is \$163 million.

13. Environmental and Disposal Liabilities

(\$ IN MILLIONS)	FY 2022	FY 2021
Beginning balance	\$ 515,645	\$ 512,257
Changes to environmental cleanup and disposal liability estimates ^(Note 20)	11,443	10,877
Costs applied to reduction of legacy environmental liabilities ^(Note 20)	(6,436)	(6,451)
Capital expenditures related to remediation activities	(992)	(1,038)
Ending environmental cleanup and disposal liabilities	\$ 519,660	\$ 515,645
Unfunded environmental liabilities ^(Note 11)	\$ 516,621	\$ 512,742
Funded environmental liabilities	3,039	2,903
Total environmental cleanup and disposal liabilities	\$ 519,660	\$ 515,645

After World War II, the U.S. developed a massive industrial complex to research, produce, and test nuclear weapons and commercial nuclear power reactors. The nuclear complex was comprised of nuclear reactors, chemical processing buildings, metal machining plants, laboratories, and maintenance facilities.

At all sites where these activities took place, some environmental contamination occurred. This contamination was caused by the production, storage, and use of radioactive materials and hazardous chemicals, which resulted in contamination of soil, surface water, or groundwater. In particular, the environmental legacy of nuclear weapons production also included thousands of contaminated buildings and large volumes of waste and special nuclear materials requiring treatment, stabilization, and disposal.

The Nuclear Waste Policy Act of 1982 (NWSA) established the Federal Government's responsibility to provide for permanent disposal of the Nation's high-level radioactive waste and SNF. The Act requires all owners and generators of high-level nuclear waste and SNF, including the Department, to pay their respective shares of the full cost of disposal. The Department's liability for disposal reflects its share of the estimated future costs of the disposal of its inventory of high-level waste and SNF. The Department's liability does not include the portion of the cost attributable to commercial owners and generators.

The Department has estimated environmental cleanup liability for the environmental contamination and waste disposition obligations discussed above. The estimates provide for a site-by-site projection of the work required to safely complete all EM projects, while complying with regulatory agreements, statutes, and regulations. Project estimates include projections of the technical scope, schedule, and estimable costs at each site for their cleanup.

In addition to the assumptions and uncertainties discussed above, the following key assumptions and uncertainties relate to the Department's estimates:

- The Department has identified approximately 11,844 potential release sites from which contaminants could migrate into the environment. Although virtually all sites have been at least partially characterized,

final remedial action and regulatory decisions have not been made for many sites. Site-specific assumptions regarding the amount and type of contamination and the remediation technologies that will be utilized were used in estimating the environmental liabilities related to these sites.

- Cost estimates for management of the Department's high-level waste and SNF have been predicated upon assumptions as to the timing of permanent disposition. Changes in high-level waste and SNF disposition plans could cause Departmental projected costs to change.
- Estimates are based on remedies considered technically and environmentally reasonable and achievable by local project managers and appropriate regulatory authorities.
- Estimated cleanup costs at sites for which there are no current feasible remediation approaches are excluded from the estimates, although applicable stewardship and monitoring costs for these sites are included. The Department has not been required via regulation to establish remediation activities for these sites.

Changes to the Department's environmental liabilities estimates in FY 2022 resulted from inflation adjustments to reflect constant dollars for the current year; improved and updated estimates for the same scope of work, including changes resulting from deferral or acceleration of work; revisions in technical approach or scope, including additional contamination; updated estimates of projected waste volumes; legal and regulatory changes; and cleanup activities performed.

The Department's liabilities also include the estimated cleanup and post-closure responsibilities, including surveillance and monitoring activities, soil and groundwater remediation, and disposition of excess material for sites. The Department is responsible for the post-closure activities at many of the closure sites, as well as other sites (former uranium mills and certain sites remediated by the USACE). The costs for these post-closure activities are estimated for a period of 75 years after the balance sheet date, i.e., through FY 2097 in FY 2022 and through FY 2096 in FY 2021. While some

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

post-cleanup monitoring and other long-term stewardship activities post FY 2097 are included, there are others the Department expects to continue beyond FY 2097 for which the costs cannot reasonably be estimated.

A portion of the environmental liability at various field sites includes anticipated costs for facilities managed by the Department's ongoing program operations which will ultimately require stabilization, deactivation, and decommissioning. These estimates are largely based upon a cost-estimating model. Site-specific estimates are used, in lieu of the cost-estimating model, when available. Cost estimates for ongoing program facilities are updated each year. For facilities newly contaminated since FY 1997, costs are allocated to the periods benefiting from the operations of the facilities. Facilities' cleanup costs allocated to future periods and not included in the liability amounted to \$1.1 billion at September 30, 2022, and \$1.1 billion at September 30, 2021.

Estimating the Department's environmental cleanup liability requires making assumptions about future activities and is inherently uncertain. The future course of the Department's environmental cleanup and disposal will depend on a number of fundamental technical and policy choices, many of which have not been made. The cost and environmental implications of alternative choices can be profound. For example, some contaminated sites and facilities could be restored to a condition suitable for any desired use; they could also be restored to a point where they pose no near-term health risks to surrounding communities but are essentially secured, monitored, and left in place. Achieving the former condition would have a higher cost but may, or may not, warrant the cost or be legally required. The estimates reflect applicable decisions and current expectations as to the extent of cleanup and site and facility reuse, which include consideration of legal requirements and stakeholder input. The environmental liability estimate includes contingency estimates intended to account for the uncertainties associated with the technical cleanup scope of the program. Congressional appropriations at lower-than-anticipated levels or lack of Congressional approval, unplanned delays in project completions including potential delays due to COVID-19, unforeseen technical issues, obtaining regulatory approval, among other things, could cause increases in life-cycle costs. All environmental liabilities as of September 30, 2022, and September 30, 2021, are stated in FY 2022 dollars and FY 2021 dollars, respectively, as required by generally accepted accounting principles for Federal entities. Future inflation could cause actual costs to be substantially higher than the recorded liability.

HANFORD SITE

The Department's Hanford Site covers 586 square miles in the desert of southeastern Washington State. The area is home to nine former production reactors and their associated processing facilities. The major activities comprising the environmental liability at Hanford include the following:

- The Waste Treatment Plant is a multi-year construction project that once complete will provide the primary treatment capability to immobilize the radioactive and chemical tank waste at the Hanford site. The estimate for this project is undergoing an Analysis of Alternatives that is expected to continue beyond FY 2022 and may result in revisions to the liability.
- The Tank Farm project includes activities required to manage and stabilize approximately 56 million gallons of radioactive waste stored in 177 underground tanks, including retrieval, treatment, disposal, and closure.
- Waste Treatment Plant Operations is responsible for the operational scope for the Waste Treatment Plant Low-Activity Waste Facility, the Analytical Laboratory, and the Balance of Facilities starting with hot commissioning but after project completion for those facilities.
- The River Corridor Closure Project addresses the remediation of contaminated soils and facilities adjacent to the Columbia River. Much of this work has been completed but remediation activities continue for the soil beneath the 324 Building; the treatment and packaging of radioactive sludge to interim storage; and in the future, the remediation of 618-11 burial grounds.
- Solid Waste Operations in the central plateau in support of remediation activities on the Hanford Site.
- Soil and groundwater, as well as D&D activities, which addresses the remediation of contaminated soils and facilities in the central plateau.
- Infrastructure services in support of the operations on the Hanford Site including safeguards and security, utility operations, and fire operations.

SAVANNAH RIVER SITE

The Savannah River Site (SRS), located in South Carolina, is 310 square miles in size with 1,000 facilities concentrated within 10 percent of the total land area. The SRS environmental liability estimate reflects the mission of safely storing, treating, and disposing of a variety of radioactive and hazardous waste streams, remediating the environment, deactivating and decommissioning excessed facilities, stabilization and immobilization of high-level waste (HLW), and the secure storage of foreign and domestic nuclear materials including spent nuclear fuel and plutonium at the site. The major activities comprising the environmental liability at SRS include the following:

- The Radioactive Liquid Waste Stabilization and Disposition program includes safely and effectively treating, stabilizing, and disposing of approximately 35 million gallons of legacy radioactive waste stored in 43 of 51 underground storage tanks. To date, eight tanks have achieved regulatory operational closure and have been grouted in place. The majority of the liquid tank

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

waste is processed through the Salt Waste Processing Facility into two streams, HLW and decontaminated salt solution (DSS) which is a low-level waste stream. The HLW stream coming from the Salt Waste Processing Facility is combined with the sludge waste stored in the liquid waste storage tanks and is sent to the Defense Waste Processing Facility (DWPF) for vitrification and poured into stainless steel canisters, which are temporarily stored in the Glass Waste Storage Buildings on-site. The DSS is sent to the Saltstone Production facility where it is combined with a cementitious material and permanently disposed in on-site Saltstone Disposal Units.

- The surplus plutonium disposition program provides the capability to disposition certain inventories of the Nation's surplus plutonium. In FY 2019, the Mixed Oxide (MOX) project was terminated and the Department is pursuing the implementation of the dilute and dispose strategy to fulfill the United States' commitment to dispose of 34 metric tons of plutonium.

IDAHO NATIONAL LABORATORY SITE

The Idaho National Laboratory (INL) is a research and engineering complex that occupies 890 square miles in southeastern Idaho and has been the center of nuclear energy research since 1949. Idaho has fulfilled numerous DOE missions including the design and testing of 52 nuclear reactors and reprocessing spent nuclear fuel to recover fissile materials. These activities resulted in inventories of waste managed as high-level, transuranic, mixed low-level, and low-level wastes. The major activities comprising the environmental liability at the INL include the following:

- The Spent Nuclear Fuel Stabilization and Disposition project includes stabilizing legacy spent nuclear fuel and managing the receipt of off-site spent nuclear fuel from research reactors.
- The Radioactive Liquid Tank Waste Stabilization and Disposition Project will treat and disposition the sodium-bearing tank wastes, close the underground waste tanks and maintain the Idaho Nuclear Technology and Engineering Center.
- The Solid Waste Stabilization and Disposition Project disposes stored transuranic waste, low-level radioactive waste, Resource Conservation and Recovery Act hazardous waste, and mixed low-level radioactive waste in compliance with the Idaho Settlement Agreement requirements and closes on-site low-level radioactive waste disposal facilities at the Radioactive Waste Management Complex.
- The Soil and Water Remediation project is responsible for remediation of contaminated soil and groundwater and closure of legacy Comprehensive Environmental Response, Compensation, and Liability Act sites at the Idaho National Laboratory. Completion of this project

will contribute to reducing the footprint and the completion of the Idaho Cleanup Project.

GASEOUS DIFFUSION PLANTS

The Department constructed and formerly operated three gaseous diffusion plants (GDPs) located in Oak Ridge, Tennessee; Portsmouth, Ohio; and Paducah, Kentucky to enrich uranium which resulted in radioactive and chemical contamination at the sites. The major activities comprising the environmental liabilities at the GDPs include the following:

- The Oak Ridge, Portsmouth, and Paducah Nuclear Facility D&D projects include environmental cleanup and surveillance and maintenance activities, and decontamination and decommissioning of inactive or excess facilities. Oak Ridge completed D&D of all facilities not supporting soil remediation at East Tennessee Technology Park (ETTP) in FY 2020. Soil remediation continues at ETTP to support future site closure.
- The Portsmouth and Paducah Nuclear Material Stabilization and Disposition-Depleted Uranium Hexafluoride Conversion projects include the operation of the depleted uranium hexafluoride conversion facilities at the Portsmouth and Paducah sites. These facilities convert the material into a more stable form of depleted uranium oxide suitable for reuse or disposition.

OAK RIDGE OFFICE OF ENVIRONMENTAL MANAGEMENT OTHER THAN GASEOUS DIFFUSION PLANT

The Oak Ridge Office of Environmental Management, located in Tennessee, includes deactivation and demolition on excess contaminated facilities at the Y-12 National Security Site and the Oak Ridge National Laboratory, construction of Mercury Treatment Facility and onsite Comprehensive Environmental Response, Compensation, & Liability Act (CERCLA) disposal facility to support D&D activities and disposition of U-233 material and transuranic waste.

ENVIRONMENTAL LIABILITIES ESTIMATE FOR OTHER SITES

Environmental liabilities exist for other sites and activities across the Department. The cleanup activities at these sites are similar to those mentioned above, including, depending on the site, soil and groundwater remediation; waste retrieval, treatment, and disposal; and decontamination and decommissioning of nuclear reactors and other facilities.

14. Other Liabilities

(\$ IN MILLIONS)	FY 2022	FY 2021
Intragovernmental		
Appropriated capital	\$ 1,806	\$ 1,187
Refinanced and additional appropriations	1,197	1,184
Capitalization adjustment	888	953
Other	1,074	1,268
Total intragovernmental	\$ 4,965	\$ 4,592
Other than intragovernmental		
Pension and other actuarial liabilities ^(Note 11 & 16)	\$ 14,804	\$ 22,336
Obligations under capital leases ^(Note 17)	2,167	2,220
Contingencies and commitments ^(Note 18)	31,097	30,966
Environment, safety, and health compliance activities ^(Note 11)	1,657	1,997
Accrued payroll, funded leave, and withholding taxes	1,823	1,791
Residential exchange program (REP) ^(Note 11)	1,514	1,722
Asset retirement obligations	964	929
Energy savings performance contracts and utility energy service contracts ^(Note 11)	435	475
Oil held for others ^(Notes 2 & 7)	—	70
Other	445	413
Total other than intragovernmental	\$ 54,906	\$ 62,919
Total other liabilities	\$ 59,871	\$ 67,511

APPROPRIATED CAPITAL

Appropriated capital owed represents the balance of appropriations provided to WAPA, Southwestern Power Administration (SWPA) and Southeastern Power Administration (SEPA) for construction, operation, and maintenance of power facilities that will be repaid to the Treasury General Fund. The amount owed includes accumulated and current year interest on the net unpaid Federal investment in the power projects. The Federal investment in these facilities is to be repaid within 50 years from the time the facilities are placed in service or are commercially operational. Replacements of Federal investments are generally expected to be repaid over their useful service lives. There is no requirement for repayment of a specific amount of Federal investment on an annual basis.

SEPA receives annual appropriations from the Treasury's General Fund for operating expenses. Annual program costs are repaid from offsetting collections from the sale of Federal hydroelectric power during the current year, resulting in a net zero appropriation.

SWPA receives annual appropriations from the Treasury's General fund for capital, operation and maintenance expenses. Annual operation and maintenance costs are repaid from offsetting collections from the sale of Federal hydroelectric power during the current year, interest is recovered annually, and construction costs are generally repaid over their estimated useful lives. WAPA receives annual appropriations from the Reclamation Fund for

construction, operation and maintenance expenses: additional detail on WAPA's debt owed to the Reclamation Fund and corresponding elimination are found in [Note 26](#). Annual operation and maintenance costs are repaid from offsetting collections during the current year, interest is recovered annually and construction costs are generally repaid over their estimated useful lives. Funding received from the Reclamation Fund is not reported as appropriated capital owed since the Reclamation Fund is managed by WAPA and all inter-fund activity is eliminated for combined reporting.

WAPA has also received appropriations from Treasury General Fund, as noted in the first paragraph of this section, the unpaid balance of these appropriations are reported as appropriated capital owed Treasury.

Except for the appropriation refinancing asset described in [Note 10](#) and in the next section, the Department's financial statements do not reflect the Federal investment in power generating facilities owned by the USACE; DOI, BOR; and the Department of State (DOS), International Boundary and Water Commission. BPA makes annual payments to Treasury from its net proceeds.

REFINANCED AND ADDITIONAL APPROPRIATED CAPITAL

As discussed in [Note 10](#), BPA refinanced its unpaid capital appropriations as of September 30, 1996. Federal appropriations reflect the responsibility that BPA has to repay the U.S. Treasury for congressionally appropriated

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

amounts in the FCRPS. Federal appropriations repayment obligations consist of the remaining unpaid power portion of USACE and BOR capital investments funded through congressional appropriations. These include appropriations for the Columbia River Fish Mitigation program as allocated to the power purpose of the USACE's FCRPS hydroelectric projects.

BPA is obligated to establish rates to repay appropriations for Federal generation and transmission plant investments within a specified repayment period, which is the reasonably expected service life of the facilities, not to exceed 50 years. Federal appropriations may be repaid early without penalty at their par value (i.e. carrying value for Federal appropriations) as part of BPA's payment to the Treasury. BPA repaid appropriations earlier than their due date in FY 2022 and FY 2021. BPA establishes schedules for the repayment of Federal appropriations when it establishes its power and transmission rates. These schedules can change depending on whether appropriations have been prepaid or deferred. Interest on appropriated amounts begins accruing when the related assets are placed into service.

CAPITALIZATION ADJUSTMENT

The capitalization adjustment is the difference between the outstanding balance of Federal appropriations, plus \$100 million, before and after refinancing under the Refinancing Act. Consistent with treatment in BPA's power and transmission rate cases, this adjustment is amortized over a 40-year period through FY 2036. Amortization of the capitalization adjustment was \$65 million for FY 2022 and FY 2021 (see [Note 10](#)).

OTHER INTRAGOVERNMENTAL

Other Intragovernmental Liabilities "Other" represents the amount due to the Treasury Judgment Fund, liability for non-entity assets, custodial liability, and various other miscellaneous liabilities.

ENVIRONMENT, SAFETY, AND HEALTH COMPLIANCE ACTIVITIES

The Department's environment, safety, and health (ES&H) liability represents those activities necessary to bring facilities and operations into compliance with existing ES&H laws and regulations (e.g., Occupational Safety and Health Act; Clean Air Act; Safe Drinking Water Act). Types of activities included in the estimate relate to the following: upgrading site-wide fire and radiological programs; nuclear safety upgrades; industrial hygiene and industrial safety; safety related maintenance; emergency preparedness programs; life safety code improvements; and transportation of radioactive and hazardous materials. The estimate covers corrective actions expected to be performed in future years for programs outside the purview of the Department's Environmental Management (EM) Program. ES&H activities within the purview of the EM program are included in the environmental liabilities estimate.

ACCRUED PAYROLL, FUNDED LEAVE, AND WITHHOLDING TAXES

This represent amounts owed to the Department's Federal and contractor employees for accrued payroll, funded accrued annual leave for contractor employees, and withholding taxes owed to state and local governments.

RESIDENTIAL EXCHANGE PROGRAM (REP)

In 1981, and as provided in the Northwest Power Act, BPA began to implement the REP through various contracts with eligible regional utility customers. BPA's implementation of the REP has been the subject of various litigations and settlement agreements.

Beginning in April 2010, over 50 litigants and other regional parties entered into mediation to resolve numerous disputes over the REP. In FY 2011, the parties reached a final settlement agreement – the 2012 Residential Exchange Program Settlement Agreement (2012 REP Settlement Agreement). As a result of the settlement, BPA recorded an associated long-term IOU exchange benefits liability and corresponding regulatory asset of \$3.1 billion. Under the 2012 REP Settlement Agreement the IOUs' REP benefits were determined for FY's 2012-2028 (also referred to herein as Scheduled Amounts). The Scheduled Amounts started at \$182 million for FY 2012 and increase over time to \$286 million for FY 2028. As provided in the 2012 REP Settlement Agreement, the Scheduled Amounts are established for each IOU based on the IOUs' average system cost, its residential exchange load and BPA's applicable Priority Firm Exchange rate. The Scheduled Amounts total \$4.1 billion over the 17-year period through FY 2028, with remaining Scheduled Amounts as of September 30, 2022 totaling \$1.7 billion. Amounts recorded of \$1.5 billion at September 30, 2022 represent the present value of future cash outflows for these IOUs exchange benefits.

ASSET RETIREMENT OBLIGATIONS

BPA recognizes asset retirement obligations (AROs) based on the future retirement of certain tangible, long-lived assets. BPA's AROs are recognized based on the estimated fair value of the dismantlement and restoration costs, primarily associated with the retirement of the Columbia Generating Station (CGS). BPA also has AROs for a 30 percent share of the former Trojan nuclear power plant decommissioning activities and for certain Energy Northwest-related site restoration activities. ARO liabilities are adjusted for any revisions, expenditures and the passage of time.

Based on agreements in place, BPA directly funds Eugene Water and Electric Board's 30 percent share of the former Trojan nuclear power plant decommissioning activities that consist of long-term operation and decommissioning of the Independent Spent Fuel Storage Installation (ISFSI). BPA funds these costs through current rates. Trojan decommissioning primarily relates to the storage of spent nuclear fuel through 2059 at the former nuclear plant site. Decommissioning of the ISFSI and final site restoration activities is not expected to occur before 2059, which is the year the NRC extended the fuel storage license through.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

BPA also has tangible long-lived assets without an associated ARO because no legal obligation exists to remove these assets.

ENERGY SAVINGS PERFORMANCE CONTRACTS AND UTILITY ENERGY SERVICE CONTRACTS

Beginning in FY 2019, SFFAS 49, *Public-Private Partnerships*, requires the disclosure of risk-sharing arrangements with expected lives greater than five years between public and private sector entities. Per SFFAS 49, "Such arrangements or transactions provide a service or an asset for government and/or general public use where in addition to the sharing of resources, each party shares in the risks and rewards of said arrangements or transactions." DOE has determined that Energy Savings Performance Contracts (ESPCs) and Utility Energy Service Contracts (UESC) meet the Public-Private Partnership (P3) criteria outlined in SFFAS 49; the disclosure details for DOE's ESPC and UESC arrangements are provided below.

Initially authorized by the Energy Policy Act of 1992 and subsequently codified as 42 U.S.C. 8287 and 42 U.S.C. 8256, respectively, ESPCs and UESCs represent partnerships with energy service companies (ESCOs) and utility companies in the form of fixed-price, performance-based arrangements that are paid back over time through generated energy cost savings. In particular, ESPCs enable DOE to partner with an ESCO for a period not to exceed 25 years to improve energy efficiency in one or more DOE facilities at no direct capital cost to the U.S. Government and without special Congressional appropriations. The ESCO finances the upfront costs of implementing energy conservation measures—often borrowing the necessary funding for the investment from a third-party financier—and receives, in return, a contractually determined share of the cost savings that result. The ESCO provides a guarantee that the improvements will generate sufficient energy cost savings to pay for the project over the expected life of the arrangement, and after the arrangement ends, DOE fully retains all subsequent cost savings. Ultimately, ESPCs and UESCs provide DOE with the overall ability to implement energy efficient infrastructure upgrades at little to no upfront expense to the Government and to generate future energy cost savings. (Similar to ESPCs, UESCs are partnerships between a Federal agency and its serving utility company in which the utility company arranges financing to cover the upfront costs of energy efficiency projects and the agency's subsequent payments are based on energy cost savings; unlike ESPCs, however, cost savings are not guaranteed by the utility company.)

Although ESPC and UESC arrangements are structured to minimize the level of risk to which DOE and the Government are exposed, general processes such as a mutual understanding of each entity's role and responsibilities within the partnership, proper and timely project planning, installation and functionality oversight, and participation in the measurement and verification of equipment performance are all key components to helping ensure that energy cost savings are successfully realized. Failure to appropriately conduct these types of processes could potentially result in lost or unachieved energy cost savings and/or reduced payments to ESCOs in the case of ESPCs, payments being made by DOE in excess of the amount of actual energy cost savings achieved, or costs related to future contract or infrastructure modifications. Additionally, though standard contract language generally allows DOE to terminate ESPC and UESC arrangements for convenience, any such action is considered by DOE to be remote and often requires, at a minimum, payment by DOE of the remaining unamortized principal (the total of which, as of September 30, 2022, is primarily represented by the "Energy savings performance contracts and utility energy service contracts" liability figure above) as well as other termination fees based on the financial details of each arrangement. Further, because title to infrastructure improvement systems and equipment is typically transferred to DOE upon project acceptance, early termination could potentially lead to increased costs related to ownership (for example, maintenance and repairs previously performed by the ESCO or utility company needing to be performed by DOE or another contractor). Lastly, some arrangements contain contractual clauses specifically clarifying that the Government will be responsible for losses due to remote risks such as accidents or "force majeure" events.

As of September 30, 2022, DOE has 19 ESPC arrangements/modifications that are active or for which implementation is currently in process and two active UESC arrangements. The period of performance range for the 21 total arrangements is between 10 and 24 years in length, with the calculation of the period of performance largely dependent upon the amount of predicted annual cost savings in conjunction with the amount of annual payments (not to exceed the amount of annual cost savings in the case of ESPCs) required to eventually fund the overall value of the project. Payments related to these types of arrangements are generally made by DOE indirectly to the ESCO or utility company through a trustee on an annual basis.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

The below table provides the amount of funding related to the non-Federal partners' implementation of DOE's ESPC and UESC arrangements; the combined total DOE payments to be made over the expected life of arrangements (including principal repayment, interest, and performance period expenses); and the total cumulative amount of payments made by DOE as of September 30, 2022.

(\$ IN MILLIONS) AS OF SEPTEMBER 30, 2022	NON-FEDERAL PARTNERS' IMPLEMENT- ATION AMOUNT	TOTAL DOE PAYMENTS TO BE MADE OVER THE EXPECTED LIFE OF ARRANGEMENT	TOTAL CUMULATIVE PAYMENTS
ESPCs	\$ 619	\$ 1,981	\$ 943
UESCs	20	23	16
Total	\$ 639	\$ 2,004	\$ 959

The following table presents the actual payments in FY 2022 Q4 and FY 2021 Q4, and the estimated amount to be paid in FY 2023 and beyond.

(\$ IN MILLIONS) AS OF SEPTEMBER 30, 2022	FY2022	FY2021	FUTURE PERIODS
Agreements/ Contracts	Actual amount paid	Actual amount paid	Estimated amount to be paid in FY 2023+
ESPCs	\$ 114	\$ 107	\$ 1,039
UESCs	2	2	7
Total	\$ 116	\$ 109	\$ 1,046

OTHER LIABILITIES

Other than Intragovernmental Liabilities "Other" represents contract holdbacks, limited payroll related liabilities, undistributed advances, and various other miscellaneous liabilities.

15. Advances from Others and Deferred Revenue

(\$ IN MILLIONS)	FY 2022	FY 2021
Intragovernmental	\$ 216	\$ 230
Nuclear Waste Fund ^(Note 11)	\$ 48,452	\$ 46,716
Power Marketing Administrations	1,601	1,494
Reimbursable work advances	346	330
Other	260	232
Subtotal	\$ 50,659	\$ 48,772
Total advances from others and deferred revenue	\$ 50,875	\$ 49,002

NUCLEAR WASTE FUND

NWF revenues are accrued based on interest earned on charges assessed against owners and generators of high-level radioactive waste and SNF and interest accrued on investments in Treasury securities. These revenues are recognized as a financing source as costs are incurred for NWF activities. Revenues that exceed the NWF expenses are deferred.

POWER MARKETING ADMINISTRATIONS

BPA's deferred revenues and other credits make up the majority of the deferred revenues and other credits for the Power Marketing Administrations. BPA's deferred revenues and other credits primarily represent the following:

- Regulatory liabilities are amounts previously collected through rates for accumulated plant removal costs as part of depreciation and unrealized gains from BPA's derivative portfolio which are deferred over the corresponding underlying contract delivery months.
- Interconnection agreements are advances for requested new network upgrades and interconnections. These advances accrue interest and

will be returned as cash or credits against future transmission service on the new or upgraded lines.

- Deferred project revenue funded in advance consisting of third party advances received where BPA will own the resulting transmission assets. The balance is amortized as other revenue not with customers over the life of the assets so that the balance prevents any stranded costs in case of impairment as prescribed by the transmission rate process.
- Third Alternating Current (AC) Intertie capacity agreements reflecting unearned revenues from customers related to the Third AC Intertie transmission line capacity project. Revenue is recognized over an estimated 51-year life of the related assets, which are generally added and retired each year.
- Service deposits reflect required deposits for BPA products or services. The majority of these amounts are expected to be returned to the customer after a period of service. In certain cases, the deposits are considered prepayments, in which case they are recognized as revenue as per terms of the contract.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

- Unearned revenue from customer deposits consists of advances received from customers for projects or studies undertaken at their request. Revenue is recognized as expenditures are incurred.
- Derivative instruments reflect the unrealized loss from BPA's derivative portfolio, which primarily includes physical power purchase and sale transactions.

16. Pension and Other Actuarial Liabilities

(\$ IN MILLIONS)	FY 2022	FY 2021
Contractor pension plans	\$ 8,456	\$ 13,242
Contractor postretirement benefits other than pensions	6,325	9,070
Contractor disability and life insurance plans	23	24
Total pension and other actuarial liabilities ^(Note 11 & 14)	\$ 14,804	\$ 22,336

Most of the Department's major contractors sponsor defined benefit pension plans which promise to pay specified benefits, such as a percentage of the final average pay for each year of service, to their employees. The Department's allowable costs under these contracts include reimbursement of annual contractor contributions to these pension plans. Most of the contractors also sponsor postretirement benefits other than pensions (PRB) consisting of predominantly postretirement health care benefits. The Department approves, for cost reimbursement purposes, these contractors' pension and postretirement benefit plans and is responsible for the allowable costs of funding the plans. The Department also reimburses these contractors for employee disability insurance plans, and estimates are recorded as unfunded liabilities for these plans.

For accounting measurements, the Department follows FASB ASC 715, *Compensation - Retirement Benefits*, for reporting contractor pension and Postretirement Benefit plans for which the Department has a continuing obligation to reimburse allowable costs. Because the Department reports under Federal accounting requirements, newly measured net prior service costs/ (credits) and net (gains)/losses are recognized immediately as components of net periodic cost rather than classified as other comprehensive income under FASB ASC 715 and later amortized and included as components of net periodic cost. All components of the net periodic cost are recognized in the *Consolidated Statements of Net Cost*. Service costs are recorded by program and all other net periodic costs are recorded as costs not assigned (see [Note 21](#)).

CONTRACTOR PENSION PLANS

As of September 30, 2022, the Department reports contractor pension assets (i.e., aggregate of net assets for all contractor plans with plan assets in excess of the projected benefit obligation) of \$243 million and contractor pension liabilities (i.e., aggregate of net liabilities for all contractor plans with projected benefit obligations in excess of the plan assets) of \$8.5 billion. The Department has a continuing obligation to reimburse allowable costs for a variety of contractor-sponsored pension plans (32 qualified and 12 nonqualified).

Contractors are required to make contributions to their plans as required by the Internal Revenue Code and the Employee Retirement Income Security Act (ERISA), as amended. For qualified defined benefit pension plans, the Department's current funding policy is to reimburse contractors for the minimum required contributions made, absent the Department's agreement to reimburse at a different level. For nonqualified plans, the funding policy is pay-as-you-go.

Assumptions and Methods – Contractors use their own actuarial assumptions for determining required contributions to employee pension plans. However, in order to provide consistency among the Department's various contractors, the Department requires the use of certain standardized actuarial assumptions for financial reporting purposes. These standardized assumptions include the discount rates, mortality assumptions, and an expected long-term inflation rate of 2.25 percent used consistently in the expected long-term rate of return on assets, salary scale, and other relevant economic assumptions affected by inflation, with adjustments to the 2.25 percent inflation rate to reflect regional or industry rates as appropriate. In most cases, except for the standardized mortality assumption, the demographic assumptions used for the ERISA valuation were used for these purposes.

The following specific assumptions and methods were used to determine the net benefit cost. The weighted average discount rate was 2.70 percent for FY 2022 and 2.50 percent for FY 2021; the weighted average long-term rate of return on assets was 5.85 percent for FY 2022 and 5.75 percent for FY 2021; and the average rate of compensation increase was 3.2 percent for FY 2022 and 3.3 percent for FY 2021. The average long-term rate of return on assets shown above is the average rate for the contractor plans. Each contractor develops its own average long-term rates of return on assets based on the specific investment profiles of the specific plans it sponsors. Therefore, there is no one overall approach to setting the rate of return for each of the contractors' plans.

The weighted average discount rates used to determine the benefit obligations as of September 30, 2022, and September 30, 2021, were 5.10 percent and 2.70 percent, respectively.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

The aggregate accumulated benefit obligation and aggregate fair value of plan assets for plans with accumulated benefit obligations in excess of plan assets are \$43.7 billion and \$38.5 billion as of September 30, 2022 and \$56.3 billion and \$47.1 billion as of September 30, 2021. The aggregate projected benefit obligation and aggregate fair value of plan assets for plans with projected benefit obligations in excess of plan assets are \$46.9 billion and \$38.5 billion as of September 30, 2022, and \$62.7 billion and \$49.4 billion as of September 30, 2021, respectively.

CONTRACTOR POSTRETIREMENT BENEFITS OTHER THAN PENSIONS

The Department's contractors sponsor a variety of postretirement benefits other than pensions. As of September 30, 2022, the Department reports contractor PRB assets (i.e., aggregate of net assets for all contractor plans with plan assets in excess of the benefit obligation) of \$15 million and contractor PRB liabilities (i.e., aggregate of net liabilities for all contractor plans with benefit obligations in excess of the plan assets) of \$6.3 billion. The Department accrues the cost of PRB during the years that the employees render service. Generally, the PRB plans are unfunded, and the Department's funding policy is to fund on a pay-as-you-go basis. There are five contractors, however, that are partially prefunding benefits as permitted by law.

Assumptions and Methods – In order to provide consistency among the Department's various contractors, certain standardized actuarial assumptions were used. These standardized assumptions include medical and dental trend rates, discount rates, and mortality assumptions.

The following specific assumptions and methods, with respect to trends in the costs of medical and dental benefit plans, were used in determining the PRB estimates. The projected medical trend rates for a point of service plan, Health Maintenance Organization (HMO), Preferred Provider Organization (PPO), or similar plan grade (i.e., decrease or increase) from 6.66 percent in 2022 down to 5.00 percent in 2036 and later for under age 65; and 6.87 percent in 2022 down to 5.00 percent in 2036 and later for age 65 and older. The medical trend rates for a traditional

indemnity or similar plan grade from 6.88 percent in 2022 down to 5.00 percent in 2036 and later for under age 65; and 7.28 percent in 2022 down to 5.00 percent in 2036 and later for age 65 and older. Separate trend rates were used for a Medicare Advantage plan, a Part D Prescription Drug Plan (PDP), and a Non-Part D PDP. Trend rates for Medicare Advantage plans at all per member per month levels of employer costs grade from 6.09 percent in 2022 down to 5.00 percent by 2036 and later. The trend rates for a Part D PDP grade from 8.84 percent in 2022 down to 5.00 percent in 2036 and later; and for a Non-Part D PDP grade from 8.53 percent in 2022 down to 5.00 percent in 2036 and later. The medical trend rates or combination of rates used to determine the PRB estimates are dependent on each of the contractor's specific plan design and impact of health care reform, if applicable. The projected dental trend rates at all ages grade from 3.30 percent in 2022 down to 3.00 percent in 2036 and later.

The weighted average discount rates of 2.70 percent for FY 2022 and 2.50 percent for FY 2021, and the weighted average long-term rate of return on assets of 3.19 percent for FY 2022 and 3.38 percent for FY 2021 were used to determine the net periodic cost. The rate of compensation increase was the same rate as each contractor used to determine pension contributions. The average long-term rate of return on assets shown above is the average rate for the contractor plans. Each contractor develops its own average long-term rate of return on assets based on the specific investment profile of the specific plans it sponsors. Therefore, there is no one overall approach to setting the rate of return for each of the contractors' plans.

The weighted average discount rates used to determine the benefit obligations as of September 30, 2022, and September 30, 2021, were 5.10 percent and 2.70 percent, respectively.

The aggregate accumulated postretirement benefit obligation and aggregate fair value of plan assets for plans with accumulated postretirement benefit obligations in excess of plan assets are \$6.4 billion and \$113 million as of September 30, 2022 and \$9.2 billion and \$120 million as of September 30, 2021.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

(\$ IN MILLIONS)	PENSION BENEFITS		OTHER POSTRETIREMENT BENEFITS	
	FY 2022	FY 2021	FY 2022	FY 2021
NET AMOUNT RECOGNIZED IN THE COMBINED BALANCE SHEET				
Accumulated benefit obligation	\$ 44,666	\$ 59,798		
Effect of future compensation increases	3,246	4,125		
Benefit obligation	\$ 47,912	\$ 63,923	\$ 6,441	\$ 9,194
Plan assets	39,699	50,918	131	141
Net amount recognized in the balance sheet (net funded status)	\$ (8,213)	\$ (13,005)	\$ (6,310)	\$ (9,053)
RECONCILIATION OF AMOUNTS RECOGNIZED IN THE COMBINED BALANCE SHEET				
Asset (prepaid plan costs)	\$ 243	\$ 237	\$ 15	\$ 17
Liability	(8,456)	(13,242)	(6,325)	(9,070)
Net amount recognized in the balance sheet (net funded status)	\$ (8,213)	\$ (13,005)	\$ (6,310)	\$ (9,053)
COMPONENTS OF NET PERIODIC COSTS				
Service costs	\$ 1,170	\$ 1,203	\$ 145	\$ 165
Interest costs	1,738	1,618	231	232
Expected return on plan assets	(2,921)	(2,535)	(4)	(4)
(Gain)/loss due to curtailments, settlements or special termination benefits	—	—	—	—
Net prior service cost/(credit)	—	5	28	(1)
Net (gain)/loss	(3,501)	(6,282)	(2,778)	(578)
Total net periodic costs	\$ (3,514)	\$ (5,991)	\$ (2,378)	\$ (186)
CONTRIBUTIONS AND BENEFIT PAYMENTS				
Employer contributions	\$ 1,276	\$ 1,389	\$ 365	\$ 355
Participant contributions	95	96	78	71
Benefit payments	2,957	2,593	458*	439*
*Includes \$15 million paid from plan assets for FY 2022, and \$13 million paid from plan assets for FY 2021. For FY 2022, gross benefit payments were \$459 million including \$1.6 million of Federal Medicare subsidy. This resulted in net benefit payments of \$458 million for FY 2022. For FY 2021, gross benefit payments were \$441 million including \$1.8 million of Federal Medicare subsidy. This resulted in net benefit payments of \$439 million for FY 2021.				

(\$ IN MILLIONS)	PENSION BENEFITS	OTHER POSTRETIREMENT BENEFITS
Expected contributions for fiscal year ending September 30, 2023		
Employer contributions	\$877	\$400
Participant contributions	91	73

(\$ IN MILLIONS)	PENSION BENEFITS	OTHER POSTRETIREMENT BENEFITS		
		GROSS PAYMENT	LESS FEDERAL MEDICARE PART D SUBSIDY *	NET PAYMENT
ESTIMATED FUTURE BENEFIT PAYMENTS FY:				
2023	\$ 2,787	\$ 487	\$ 3	\$ 484
2024	2,883	499	3	496
2025	2,970	512	3	509
2026	3,055	522	3	519
2027	3,120	529	3	526
2028 to 2032	16,437	2,662	16	2,646
* Under the Medicare Prescription Drug, Improvement and Modernization Act of 2003, a Federal subsidy is provided to sponsors of retiree healthcare benefit plans that provide a benefit at least actuarially equivalent to the benefit established by law. Generally, the Department has reflected the impact of the subsidy as a reduction to the employers' cost of the benefits.				

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

The following chart shows the average target allocation for the 32 pension benefit plans and five other postretirement benefit plans with assets. The weighted average actual FY 2022 and FY 2021 allocations of assets are also shown.

	PENSION BENEFITS			OTHER POSTRETIREMENT BENEFITS		
	TARGET ALLOCATION	PERCENT OF PLAN ASSETS AT END FY 2022	PERCENT OF PLAN ASSETS AT END FY 2021	TARGET ALLOCATION	PERCENT OF PLAN ASSETS AT END FY 2022	PERCENT OF PLAN ASSETS AT END FY 2021
Cash and Equivalents	3.2 %	3.9 %	2.2 %	0.1 %	0.1 %	0.1 %
US Government Bonds	11.2 %	9.0 %	10.0 %	4.3 %	4.3 %	2.9 %
State and Municipal Government Bonds	0.2 %	0.3 %	0.3 %	1.0 %	1.0 %	1.1 %
Foreign Government Bonds	0.4 %	0.4 %	0.4 %	0.0 %	0.0 %	0.0 %
High-yield Corporate Bonds	5.1 %	3.4 %	1.2 %	0.0 %	0.0 %	0.0 %
Corporate Bonds other than high-yield	12.7 %	15.6 %	18.1 %	3.0 %	3.0 %	4.1 %
Domestic Equities	19.5 %	16.2 %	18.0 %	1.8 %	1.8 %	2.4 %
International Equities	17.4 %	12.6 %	15.4 %	0.9 %	0.9 %	1.1 %
Real Estate Investment Funds	9.2 %	7.3 %	4.8 %	0.0 %	0.0 %	0.0 %
Other Real Estate	0.2 %	0.3 %	0.1 %	0.0 %	0.0 %	0.0 %
Mortgage-Backed Securities	0.4 %	0.5 %	0.5 %	0.2 %	0.2 %	0.2 %
Asset-Backed Commercial Paper	0.1 %	0.1 %	0.0 %	0.0 %	0.0 %	0.0 %
Bonds/Notes Issued by Structured Investment Vehicles	0.2 %	0.2 %	0.1 %	0.0 %	0.0 %	0.0 %
Derivatives, including Collateralized Debt Obligations and Credit Default Swaps	0.2 %	0.1 %	0.1 %	2.2 %	2.2 %	2.3 %
Private Investment Funds, including Hedge Funds	5.0 %	6.1 %	4.9 %	0.0 %	0.0 %	0.0 %
Insurance Contracts (general accounts)	0.0 %	0.2 %	0.2 %	79.7 %	79.7 %	77.7 %
Insurance Contracts (separate accounts)	0.1 %	0.0 %	0.0 %	6.6 %	6.6 %	7.5 %
Employer Securities	0.5 %	0.5 %	0.5 %	0.0 %	0.0 %	0.0 %
Aggregate Bond Index, Long Bond Index	1.5 %	0.8 %	1.1 %	0.0 %	0.0 %	0.0 %
Other	12.9 %	22.5 %	22.1 %	0.2 %	0.2 %	0.6 %
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %

Each contractor develops its own investment policies and strategies for the plans it sponsors. Therefore, there is no one overall investment policy for the contractors' plans.

Generally, their objectives provide for benefit security for plan participants through the maximization of total returns while limiting risk and providing liquidity coverage of benefit payments.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

The following chart shows the allocation of the assets for FY 2022 and FY 2021 among the levels in the fair value hierarchy and net asset values (NAV) as a practical expedient for the pension benefit plans with assets. The allocation of assets among the fair value hierarchy reflects

the implementation of *Accounting Standards Update* (ASU) No. 2015-07 for reporting investments using the net asset value per share (or its equivalent) as a practical expedient, as applicable.

(\$ IN MILLIONS)			QUOTED PRICES IN ACTIVE MARKETS FOR IDENTICAL ASSETS		SIGNIFICANT OBSERVABLE INPUTS		SIGNIFICANT UNOBSERVABLE INPUTS		NET ASSET VALUE, AS A PRACTICAL EXPEDIENT	
	Total		Level 1		Level 2		Level 3		NAV	
Asset Class	FY 2022	FY 2021	FY 2022	FY 2021	FY 2022	FY 2021	FY 2022	FY 2021	FY 2022	FY 2021
Cash and Equivalents	\$ 1,560	\$ 1,134	\$ 554	\$ 137	\$ 584	\$ 621	\$ —	\$ —	\$ 422	\$ 375
US Government Bonds	3,581	5,110	1,422	2,148	1,298	2,017	—	—	861	945
State and Municipal Government Bonds	117	148	—	—	116	145	—	1	1	2
Foreign Government Bonds	169	221	50	68	71	114	—	—	48	39
High-yield Corporate Bonds	1,351	616	6	6	186	300	—	—	1,159	310
Corporate Bonds other than high-yield	6,202	9,195	533	577	5,434	8,057	1	—	234	561
Domestic Equities	6,445	9,170	2,606	5,218	1,035	850	—	6	2,804	3,096
International Equities	5,003	7,856	1,160	2,636	221	1,005	—	—	3,622	4,215
Real Estate Investment Funds	2,886	2,432	2	80	—	—	2	—	2,882	2,352
Other Real Estate	119	52	—	—	—	—	70	52	49	—
Mortgage-Backed Securities	193	255	3	4	113	133	—	—	77	118
Asset-Backed Commercial Paper	21	2	—	—	—	—	—	—	21	2
Bonds/Notes Issued by Structured Investment Vehicles	75	71	—	—	—	—	—	—	75	71
Derivatives	59	69	—	—	(2)	12	—	—	61	57
Private Investment Funds	2,421	2,511	—	29	—	32	60	96	2,361	2,354
Insurance Contracts (general accounts)	81	83	—	—	1	1	80	82	—	—
Insurance Contracts (separate accounts)	18	18	—	—	18	18	—	—	—	—
Employer Securities	194	244	194	244	—	—	—	—	—	—
Aggregate Bond Index, Long Bond Index	324	569	—	45	324	360	—	—	—	164
Other	8,880	11,162	(444)	(240)	120	82	94	94	9,110	11,226
Total Assets	\$ 39,699	\$ 50,918	\$ 6,086	\$ 10,952	\$ 9,519	\$ 13,747	\$ 307	\$ 331	\$ 23,787	\$ 25,887

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

The following chart shows the reconciliation of the Level 3 assets for FY 2022 and FY 2021 for the pension benefit plans with assets.

(\$ IN MILLIONS)	DOMESTIC EQUITIES	REAL ESTATE INVESTMENT FUNDS	OTHER REAL ESTATE	PRIVATE INVESTMENT FUNDS	INSURANCE CONTRACTS (GENERAL ACCOUNTS)	OTHER	TOTAL
FY 2022							
Beginning Balance	\$ 6	\$ —	\$ 52	\$ 96	\$ 82	\$ 95	\$ 331
Actual return on plan assets:							
Relating to assets still held at the reporting date	—	—	7	(7)	1	1	2
Relating to assets sold during the period	—	—	—	(1)	(1)		(2)
Purchases, sales, and settlements	(6)	2	7	(22)	(1)	15	(5)
Transfers in and/or out of Level 3	—	—	—	(7)	—	(20)	(27)
Other	—	—	4	—	—	3	7
Ending Balance	\$ —	\$ 2	\$ 70	\$ 59	\$ 81	\$ 94	\$ 306
FY 2021							
Beginning Balance	\$ —	\$ —	\$ 45	\$ 75	\$ 83	\$ 71	\$ 274
Actual return on plan assets:							
Relating to assets still held at the reporting date	—	—	—	10	1	7	18
Relating to assets sold during the period	—	—	—	—	(1)	4	3
Purchases, sales, and settlements	6	—	4	16	(1)	16	41
Transfers in and/or out of Level 3	—	—	(2)	(5)	—	(8)	(15)
Other	—	—	5	—	—	5	10
Ending Balance	\$ 6	\$ —	\$ 52	\$ 96	\$ 82	\$ 95	\$ 331

Pension assets included in Level 1 of the fair value hierarchy are valued daily based on quoted prices in active markets. Assets included in Level 2 are valued using significant observable inputs other than quoted prices in active markets. US Government Bonds and Corporate Bonds included in Level 2 assets are generally part of collective investment funds valued at the net asset values of the commingled funds based on the quoted prices of the underlying investments as a readily determinable fair value that is published by investors and is the basis for current transactions or valued based on other observable inputs such as market indices or other comparable investments. Other bonds in these categories are valued based on interest rates and yield curves observable at commonly quoted intervals or at bid evaluation prices for securities traded on OTC markets as provided by independent pricing vendors. Domestic and International Equities included in Level 2 assets are generally part of collective investment funds valued at the net asset values of the commingled funds based on the quoted prices of the underlying investments as a readily determinable fair value that is published by investors and is the basis for current transactions. Assets included in Level 3 are valued using significant unobservable inputs. Private Investment Funds and Real Estate Funds included in Level 3 assets are generally priced by the fund general partners or investment managers, verified by independent third-party appraisers, and audited by independent auditing firms. The actual market values are generally determinable by investment managers and verified by third parties, or by negotiations between independent parties pursuant to sales transactions. Assets held in Life Insurance Company

General Accounts under Level 3 are generally credited guaranteed interest rates under the contracts or are valued based on the values of the underlying asset holdings of the accounts.

There are two pension plans that have securities of the employer or related parties included in the plan assets. No assets are expected to be returned to the employers during the next fiscal year.

The \$131 million of assets in the five other postretirement benefit plans include \$104 million of investments in insurance contracts (General Accounts) of which \$72 million is valued using significant unobservable inputs (Level 3). The balance of the Level 3 insurance contracts decreased by \$6 million during FY 2022 from \$78 million to \$72 million. Assets held in Life Insurance Company General and Separate Accounts under Levels 2 and 3 of the fair value hierarchy are generally credited guaranteed interest rates based on customized fixed income indices. The remaining assets in the other postretirement benefit plans are invested in asset classes similar to the assets of the pension plans. None of the other assets in the other postretirement benefit plans were valued using unobservable inputs and none were valued based on the net asset value as a practical expedient of fair value.

Some of the Department's contractors' plan assets are invested in investment funds, which are recorded based on the net asset value (NAV) per share (or its equivalent) and reported by the underlying funds without further adjustment, as a practical expedient of fair value.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Generally, the fair value of the investment in a privately offered investment fund represents the amount that the investor could reasonably expect to receive from the investment fund if the investment is withdrawn at the measurement date based on the NAV. These investments are redeemable at NAV under ordinary terms of the

agreements and based on the operation of the underlying funds. However, it is possible that these redemption rights may be restricted or eliminated by the funds in the future in accordance with the underlying fund agreements. The terms of any fund agreements may vary by contractor.

17. Leases

Non-Federal Capital Leases:

(\$ IN MILLIONS)	FY 2022	FY 2021
SUMMARY OF ASSETS UNDER CAPITAL LEASE		
Power Line Equipment	\$ 2,049	\$ 2,010
Buildings	12	12
ADP equipment	211	262
Construction work in progress	—	117
Lease-purchase trust funds	14	15
Total capital lease assets	\$ 2,286	\$ 2,416
Less accumulated depreciation	(421)	(461)
Net assets under capital leases	\$ 1,865	\$ 1,955

(\$ IN MILLIONS)	POWER LINE EQUIPMENT	OTHER	TOTAL
FISCAL YEAR 2022			
Future lease payments:			
2023	140	46	186
2024	155	31	186
2025	250	8	258
2026	166	2	168
2027	140	1	141
2028+	2,121	3	2,124
Total future lease payments	\$ 2,972	\$ 91	\$ 3,063
Less imputed interest	(879)	(3)	(882)
Less executory costs	(14)	—	(14)
Net capital lease liability	\$ 2,079	\$ 88	\$ 2,167
Capital lease liabilities covered by budgetary resources			\$ (2,089)
Capital lease liabilities not covered by budgetary resources ^(Note 11)			(78)
Total capital lease liability			\$ (2,167)

Federal and Non-Federal Operating Leases:

(\$ IN MILLIONS)	ASSET CATEGORY		TOTAL	
FISCAL YEAR 2022	BUILDINGS/ FACILITIES	OTHER	FEDERAL	NON-FEDERAL
Future lease payments:				
2023	\$ 129	\$ 7	\$ 85	\$ 51
2024	118	5	82	41
2025	106	4	82	28
2026	98	1	79	20
2027	283	2	79	206
2028+	430	6	362	74
Total future lease payments	\$ 1,164	\$ 25	\$ 769	\$ 420

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

The Department acquires functional use of various buildings/facilities, equipment, and other assets via operating lease instruments. The above table shows the Department's total future lease payments by Fiscal Year for all Federal and non-Federal operating leases that have initial or remaining non-cancellable terms in excess of one year as of September 30, 2022. In particular, the bulk of the Department's \$769 million of total future lease

payments for Federal non-cancellable operating leases is comprised of two Occupancy Agreements (OA) between DOE and the General Services Administration (GSA) consisting of \$646 million in combined future lease payments. The two OAs have lease terms that expire in FY 2032-2033.

18. Contingencies and Commitments

(\$ IN MILLIONS)	FY 2022	FY 2021
Unfunded contingencies ^(Note 11)		
Spent nuclear fuel litigation	\$ 31,024	\$ 30,878
Other	69	85
Subtotal	\$ 31,093	\$ 30,963
Funded contingencies		
Other	4	3
Total contingencies	\$ 31,097	\$ 30,966

(\$ IN MILLIONS)	ACCRUED LIABILITIES	ESTIMATED RANGE OF LOSS		ACCRUED LIABILITIES	ESTIMATED RANGE OF LOSS	
		Lower End	Upper End		Lower End	Upper End
		FY 2022			FY 2021	
Legal Contingencies:						
Probable	\$ 31,041	\$ 31,041	\$ 31,041	\$ 30,913	\$ 30,913	\$ 31,012
Reasonably Possible	—	—	90	—	—	—
Environmental Contingencies:						
Probable	—	—	—	—	—	—
Reasonably Possible	—	113	142	—	113	432
Other Contingencies:						
Probable	56	56	56	53	53	53
Reasonably Possible	—	—	—	—	—	—
Total Contingencies	\$ 31,097	\$ 31,210	\$ 31,329	\$ 30,966	\$ 31,079	\$ 31,497

The Department is a party in various administrative proceedings, legal actions, and tort claims which may ultimately result in settlements or decisions adverse to the Federal government. The Department has accrued contingent liabilities where losses are determined to be probable and the amounts can be estimated. Other significant contingencies exist where a loss is reasonably possible or where the loss is probable and an estimate cannot be determined. In some cases, a portion of any loss that may occur may be paid from Treasury's Judgment Fund and reported as Costs Not Assigned (see [Note 21](#)).

The Judgment Fund is a permanent, indefinite appropriation available to pay judgments against the government. The following are significant contingencies:

SPENT NUCLEAR FUEL LITIGATION

In accordance with the NWP, the Department entered into more than 69 Standard Contracts with utilities in which, in return for payment of fees into the NWF, the Department agreed to begin disposal of SNF by January 31, 1998. Because the Department has no facility available to

receive SNF under the NWP, it has been unable to begin disposal of the utilities' SNF as required by the contracts. Significant litigation claiming damages for partial breach of contract has ensued as a result of this delay.

To date, 44 suits have been settled involving utilities that collectively own 85 percent of the nuclear reactors subject to litigation for partial breach of contract. Under the terms of the settlements, the Judgment Fund, 31 U.S.C. 1304, paid \$7.4 billion as of September 30, 2022 to the settling utilities for delay damages they have incurred through September 30, 2022. In addition, 70 cases have been resolved by 62 final unappealable judgments and eight voluntary withdrawals with no damages. Eight of the unappealable judgments resulted in an award of no damages by the trial court and the 54 remaining cases resulted in a total of \$2.6 billion in damages that have been paid by the Judgment Fund as of September 30, 2022. An additional 16 cases remain pending the Court of Federal Claims. Liability is probable in these cases, and in many of these cases orders have already been entered establishing

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

the Government's liability and the only outstanding issue to be litigated is the amount of damages to be awarded.

Over two decades ago, the industry was reported to estimate that damages for all utilities with which the Department has contracts ultimately would be at least \$50 billion. The Department believed that this industry estimate was highly inflated. At that time, the disposition of cases that had either been settled or subject to a judgment in the trial court suggested that the Government's ultimate liability was likely to be significantly less than that estimate. The Government is not aware of any industry update of the old \$50 billion estimate or how the original estimate was derived. Accordingly, the Department uses settlements as the basis for estimating the Government's aggregate SNF litigation. The Department's SNF litigation liability is updated to include the effects of final judgments and settlements as well as payments to date from the Judgment Fund. Additional payments under these settled and adjudicated cases may be made if the utilities incur additional costs resulting from the Department's delay in acceptance of SNF. The Department believes its assumptions and methodology provide a reasonable basis for the contingent liability estimate. Based on these settlement estimates, the total liability estimate as of September 30, 2022 was \$41.1 billion. After deducting the cumulative amount paid of \$10.1 billion as of September 30, 2022 under these settlements and as a result of final judgments, the remaining liability is estimated to be approximately \$31.0 billion. Under current law, any damages or settlements in this litigation will be paid out of the Judgment Fund. The Department's contingent liability estimate for SNF litigation is reported net of amounts paid to date from the Judgment Fund.

The Department previously reported several developments that made it difficult to reasonably predict the amount of the Government's likely liability. The Consolidated Appropriations Act, 2021, appropriated \$20 million for the Department to proceed with planning for Federal consolidated interim storage using a consent-based approach.

In FY 2021, the Administration began planning activities for a consent-based approach to implementation of one or more consolidated interim storage facilities in the near term, followed by a disposal facility some years after. In the FY 2022 Budget Request, the Administration requested additional funds to work collaboratively with the public, communities, stakeholders, and governments at the Tribal, State, and local levels and plans to and intends to pursue a consent-based approach to site an interim storage facility or facilities and permanent disposal. The Consolidated Appropriations Act, 2022, appropriated \$20 million for the Department's continued activities related to Federal consolidated interim storage and the FY 2023 Budget Request requests \$53 million for such activities, which reflects a ramp-up of activities to support effective implementation of Federal consolidated interim storage. As the Department intends to fulfill its contractual obligations upon the acceptance of SNF and HLW for

transport from the reactor facilities, a preliminary operational date of the consolidated interim storage facility or facilities is factored into the liability calculation. The liability estimate is contingent upon Congress amending the NWPA and providing adequate ongoing appropriations.

ALLEGED EXPOSURES TO RADIOACTIVE AND/OR TOXIC SUBSTANCES

A number of class action and/or multiple plaintiff tort suits have been filed against current and former DOE contractors in which the plaintiffs seek damages for alleged exposures to radioactive and/or toxic substances as a result of the historic operations of the Department's nuclear facilities. The most significant of these cases arise out of operations of the facilities at Brookhaven, New York. Collectively, in these cases, damages of \$1.2 billion are currently sought by the plaintiffs. However, the Department believes that if any damages are ultimately awarded, the amounts would be significantly less than what the plaintiffs seek.

In the Brookhaven litigation, two class action cases, *Osarczuk v. Associated Universities and Tarzia v. Associated Universities (AUI)*, were filed in which residents and property owners near Brookhaven National Laboratory (BNL) asserted claims for negligence, gross negligence, abnormally dangerous activity, and private nuisance and sought damages, primarily for air and ground water contamination, as a result of the release of hazardous substances stemming from Lab operations. In addition, one toxic tort case, *McGowan, et al. v. AUI*, was filed in which a former worker at BNL asserted claims for negligence, abnormally dangerous activity, gross negligence, and loss of consortium and sought damages as a result of the release of Trichloroethylene (TCE) stemming from Lab operations. In *Osarczuk*, the parties have settled all of the cases in the first cohort of 20 bellwether cases and all of the cases in the second cohort of 20 bellwether cases. In addition to the 18 bellwether plaintiff groups, there are 35 remaining bellwether groups in this action. Settlement offers for the third cohort were exchanged, but no agreements were reached. AUI filed individual motions for summary judgment against the remaining plaintiffs, and the parties filed a stipulation to extend the time to prepare opposition and reply papers. On March 17, 2022, the trial court granted the defense motions for summary judgment, dismissing all remaining cases. On March 31, 2022, plaintiffs filed a notice of appeal. On April 18, 2022, plaintiffs filed a motion for leave with the trial court to reargue the court's decision granting summary judgment. On September 16, 2022, the Appellate Division granted plaintiffs' application to extend the time to perfect the appeal to October 31, 2022. In *Tarzia*, the plaintiffs filed on April 6, 2018, with the Appellate Division of the New York Supreme Court, a notice of appeal of the trial court's February 22, 2018, Order granting AUI's motion to dismiss with prejudice the plaintiffs' complaint in this action for failure to prosecute, after the plaintiffs failed to comply with the judge's earlier Order requiring them to serve their responses to AUI's discovery demands. The plaintiffs failed to perfect that appeal, and the

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Appellate Division dismissed the appeal. The plaintiffs subsequently filed an appeal brief with the Appellate Division. On September 23, 2020, the Appellate Division issued an opinion affirming the trial court. Plaintiffs filed a motion with the Appellate Division seeking re-argument, which the Appellate Division denied. Then on May 6, 2021, the New York City Court of Appeals dismissed plaintiffs' motion for leave to appeal. In McGowan, a complaint was filed on May 19, 2020 and AUI responded to the complaint on February 19, 2021. The case is in discovery.

HANFORD SITE NATURAL RESOURCES DAMAGES

The Confederated Tribes of the Yakama Nation filed suit in September 2002 against DOE and the Department of Defense alleging natural resources damages in the 1100 area of the Hanford site. The Yakama Nation has since amended their complaint to add the 100 and 300 areas to the suit, alleging additional natural resources damages. In addition, the States of Washington and Oregon, as well as the Confederated Tribes of the Umatilla and the Nez Perce tribe, have joined the suit. Two of the four claims have been settled, the third claim remains stayed, and the fourth has been dismissed. The government reimbursed the Yakama Nation for its past response costs under claim one of the complaint. Under the settlement for claim two, the Trustees use the Trustee Council's administrative process to conduct a natural resource damage assessment through consensus activities, and DOE provides funding as appropriate through discretionary financial assistance agreements. Claim three, which seeks natural resource damages recovery, remains stayed, until the issue of resource damages (if any) is resolved. Claim four was dismissed. The case is still pending.

LOS ALAMOS ENVIRONMENTAL CLEAN-UP COMPLIANCE

Nuclear Watch New Mexico filed suit in May 2016 in the U.S. District Court for the District of New Mexico against DOE and Los Alamos National Security, LLC (LANS), the operating contractor for Los Alamos National Laboratory (LANL), pursuant to the citizen suit provision of the Resource Conservation and Recovery Act (RCRA). Nuclear Watch alleges that DOE and LANS are in violation of a Compliance Order on Consent entered into in 2005 between the New Mexico Environment Department (NMED), DOE, and LANS, which established various milestones for environmental cleanup activity at Los Alamos. A new Compliance Order on Consent between DOE and NMED was entered into in June 2016, shortly after Nuclear Watch filed its lawsuit, which explicitly supersedes the 2005 order. In its complaint, Nuclear Watch sought declaratory and injunctive relief to bring DOE and LANS into compliance with the 2005 order and sought civil penalties under RCRA, which Nuclear Watch estimated to total up to \$300 million. NMED intervened as a defendant, and Nuclear Watch twice amended its complaint. In late 2016, the defendants moved to dismiss the suit. In July 2018, the district court granted the motions to dismiss in part, dismissing all claims for declaratory and injunctive relief, but denied the motions to dismiss with respect to claims seeking civil penalties for alleged past violations. All parties filed cross-motions for

summary judgment, which the court denied for Nuclear Watch and DOE but granted for LANS in November 2019. The parties commenced discovery and continued settlement discussions. The parties informed the court of a settlement agreement in principle. A status conference was held on October 5, 2021 and the parties continue to work toward finalizing a settlement. In February 2022, the parties fully executed a settlement agreement, which requires DOE to undertake certain environmental-related projects over the coming years. On March 17, 2022, the district court administratively closed the case at the parties' request and further ordered DOE to submit status reports at six-month intervals on the progress of its settlement performance. On September 16, 2022, DOE submitted its first status report noting DOE's ongoing compliance with the settlement agreement.

PADUCAH AND PORTSMOUTH NATURAL RESOURCE DAMAGES

As a result of releases of hazardous substances at the Paducah and Portsmouth Sites, the States of Ohio and Kentucky have potential claims against DOE under the CERCLA for damages to natural resources (e.g., ground water) caused by such releases.

At the Paducah site, Kentucky has indicated that it desires a "tolling" agreement with respect to potential claims for natural resource damages. A tolling agreement would suspend the statute of limitations for the filing of the state's claims for a mutually agreeable period of time. As of September 30, 2022, Kentucky has not pursued executing a tolling agreement. It is possible that DOE will be liable for some natural resource damages at this site. DOE is unable to prepare an estimate of such damages and has not included a provision for damages in the consolidated financial statements.

At the Portsmouth site, DOE and Ohio EPA have executed a Director's Final Findings and Order settling the claims for natural resource damages. DOE will continue discussions with the remaining Federal trustees to resolve any potential claims for natural resource damages to be pursued by them.

PURCHASE POWER AND TRANSMISSION COMMITMENTS AND IRRIGATION ASSISTANCE

The PMAs have entered into commitments to sell expected generation for future dates. When the PMAs forecast a resource shortage they take a variety of operational and business steps to cover a potential shortage including entering into power purchase commitments. If appropriate, the PMAs will enter into long-term commitments to purchase power for future delivery. The PMAs record expenses associated with these purchases in the periods that power is received.

As directed by law, WAPA and BPA are required to establish rates sufficient to make cash distributions to the Treasury for the portion of BOR's original capital construction costs allocated to irrigation purposes, which were determined by the Secretary of the Interior to be beyond the ability of the irrigation customers to pay. These

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

irrigation distributions do not specifically relate to power generation. In establishing power rates, particular statutory provisions guide the assumptions that WAPA and BPA make as to the amount and timing of such distributions. As a result, WAPA and BPA include a schedule of irrigation assistance costs in each respective power system's power repayment study to demonstrate repayment of principal within the allowable repayment period. These repayment amounts do not incur or accumulate interest from the date that BOR determines the irrigators' inability to pay. Future irrigation assistance payments are scheduled for BPA to total \$247 million over a maximum of 66 years since the time the irrigation facilities were completed and placed in service, and WAPA's payments are scheduled to total \$1.4 billion over a maximum of 50 years since the time the irrigation facilities and additions were completed and placed in service.

Although these repayments will be recovered through power sales, they do not represent an operating cost of the individual power systems nor a liability on the consolidated balance sheets due to factors such as the variable payment schedule.

The following table summarizes future purchase power and transmission commitments and irrigation assistance. The table includes firm purchase power agreements of known costs that are currently in place to assist in meeting expected future obligations under long-term power sales contracts. BPA has several power purchase agreements with wind-powered and other generating facilities that are not included in the table below as payments are based on the variable amount of future energy generated and as such no minimum payments required.

(\$ IN MILLIONS) FISCAL YEAR	PURCHASE POWER AND TRANSMISSION (ALL PMA'S)	IRRIGATION ASSISTANCE (BPA and WAPA)
2023	123	35
2024	110	8
2025	102	123
2026	101	21
2027	72	6
2028+	137	1,469
Total	\$ 645	\$ 1,662

INTEGRATED FISH AND WILDLIFE PROGRAM

The Northwest Power Act directs BPA to protect, mitigate and enhance fish and wildlife and their habitats to the extent they are affected by the Federal hydroelectric projects on the Columbia River and its tributaries from which BPA markets power. BPA makes expenditures and incurs other costs for fish and wildlife protection and mitigation that are consistent with the purposes of the Northwest Power Act and the Pacific Northwest Power and Conservation Council's Columbia River Basin Fish and Wildlife Program. In addition, certain fish and wildlife species that inhabit the Columbia River Basin are listed under the Endangered Species Act (ESA) as threatened or endangered. BPA makes expenditures and incurs other costs related to power purchases to comply with the ESA and implement certain biological opinions (BiOp) prepared by the National Oceanic and Atmospheric Administration Fisheries Service and the U.S. Fish and Wildlife Service in furtherance of the ESA (including results from the Columbia River System Operations (CRSO) Environmental Impact Statement). BPA's total commitment including timing of payments under the Northwest Power Act, ESA, and BiOp, including CRSO Environmental Impact Statement impacts, is not fixed or determinable.

As of September 30, 2022, BPA has long-term fish and wildlife agreements with estimated contractual commitments of \$373 million, which are likely to result in future expenses or regulatory assets. These agreements will expire at various dates through FY 2027 and do not include the Columbia Basin Fish Accords extension agreements, which are described below.

As of November 1, 2022, BPA and its Federal partners USACE and BOR are in the process of signing extension agreements with current Accords partners, namely certain states and tribes, to extend the Columbia Basin Fish Accords. The Accords and associated BPA funding commitments facilitate implementation of projects that provide BPA with legal compliance actions under applicable laws, including the Northwest Power Act and ESA, and that benefit Columbia River Basin fish and wildlife. The existing agreements expired September 30, 2022, and will be extended until September 30, 2025. The extension agreements are expected to commit approximately \$409 million for fish and wildlife protection and mitigation, which will result in future expenses or regulatory assets.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

19. Dedicated Collections

	FY 2022						
(\$ IN MILLIONS)	NUCLEAR WASTE FUND	D&D FUND	PMA's	OTHER	TOTAL (COMBINED)	ELIMINATIONS	TOTAL (CONSOLIDATED)
BALANCE SHEET							
ASSETS							
Intragovernmental:							
Fund Balance with Treasury	\$ 26	\$ 100	\$ 4,939	\$ 1,092	\$ 6,157	\$ —	\$ 6,157
Investments, net	46,015	769	1,611	611	49,006	—	49,006
Accounts receivable, net	—	—	202	—	202	(16)	186
Loans receivable, net	—	—	2,988	—	2,988	(2,988)	—
Advances and prepayments	1	—	3	—	4	(3)	1
Total intragovernmental assets	\$ 46,042	\$ 869	\$ 9,743	\$ 1,703	\$ 58,357	\$ (3,007)	\$ 55,350
Cash	—	—	128	—	128	—	128
Accounts receivable, net	2,436	—	702	672	3,810	—	3,810
Loans receivable, net	—	—	1	—	1	—	1
Inventory, net	—	—	143	183	326	—	326
General property, plant, and equipment, net	—	28	11,050	289	11,367	—	11,367
Advances and prepayments	—	—	46	—	46	—	46
Other assets	—	—	12,767	—	12,767	—	12,767
Total Assets	\$ 48,478	\$ 897	\$ 34,580	\$ 2,847	\$ 86,802	\$ (3,007)	\$ 83,795
LIABILITIES AND NET POSITION							
Intragovernmental:							
Accounts payable	\$ —	\$ 1	\$ 78	\$ —	\$ 79	\$ (16)	\$ 63
Debt	—	—	8,772	—	8,772	(2,988)	5,784
Advances from others and deferred revenue	—	—	6	—	6	(3)	3
Other intragovernmental liabilities	—	26	4,041	—	4,067	—	4,067
Total intragovernmental liabilities	\$ —	\$ 27	\$ 12,897	\$ —	\$ 12,924	\$ (3,007)	\$ 9,917
Accounts payable	—	123	640	18	781	—	781
Federal debt and interest payable	—	—	5,101	—	5,101	—	5,101
Federal employee benefits payable	1	—	56	—	57	—	57
Environmental and disposal liabilities	—	25,914	22	—	25,936	—	25,936
Advances from others and deferred revenue	48,452	—	1,601	13	50,066	—	50,066
Other liabilities	—	22	4,663	54	4,739	—	4,739
Total liabilities	\$ 48,453	\$ 26,086	\$ 24,980	\$ 85	\$ 99,604	\$ (3,007)	\$ 96,597
Unexpended appropriations	25	—	166	9	200	—	200
Cumulative results of operations	—	(25,189)	9,434	2,753	(13,002)	—	(13,002)
Total Liabilities and Net Position	\$ 48,478	\$ 897	\$ 34,580	\$ 2,847	\$ 86,802	\$ (3,007)	\$ 83,795
STATEMENT OF NET COST							
Program costs	\$ 19	\$ 916	\$ 5,261	\$ 196	\$ 6,392	\$ (371)	\$ 6,021
Less earned revenues	(10)	(582)	(6,400)	(4,057)	(11,049)	371	(10,678)
Net program costs	\$ 9	\$ 334	\$ (1,139)	\$ (3,861)	\$ (4,657)	\$ —	\$ (4,657)
Costs not assigned	—	(10)	1	(2)	(11)	(1)	(12)
Net cost of operations	\$ 9	\$ 324	\$ (1,138)	\$ (3,863)	\$ (4,668)	\$ (1)	\$ (4,669)
STATEMENT OF CHANGES IN NET POSITION							
Unexpended appropriations, beginning balance	\$ 17	\$ —	\$ —	\$ 10	\$ 27	\$ —	\$ 27
Appropriations received	21	—	500	6	527	—	527
Appropriations transferred - in/(out)	—	—	(1)	—	(1)	—	(1)
Other adjustments	—	—	3	(1)	2	—	2
Appropriations used	(13)	—	(336)	(6)	(355)	—	(355)
Unexpended appropriations, ending balance	25	\$ —	\$ 166	\$ 9	\$ 200	\$ —	\$ 200
Cumulative results of operations, beginning balance	\$ —	\$ (25,706)	\$ 8,736	\$ 2,966	\$ (14,004)	\$ —	\$ (14,004)
Appropriations used	13	—	336	6	355	—	355
Non-exchange revenue	—	—	—	1	1	—	1
Transfers - (in)/out without reimbursement	(4)	841	(497)	(841)	(501)	—	(501)
Donations and forfeitures of property	—	—	16	—	16	—	16
Imputed financing	—	—	11	—	11	(1)	10
Other	—	—	(306)	(3,242)	(3,548)	—	(3,548)
Net cost of operations	(9)	(324)	1,138	3,863	4,668	1	4,669
Cumulative results of operations, ending balance	\$ —	\$ (25,189)	\$ 9,434	\$ 2,753	\$ (13,002)	\$ —	\$ (13,002)
Net position, end of period	\$ 25	\$ (25,189)	\$ 9,600	\$ 2,762	\$ (12,802)	\$ —	\$ (12,802)

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Dedicated Collections (continued)

	FY 2021						
(\$ IN MILLIONS)	NUCLEAR WASTE FUND	D&D FUND	PMAs	OTHER	TOTAL (COMBINED)	ELIMINATIONS	TOTAL (CONSOLIDATED)
BALANCE SHEET							
ASSETS							
Intragovernmental:							
Fund Balance with Treasury	\$ 20	\$ 30	\$ 5,104	\$ 1,238	\$ 6,392	\$ —	\$ 6,392
Investments,, net	44,295	347	—	1,451	46,093	—	46,093
Accounts receivable, net	—	24	161	—	185	(35)	150
Loans receivable, net	—	—	2,866	—	2,866	(2,866)	—
Advances and prepayments	—	—	2	—	2	(2)	—
Total intragovernmental assets	\$ 44,315	\$ 401	\$ 8,133	\$ 2,689	\$ 55,538	\$ (2,903)	\$ 52,635
Cash	—	—	172	—	172	—	172
Accounts receivable, net	2,418	—	497	—	2,915	—	2,915
Loans receivable, net	—	—	1	—	1	—	1
Inventory, net	—	—	140	180	320	—	320
General property, plant, and equipment, net	—	28	10,753	172	10,953	—	10,953
Advances and prepayments	—	—	37	—	37	—	37
Other assets	—	(24)	13,394	—	13,370	—	13,370
Total Assets	\$ 46,733	\$ 405	\$ 33,127	\$ 3,041	\$ 83,306	\$ (2,903)	\$ 80,403
LIABILITIES AND NET POSITION							
Intragovernmental:							
Accounts payable	\$ —	\$ 15	\$ 67	\$ —	\$ 82	\$ (25)	\$ 57
Debt	—	—	8,605	—	8,605	(2,866)	5,739
Advances from others and deferred revenue	—	—	3	—	3	(2)	1
Other intragovernmental liabilities	—	25	3,580	—	3,605	(10)	3,595
Total intragovernmental liabilities	\$ —	\$ 40	\$ 12,255	\$ —	\$ 12,295	\$ (2,903)	\$ 9,392
Accounts payable	—	175	573	8	756	—	756
Debt	—	—	5,082	—	5,082	—	5,082
Federal employee benefits payable	—	—	64	—	64	—	64
Environmental and disposal liabilities	—	25,863	20	—	25,883	—	25,883
Advances from others and deferred revenue	46,716	—	1,494	3	48,213	—	48,213
Other liabilities	—	33	4,903	54	4,990	—	4,990
Total liabilities	\$ 46,716	\$ 26,111	\$ 24,391	\$ 65	\$ 97,283	\$ (2,903)	\$ 94,380
Unexpended appropriations	17	—	—	10	27	—	27
Cumulative results of operations	—	(25,706)	8,736	2,966	(14,004)	—	(14,004)
Total Liabilities and Net Position	\$ 46,733	\$ 405	\$ 33,127	\$ 3,041	\$ 83,306	\$ (2,903)	\$ 80,403
STATEMENT OF NET COST							
Program costs	\$ 10	\$ 1,052	\$ 5,012	\$ 182	\$ 6,256	\$ (311)	\$ 5,945
Less earned revenues	(12)	(7)	(5,628)	(1,220)	(6,867)	311	(6,556)
Net program costs	\$ (2)	\$ 1,045	\$ (616)	\$ (1,038)	\$ (611)	\$ —	\$ (611)
Costs not assigned	—	(6)	—	(2)	(8)	—	(8)
Net cost of operations	\$ (2)	\$ 1,039	\$ (616)	\$ (1,040)	\$ (619)	\$ —	\$ (619)
STATEMENT OF CHANGES IN NET POSITION							
Unexpended appropriations, beginning balance	\$ —	\$ —	\$ —	\$ 9	\$ 9	\$ —	\$ 9
Appropriations received	20	—	—	7	27	—	27
Appropriations transferred - in/(out)	—	—	—	—	—	—	—
Other adjustments	—	—	—	—	—	—	—
Appropriations used	(3)	—	—	(6)	(9)	—	(9)
Unexpended appropriations, ending balance	17	—	—	10	27	—	27
Cumulative results of operations, beginning balance	\$ —	\$ (24,958)	\$ 8,600	\$ 3,416	\$ (12,942)	\$ —	\$ (12,942)
Appropriations used	3	—	—	6	9	—	9
Non-exchange revenue	—	—	—	5	5	—	5
Transfers - (in)/out without reimbursement	(5)	291	(531)	(290)	(535)	—	(535)
Donations and forfeitures of property	—	—	36	—	36	—	36
Imputed financing	—	—	10	—	10	—	10
Other	—	—	5	(1,211)	(1,206)	—	(1,206)
Net cost of operations	2	(1,039)	616	1,040	619	—	619
Cumulative results of operations, ending balance	\$ —	\$ (25,706)	\$ 8,736	\$ 2,966	\$ (14,004)	\$ —	\$ (14,004)
Net position, end of period	\$ 17	\$ (25,706)	\$ 8,736	\$ 2,976	\$ (13,977)	\$ —	\$ (13,977)

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

NUCLEAR WASTE FUND

The NWPA requires the owners and generators of nuclear waste to pay their share of disposal costs into the NWF and, to that end, establishes a fee for electricity generated and sold by civilian nuclear power. A special fund within Treasury was created to account for the collection of those fees. Fees collected are invested in Treasury securities and any interest earned is available to pay expenditures related to radioactive waste disposal activities covered by the NWF. The NWPA requires preparation of annual financial statements. On March 15, 2022, the President signed into law the Consolidated Appropriations Act, 2022, which appropriated \$27.5 million for interim storage and nuclear waste disposal activities, of which \$7.5 million was derived from the Nuclear Waste Fund.

DECONTAMINATION AND DECOMMISSIONING FUND

The Energy Policy Act of 1992 established the D&D Fund to pay for the costs of decontamination and decommissioning of gaseous diffusion facilities through collection of revenues derived from domestic utility assessments and government appropriations. As part of that Act, funds in excess of current needs are invested in Treasury securities and the interest earned is available to

pay the costs of the environmental remediation. On March 15, 2022, the President signed into law the Consolidated Appropriations Act, 2022, which authorized the EM Program to spend \$860 million in D&D activities. The law required the transfer of funds into the D&D account, of which \$841 million was transferred from the USEC Fund and \$573 million was transferred from the Defense Environmental Cleanup account.

POWER MARKETING ADMINISTRATIONS

The PMAs have been funded primarily from four sources. These have included contract authority, borrowing authority, direct receipts generated from the sale of power and transmission services, and annual appropriations. SEPA and SWPA receive an annual appropriation from Treasury's General Fund. WAPA receives an annual appropriation from a receipt fund within the Reclamation Fund, and during FY 2022, received a \$500 million appropriation from the General Fund related to the Infrastructure Investment and Jobs Act. These appropriated funds are repaid to Treasury's General Fund and the Reclamation Fund from the revenues generated from power sales.

20. Program Costs and Earned Revenues by Major Program

(\$ IN MILLIONS)	FY 2022	FY 2021
Nuclear Security and NNSA		
Program Costs	\$ 14,653	\$ 13,832
Earned Revenues	(14)	(16)
Changes to environmental cleanup and disposal liability estimates ^(Note 13)	2,790	1,432
Net Cost of Nuclear Security and NNSA	\$ 17,429	\$ 15,248
Science		
Program Costs	\$ 12,270	\$ 11,844
Earned Revenues	(96)	(93)
Changes to environmental cleanup and disposal liability estimates ^(Note 13)	8,375	8,653
Net Cost of Science	\$ 20,549	\$ 20,404
Energy		
Program Costs	\$ 15,115	\$ 9,685
Earned Revenues	(22,648)	(6,429)
Changes to environmental cleanup and disposal liability estimates ^(Note 13)	278	791
Net Cost of Energy	\$ (7,255)	\$ 4,047
Net Cost of Major Programs	\$ 30,723	\$ 39,699
Other Programs		
Reimbursable programs		
Program Costs	\$ 5,422	\$ 5,239
Earned Revenues	(5,430)	(5,223)
Net Cost of Reimbursable Programs	\$ (8)	\$ 16
Other Programs		
Program Costs	\$ 2,599	\$ 2,371
Earned Revenues	(467)	(429)
Net Cost of Other Programs	\$ 2,132	\$ 1,942
Costs applied to reduction of legacy environmental liabilities ^(Note 13)	\$ (6,436)	\$ (6,451)
Costs not assigned to programs ^(Note 21)	\$ 721	\$ 1,213
Net Cost of Operations	\$ 27,132	\$ 36,419

MAJOR PROGRAMS**Nuclear Security and NNSA**

The general program costs and revenues related to Nuclear Security and NNSA allow the Department to strengthen national security by maintaining a safe, secure, and effective nuclear weapons stockpile that will deter any adversary and guarantee the defense of the Nation and its allies; managing the research, development, and production activities and associated infrastructure needed to meet national nuclear security requirements; accelerating and expanding efforts to reduce the global threat posed by nuclear weapons, nuclear proliferation and unsecured or excess nuclear materials; and providing safe and effective nuclear propulsion for the U.S. Navy.

For the Department's environmental cleanup and disposal liability cost estimates attributable to the Nuclear Security and NNSA program, the increase between FY 2022 and FY 2021 is due to inflation adjustments to reflect constant dollars for the current year; updated estimates for the same scope of work, including changes resulting from deferral or acceleration of work; and revisions in technical approach or scope, including additional contamination (see [Note 13](#)).

Science

The general program costs and revenues related to Science enable the Department to lead the world in research in the physical, chemical, biological, and computational sciences; contribute fundamental scientific discoveries and technological solutions that support American pre-eminence in science and innovation; and lead the national effort to maintain primacy in high-performance computing.

For the Department's environmental cleanup and disposal liability cost estimates attributable to the Science program, the change between FY 2022 and FY 2021 resulted from improved and updated estimates for the same scope of work, including changes resulting from deferral or acceleration of work; revisions in technical approach or scope, including additional contamination; updated estimates of projected waste volumes; changes in the Department's allocable percentage share of future costs; legal and regulatory changes; and cleanup activities performed (see [Note 13](#)).

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Energy

The general program costs and revenues related to Energy allow the Department to lead the Nation in cutting-edge research and development of an extensive range of energy technologies and identify and promote transformational technological advances to increase energy affordability and efficiency. The Energy program also enables the Department to lead national efforts to develop technologies to modernize the electric grid to improve its reliability and resilience; enhance the security, reliability, and resilience of energy infrastructure; improve domestic fossil energy production and use; and expedite recovery from energy supply disruptions.

The earned revenues within the Energy program are primarily made up of revenue from the sale of oil at the SPR. On March 31, 2022, the President authorized a release of 180 million barrels of SPR crude oil ([Note 7](#)) by the end of the 2022 calendar year. This action was taken to address the significant market supply disruption caused by Putin's war on Ukraine and to help lower energy costs for American families. This historic release has provided a record amount of crude oil supply to the U.S. economy and significantly increased the FY 2022 revenues reported to the U.S. Treasury by the Department.

For the Department's environmental cleanup and disposal liability cost estimates attributable to the Energy program, the change between FY 2022 and FY 2021 resulted from improved and updated estimates for the same scope of work, including changes resulting from deferral or acceleration of work; revisions in technical approach or scope, including additional contamination; updated estimates of projected waste volumes; changes in the Department's allocable percentage share of future costs; legal and regulatory changes; and cleanup activities performed (see [Note 13](#)).

OTHER PROGRAMS

Reimbursable Programs

The Department performs work for, and provides services to, other Federal agencies and private companies on a reimbursable work basis and a cooperative work basis.

For research and other activities, including the provision of materials and services for the benefit of non-DOE entities, the Department's general pricing policy is to charge full cost as defined in section 3137 of the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999, 42 U.S.C. § 7259a. The general pricing policy does not apply when prices or charges are otherwise established or prohibited by statute or regulation, and in some cases the full cost information provided by the Department in accordance with SFFAS 4, *Managerial Cost Accounting Concepts and Standards for the Federal Government*, may exceed revenues.

Other Programs

The Department's other programs allow the agency to employ effective management and refine operational and support capabilities to support Departmental missions. Costs included in the Other Programs line support the activities reported in all of the Department's major programs.

Costs Applied to Reduction of Legacy Environmental Liabilities

The costs applied to reduction of legacy environmental liabilities are current year operating expenditures for the remediation of contaminated facilities and wastes generated from past operations. These amounts are excluded from the current year environmental liabilities estimate since the expenses have been accrued.

21. Costs Not Assigned to Programs

(\$ IN MILLIONS)	FY 2022	FY 2021
Spent nuclear fuel contingency ^(Note 18)		
Judgment Fund payments	\$ 1,043	\$ 389
Change in estimate	147	273
Current year spent nuclear fuel contingency costs	\$ 1,190	\$ 662
Changes in contractor pension and PRB estimates	(7,209)	(7,545)
Change in unfunded safety and health liabilities ^(Notes 11 and 14)	(340)	561
Change in occupational illness program	7,071	7,243
Other	9	292
Total Costs Not Assigned to Programs ^(Note 20)	\$ 721	\$ 1,213

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

CHANGES IN CONTRACTOR PENSION AND PRB ESTIMATES

The changes in contractor pension and PRB estimates are comprised of all the components of contractor pension and PRB net periodic costs except for service costs [i.e., interest costs; expected return on plan assets; (gain)/loss due to curtailments, settlements, or special termination benefits; net prior service cost/(credit); and net (gain)/loss including impacts of changes in actuarial assumptions]. Service costs are not included since they are recorded by program (see [Notes 16](#) and [22](#)).

COMPENSATION PROGRAM FOR OCCUPATIONAL ILLNESSES

The Energy Employees Occupational Illness Compensation Program Act (EEOICPA) authorized compensation for certain illnesses suffered by employees of the Department, its predecessor agencies, and contractors who performed work for the nuclear weapons program (see [Note 22](#)). EEOICPA covers illnesses associated with exposure to radiation, beryllium, or silica. In general, each eligible employee and survivors of deceased employees will receive compensation for the disability or death of that employee in the amount of \$150,000 plus the costs of medical care.

The National Defense Authorization Act of 2005 amended the EEOICPA to grant workers' compensation benefits to covered employees and their families for illness and death arising from exposure to toxic substances at the Department's facilities. The amendment also makes it possible for uranium workers, as defined under Section 5 of the Radiation Exposure Compensation Act, to receive compensation for illnesses due to toxic substance exposure at a uranium mine or mill covered under that Act.

As of September 30, 2005, the law makes payments under these programs the responsibility of the Department of Labor. Therefore, the liability is recorded by the Department of Labor and changes in the total liability are recognized by the Department as an imputed cost and an imputed financing source.

The increase in FY 2022 is primarily due to an increase in the year-end discounted liability estimate for future EEOICPA benefit payments. This increase was largely driven by the continued rise of new cases and expansion of benefits due to increase in acceptances of consequential conditions in existing cases.

22. Inter-Entity Costs

Goods and services are received from other Federal entities at no cost or at a cost less than the full cost to the providing Federal entity. Consistent with accounting standards, certain costs of the providing entity that are not fully reimbursed by the Department are recognized as imputed cost in the *Statement of Net Cost* and are offset by imputed financing in the *Statement of Changes in Net Position*. Such imputed costs and financing relate to

EEOICPA payments by the Department of Labor (see [Note 21](#)), Treasury borrowing costs during construction of WAPA plant assets recoverable by the Bureau of Reclamation, employee benefits, and claims paid by the Treasury Judgment Fund (see [Note 21](#)). Unreimbursed costs of goods and services other than those identified above are not included in our financial statements.

23. Combined Statements of Budgetary Resources

The *Statements of Budgetary Resources* are presented on a combined, rather than a consolidated, basis in accordance with OMB guidance.

NET ADJUSTMENTS TO UNOBLIGATED BALANCE, BROUGHT FORWARD, OCTOBER 1

(\$ IN MILLIONS)	FY 2022	FY 2021
Unobligated balance brought forward, Oct 1	\$ 8,946	\$ 10,569
Unobligated balance transferred to other accounts	(3)	—
Unobligated balance transferred from other accounts	23	6
Adjustment to unobligated balance brought forward, Oct 1	—	1
Recoveries of prior year unpaid obligations	730	650
Unobligated balances applied to repay debt	(215)	(406)
Other balances withdrawn to Treasury	(21)	(32)
Recoveries of prior year paid obligations	17	59
Total Adjusted Unobligated Balance Brought Forward	\$ 9,477	\$ 10,847

BORROWING AUTHORITY

The Department's borrowing authority reflected in the *Combined Statements of Budgetary Resources* represents the amount of borrowing authority for the current Fiscal Year's obligations, which may or may not have been converted to cash. The amount of borrowing authority available for the Department's loan program has increased from \$838 million as of September 30, 2021, to \$997 million as of September 30, 2022, while the amount of borrowing authority available for WAPA has remained unchanged at \$3.2 billion, and for BPA has increased from \$2.1 billion as of September 30, 2021 to \$8.0 billion as of September 30, 2022. The amounts available are authority that has not been converted to cash.

Therefore, Congress permitted BPA to enter into (multiyear) contracts (including when BPA received annual appropriations). The Bonneville Project Act provides the following authority:

832a(f) - "Subject only to the provisions of this chapter, the Administrator is authorized to enter into such contracts, agreements and arrangements, including the amendment, modification, adjustment, or (cancellation) thereof and the compromise or final settlement of any claim arising thereunder, and to make such expenditures, upon, such terms and conditions and in such manner as he may deem necessary."

The amount of contract authority reflected as available in the *Combined Statements of Budgetary Resources* has decreased from \$2.4 billion as of September 30, 2021 to \$1.3 billion as of September 30, 2022.

CONTRACT AUTHORITY

Congress intended BPA to operate in a businesslike manner and to carry out its mission free from the uncertainty inherent in the annual appropriations process.

UNDELIVERED ORDERS AT THE END OF THE PERIOD

(\$ IN MILLIONS)	FY 2022		FY 2021	
	Federal	Non-Federal	Federal	Non-Federal
Undelivered orders - unpaid	\$ 2,523	\$ 41,583	\$ 2,024	\$ 33,939
Undelivered orders - paid	5	429	12	380
Total Undelivered Orders	\$ 2,528	\$ 42,012	\$ 2,036	\$ 34,319

PERMANENT INDEFINITE APPROPRIATIONS

(\$ IN MILLIONS)	FY 2022	FY 2021
Definite appropriations	\$ 98,328	\$ 39,813
Permanent indefinite mandatory appropriations	22	310
Total Appropriations	\$ 98,350	\$ 40,123

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

The Department is authorized to use indefinite appropriations per the FCRA. These amounts are used to fund upward re-estimates on the FCRA loans. Permanent indefinite mandatory appropriations are appropriations that are available until expended. The permanent

indefinite mandatory appropriations are attributable to the Title 17 Innovative Technology Loan Guarantee Program and the Advanced Technology Vehicles Manufacturing Loan Program.

LEGAL ARRANGEMENTS AFFECTING THE USE OF UNOBLIGATED BALANCES

(\$ IN MILLIONS)	FY 2022	FY 2021
Loan funds reserved for future defaults	\$ 944	\$ 960
Unexpired appropriations that did not receive apportionments	16	19
Prior year deobligations in excess of apportioned amount	56	69
Actual unobligated carryover greater than estimated amounts on the apportionments	—	4
Expired appropriations	90	76
Other amounts not apportioned	34,351	434
Total Unobligated Balances Not Available	\$ 35,457	\$ 1,562

Other amounts not apportioned includes IRA funding.

EXPLANATION OF DIFFERENCES BETWEEN THE SBR AND THE BUDGET OF THE U.S. GOVERNMENT

(\$ IN MILLIONS)	BUDGETARY RESOURCES	NEW OBLIGATIONS & UPWARD ADJUSTMENTS (TOTAL)	DISTRIBUTED OFFSETTING RECEIPTS	NET OUTLAYS
Combined Statements of Budgetary Resources as published	\$ 62,770	\$ 53,825	\$ (3,612)	\$ 37,918
OMB adjustments made to exclude:				
U.S. Enrichment Corporation Fund	—	—	—	4
Non-budgetary Credit Reform Financing Accounts	(1,621)	(644)	—	(616)
Expired accounts	(76)	—	—	—
Other	(6)	(3)	4	5
Budget of the United States Government	\$ 61,067	\$ 53,178	\$ (3,608)	\$ 37,311

The FY 2021 *Combined Statements of Budgetary Resources* are reconciled to the President's Budget that was published in February 2022. The President's Budget containing actual FY 2022 balances is expected to be published and available on the OMB website in April 2023. Budgetary resources, new obligations and upward adjustments, and net outlays are reconciled to the Departmental balances as published in the Appendix to the Budget; distributed offsetting receipts is reconciled to the Departmental balances in the Federal Budget by Agency

and Account section of the Analytical Perspectives Volume of the President's Budget.

The non-budgetary credit reform financing accounts are reported separately in the President's Budget and are not reflected in the budget surplus or deficit. Unobligated balances in expired accounts are reported in the SBR but are not included in the President's Budget.

24. Custodial Activities

POWER MARKETING ADMINISTRATIONS

The SEPA, SWPA, and WAPA are responsible for collecting and remitting to Treasury, Army Corps, and the DOI revenues attributable to the hydroelectric power projects owned and operated by the DoD, USACE; DOI, BOR; and the DOS, International Boundary and Water Commission. These revenues are reported as custodial activities of the Department.

FEDERAL ENERGY REGULATORY COMMISSION

FERC is responsible for billing regulated companies annual charges as a custodian for certain Federal agencies. These include: (1) the USACE for licensees to provide

maintenance and operations of dams owned by the U.S. and maintenance for operations of headwater or other navigable waters owned by the U.S.; (2) the BOR for the occupancy and use of public lands and national parks owned by the U.S. and for Indian Tribal Trust Funds from licensees for the reservation of Indian land; (3) Treasury for revenues collected based on penalties, interest, and administrative charges for overdue accounts receivables and for civil penalties; and (4) payments to states collected from licensees for the occupancy and use of national forests and public lands from development within the boundaries of any state.

25. Reconciliation of Net Cost to Net Outlays

(\$ IN MILLIONS)	FY 2022			FY 2021		
	Intra-governmental	Other than Intra-governmental	Total	Intra-governmental	Other than Intra-governmental	Total
Net Cost	\$ 3,507	\$ 23,625	\$ 27,132	\$ 3,654	\$ 32,765	\$ 36,419
Components of Net Operating Cost Not Part of the Budgetary Outlays						
Property, plant, and equipment depreciation	\$ —	\$ (1,998)	\$ (1,998)	\$ —	\$ (2,034)	\$ (2,034)
Property, plant, and equipment disposal & reevaluation	—	(942)	(942)	—	(1,015)	(1,015)
Cost of goods sold	—	(4,996)	(4,996)	—	(512)	(512)
Cost capitalization offset	—	293	293	—	316	316
Year-end credit reform subsidy re-estimates	274	—	274	367	—	367
President's adjustment to re-estimates	15	—	15	(8)	—	(8)
Gains/losses on all other investments	—	(4)	(4)	—	(4)	(4)
Other	—	265	265	—	(218)	(218)
Net cost for non-budgetary credit reform financing accounts	—	—	—	(194)	—	(194)
Increase/(decrease) in assets:						
Cash	\$ —	\$ (44)	\$ (44)	\$ —	\$ (128)	\$ (128)
Accounts receivable	303	2,267	2,570	219	(8)	211
Investments	(30)	—	(30)	(36)	—	(36)
Advances and prepayments	(8)	50	42	(19)	206	187
Other assets	—	(597)	(597)	—	(313)	(313)
(Increase)/decrease in liabilities:						
Accounts payable	\$ (3)	\$ (264)	\$ (267)	\$ (2)	\$ (471)	\$ (473)
Loan guarantee liability (Non-FCRA)	5	—	5	(6)	—	(6)
Environmental and disposal liabilities	—	(4,015)	(4,015)	—	(3,388)	(3,388)
Federal employee and veteran benefits payable	—	(142)	(142)	—	1	1
Federal debt and interest payable	—	(19)	(19)	—	(4)	(4)
Advances from others and deferred revenue	15	(155)	(140)	9	(56)	(47)
Other liabilities	(78)	7,992	7,914	138	6,934	7,072
Financing sources:						
Imputed cost	\$ (8,230)	\$ —	\$ (8,230)	\$ (7,848)	\$ —	\$ (7,848)
Other	(245)	—	(245)	(9)	—	(9)
Total Components of Net Operating Cost Not Part of Budget Outlays	\$ (7,982)	\$ (2,309)	\$ (10,291)	\$ (7,389)	\$ (694)	\$ (8,083)
Components of the Budget Outlays Not Part of Net Operating Cost						
Acquisition of capital assets	\$ 61	\$ 6,328	\$ 6,389	\$ 5	\$ 5,634	\$ 5,639
Acquisition of inventory	—	1,330	1,330	(1)	1,358	1,357
Effect of prior year agencies credit reform subsidy re-estimate	(383)	—	(383)	(160)	—	(160)
Other	(1,728)	(17)	(1,745)	(1,635)	(2)	(1,637)
Financing sources:						
Donated revenue	\$ —	\$ (21)	\$ (21)	\$ —	\$ (6)	\$ (6)
Transfers out (in) without reimbursement	229	—	229	239	—	239
Total Components of the Budget outlays Not Part of Net Operating Cost	\$ (1,821)	\$ 7,620	\$ 5,799	\$ (1,552)	\$ 6,984	\$ 5,432
Miscellaneous Items:						
Custodial/Non-exchange revenue	\$ (1)	\$ (207)	\$ (208)	\$ (5)	\$ (285)	\$ (290)
Non-Entity activity	(87)	—	(87)	212	—	212
Other adjustments	78	—	78	—	—	—
Total Other Reconciling Items	\$ (10)	\$ (207)	\$ (217)	\$ 207	\$ (285)	\$ (78)
Total Net Outlays (Calculated Total)	\$ (6,306)	\$ 28,729	\$ 22,423	\$ (5,080)	\$ 38,770	\$ 33,690
Related Amounts on the Statement of Budgetary Resources:						
Outlays, net (Total) ^(Note 23)			\$ 28,944			\$ 37,302
Distributed offsetting receipts ^(Note 23)			(6,521)			(3,612)
Agency Outlays, Net			\$ 22,423			\$ 33,690

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

This reconciliation explains the relationship between the entity's net outlays on a budgetary basis and the net cost of operations during the reporting period. It serves not only to identify costs paid for in the past, and those that will be paid for in the future, but also to assure integrity between budgetary and financial accounting. According to OMB Circular A-136, FCRA financing fund activity is excluded from this reconciliation.

The table illustrates the key reconciling items between net operating cost and net outlays which includes three sections. (1) The components of net cost not part of budgetary outlays includes proprietary accounts that do

not result in net outlays during the current fiscal year. This includes items such as depreciation, cost of goods sold, credit reform items, changes to certain assets and liabilities, and imputed financing; (2) The components of the budget outlays that are not part of net operating cost accounts for budgetary outlays that do not result in proprietary costs for the current fiscal year. This includes acquisition of capitalized assets, and inventory, both of which have disbursements without associated costs, as well as the effect of prior year agencies credit reform subsidy re-estimates and transfers; and (3) The miscellaneous items section includes the custodial/non-exchange revenue, non-entity activity, and an other adjustment for BPA.

26. Reclassification of Financial Statement Line Items for Financial Report Compilation Process

(\$ IN MILLIONS)						
FY 2022 Statement of Net Cost	FY 2022	FY 2022 Reclassified				Line Items Used to Prepare FY 2022 Governmentwide Statement of Net Cost
Financial Statement Line	Amounts	Dedicated Collections Combined	Dedicated Collections Eliminations	All Other Amounts (with Eliminations)	Total	Reclassified Financial Statement Line
Gross Costs (Note 20)	\$ 55,787	\$ 5,509	\$ —	\$ 39,744	\$ 45,253	Non-Federal Gross Cost
						Intragovernmental Costs
		\$ 57	\$ —	\$ 439	\$ 496	Benefit Program Costs
		11	—	8,219	8,230	Imputed Costs
		482	(267)	842	1,057	Buy/Sell Costs
		—	—	60	60	Purchase of Assets
		322	(105)	430	647	Borrowing and Other Interest Expense
		—	—	102	102	Other Expenses (w/o Reciprocals)
		\$ 872	\$ (372)	\$ 10,092	\$ 10,592	Total Intragovernmental Costs
Total Gross Costs	\$ 55,787	\$ 6,381	\$ (372)	\$ 49,836	\$ 55,845	Total Reclassified Gross Costs
Earned Revenue (Note 20)	\$ (28,655)	\$ 8,596	\$ —	\$ 13,427	\$ 22,023	Non-Federal Earned Revenue
						Intragovernmental Revenue
		602	(266)	4,513	4,849	Buy/Sell Revenue
		1,745	—	—	1,745	Federal Securities Interest Revenue Including Associated Gains/Losses (Exchange)
		106	(105)	35	36	Borrowing and Other Interest Revenue
		—	—	60	60	Purchase of Asset Offset
		\$ 2,453	\$ (371)	\$ 4,608	\$ 6,690	Total Intragovernmental Revenues
Total Earned Revenue	\$ (28,655)	\$ 11,049	\$ (371)	\$ 18,035	\$ 28,713	Total Reclassified Earned Revenue
Net Cost	\$ 27,132	\$ (4,668)	\$ (1)	\$ 31,801	\$ 27,132	
Exchange Statement of Custodial Activity						
Exchange Custodial Collections from the SCA		254		117	371	Non-Federal Earned Revenue
		252	—	117	369	Custodial Collections Transferred to a TAS Other Than the General Fund - Exchange
		\$ (20)	\$ —	\$ (5)	\$ (25)	Accrual of Custodial Collections Yet to be Transferred to a TAS Other Than the General Fund - Exchange
Total Disposition of Exchange Custodial Collections		232	\$ —	\$ 112	\$ 344	Total Reclassified Disposition of Custodial Collections
		\$ 22	\$ —	\$ 5	\$ 27	Net Custodial Activity
		\$ (4,690)	\$ (1)	\$ 31,796	\$ 27,105	Total Reclassified Net Cost

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

(\$ IN MILLIONS)						
FY 2022 Statement of Changes in Net Position	FY 2022	FY 2022 Reclassified				Line Items Used to Prepare FY 2022 Governmentwide Statements of Changes in Net Position
Financial Statement Line	Amounts	Dedicated Collections Combined	Dedicated Collections Eliminations	All Other Amounts (with Eliminations)	Total	Reclassified Financial Statement Line
UNEXPENDED APPROPRIATIONS						UNEXPENDED APPROPRIATIONS
Beginning Balances	\$ 34,955	\$ 27	\$ —	\$ 34,928	\$ 34,955	Net Position, Beginning of Period
Appropriations Received (Note 23)	98,507	527	—	97,980	98,507	Appropriations Received as Adjusted
Appropriations Transferred In/(Out)	—	(1)		1	—	Non-Expenditure Transfers-Out of Unexpended Appropriations and Financing Sources
Other Adjustments	(277)	2	—	(279)	(277)	Appropriations Received as Adjusted
Appropriations Used	(40,136)	(355)	—	(39,781)	(40,136)	Appropriations Used
Total Unexpended Appropriations	\$ 93,070	\$ 200	\$ —	\$ 92,870	\$ 93,070	Total Unexpended Appropriations
CUMULATIVE RESULTS OF OPERATIONS						CUMULATIVE RESULTS OF OPERATIONS
Beginning Balances	\$(478,598)	\$ (14,004)	\$ —	\$ (464,594)	\$(478,598)	Net Position, Beginning of Period
Appropriations Used	40,136	355	—	39,781	40,136	Appropriations Expended
Non-Exchange Revenues	1	1	—	—	1	Federal Securities Interest Revenue Including Associated Gains/Losses (Non-Exchange)
Donations and Forfeitures of Property	17	16	—	1	17	Other Taxes and Receipts
Transfers - In/(Out) Without Reimbursement	(503)	(102)	—		(102)	Appropriation of Unavailable Special/Trust Fund Receipts Transfers-Out
		(6)	—	—	(6)	Appropriation of Unavailable Special or Trust Fund Receipts Transfers-In
		(4)	—		(4)	Non-Expenditure Transfers-Out of Unexpended Appropriations and Financing Sources
		(226)	—	—	(226)	Expenditure Transfers-Out of Financing Sources
		—	—	132	132	Transfers-In w/o Reimbursement
		(163)	—	(134)	(297)	Transfers-Out w/o Reimbursement
Total Transfers In/Out w/o Reimbursement- Other	\$ (503)	\$ (501)	\$ —	\$ (2)	\$ (503)	
Other	(3,880)	(3,288)	—	(432)	(3,720)	Non-entity Collections Transferred to the General Fund
		—	—	94	94	Accrual for Non-entity Amounts to be Collected and Transferred to the General Fund
		209			209	Other Financing Sources with Budgetary Impact
		(469)	—	6	(463)	Other Non-Budgetary Financing Sources
Total Other	\$ (3,880)	\$ (3,548)	\$ —	\$ (332)	\$ (3,880)	
Donations and Forfeitures of Cash	\$ 21	\$ —	\$ —	\$ 21	\$ 21	Other Taxes and Receipts
Imputed Financing	8,230	10	—	8,220	8,230	Imputed Financing Sources
Total Donations, Transfers, Other & Imputed Financing	\$ 3,885	\$ (4,023)	\$ —	\$ 7,908	\$ 3,885	
Net Cost of Operations	(27,132)	4,669	—	(31,801)	(27,132)	
Total Cumulative Results of Operations	\$(461,708)	\$ (13,002)	\$ —	\$ (448,706)	\$(461,708)	Cumulative Results of Operations
Net Position	\$(368,638)	\$ (12,802)	\$ —	\$ (355,836)	\$(368,638)	Net Position
					\$ 27	Net Custodial Activity Reclassified from Net Cost
Non-Exchange Custodial Collections from the SCA		\$ 197	\$ —	\$ 13	\$ 210	Other Taxes and Receipts
Disposition of Non-Exchange Custodial Collections from the SCA		(20)	—	—	(20)	Collections Transferred to a TAS Other Than the General Fund
		(209)	—	(19)	(228)	Non-entity Collections Transferred to the General Fund
		10	—	1	11	Accrual for Non-entity Amounts to be Collected and Transferred to the General Fund
		\$ (22)		\$ (5)	\$ (237)	Total Reclassified Disposition of Non-Exchange Custodial Collections
					\$ (27)	Net Custodial Activity
					\$(368,638)	Total Reclassified Net Position

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

To prepare the Financial Report of the U.S. Government (Financial Report), the Department of the Treasury requires agencies to submit an adjusted trial balance, which is a listing of amounts by U.S. Standard General Ledger account that appear in the financial statements. Treasury uses the trial balance information reported in the Government-wide Treasury Account Symbol Adjusted Trial Balance System (GTAS) to develop a Reclassified Statement of Net Cost and a Reclassified Statement of Changes in Net Position for each agency, which are accessed using GTAS. Treasury eliminates all intragovernmental balances from the reclassified statements and aggregates lines with the same title to develop the Financial Report statements. This note shows the Department's financial statements and the Department's reclassified statements prior to elimination of intragovernmental balances and prior to aggregation of

repeated Financial Report line items. A copy of the 2021 Financial Report can be found on the Bureau of the Fiscal Service's website and a copy of the 2022 Financial Report will be posted to this site as soon as it is released.

The term "intragovernmental" is used in this note to refer to amounts that result from other components of the Federal Government.

The term "non-Federal" is used in this note to refer to Federal Government amounts that result from transactions with non-Federal entities. These include transactions with individuals, businesses, non-profit entities, and State, local, and foreign governments.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Consolidating and Combining Schedules

U.S. Department of Energy Consolidating Schedules - Balance Sheets

As of September 30, 2022 and 2021

(See independent auditors' report)

(\$ IN MILLIONS)	FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
	FY 2022				
ASSETS:					
Intragovernmental Assets:					
Fund Balance with Treasury	\$ 279	\$ 4,939	\$ 112,447	\$ —	\$ 117,665
Investments, Net	—	1,611	47,394	—	49,005
Accounts Receivable, Net	—	186	822	(380)	628
Advances and Prepayments	—	—	106	(102)	4
Other Assets	—	—	30	(30)	—
Total Intragovernmental Assets	\$ 279	\$ 6,736	\$ 160,799	\$ (512)	\$ 167,302
Other than Intragovernmental:					
Cash	\$ —	\$ 128	\$ —	\$ —	\$ 128
Accounts Receivable, Net	19	711	4,562	—	5,292
Loans Receivable, Net	—	1	15,444	—	15,445
Inventory, Net	—	143	44,869	—	45,012
General Property, Plant, and Equipment, Net	48	11,050	35,673	—	46,771
Advances and Prepayments	—	46	584	—	630
Other Assets	—	12,767	950	—	13,717
Total Other than Intragovernmental	\$ 67	\$ 24,846	\$ 102,082	\$ —	\$ 126,995
Total Assets	\$ 346	\$ 31,582	\$ 262,881	\$ (512)	\$ 294,297
LIABILITIES:					
Intragovernmental Liabilities:					
Accounts Payable	\$ —	\$ 62	\$ 221	\$ (134)	149
Debt	—	5,784	15,907	—	21,691
Advances from Others and Deferred Revenue	—	3	315	(102)	216
Other Liabilities	6	4,050	1,185	(276)	4,965
Total Intragovernmental Liabilities	\$ 6	\$ 9,899	\$ 17,628	\$ (512)	\$ 27,021
Other than Intragovernmental:					
Accounts Payable	\$ 23	\$ 640	\$ 4,412	\$ —	\$ 5,075
Federal Debt and Interest Payable	—	5,101	—	—	5,101
Federal Employee Benefits Payable	25	56	343	—	424
Environmental and Disposal Liabilities	—	22	519,638	—	519,660
Loan Guarantee Liabilities	—	—	89	—	89
Advances from Others and Deferred Revenue	—	1,601	49,058	—	50,659
Other Liabilities	35	4,663	50,208	—	54,906
Total Liabilities Other than Intragovernmental	\$ 83	\$ 12,083	\$ 623,748	\$ —	\$ 635,914
Total Liabilities	\$ 89	\$ 21,982	\$ 641,376	\$ (512)	\$ 662,935
NET POSITION:					
Unexpended Appropriations					
Unexpended Appropriations - Funds from Dedicated Collections	\$ —	\$ 166	\$ 34	\$ —	\$ 200
Unexpended Appropriations - Funds from Other than Dedicated Collections	100	—	92,770	—	92,870
Cumulative Results of Operations					
Cumulative Results of Operations - Funds from Dedicated Collections	—	9,434	(22,436)	—	(13,002)
Cumulative Results of Operations - Funds from Other than Dedicated Collections	157	—	(448,863)	—	(448,706)
Total Net Position	\$ 257	\$ 9,600	\$ (378,495)	\$ —	\$ (368,638)
Total Liabilities and Net Position	\$ 346	\$ 31,582	\$ 262,881	\$ (512)	\$ 294,297

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
FY 2021				
\$ 180	\$ 5,109	\$ 43,557	\$ —	\$ 48,846
—	\$ —	\$ 46,092	\$ —	46,092
—	150	1,003	(606)	547
—	—	104	(92)	12
—	—	—	—	—
\$ 180	\$ 5,259	\$ 90,756	\$ (698)	\$ 95,497
—	172	—	—	172
25	506	2,494	—	3,025
—	1	16,338	—	16,339
—	140	49,166	—	49,306
29	10,753	32,377	—	43,159
—	37	543	—	580
—	13,394	78	—	13,472
\$54	\$25,003	\$100,996	\$—	\$126,053
\$ 234	\$ 30,262	\$ 191,752	\$ (698)	\$ 221,550
\$ 3	\$ 56	\$ 207	\$ (119)	147
—	5,739	16,875	—	22,614
—	1	321	(92)	230
10	3,594	1,475	(487)	4,592
\$ 13	\$ 9,390	\$ 18,878	\$ (698)	\$ 27,583
\$ 20	\$ 573	\$ 4,219	\$ —	\$ 4,812
—	5,082	—	—	5,082
25	64	193	—	282
—	20	515,625	—	515,645
—	—	98	—	98
—	1,494	47,278	—	48,772
38	4,903	57,978	—	62,919
\$ 83	\$ 12,136	\$ 625,391	\$ —	\$ 637,610
\$ 96	21,526	\$ 644,269	\$ (698)	\$ 665,193
\$ —	—	\$ 27	\$ —	\$ 27
—	—	34,928	—	34,928
—	8,736	(22,740)	—	(14,004)
138	—	(464,732)	—	(464,594)
\$ 138	8,736	\$ (452,517)	\$ —	\$ (443,643)
\$ 234	30,262	\$ 191,752	\$ (698)	\$ 221,550

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

U.S. Department of Energy Consolidating Schedules of Net Cost For the Years Ended September 30, 2022 and 2021

(See independent auditors' report)

(\$ IN MILLIONS)	FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
	FY 2022				
MAJOR PROGRAMS:					
Nuclear Security and NNSA					
Program Costs	\$ —	\$ —	\$ 17,444	\$ (1)	\$ 17,443
Less: Earned Revenues	—	—	(15)	1	(14)
Net Cost of Nuclear Security and NNSA	\$ —	\$ —	\$ 17,429	\$ —	\$ 17,429
Science					
Program Costs	\$ —	\$ —	\$ 21,324	\$ (679)	\$ 20,645
Less: Earned Revenues	—	—	(775)	679	(96)
Net Cost of Science	\$ —	\$ —	\$ 20,549	\$ —	\$ 20,549
Energy					
Program Costs	\$ —	\$ 4,645	\$ 10,751	\$ (3)	\$ 15,393
Less: Earned Revenues	—	(5,728)	(16,923)	3	(22,648)
Net Cost of Energy	\$ —	\$ (1,083)	\$ (6,172)	\$ —	\$ (7,255)
Net Cost of Major Programs	\$ —	\$ (1,083)	\$ 31,806	\$ —	\$ 30,723
OTHER PROGRAMS:					
Reimbursable Programs					
Program Costs	\$ —	\$ 356	\$ 5,100	\$ (34)	\$ 5,422
Less: Earned Revenues	—	(412)	(5,052)	34	(5,430)
Net Cost of Reimbursable Programs	\$ —	\$ (56)	\$ 48	\$ —	\$ (8)
Other programs:					
Program Costs	\$ 456	\$ —	\$ 2,401	\$ (258)	\$ 2,599
Less: Earned Revenues	(456)	—	(269)	258	(467)
Net Cost of Other Programs	\$ —	\$ —	\$ 2,132	\$ —	\$ 2,132
Costs Applied to Reduction of Legacy Environmental Liabilities	\$ —	\$ —	\$ (6,436)	\$ —	\$ (6,436)
Costs Not Assigned to Programs	\$ —	\$ —	\$ 721	\$ —	\$ 721
Net Cost of Operations	\$ —	\$ (1,139)	\$ 28,271	\$ —	\$ 27,132

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
FY 2021				
\$ —	\$ —	\$ 15,264	\$ —	\$ 15,264
—	—	(16)	—	(16)
\$ —	\$ —	\$ 15,248	\$ —	\$ 15,248
\$ —	\$ —	\$ 20,575	\$ (78)	\$ 20,497
—	—	(171)	78	(93)
\$ —	\$ —	\$ 20,404	\$ —	\$ 20,404
\$ —	\$ 4,446	\$ 6,033	\$ (3)	\$ 10,476
—	(5,027)	(1,405)	3	(6,429)
\$ —	\$ (581)	\$ 4,628	\$ —	\$ 4,047
\$ —	\$ (581)	\$ 40,280	\$ —	\$ 39,699
\$ —	\$ 333	\$ 4,925	\$ (19)	\$ 5,239
\$ —	\$ (368)	\$ (4,874)	\$ 19	\$ (5,223)
\$ —	\$ (35)	\$ 51	\$ —	\$ 16
\$ 420	\$ —	\$ 2,208	\$ (257)	\$ 2,371
(420)	—	(266)	257	(429)
\$ —	\$ —	\$ 1,942	\$ —	\$ 1,942
\$ —	\$ —	\$ (6,451)	\$ —	\$ (6,451)
\$ —	\$ —	\$ 1,213	\$ —	\$ 1,213
\$ —	\$ (616)	\$ 37,035	\$ —	\$ 36,419

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

U.S. Department of Energy Consolidating Schedules of Changes in Net Position

For the Years Ended September 30, 2022 and 2021

(See independent auditors' report)

(\$ IN MILLIONS)	FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
	FY 2022				
UNEXPENDED APPROPRIATIONS:					
Beginning Balances	\$ —	\$ —	\$ 34,955	\$ —	\$ 34,955
Appropriations Received	\$ 100	\$ 500	\$ 97,907	\$ —	\$ 98,507
Appropriations Transferred - In/Out	—	(1)	22	—	21
Other Adjustments	—	3	(280)	—	(277)
Appropriations Used	—	(336)	(39,800)	—	(40,136)
Net Change in Unexpended Appropriations	\$ 100	\$ 166	\$ 57,849	\$ —	\$ 58,115
Total Unexpended Appropriations	\$ 100	\$ 166	\$ 92,804	\$ —	\$ 93,070
CUMULATIVE RESULTS OF OPERATIONS:					
Beginning Balances	\$ 138	\$ 8,736	\$ (487,472)	\$ —	\$ (478,598)
Other Adjustments	\$ —	\$ —	\$ —	\$ —	\$ —
Appropriations Used	—	336	39,800	—	40,136
Non-Exchange Revenue	—	—	1	—	1
Donations and Forfeitures of Cash	—	—	21	—	21
Transfers - In/Out Without Reimbursement	—	(497)	(6)	—	(503)
Donations and Forfeitures of Property	—	16	1	—	17
Imputed Financing	14	10	8,206	—	8,230
Other	5	(306)	(3,579)	—	(3,880)
Net Cost of Operations	\$ —	\$ 1,139	\$ (28,271)	\$ —	\$ (27,132)
Net Change in Cumulative Results of Operations	\$ 19	\$ 698	\$ 16,173	\$ —	\$ 16,890
Total Cumulative Results of Operations	\$ 157	\$ 9,434	\$ (471,299)	\$ —	\$ (461,708)
Net Position	\$ 257	\$ 9,600	\$ (378,495)	\$ —	\$ (368,638)

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
FY 2021				
\$ —	\$ —	\$ 32,766	\$ —	\$ 32,766
\$ —	\$ —	\$ 41,311	\$ —	\$ 41,311
—	—	3	—	3
—	—	(2,315)	—	(2,315)
—	—	(36,810)	—	(36,810)
\$ —	\$ —	\$ 2,189	\$ —	\$ 2,189
\$ —	\$ —	\$ 34,955	\$ —	\$ 34,955
\$ 120	\$ 8,600	\$ (493,588)	\$ —	\$ (484,868)
\$ —	\$ —	\$ (18)	\$ —	\$ (18)
—	—	36,810	—	36,810
—	—	6	—	6
—	—	6	—	6
—	(531)	5	—	(526)
—	36	2	—	38
13	10	7,825	—	7,848
5	5	(1,485)	—	(1,475)
\$ —	\$ 616	\$ (37,035)	\$ —	\$ (36,419)
\$ 18	\$ 136	\$ 6,116	\$ —	\$ 6,270
\$ 138	\$ 8,736	\$ (487,472)	\$ —	\$ (478,598)
\$ 138	\$ 8,736	\$ (452,517)	\$ —	\$ (443,643)

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

U.S. Department of Energy Combining Schedules of Budgetary Resources For the Years Ended September 30, 2022 and 2021

(See independent auditors' report)

(\$ IN MILLIONS)	FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	COMBINED
	FY 2022			
BUDGETARY RESOURCES:				
Unobligated Balance from Prior Year Budget Authority, Net	\$ 33	\$ 887	\$ 8,557	\$ 9,477
Appropriations	103	600	97,647	98,350
Borrowing Authority	—	739	3,235	3,974
Contract Authority	—	1,270	—	1,270
Spending Authority from Offsetting Collections	466	2,970	18,343	21,779
Total Budgetary Resources	\$ 602	\$ 6,466	\$ 127,782	\$ 134,850
STATUS OF BUDGETARY RESOURCES:				
New Obligations and Upward Adjustments (Total)	\$ 459	\$ 5,297	\$ 56,422	\$ 62,178
Unobligated Balance, End of Year:				
Apportioned, Unexpired Accounts	\$ 42	\$ 838	\$ 36,323	\$ 37,203
Exempt from Apportionment, Unexpired Accounts	—	8	4	12
Unapportioned, Unexpired Accounts	101	323	34,943	35,367
Unexpired, Unobligated Balance, End of Year	\$ 143	\$ 1,169	\$ 71,270	\$ 72,582
Expired, Unobligated Balance, End of Year	—	—	90	90
Unobligated Balance, End of Year (Total)	\$ 143	\$ 1,169	\$ 71,360	\$ 72,672
Total Budgetary Resources	\$ 602	\$ 6,466	\$ 127,782	\$ 134,850
OUTLAYS, NET				
Outlays, Net (Total)	\$ 8	\$ (615)	\$ 29,551	\$ 28,944
Distributed Offsetting Receipts (-)	(14)	(556)	(5,951)	(6,521)
Agency Outlays, Net	\$ (6)	\$ (1,171)	\$ 23,600	\$ 22,423
Disbursements, Net (Total)	\$ —	\$ —	\$ (814)	\$ (814)

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	COMBINED
FY 2021			
\$ 58	\$ 1,006	\$ 9,783	\$ 10,847
6	100	40,017	40,123
—	737	113	850
—	2,379	—	2,379
404	1,596	6,571	8,571
\$ 468	\$ 5,818	\$ 56,484	\$ 62,770
\$ 445	\$ 4,976	\$ 48,404	\$ 53,825
\$ 23	\$ 454	\$ 6,893	\$ 7,370
—	9	4	13
—	379	1,107	1,486
\$ 23	\$ 842	\$ 8,004	\$ 8,869
—	—	76	76
\$ 23	\$ 842	\$ 8,080	\$ 8,945
\$ 468	\$ 5,818	\$ 56,484	\$ 62,770
\$ 14	\$ (50)	\$ 37,338	\$ 37,302
(35)	(541)	(3,036)	(3,612)
\$ (21)	\$ (591)	\$ 34,302	\$ 33,690
\$ —	\$ —	\$ 616	\$ 616

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

U.S. Department of Energy Consolidating Schedules of Custodial Activities For the Years Ended September 30, 2022 and 2021

(See independent auditors' report)

(\$ IN MILLIONS)	FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
	FY 2022				
SOURCES OF COLLECTIONS:					
Cash Collections:					
Power Marketing Administrations	\$ —	\$ 544			\$ 544
Federal Energy Regulatory Commission	43	—			43
Total Cash Collections	\$ 43	\$ 544	\$ —	\$ —	\$ 587
Accrual Adjustment	(1)	(1)			(2)
Total Custodial Revenue	\$ 42	\$ 543	\$ —	\$ —	\$ 585
DISPOSITION OF REVENUE:					
Transferred to Others:					
Bureau of Reclamation	\$ (8)	\$ (154)			\$ (162)
Department of the Treasury	(19)	(209)			(228)
Army Corps of Engineers	(13)	(184)			(197)
Others	(3)	—			(3)
Decrease/(Increase) in Amounts to be Transferred	1	4			5
Net Custodial Activity	\$ —	\$ —	\$ —	\$ —	\$ —

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
FY 2021				
\$ —	\$ 619	\$ —	\$ —	\$ 619
63	—	—	—	63
\$ 63	\$ 619	\$ —	\$ —	\$ 682
3	—	—	—	3
\$ 66	\$ 619	\$ —	\$ —	\$ 685
\$ (11)	\$ (173)	\$ —	\$ —	\$ (184)
(36)	(252)	—	—	(288)
(11)	(183)	—	—	(194)
(6)	—	—	—	(6)
(2)	(11)	—	—	(13)
\$ —	\$ —	\$ —	\$ —	\$ —

Required Supplementary Information (RSI)

Unaudited – See accompanying Auditors' Report

This section of the report provides required supplementary information for the Department on deferred maintenance, Government Land and budgetary resources by major budget account.

Deferred Maintenance

Deferred maintenance and repairs information is a requirement under Statements of Federal Financial Accounting Standards (SFFAS) No. 42, *Deferred Maintenance and Repairs (DM&R)*, which requires deferred maintenance disclosures as of the end of each FY. Deferred maintenance is defined in SFFAS No. 42 as "maintenance and repairs that were not performed when they should have been or were scheduled to be and which are put off or delayed for a future period." DM&R reporting enables the government to be accountable to citizens for the proper administration and stewardship of its assets. Specifically, DM&R reporting assists by providing an entity's realistic estimate of DM&R amounts and the effectiveness of asset maintenance practices the entities employ in fulfilling their missions.

DOE Estimated DM&R for FY 2022 (Dollars in Millions) :

Buildings and Other Structures and Facilities	\$10,770
Capital Equipment	\$ 175
Total	\$10,945

Deferred Maintenance and Repairs – Buildings and Other Structures and Facilities

The Department owns over 19,900 buildings and structures with an estimated replacement value of \$263 billion. The Department's portfolio of property, plant, and equipment (PP&E) supports preeminent Federal research laboratory campuses; user facilities; production, special purpose, and legacy clean-up activities; and facilities used predominantly for office space and warehousing. Departmental policy is to maintain real property assets in a manner that promotes operational safety, worker health, environmental protection and compliance, property preservation, and cost-effectiveness, while meeting program missions. Estimates reported include DM&R for capitalized or not capitalized, and fully depreciated and not fully depreciated buildings, structures, and heritage assets owned by the Department. The Department categorizes assets designated as a National Historic Landmark, or listed in the National Register of Historical Places, or those included in the Manhattan Project National Historic Park as a Heritage Asset or Stewardship Land. The Department does not accrue DM&R on general or stewardship land parcels.

Defining and Implementing DM&R Policies in Practice

The Department visually assesses the condition of each building and structure at least once every five years with the exception of some structures where a physical barrier

prevents visual assessments (e.g., underground pipe systems). In such cases, sites may employ other methods to identify deficiencies. The inspection requirement applies to active and inactive/excess assets. Inactive assets must remain in a state safe enough to allow such inspections to occur, to protect life safety and the environment, to support eventual disposition, and so as not to endanger the mission responsibilities borne by other assets. Sites estimate the cost to address DM&R deficiencies using unit construction, maintenance, and repair cost data available from RSMeans, or other similar data sources and apply site-specific cost factors. In the time between updates, sites apply inflation factors derived from annual budget guidance published by the Department's Chief Financial Officer. Sites remove an item and its estimated cost from their backlog after resolving a deferred maintenance item or when management determines the repair is no longer needed. The National Nuclear Security Administration (NNSA) estimates DM&R costs for its sites using the BUILDER Sustainment Management System (SMS). The BUILDER SMS compares field inspection data with engineered lifecycle curves to calculate a condition score for each asset component. By weighting the component condition scores by the unit replacement costs of the components, the BUILDER SMS calculates the overall Building Condition Index (BCI) for each asset using a 0-to-100 point scale. NNSA uses standards and policies to define the acceptable condition for each asset. The NNSA BUILDER DM&R costs rely on cost data available from RSMeans, adjusted by site-specific cost factors. The BUILDER SMS calculates the cost to restore each asset component's condition to a condition standard considered acceptable in the current year. This cost includes repair and replacement of existing deficiencies and repair or replacement of components projected to fall below an acceptable condition level during the fiscal year.

Ranking and Prioritizing DM&R Activities

The Department does not rank or prioritize the maintenance and repair activities of its component programs and sites. Instead, it relies on the site manager to apply the maintenance budget based on the role each asset has in supporting the site's various missions. Ranking factors include mission dependency, status, use, ownership, and risks presented by any noted deficiencies, among other considerations. For all NNSA sites, the Office of Infrastructure established a single set of standards and policies for prioritizing maintenance and repair activities using similar factors. The Department's implementation of Office of Management and Budget (OMB) Memorandum M-20-03, *Implementation of Agency-wide Real Property Capital Planning* includes identifying projects and activities that reduce deferred maintenance in developing the President's Budget submission.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Factors Considered in Setting Acceptable Condition

The DOE Asset Management Plan identifies Asset Condition Index (ACI) as a real property portfolio performance measure. ACI compares an asset's (or portfolio's) DM&R to its Replacement Plant Value (RPV) through the following equation: $(1 - (DM\&R \div RPV)) \times 100$. Internal reporting guidance assigns qualitative labels to ACI ranges and considers assets with an ACI equal to or greater than 95 in at least adequate condition. For this purpose, the Department equates the terms "adequate" and "acceptable." As of September 30, 2022, the percentage of active buildings in a condition at or above acceptable is approximately 74 percent (a three percent increase from 2021).

Significant Changes from Prior Year and Related Events

As of September 30, 2022, the DOE had an estimated \$10.8 billion in total deferred maintenance which is an increase of about \$495 million (or 4.8 percent) from the FY 2021 total of \$10.3 billion. The Department applies a year-to-year variance threshold of 10 percent and considers overall increases or decreases beyond that threshold as significant. The FY 2022 increase of 4.8 percent is well below the 10 percent threshold and suggests that the Department's DM&R is beginning to stabilize after several years of double-digit percentage increases.

Capital Equipment

Pursuant to the cost/benefit considerations provided in SFFAS No. 42, the Department has determined that the requirements for deferred maintenance reporting on personal property (capital equipment) are not applicable to property items with an acquisition cost of less than \$100,000, except in situations where maintenance is needed to address worker and public health and safety concerns.

Various methods were used for measuring deferred maintenance and determining acceptable operating condition for the Department's capital equipment, including periodic condition assessments, physical inspections, review of work orders, manufacturer and engineering specification, and other methods, as appropriate.

An amount of \$175 million of deferred maintenance was estimated to be needed as of September 30, 2022, to return capital equipment assets to acceptable operating condition.

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Deferred Maintenance and Repair Costs

Estimates of the beginning and ending balances of DM&R for each major category of real property for which maintenance and repairs have been deferred include:

(\$ IN MILLIONS)	2022 Ending Balance DM&R	2022 Beginning Balance DM&R
ACTIVE:		
General PP&E:		
Buildings	\$ 6,063	\$ 5,889
Structures	3,326	2,996
Subtotal - General PP&E - Active	\$ 9,389	\$ 8,884
Heritage Assets	\$ 27	\$ 5
Subtotal - All Active	\$ 9,416	\$ 8,889
INACTIVE AND EXCESS:		
General PP&E:		
Buildings	\$ 1,223	\$ 1,220
Structures	115	156
Subtotal - General PP&E - Inactive and Excess	\$ 1,338	\$ 1,377
Heritage Assets	\$ 16	\$ 9
Subtotal - All Inactive and Excess	\$ 1,353	\$ 1,385
Total Deferred Maintenance and Repair Cost:	\$ 10,770	\$ 10,275

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Government Land

Federal Land reporting is a new requirement in FY 2022 under Statement of Federal Financial Accounting Standards (SFFAS) No. 59, *Accounting and Reporting of Government Land*. This standard provides requirements to report the estimated size (acres) of Federal land use by intent/purpose and ownership status. The Department uses its PP&E and Stewardship Land to support its mission activities by providing area to primarily accommodate administrative facilities, laboratory research and testing facilities, production facilities, long-term waste storage facilities, clean-up operations, and long-term legacy site management. The following tables provide the required

reporting detail: **Table 1** is breakdown of all of the land the Department owns by General PP&E Land and Stewardship Land followed by a subsequent breakout into three predominant use subcategories (Conservation and Preservation, Operational, and Commercial use land); **Table 2** shows estimated land held for disposal or exchange; and **Table 3** reports land rights (land not owned by DOE), whether such rights are permanent or temporary, and amounts paid during the year to maintain such rights. Bonneville Power Administration (BPA) data is excluded from these tables.

Table 1

Characterized by Purpose or Intent at Acquisition			Sub-Categorized by Predominant Use			
Stewardship Land (Acres)	General PP&E Land (Acres)	Total Land (Acres)	Conservation & Preservation (Acres)	Operational (Acres)	Commercial Use (Acres)	Total Land (Acres)
1,494,722	696,816	2,191,538	5,075	2,173,664	12,799	2,191,538

Table 2

Land Held for Disposal or Exchange		
Stewardship Land (Acres)	General PP&E Land (Acres)	Total Land (Acres)
—	1,658	1,658

Table 3

Land Rights			
Permanent Land Rights (Acres)	Temporary Land Rights (Acres)	Total Land Rights (Acres)	Total Cost to Maintain Land Rights (\$)
42,171	316,811	358,982	\$ 1,408,814

FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Budgetary Resources by Major Account - IIJA Funding only For the Year Ended September 30, 2022

(\$ IN MILLIONS)	Energy Efficiency And Renewable Energy 019 20 0321	Clean Energy Demonstrations 019 20 2297	Fossil Energy And Carbon Management 019 20 0213	Electricity 019 20 0318	Nuclear Energy 019 20 0319
BUDGETARY RESOURCES:					
Unobligated Balance from Prior Year Budget Authority, Net	\$ —	\$ —	\$ —	\$ —	\$ —
Appropriations	8,161	5,117	1,832	1,657	1,197
Borrowing Authority	—	—	—	—	—
Contract Authority	—	—	—	—	—
Spending Authority from Offsetting Collections	—	—	—	—	—
Total Budgetary Resources	\$ 8,161	\$ 5,117	\$ 1,832	\$ 1,657	\$ 1,197
STATUS OF BUDGETARY RESOURCES:					
New Obligations and Upward Adjustments (Total)	\$ 529	\$ 50	\$ 28	\$ 21	\$ 4
Unobligated Balance, End of Year:					
Apportioned, Unexpired Accounts	\$ 7,632	\$ 5,067	\$ 1,804	\$ 1,635	\$ 1,193
Exempt from Apportionment, Unexpired Accounts	—	—	—	—	—
Unapportioned, Unexpired Accounts	—	—	—	—	—
Unexpired, Unobligated Balance, End of Year	\$ 7,632	\$ 5,067	\$ 1,804	\$ 1,635	\$ 1,193
Expired, Unobligated Balance, End of Year	—	—	—	—	—
Unobligated Balance, End of Year (Total)	\$ 7,632	\$ 5,067	\$ 1,804	\$ 1,635	\$ 1,193
Total Budgetary Resources	\$ 8,161	\$ 5,117	\$ 1,832	\$ 1,657	\$ 1,197
Agency Outlays, Net	\$ 5	\$ 5	\$ 4	\$ 3	\$ 1
Disbursements, Net (Total)	\$ 5	\$ 5	\$ 4	\$ 3	\$ 1
	Construction, Rehabilitation, Operation, And Maintenance, Western Area Power Administration 019 50 5068	Cybersecurity, Energy Security, And Emergency Response 019 20 2250	Colorado River Basins Power Marketing Fund, Western Area Power Administration 019 50 4452	Other IIJA	Combined Statement of Budgetary Resources - IIJA Only Total
BUDGETARY RESOURCES:					
Unobligated Balance from Prior Year Budget Authority, Net	\$ —	\$ —	\$ —	\$ —	\$ —
Appropriations	414	150	85	73	18,686
Borrowing Authority	—	—	—	—	—
Contract Authority	—	—	—	—	—
Spending Authority from Offsetting Collections	—	—	—	—	—
Total Budgetary Resources	\$ 414	\$ 150	\$ 85	\$ 73	\$ 18,686
STATUS OF BUDGETARY RESOURCES:					
New Obligations and Upward Adjustments (Total)	\$ 343	\$ 11	\$ 38	\$ 3	\$ 1,027
Unobligated Balance, End of Year:					
Apportioned, Unexpired Accounts	\$ 71	\$ 139	\$ 47	\$ 70	\$ 17,658
Exempt from Apportionment, Unexpired Accounts	—	—	—	—	—
Unapportioned, Unexpired Accounts	—	—	—	—	—
Unexpired, Unobligated Balance, End of Year	\$ 71	\$ 139	\$ 47	\$ 70	\$ 17,658
Expired, Unobligated Balance, End of Year	—	—	—	—	—
Unobligated Balance, End of Year (Total)	\$ 71	\$ 139	\$ 47	\$ 70	\$ 17,658
Total Budgetary Resources	\$ 414	\$ 150	\$ 85	\$ 73	\$ 18,686
Agency Outlays, Net	\$ 260	\$ 2	\$ 21	\$ 1	\$ 302
Disbursements, Net (Total)	\$ 260	\$ 2	\$ 21	\$ 1	\$ 302

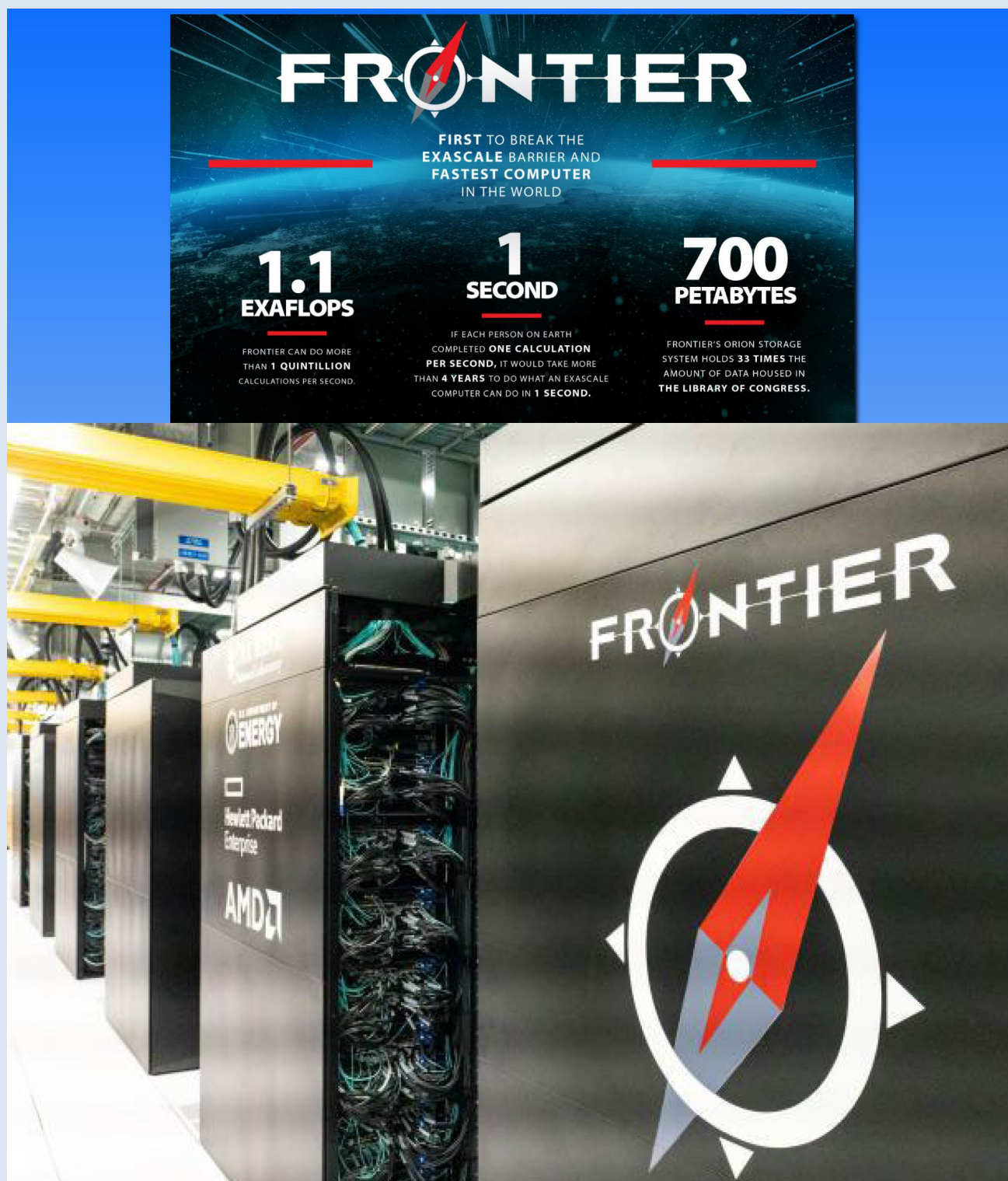
FINANCIAL STATEMENTS, FOOTNOTES, AND CONSOLIDATING SCHEDULES

Budgetary Resources by Major Account - Includes IJJA and IRA Funding For the Year Ended September 30, 2022

	Energy Efficiency and Renewable Energy	Weapons Activities	SPR Petroleum Account	Science	Title 17 Innovative Loan Guarantee Program
(\$ IN MILLIONS)	019 20 0321	019 05 0240	019 20 0233	019 20 0222	019 20 0208
BUDGETARY RESOURCES:					
Unobligated Balance from Prior Year Budget Authority, Net	\$ 871	\$ 1,006	\$ 11	\$ 140	\$ 289
Appropriations	23,425	15,920	7	9,210	8,648
Borrowing Authority	—	—	—	—	—
Contract Authority	—	—	—	—	—
Spending Authority from Offsetting Collections	196	1,932	11,029	578	6
Total Budgetary Resources	\$ 24,492	\$ 18,858	\$ 11,047	\$ 9,928	\$ 8,943
STATUS OF BUDGETARY RESOURCES:					
New Obligations and Upward Adjustments (Total)	\$ 3,392	\$ 18,469	\$ 70	\$ 9,516	\$ 72
Unobligated Balance, End of Year:					
Apportioned, Unexpired Accounts	\$ 8,949	\$ 373	\$ 10,977	\$ 411	\$ 269
Exempt from Apportionment, Unexpired Accounts	—	—	—	—	—
Unapportioned, Unexpired Accounts	12,150	15	—	—	8,600
Unexpired, Unobligated Balance, End of Year	\$ 21,099	\$ 388	\$ 10,977	\$ 411	\$ 8,869
Expired, Unobligated Balance, End of Year	1	1	—	1	2
Unobligated Balance, End of Year (Total)	\$ 21,100	\$ 389	\$ 10,977	\$ 412	\$ 8,871
Total Budgetary Resources	\$ 24,492	\$ 18,858	\$ 11,047	\$ 9,928	\$ 8,943
Agency Outlays, Net	\$ 2,452	\$ 14,027	\$ (10,995)	\$ 7,143	\$ 60
Disbursements, Net (Total)	\$ —	\$ —	\$ —	\$ —	\$ —
	Defense Environmental Cleanup	Advanced Technology Vehicles Manufacturing Loan Program Account	Electricity Delivery and Energy Reliability	Nuclear Energy	Other Budgetary Accounts
	019 10 0251	019 20 0322	019 20 0318	019 20 0319	
BUDGETARY RESOURCES:					
Unobligated Balance from Prior Year Budget Authority, Net	\$ 601	\$ 2,432	\$ 16	\$ 254	\$ 3,095
Appropriations	7,282	3,005	4,789	3,767	22,297
Borrowing Authority	—	—	—	—	739
Contract Authority	—	—	—	—	1,270
Spending Authority from Offsetting Collections	—	—	1	304	6,862
Total Budgetary Resources	\$ 7,883	\$ 5,437	\$ 4,806	\$ 4,325	\$ 34,263
STATUS OF BUDGETARY RESOURCES:					
New Obligations and Upward Adjustments (Total)	\$ 6,954	\$ 145	\$ 254	\$ 1,995	\$ 17,402
Unobligated Balance, End of Year:					
Apportioned, Unexpired Accounts	\$ 925	\$ 2,291	\$ 1,692	\$ 1,473	\$ 9,828
Exempt from Apportionment, Unexpired Accounts	—	—	—	—	12
Unapportioned, Unexpired Accounts	—	3,000	2,860	850	6,948
Unexpired, Unobligated Balance, End of Year	\$ 925	\$ 5,291	\$ 4,552	\$ 2,323	\$ 16,788
Expired, Unobligated Balance, End of Year	4	1	—	7	73
Unobligated Balance, End of Year (Total)	\$ 929	\$ 5,292	\$ 4,552	\$ 2,330	\$ 16,861
Total Budgetary Resources	\$ 7,883	\$ 5,437	\$ 4,806	\$ 4,325	\$ 34,263
Agency Outlays, Net	\$ 6,801	\$ 8	\$ 209	\$ 1,557	\$ 1,554
Disbursements, Net (Total)	\$ —	\$ —	\$ —	\$ —	\$ —
	Subtotal of Budgetary Accounts	Title 17 Innovative Technology Direct Loan Financing Account	Title 17 Innovative Loan Guaranteed Loan Financing Account	Advanced Technology Vehicles Manufacturing Direct Loan Financing Account	Combined Statement of Budgetary Resources
		019 20 4455	019 20 4577	019 20 4579	Total
BUDGETARY RESOURCES:					
Unobligated Balance from Prior Year Budget Authority, Net	\$ 8,715	\$ 632	\$ 130	\$ —	\$ 9,477
Appropriations	98,350	—	—	—	98,350
Borrowing Authority	739	626	—	2,609	3,974
Contract Authority	1,270	—	—	—	1,270
Spending Authority from Offsetting Collections	20,908	633	3	235	21,779
Total Budgetary Resources	\$ 129,982	\$ 1,891	\$ 133	\$ 2,844	\$ 134,850
STATUS OF BUDGETARY RESOURCES:					
New Obligations and Upward Adjustments (Total)	\$ 58,269	\$ 1,260	\$ 23	\$ 2,626	\$ 62,178
Unobligated Balance, End of Year:					
Apportioned, Unexpired Accounts	\$ 37,188	\$ —	\$ 15	\$ —	\$ 37,203
Exempt from Apportionment, Unexpired Accounts	12	—	—	—	12
Unapportioned, Unexpired Accounts	34,423	631	95	218	35,367
Unexpired, Unobligated Balance, End of Year	\$ 71,623	\$ 631	\$ 110	\$ 218	\$ 72,582
Expired, Unobligated Balance, End of Year	90	—	—	—	90
Unobligated Balance, End of Year (Total)	\$ 71,713	\$ 631	\$ 110	\$ 218	\$ 72,672
Total Budgetary Resources	\$ 129,982	\$ 1,891	\$ 133	\$ 2,844	\$ 134,850
Agency Outlays, Net	\$ 22,816	\$ (178)	\$ (205)	\$ (10)	\$ 22,423
Disbursements, Net (Total)	\$ —	\$ 266	\$ 20	\$ (1,100)	\$ (814)

FY 2022 DOE Highlight: Frontier Supercomputer

In May 2022, the **Frontier Supercomputer** at the Department of Energy's **Oak Ridge National Laboratory (ORNL)** earned the top ranking as the world's fastest on the 59th TOP500 list, with 1.1 exaflops of performance. The system is the first to achieve an unprecedented level of computing performance known as exascale, a threshold of a quintillion calculations per second. For more information, visit <https://www.ornl.gov/news/frontier-supercomputer-debuts-worlds-fastest-breaking-exascale-barrier>.



Auditors' Report

Memorandum from the Inspector General



DEPARTMENT OF ENERGY
OFFICE OF INSPECTOR GENERAL

MEMORANDUM

DATE: November 15, 2022

REPLY TO:
ATTN OF: IG-50 (A22FN008)

SUBJECT: Audit Report on The Department of Energy's Fiscal Year 2022 Consolidated Financial Statements

TO: Under Secretary of Science and Innovation, S4
Principal Deputy Under Secretary for Infrastructure, S3
Deputy Chief Financial Officer, CF-2
Director, Office of Audits and Internal Affairs, NA-MB-1.1

The attached report presents the results of the independent certified public accountants' audit of the Department of Energy's consolidated financial statements as of September 30, 2022, and 2021, and the related consolidated statements of net cost, changes in net position, custodial activity, and combined statements of budgetary resources for the years then ended.

To fulfill the Office of Inspector General's (OIG) audit responsibilities, we contracted with the independent public accounting firm of KPMG LLP (KPMG) to conduct the audit, subject to our review. KPMG is responsible for expressing an opinion on the Department's financial statements and reporting on applicable internal controls and compliance with laws and regulations. The OIG monitored audit progress and reviewed the audit report and related documentation. This review disclosed no instances where KPMG did not comply, in all material respects, with generally accepted government auditing standards. The OIG did not express an independent opinion on the Department's financial statements.

KPMG audited the consolidated financial statements of the Department as of September 30, 2022, and 2021, and the related consolidated statements of net cost, changes in net position, custodial activity, and combined statements of budgetary resources for the years then ended. KPMG concluded that these consolidated financial statements are presented fairly, in all material respects, in conformity with United States generally accepted accounting principles, and KPMG had issued an unmodified opinion based on its audits and the reports of other auditors for the years ended September 30, 2022, and 2021.

As part of this audit, auditors also considered the Department's internal controls over financial reporting and tested for compliance with certain provisions of laws, regulations, contracts, and grant agreements that could have a direct and material effect on the consolidated financial statements. The audit did not identify any deficiency in internal control over financial reporting that is considered a material weakness.

The OIG issued notices of findings and recommendations to management throughout the audit. All findings and recommendations will be detailed in management letters that are provided to the

AUDITORS' REPORT

Department at a later date. The audit disclosed no instances of noncompliance or other matters required to be reported under applicable audit standards and requirements.

We appreciated the cooperation of your staff during the review.



Kshemendra Paul
Assistant Inspector General
for Cyber Assessments and Data Analytics
Office of Inspector General

Attachment

cc: Deputy Director, Office of Enterprise Assessments, EA-1
Director, Office of Finance and Accounting, CF-10
Director, Office of Financial Policy and Audit Resolution, CF-20
Audit Resolution Specialist, Office of Financial Policy and Audit Resolution, CF-20
Audit Liaison, Office of the Under Secretary of Science and Innovation, S4
Audit Liaison, Office of Under Secretary for Infrastructure, S3

Auditors' Report

Independent Auditors' Report



Office of Inspector General

OFFICE OF CYBER
ASSESSMENTS AND DATA
ANALYTICS

AUDIT REPORT

THE DEPARTMENT OF ENERGY'S FISCAL YEAR
2022 CONSOLIDATED FINANCIAL STATEMENTS

DOE-OIG-23-06
NOVEMBER 2022

Consistent with standing Office of Inspector General (OIG) policy, the attached report is provided for your action/information prior to being released publicly. As such, the report should not be discussed or distributed outside the Department prior to public release. Generally, the report will be released to the public by posting it on the OIG website 2 to 3 days after it is provided to management. Please refer to the OIG website (<http://www.energy.gov/ig/calendar-year-reports>) to ensure that the report has been posted prior to discussing/distributing the report outside the Department.

AUDITORS' REPORT



Department of Energy
Washington, DC 20585

November 15, 2022

MEMORANDUM FOR THE SECRETARY

A handwritten signature in blue ink, which appears to read "Teri L. Donaldson", is positioned above the "FROM:" line.

FROM: Teri L. Donaldson
Inspector General

SUBJECT: INFORMATION: Audit Report on The Department of Energy's Fiscal
Year 2022 Consolidated Financial Statements

The attached report presents the results of the independent certified public accountants' audit of the Department of Energy's consolidated financial statements as of September 30, 2022, and 2021, and the related consolidated statements of net cost, changes in net position, custodial activity, and combined statements of budgetary resources for the years then ended.

To fulfill the Office of Inspector General's (OIG) audit responsibilities, we contracted with the independent public accounting firm of KPMG LLP (KPMG) to conduct the audit, subject to our review. KPMG is responsible for expressing an opinion on the Department's financial statements and reporting on applicable internal controls and compliance with laws and regulations. The OIG monitored audit progress and reviewed the audit report and related documentation. This review disclosed no instances where KPMG did not comply, in all material respects, with generally accepted government auditing standards. The OIG did not express an independent opinion on the Department's financial statements.

KPMG audited the consolidated financial statements of the Department as of September 30, 2022, and 2021, and the related consolidated statements of net cost, changes in net position, custodial activity, and combined statements of budgetary resources for the years then ended. KPMG concluded that these consolidated financial statements are presented fairly, in all material respects, in conformity with United States generally accepted accounting principles, and KPMG had issued an unmodified opinion based on its audits and the reports of other auditors for the years ended September 30, 2022, and 2021.

As part of this audit, auditors also considered the Department's internal controls over financial reporting and tested for compliance with certain provisions of laws, regulations, contracts, and grant agreements that could have a direct and material effect on the consolidated financial statements. The audit did not identify any deficiency in internal control over financial reporting that is considered a material weakness.

The OIG issued notices of findings and recommendations to management throughout the audit. All findings and recommendations will be detailed in management letters that are provided to the

AUDITORS' REPORT

Department at a later date. The audit disclosed no instances of noncompliance or other matters required to be reported under applicable audit standards and requirements.

We appreciated the cooperation of your staff during the audit.

Attachment

cc: Deputy Secretary
Chief of Staff
Under Secretary of Science and Innovation, S4
Under Secretary for Nuclear Security and National Nuclear Security Administration, S5
Principal Deputy Under Secretary for Infrastructure, S3
Deputy Director, Office of Enterprise Assessments, EA-1
Deputy Chief Financial Officer, CF-2

Audit Report: DOE-OIG-23-06

Department financial reports are available for download on the Office of the Chief Financial Officer Web site: <https://www.energy.gov/cfo/listings/agency-financial-reports>

INDEPENDENT AUDITORS' REPORT



KPMG LLP
Suite 12000
1801 K Street, NW
Washington, DC 20006

Independent Auditors' Report

The Inspector General, United States Department of Energy, and
The Secretary, United States Department of Energy:

Report on the Audit of the Consolidated Financial Statements

Opinion

We have audited the consolidated financial statements of United States (U.S.) Department of Energy (Department), which comprise the consolidated balance sheets as of September 30, 2022, and 2021, and the related consolidated statements of net costs, changes in net position, and custodial activity, and combined statements of budgetary resources for the years then ended, and the related notes to the consolidated financial statements.

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the financial position of the Department as of September 30, 2022, and 2021, and its net costs, changes in net position, budgetary resources, and custodial activity for the years then ended in accordance with U.S. generally accepted accounting principles.

Basis for Opinion

We conducted our audits in accordance with Generally Accepted Auditing Standards (GAAS), standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States, and Office of Management and Budget (OMB) Bulletin No. 22-01, *Audit Requirements for Federal Financial Statements*. Our responsibilities under those standards and OMB Bulletin No. 22-01 are further described in the Auditors' Responsibilities for the Audit of the Consolidated Financial Statements section of our report. We are required to be independent of the Department and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audits. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Emphasis of Matters

As discussed in Note 6 to the consolidated financial statements, the Department has total direct loans and loan guarantees, net, of \$17 billion and \$18 billion as of September 30, 2022, and 2021, respectively, which are issued under the *Federal Credit Reform Act of 1990*. Subsidy costs of the direct loans and loan guarantees are intended to estimate the long-term cost to the U.S. Government of its loan program and include interest rate differentials, delinquencies, defaults, fees, and other cash flow items. A subsidy re-estimate is performed annually at September 30. Any adjustment resulting from the re-estimate is recognized as subsidy expense. Our opinion is not modified with respect to this matter.

As discussed in Note 13 to the consolidated financial statements, the cost estimates supporting the Department's environmental cleanup and disposal liabilities of \$520 billion and \$516 billion as of September 30, 2022, and 2021, respectively, are based upon assumptions regarding funding and other future action and decisions, many of which are beyond the Department's control. Our opinion is not modified with respect to this matter.

As discussed in Note 18 to the consolidated financial statements, the Department is involved as a defendant in several matters of litigation relating to its inability to accept commercial spent nuclear fuel by January 1, 1998,

KPMG LLP is a Delaware limited liability partnership and a member firm of the KPMG global organization of independent member firms affiliated with KPMG International Limited, a private English company limited by guarantee.

AUDITORS' REPORT

Attachment



the date specified in the *Nuclear Waste Policy Act of 1982, as amended*. The Department has recorded liabilities for likely damages of \$31.1 billion and \$31 billion as of September 30, 2022, and 2021, respectively. Our opinion is not modified with respect to this matter.

Other Matter - Interactive Data

Management has elected to reference to information on websites or other forms of interactive data outside the *Agency Financial Report* to provide additional information for the users of its consolidated financial statements. Such information is not a required part of the basic consolidated financial statements or supplementary information required by the Federal Accounting Standards Advisory Board. The information on these websites or the other interactive data has not been subjected to any of our auditing procedures, and accordingly we do not express an opinion or provide any assurance on it.

Responsibilities of Management for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with U.S. generally accepted accounting principles, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibilities for the Audit of the Consolidated Financial Statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS, *Government Auditing Standards*, and OMB Bulletin No. 22-01 will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the consolidated financial statements.

In performing an audit in accordance with GAAS, *Government Auditing Standards*, and OMB Bulletin No. 22-01, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Department's internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the consolidated financial statements.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control related matters that we identified during the audit.

Required Supplementary Information

U.S. generally accepted accounting principles require that the information in the Management's Discussion and Analysis and Required Supplementary Information sections be presented to supplement the basic consolidated

AUDITORS' REPORT

Attachment



financial statements. Such information is the responsibility of management and, although not a part of the basic consolidated financial statements, is required by the Federal Accounting Standards Advisory Board who considers it to be an essential part of financial reporting for placing the basic consolidated financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with GAAS, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic consolidated financial statements, and other knowledge we obtained during our audits of the financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Management is responsible for the other information included in the Agency Financial Report. The other information comprises the About This Report, Table of Contents, Message from the Secretary, Message from the Deputy Chief Financial Officer, Introduction to Principal Statements, Memorandum from Inspector General and Other Information but does not include the basic consolidated financial statements and our auditors' report thereon. Our opinion on the basic consolidated financial statements do not cover the other information, and we do not express an opinion or any form of assurance thereon.

In connection with our audit of the basic consolidated financial statements, our responsibility is to read the other information and consider whether a material inconsistency exists between the other information and the basic consolidated financial statements, or the other information otherwise appears to be materially misstated. If, based on the work performed, we conclude that an uncorrected material misstatement of the other information exists, we are required to describe it in our report.

Report on Internal Control Over Financial Reporting

In planning and performing our audit of the consolidated financial statements as of and for the year ended September 30, 2022, we considered the Department's internal control over financial reporting (internal control) as a basis for designing audit procedures that are appropriate in the circumstances for the purpose of expressing our opinion on the consolidated financial statements, but not for the purpose of expressing an opinion on the effectiveness of the Department's internal control. Accordingly, we do not express an opinion on the effectiveness of the Department's internal control. We did not test all internal controls relevant to operating objectives as broadly defined by the *Federal Managers' Financial Integrity Act of 1982*.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A material weakness is a deficiency, or a combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented or detected and corrected, on a timely basis. A significant deficiency is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the preceding paragraph and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies and therefore, material weaknesses or significant deficiencies may exist that were not identified.

Report on Compliance and Other Matters

As part of obtaining reasonable assurance about whether the Department's consolidated financial statements as of and for the year ended September 30, 2022 are free from material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the consolidated financial statements. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not

AUDITORS' REPORT

Attachment



express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards* or OMB Bulletin No. 22-01.

We also performed tests of the Department's compliance with certain provisions referred to in Section 803(a) of the *Federal Financial Management Improvement Act of 1996* (FFMIA). Providing an opinion on compliance with FFMIA was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances in which the Department's financial management systems did not substantially comply with the (1) Federal financial management systems requirements, (2) applicable Federal accounting standards, and (3) the United States Government Standard General Ledger at the transaction level.

Purpose of the Reporting Required by Government Auditing Standards

The purpose of the communication described in the Report on Internal Control Over Financial Reporting and the Report on Compliance and Other Matters sections is solely to describe the scope of our testing of internal control and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the Department's internal control or compliance. Accordingly, this communication is not suitable for any other purpose.

KPMG LLP

Washington, DC
November 14, 2022

AUDITORS' REPORT

FEEDBACK

The Office of Inspector General has a continuing interest in improving the usefulness of its products. We aim to make our reports as responsive as possible and ask you to consider sharing your thoughts with us.

Please send your comments, suggestions, and feedback to OIG.Reports@hq.doe.gov and include your name, contact information, and the report number. You may also mail comments to us:

Office of Inspector General (IG-12)
Department of Energy
Washington, DC 20585

If you want to discuss this report or your comments with a member of the Office of Inspector General staff, please contact our office at 202–586–1818. For media-related inquiries, please call 202–586–7406.



Other Information



FY 2022 Summary of Financial Statement Audit and Management Assurances

Audit Opinion	Unmodified				
Restatement	No				
Material Weaknesses	Beginning Balance	New	Resolved	Consolidated	Ending Balance
<i>TOTAL Material Weaknesses</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>

Effectiveness of Internal Control Over Financial Reporting (FMFIA Section II) – Statement of Assurance	Unmodified					
Material Weaknesses	Beginning Balance	New	Resolved	Consolidated	Reassessed	Ending Balance
TOTAL Material Weaknesses	0	0	0	0	0	0

Effectiveness of Internal Control Over Operations (FMFIA Section II) – Statement of Assurance	Unmodified					
Material Weaknesses	Beginning Balance	New	Resolved	Consolidated	Reassessed	Ending Balance
TOTAL Material Weaknesses	0	0	0	0	0	0

Conformance with Federal Financial Management System Requirements (FMFIA Section IV) – Statement of Assurance	Federal Systems conform to financial management system requirements					
Non-Compliance	Beginning Balance	New	Resolved	Consolidated	Reassessed	Ending Balance
TOTAL Non-Conformance	0	0	0	0	0	0

Conformance with Section 803 (a) of the Federal Financial Management Improvement Act (FFMIA)		
	Agency	Auditor
1. Federal Financial Management System Requirements	No lack of compliance noted	No lack of compliance noted
2. Applicable Federal Accounting Standards	No lack of compliance noted	No lack of compliance noted
3. USSGL at Transaction Level	No lack of compliance noted	No lack of compliance noted

Department of Energy's Management Challenges – Report of the Inspector General

Congress requires that Inspectors General annually identify the most significant management challenges facing their agencies and report those challenges to Congress and the Agency head. Congress intended that Inspectors General focus attention on significant management issues, with the objective of working with Agency managers to enhance the effectiveness of Agency programs and operations.

The Office of Inspector General (OIG), in coordination with Department mission elements, identified the Department's most pressing management challenges, focusing on specific issues where near-term progress is measurable and achievable. For Fiscal Year (FY) 2023, we identified one new challenge area pertaining to the influx of significant funding to the Department through recent legislative acts.

The OIG has identified the following “cross-cutting” management challenges that may impact the Department across program elements:

- Implementing Effective Oversight of Expenditures under the *Infrastructure Investment and Jobs Act* (IIJA), the *CHIPS and Science Act* (CHIPS Act), and the *Inflation Reduction Act* (IRA)
- Using all Available Tools to Combat the Theft of Intellectual Property—Research Security
- Modernizing Oversight by Continuing to Access Systems and Data for the Purpose of Running Data Analytics
- Improving Audits of Costs Incurred and Claimed
- Building a Stronger Suspension and Debarment Program
- Enforcing the Mandatory Disclosure Rule

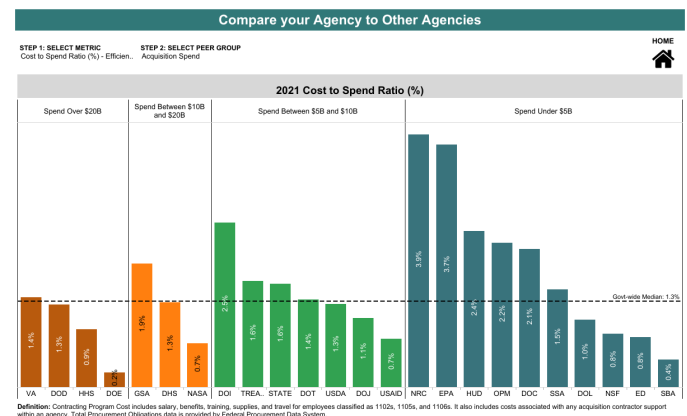
Additionally, the OIG identified the following challenge areas for key mission elements:

- National Nuclear Security Administration (NNSA)—Restoring Plutonium Pit Production Capability
- Office of Environmental Management—Managing Tank Waste
- Artificial Intelligence and Technology Office—Establishing the Department as a Federal Enterprise Leader in Developing and Deploying Artificial Intelligence

I. CROSS-CUTTING CHALLENGES— REDUCING FRAUD, WASTE, AND ABUSE

As the largest civilian contracting agency in the Federal Government, the Department spends approximately 90 percent of its annual budget on contracts to operate its scientific laboratories, engineering and production facilities, and environmental restoration sites.

These contracts are overseen by a Department procurement and acquisition workforce that, historically, has been underfunded and understaffed as compared to other Federal agencies. To illustrate, the Office of Management and Budget performed a comparison of Federal acquisition workforce costs to contract spending for Federal agencies and demonstrated that the Department of Energy has the smallest acquisition workforce oversight ratios by far – a 0.2 percent rate of acquisition workforce per contract dollars in the Department as compared to the next lowest peer agency with 0.9 percent rate.



This comparison was performed prior to the Department receiving an unprecedented influx of funds through the passage of IIJA, the CHIPS Act, and IRA. The additional funding will inevitably strain the existing administration and oversight structure as the Department ramps up its management of these funds in compliance with Congress' directives.

Due to Department reliance on contractors to execute much of its mission and the dramatic increase in funding, the OIG continues to focus and strengthen its efforts on cross-cutting management challenges to modernize and improve Department oversight of its contractors. Realizing improvements within these areas will help protect the Department from fraud, waste, and abuse.

Implementing Effective Oversight of Expenditures under IIJA, the CHIPS Act, and IRA

Significance of the Issue

For context, the Department's *Combined Statements of Budgetary Resources* reports a total of \$53.8 billion in budgetary resources for FY 2021.¹ With the enactment of three major new funding laws in FY 2022, the Department is facing major risks associated with creating new programs and rapidly expanding existing programs.

- IIJA² appropriated \$62.5 billion, over five years, for clean energy demonstration projects; energy efficiency and renewable energy programs; grid reliability and electrical transmission projects; fossil energy and carbon management projects; credits for continued civilian nuclear power production; and other programs.
- The CHIPS Act³ authorized an additional \$30.5 billion, over five years, to the Department for Office of Science projects, research and development, and additional science and innovation priorities.
- IRA⁴ appropriated \$35.2 billion to support home energy rebate programs; projects to decrease greenhouse gasses in industrial facilities; numerous projects in energy programs; and, most importantly, a major expansion of the Department's direct loans and loan guarantee program by funding credit subsidies and administration costs for the Department's Loan Program Office.
- Each of these new laws greatly expand the Department's loan authorities—after adding the expanded loan authority to existing loan authorities, the sum of loan and loan guarantee authority is expected to approach \$350 billion.

Challenges

The scale and magnitude of these new spending and loan programs introduce a greatly increased risk of fraud, waste, and mismanagement. The OIG has recently issued a series of reports⁵ that draw from prior OIG and United States (U.S.) Government Accountability Office reports to assist Department leadership to identify and correct potential shortfalls in several of the existing Department

programs impacted by the new legislation. Common themes and risk discussed in these reports include:

- Insufficient Federal staffing and oversight of projects at the transaction level. The Department has a long history of insufficient staffing to oversee its contractors and financial assistance awards. The OIG has encouraged Department leadership to reserve resources to provide sufficient oversight over these new and expanding programs;
- Inadequate internal controls and policies and procedures at both the Federal level and recipient level. We noted inadequate controls to include basic accounting controls and financial systems in place to adequately segregate and accumulate costs, as well as inadequate controls to select contractors, grantees, subcontractors and subrecipients;
- Circumvention of project controls that were put into place to mitigate technical and financial risks;
- Potential conflicts of interest and undue influence;
- Problems associated with compliance with contract and grant terms and conditions, such as the *Davis-Bacon Act*, competitive contracting, domestic sourcing, management of interest on advanced funds, reporting and other requirements; and
- Inadequate acceptance of completed work including problems with substandard work, billing errors, unapproved work order changes, unperformed or undocumented final inspections, and charges for unsupported costs.

These risks are compounded by the fact that this major increase in spending and lending under the new legislation will be overseen by a Department procurement and acquisition workforce that has been historically underfunded and understaffed. We noted that IIJA caps administrative expenditures at three percent, which may be highly problematic given that the Department is already underfunded and given that the new expenditures under IIJA include both near-term and longer-term expenditures. It appears that substantial dollars may be moving under IIJA through the Department before an appropriately sized oversight infrastructure is implemented. The Department is currently evaluating whether it may have additional flexibility under the CHIPS Act and IRA to implement a more robust oversight infrastructure. In FY 2022, the

¹ https://www.energy.gov/sites/default/files/2021-11/fy-2021-doe-agency-financial-report_0.pdf

² Public Law 117-58

³ Public Law 117-167

⁴ Public Law 117-169

⁵ <https://www.energy.gov/ig/articles/special-report-doe-oig-22-40>
<https://www.energy.gov/ig/articles/special-report-doe-oig-22-39>
<https://www.energy.gov/ig/articles/special-report-doe-oig-22-34>
<https://www.energy.gov/ig/articles/special-report-doe-oig-22-30>

Department has already obligated approximately \$1.057 billion of IIJA funds and will begin to accelerate spending in FY 2023.

It is imperative that Department leadership recognize the immense risks associated with these new and expanded programs and take assertive steps to mitigate the risks. The OIG has identified a need for Department leadership to identify and set aside sufficient resources for full Federal program staffing, as well as sufficient resources to build robust internal controls and independent oversight systems to prevent and detect problems to ensure the Government and taxpayers are protected.

Department officials have informed the OIG that the Department is taking steps to improve its fraud prevention and detection controls, interagency collaboration, project management, and technical assistance, among other things.

This area will likely remain a major management challenge for the foreseeable future.

Using All Available Tools to Combat the Theft of Intellectual Property—Research Security

Significance of the Issue

As reported in the FY 2021 *Agency Financial Report*, the Department supported \$14.4 billion in total research and development.⁶ The risks associated with the theft of intellectual property will only increase as the Department invests heavily utilizing some of the newly authorized and appropriated funds under IIJA, the CHIPS Act, and IRA. While some of this work is for fundamental research that is freely published in public, much of it is subject to intellectual property protections and/or national security considerations. This major investment remains a target for foreign governments seeking to illicitly acquire access to U.S.-funded research efforts. This is particularly troubling given the Department's integral role in the development and maintenance of nuclear weapons systems, along with other pivotal national security missions. The economic and scientific value of the research and intellectual property developed within the Department's complex has led foreign governments and their proxies to intensify efforts to extract information from the Department's institutions.

Department Progress

Since our prior *Management Challenges Report*, the Department's Research Security and Integrity Policy Working Group has drafted a new conflict of interest policy, released via a Financial Assistance Letter, which emphasizes combating financial conflicts of interest among Department-funded researchers. The Department has also begun work on a new conflict of commitment policy which seeks to address the same concerns for non-financial, overlapping commitments from multiple institutions that

will help enhance integrity among our grantees. The Department has begun to demonstrate a commitment to preventing theft of its intellectual property by instituting prohibitions on affiliation with foreign talent programs from countries of concern for all prospective IIJA funding recipients, and by signaling it will widen such restrictions to all financial assistance recipients for future funding opportunity announcements. The Department also seeks to finalize required disclosures for the current and pending grantees.

Challenges

While some efforts are underway as described above, the Department must prioritize these efforts, complete these and other tasks, and ensure that it has adequate tools and resources to effectively prevent theft of intellectual property. At the same time, these tools must be designed with sufficient clarity to facilitate timely investigations and prosecutions of individuals violating the laws intended to protect this research. For example, the challenge remains in FY 2023 for the Department to fully implement National Security Presidential Memorandum 33 by creating a standardized set of required certifications and disclosures for all funding applicants. This is especially important given the significant increase in grant funds allocated under IIJA, the CHIPS Act, and IRA. The Department must also closely monitor the effective implementation of Department directives restricting employees and contractors from affiliating with any foreign state-sponsored programs from identified countries of concern.

Aside from such affiliations, the Department must also design requirements to deter and penalize individuals who have stolen valuable intellectual property owned by the U.S. and transported that property to our adversaries.

Modernizing Oversight by Continuing to Access Systems and Data for the Purpose of Running Data Analytics

Significance of the Issue

The potential use of data analytics could save the taxpayers substantial funds and improve efficiency and oversight. In March 2020, the *Payment Integrity Information Act of 2019* was enacted and incorporated select provisions from the *Fraud Reduction and Data Analytics Act of 2015*, the *Improper Payments Information Act of 2002*, the *Improper Payments Elimination and Recovery Act of 2010*, and the *Improper Payments Elimination and Recovery Improvement Act of 2012* into a single subchapter in the U.S. Code. To comply with the *Payment Integrity Information Act of 2019*, the Department has undertaken the development and implementation of a Fraud Risk and Data Analytics Framework (Framework). The significance of the potential use of data analytics within the Department cannot be overstated. For example, the use of data analytics would improve effective and

⁶ <https://www.energy.gov/cfo/articles/fy-2021-doe-agency-financial-report>

efficient management and oversight of the significant influx of funds associated with IIJA, the CHIPS Act, and IRA.

Department Progress

Although much work remains, the Department has taken some steps towards establishing and implementing the Framework. Officials have defined the Framework and its placement within the organization and established a leadership hierarchy to guide the effort. To assist in the continued Framework implementation, the Department established a Senior Assessment Team to provide a leadership role in reviewing the Department's fraud risk profile and direct mitigation strategies with the support of the Data Analytics Working Group.

The Department also formed a Fraud Risk Working Group that supports preparation of the annual agency fraud risk register and fraud risk profile. The working group developed a fraud risk register based on reported fraud risks, fraud risk occurrences, and internal control entity assessment data. The register was then prioritized to prepare the Department's Fraud Risk Profile, which was approved by the Senior Assessment Team and the Senior Oversight Council, the Departmental Internal Control, and the Assessment Review Council. The Department's Fraud Risk Profile was issued in June 2022 by the Chief Risk Officer and Deputy Chief Financial Officer and identifies the Department's most significant risks for focusing data analytic efforts.

The Department's Data Analytics Working Group also established collaboration with field and contractor staff to identify contractor conflicts of interest and available data sets that could be used as pilots for data analytic purposes. Data analytic activities have also been incorporated into the internal control program and the payment integrity program to more efficiently and effectively track and trend data for overseeing and monitoring internal controls, improper payments, and possible fraud. The Department recognizes the need to expand training in data analytics, and aside from continuing to upskill the workforce in this area internally, the Department is also leveraging the Chief Financial Officer Council's Workforce Modernization Working Group's data analytics pilot cohort training program for several participating personnel.

The Department is also developing a Planning, Programming, Budgeting, and Execution process (i.e., multi-year budgeting) that includes consideration of the Department's most significant risks. The Planning, Programming, Budgeting, and Execution process will be a data-driven, resource-allocation process to apply leadership priorities, provide transparency, and direct resources to mitigate risks. The Department proposes to further enhance its Antifraud Strategy by linking Department fraud risks to organizational risks and considering mitigation actions from risk owners and supporting offices to annually update the Department's Fraud Risk Profile and identify newly confirmed fraudulent activities.

As part of the Department's Governance, Risk, and Compliance Project that was implemented within the financial management system, Standard Accounting and Reporting System, analytics are utilized to monitor financial transactional data and identify business process exceptions. Analytics through the Governance, Risk, and Compliance Project can provide the Department with the ability to identify business process breakdowns, as well as manage and remediate exceptions. Remediation of exceptions should improve data quality and reduce fraud.

Challenges

As noted in our prior *Management Challenges Report*, an immediate challenge complicating Department implementation of the Framework is its limited oversight resources, including limited personnel with the associated skill sets needed to operate a data analytics program. All the planning in the world will not substitute for having a properly sized and properly trained workforce to implement data analytics.

Another significant challenge the Department faces is identifying the data systems and the sources used by the Department and its contractors. The Office of the Chief Financial Officer is currently documenting the current data analytics being performed by Department elements and the data systems in use. Even when these systems are identified, the Department may encounter challenges accessing data, especially for systems managed by its contractors.

On an independent track, the OIG continues to move forward with its use of data analytics. The OIG uses data analytics to conduct risk assessments and to support ongoing audits, inspections, and investigations. In the near-term, the OIG data analytics team will continue to focus on two goals: (1) to identify and access critical data contained in relevant Federal and contractor systems, and (2) to analyze high-risk areas such as labor, pay, grants, subcontracts, and contract charges.

The OIG's use of data analytics will help to alleviate many of the historical issues associated with delays in receiving data and will ensure the integrity and completeness of data. Notably, direct read-only access to information is the most effective and efficient way to use data analytics to identify fraud, waste, and abuse in real time. Real time, or near-immediate, detection of fraud is the most powerful use of data analytics.

Improving Audits of Costs Incurred and Claimed

In our prior *Management Challenges Report*, we discussed the results of the OIG's multi-year effort to evaluate the Cooperative Audit Strategy. The culmination of these efforts resulted in an OIG Special Project Report, *The Transition to Independent Audits of Management and Operating Contractors' Annual Statement of Costs Incurred and Claimed* (DOE-OIG-21-26, April 2021), which identified

significant findings demonstrating that the Cooperative Audit Strategy was not functioning as intended. Since that time, the OIG has worked cooperatively with the Department and Management and Operating (M&O) contractors to begin implementing the independent audit strategy, under which the OIG will conduct, or arrange for, independent incurred cost audits for 23 M&O contractors across the Department enterprise. The OIG's independent audit effort is designed to correct the Cooperative Audit Strategy and restore independence to these audits. In FY 2022, the OIG received an additional appropriation of \$18 million to perform the incurred cost audits. The OIG has hired 30 auditors to date and has partnered with both the Defense Contract Audit Agency and other independent audit organizations to launch the new incurred cost audit program.

The Department has also taken steps to transition to independent audits by modifying major contracts and updating its policy guidance documents. Additionally, the Department is in the process of preparing updated language for the Department of Energy Acquisition Regulation. The Department has taken steps to standardize the incurred cost submission to comply with the Federal Acquisition Regulation (FAR). In standardizing the required incurred cost submission to conform with FAR, several M&O contractors have asked for and received extensions to the timeframes for submissions. Given this is the first year the submissions are being developed in this new format, some challenges and delays were anticipated; however, it is important that the Department enforce the timeframes established in FAR to ensure that incurred cost audits may be performed in a timely manner.

The Department is ultimately responsible to ensure that the \$24 billion spent annually by M&O contractors represent costs that are reasonable, allocable, and allowable in supporting the mission of the Department. While the OIG will independently audit these expenditures, the OIG is not an internal control that may be cited to reduce or diminish the Department's primary oversight responsibilities. Because the Department has made substantial progress implementing an independent audit strategy, we anticipate that this issue will no longer appear in future Management Challenges reports.

Building a Stronger Suspension and Debarment Program

Having a robust suspension and debarment program is crucial for the Department's operations and to promote the integrity of governmental contracting, and other transactions. For context, the Department's *Combined Statements of Budgetary Resources* reports a total of \$53.8 billion in budgetary resources for FY 2021⁷ to be used for contracting for services and supplies, acquiring assets, or making grants and other transactions. During

the first three quarters of FY 2022, the Department obligated more than \$41 billion in the same categories.⁸ IJIA, the CHIPS Act, and IRA will substantially increase these figures.

In our prior *Management Challenges Report*, we identified an opportunity to improve suspension and debarment processes at the Department. Suspension and debarment are the primary means the Government uses to mitigate risk from parties that have shown themselves not to be responsible participants in Federal procurements, grants, agreements, programs, and transactions. While these remedies typically rely upon criminal convictions or serious civil offenses, Suspension and Debarment Officials may impose these exclusions whenever evidence indicates that the individual or company is not presently responsible and, therefore, presents a risk to Federal programs and operations.

The prior *Management Challenges Report* notes that other Federal agencies with a smaller contracting presence operate robust suspension and debarment programs. Previous reports also looked at Department of Defense actions for proportionate comparison. The number of actions taken by these comparators are:⁹

General Services Administration:

- FY 2019 – 49 Suspensions and 84 Debarments
- FY 2020 – 15 Suspensions and 60 Debarments

Department of Housing and Urban Development:

- FY 2019 – 40 Suspensions and 97 Debarments
- FY 2020 – 23 Suspensions and 33 Debarments

Department of Defense:

- FY 2019 – 267 Suspensions and 442 Debarments
- FY 2020 – 137 Suspensions and 484 Debarments

Department of Energy:

- FY 2019 – 3 Suspensions and 11 Debarments
- FY 2020 – 8 Suspensions and 9 Debarments

To assist the Department in improving its record, the OIG enhanced its capabilities regarding suspension and debarment referrals and updated its procedures in October 2021. The early reviews and streamlined referrals sought to identify evidence and produce an actionable referral as early and efficiently as possible. In the following months, the OIG completed its initial operational training cycle and enhanced the forms for our referral packages.

The OIG has now institutionalized the process of referring judicially based suspension and debarment activities. The OIG's emphasis on identification and preparation of referrals has enabled the OIG to increase the number of referrals to the Department. Specifically, in FY 2020, the

⁷ https://www.energy.gov/sites/default/files/2021-11/fy-2021-doe-agency-financial-report_0.pdf

⁸ Based on [USASpending.gov](https://www.usaspending.gov) agency-specific detail reviewed in August 2022.

⁹ All numbers listed come from the Interagency Suspension and Debarment Committee reports at <https://www.acquisition.gov/isdc-reporting> (last accessed September 20, 2022).

OIG made seven suspension and debarment referrals, while the number increased to 18 in FY 2021 and increased to 29 in FY 2022.¹⁰

Given the increase in suspension and debarment referrals, some challenges and delays were anticipated. The Department should, however, establish a timeframe, such as 30 calendar days, within which it will issue a first notice or otherwise act on an OIG suspension or debarment referral.¹¹ The OIG looks forward to continuing to work with the Department to ensure that Suspending and Debarring Officials have the evidence they need in time to protect the Government with appropriate exclusions.

Enforcing the Mandatory Disclosure Rule

Given Department reliance on contractors to execute its mission, it is imperative that Department contractors conduct business operations with integrity. For this reason, FAR requires contractors' internal programs to include an ethics and compliance system with practices aimed at preventing and detecting misconduct and promoting an organizational culture that encourages ethical conduct and a commitment to compliance with the law. Contractors who conduct work for the Department must establish and maintain an Employee Concerns Program suitable for the organization to accept, process, and resolve employee concerns related, but not limited to, fraud, waste, and abuse. A critical feature of this compliance strategy is FAR's Mandatory Disclosure Rule (MDR).

The MDR requires a Federal contractor to disclose to the OIG in a timely manner, in writing, whenever the contractor has credible evidence of violations of Federal criminal law involving fraud, conflict of interest, bribery, gratuity violations, or violations of the civil *False Claims Act*.

In July 2020, the OIG initiated inspections to determine how contractors have been managing specific employee concerns that trigger MDR requirements. The OIG reviewed the results of these inspections and discovered significant lapses in reporting. Those lapses included numerous cases in which the contractors documented credible evidence of potential violations of Federal criminal law or the civil *False Claims Act* but did not disclose these matters to the OIG. Even where the contractors engaged outside counsel to handle an inquiry, or took remedial action against an employee, contractors failed to report the cases to the OIG, as required.

The contractors' failure to report these issues denied the OIG the opportunity to conduct timely, independent investigations. Timely, independent investigations are crucial to procurement integrity. Such violations of the

MDR may expose the Department to additional fraud, waste, and abuse.

In FY 2023, the Department should ensure that the contractors report mandatory disclosures in accordance with the rule. To assist with this, the OIG is working to improve the reporting mechanism for MDRs by developing a consistent, electronic means to report, and by developing instructions and examples related to the reporting requirement.

II. KEY MISSION ELEMENT CHALLENGES

National Nuclear Security Administration— Restoring Plutonium Pit Production Capability

Significance of the Issue

NNSA is responsible for maintaining a safe, secure, reliable, and effective nuclear weapons stockpile. Plutonium pits are a vital component in all U.S. nuclear weapons. During the Cold War, the Nation produced more than 1,000 plutonium pits per year (PPY) at the Rocky Flats Plant in Colorado. Since the closure of the Rocky Flats Plant in 1992, the U.S. has lacked the capability to produce significant quantities of new plutonium pits.

Maintaining confidence in the nuclear warheads that compose our Nation's nuclear deterrent requires the Department to re-establish a plutonium pit manufacturing capability. Newly manufactured pits are required to improve warhead safety and security, mitigate the risk of confidence in the deterrent posed by plutonium/pit aging, and support potential changes to future warheads due to threats posed to the U.S. nuclear deterrent from renewed peer competition.

Department Progress

The Department of Energy works closely with the Department of Defense to meet the requirement of manufacturing no fewer than 80 war reserve (WR) PPY as close to 2030 as technically and economically feasible. To achieve this manufacturing capacity, the Department implemented a two-site solution with the objective of producing 30 WR PPY at Los Alamos National Laboratory (LANL) at the existing Plutonium Facility-4, while also producing 50 WR PPY at the Savannah River Site's (SRS) facility previously referred to as the Mixed Oxide Fuel Fabrication Facility. Both facilities already meet the stringent building design standards necessary to support pit manufacturing; however, only the facility located at LANL is currently capable of producing plutonium pits. The Department's assessment continues to be that utilizing two facilities is the most effective approach in terms of

¹⁰ Two of the referrals, which used the Nonprocurement Suspension and Debarment Rule in Title 2 Code of Federal Regulations § 180, recommend that the Suspending and Debarring Official issue a suspension while the debarment is pending. Under Interagency Suspension and Debarment Committee counting conventions, the OIG counts the debarment and suspension elements of those referrals separately.

¹¹ Action in this context would include declining to suspend or debar. The Department's Suspending and Debarring Officials clearly have the prerogative not to issue an exclusion in response to an OIG referral.

schedule, cost, and meeting the 80 WR PPY deliverable. Additionally, the two-site approach provides the needed resilience against unplanned outages, particularly important for implementing production capacity.

Major capital acquisition projects at both sites achieved key milestones in FY 2021 and FY 2022. At LANL, in April 2021, the Los Alamos Plutonium Pit Production Project (LAP4) achieved Critical Decision (CD)-1, *Approve Alternate Selection and Cost Range*; in November 2021, the LAP4 subproject, Decontamination and Decommissioning, achieved CD-2/3, *Approve Performance Baseline and Start of Construction*, for demolition activities that make room for the installation of new production equipment; and CD-3A and CD-3B authorizing long lead procurements for gloveboxes and process equipment were approved. Work has begun on developing the 90 percent design package to manufacture and install the 30 Base subproject production equipment, and the CD-2 package is expected in the first quarter of FY 2023. At SRS, in June 2021, the Savannah River Plutonium Processing Facility (SRPPF) Project achieved CD-1, and the project is maturing the design and refining costs and schedule estimates to support CD-2 in FY 2025.

Based on the 30 percent design, which includes complete information from the LAP4 and SRPPF CD-1 submissions, the Department assessed that achieving rate production of 30 PPY at LANL is achievable.

However, the Department has determined that producing 50 PPY by 2030 at SRS to meet the overall 80 PPY objective is not achievable. The SRPPF assessment is based on considerations that to produce WR pits¹² at the required rate necessitates successful completion of the following three activities: (1) completing SRPPF construction and receiving startup authorization (CD-4); (2) demonstrating a WR-quality pit manufacturing capability; and (3) demonstrating the ability to manufacture at full rate capacity while maintaining WR quality control. The first key activity is expected to be completed in the CD-1 approved schedule range from the first quarter of FY 2032 through the fourth quarter of FY 2035.

As the SRPPF design matures, the Department will continue exploring all available options to accelerate the project to reach CD-4 as early as possible within the CD-1 approved time range. The total time duration for achieving the last two key activities is several years based on past and current experience. The Department plans to utilize information from the SRPPF CD-2 package; leverage ongoing work at LANL and Lawrence Livermore National Laboratory to minimize the time required for demonstrating WR manufacturing capacity; and apply lessons learned from LANL as it ramps up rate production to refine and establish the target date for CD-4, while achieving 50 WR PPY at SRS. In addition, the Department anticipates the delivery of the SRPPF CD-2 package in FY 2024, which will include two implementation schedules

developed with information obtained from LANL and Lawrence Livermore National Laboratory based on prior experience manufacturing pits at LANL. The two implementation schedules will include: (1) a plan for meeting 50 WR PPY as soon as possible, and (2) a plan emphasizing the reduction of overall risk in meeting the schedule. This approach will provide options for the Nation's decision makers on how to proceed with the implementation of the SRPPF.

Challenges

To meet these production objectives, the Department faces challenges associated with staffing and the construction and modernization of LANL and SRS facilities. The Department must develop and maintain an expert workforce of sufficient size and quality to meet the challenging and changing needs of new processes, prototype demonstrations, capacity production, and the building of special items to support the project.

Office of Environmental Management—Managing Tank Waste

Significance of the Issue

The Department's Office of Environmental Management (Environmental Management) is responsible for addressing the environmental legacy of decades of nuclear weapons production and Government-sponsored nuclear energy research. This mission includes the safe, effective, and cost-efficient management, treatment, and disposition of waste (i.e., "tank waste") generated through legacy-spent nuclear fuel reprocessing and other plutonium processing activities. Environmental Management manages a total inventory of approximately 92 million gallons of tank waste, which is a primary environmental risk at most sites where it is located. At the Hanford Site (Hanford), SRS, and the Idaho National Laboratory Site (INL), the remaining tank waste is stored in aging underground tanks.

In addition to environmental risks, tank waste represents a significant financial burden to the U.S. Government. The Department is the top contributor to the Federal Government's overall environmental liabilities, with Environmental Management's current total environmental liability approximately \$406 billion in 2021 constant dollars according to the Department's FY 2021 *Agency Financial Report*. As such, the Department expends significant resources to manage this tank waste safely and effectively.

Department Progress

The Department is currently engaged in a major effort to construct and commission complex, first-of-its-kind, multi-billion-dollar facilities to treat tank waste.

¹² WR pits have been certified to meet the stringent quality assurance requirements necessary to enter the U.S. nuclear weapons stockpile.

The Department initiated hot commissioning of the Salt Waste Processing Facility (SWPF) at SRS in October 2020 and began full operations of the facility in January 2021. Since the introduction of radioactive salt waste to the SWPF, it has processed over 3 million gallons of salt waste. As the SWPF increases efficiency and optimizes its operations, process rates of up to 6 million gallons annually are projected with current technologies.

At INL, the Department completed a confirmatory run, using waste simulant to assess readiness for radiological operations of the Integrated Waste Treatment Unit (IWTU), which will treat remaining liquid tank waste. The Department anticipates the IWTU will be operational during the second quarter of FY 2023 with waste treatment expected to take 5-to-7 years to complete.

At the Hanford Waste Treatment and Immobilization Plant (WTP), the Analytical Laboratory is ready to support commissioning of the Low-Activity Waste Facility. Additionally, the Department has completed construction of the Hanford WTP's Low-Activity Waste Facility. Startup testing was completed in November 2021 and heat-up of the first of two melters at the WTP was initiated in October 2022. Cold commissioning is scheduled to begin in FY 2023 to support commencement of radiological operations. In January 2022, the Department initiated the first large-scale treatment of tank waste at Hanford with the startup of the Tank Side Cesium Removal system, which removes radioactive cesium and undissolved solids from the tank waste in preparation for vitrification at the Low-Activity Waste Facility under the Direct Feed Low-Activity Waste (DFLAW) approach. To date, approximately 380,000 gallons of tank waste have been processed by the Tank Side Cesium Removal system.

Along with ensuring the completion and commissioning of the necessary tank waste treatment facilities, the Department has instituted new policies and approaches that have the potential to open new disposition pathways for tank waste. In FY 2019, the Department issued its interpretation of the statutory term, "high-level radioactive waste" as defined in the *Atomic Energy Act of 1954*, as amended, and the *Nuclear Waste Policy Act of 1982*, as amended. This interpretation represents a science-driven approach to managing tank waste via its radioactive characteristics, not by how the waste was generated. The high-level radioactive waste (HLW) interpretation could enable the Department to manage and dispose of tank waste in a risk-based and more cost-effective manner that remains fully protective of human health and the environment more appropriately. The first application of the HLW interpretation was completed with public participation in September 2020 with 8 gallons of SRS Defense Waste Processing Facility recycle wastewater shipped to the Waste Control Specialists LLC's low-level radioactive waste disposal facility in Andrews, Texas. Secretary Granholm committed to assessing the HLW

interpretation during her Congressional confirmation hearing in January 2021. This assessment, which was completed in December 2021,¹³ affirmed that the HLW interpretation is consistent with the law, the best available science and data, and the recommendations of the Blue-Ribbon Commission on America's Nuclear Future. In developing the HLW interpretation, the views of members of the public and the scientific community were considered. The Department is currently in the process of evaluating a second waste stream (i.e., contaminated process equipment) at SRS for potential disposal at a licensed commercial facility under the HLW interpretation. The Department will not use the HLW interpretation without prior meaningful consultation with stakeholders and regulators. Any decisions about whether and how the interpretation would apply to other wastes at any site would be the subject of subsequent actions using a robust public engagement process.

Challenges

The safe and efficient management and disposition of tank waste will require the Department's sustained commitment and leadership. While progress has been made in establishing its capabilities to treat tank waste for final disposition, significant work remains. At Hanford, the Department will need to complete start-up and commissioning of those facilities involved in the DFLAW approach. The Low-Activity Waste Vitrification facility is estimated to treat approximately one-third of the low-activity inventory of tank waste. The DFLAW approach will treat approximately 1 million gallons yearly. The Department will need to identify and select additional treatment options to fully address Hanford's remaining low-activity inventory. A study to support that effort is being conducted by the Federally Funded Research and Development Center National Academies of Sciences, Engineering and Medicine, under Section 3125 of the *National Defense Authorization Act for Fiscal Year 2021*. Additionally, the Department needs to identify and develop technically achievable, cost-effective, and viable approaches for treating the high-activity inventory of tank waste at Hanford for disposition. The current program of record calls for the WTP's Pretreatment and High-Level Waste facilities to prepare and vitrify the high-level waste for eventual final disposition. However, construction work on those facilities was suspended to resolve technical issues. Analyses performed by the Department and the Army Corps of Engineers determined that it is unlikely that the Department will complete the Pretreatment and High-Level Waste facilities and begin operation in time to meet current commitments. Currently, the Department is finalizing an Analysis of Alternatives and is conducting holistic negotiations with the State of Washington Department of Ecology on potential options for treating high-level tank waste as efficiently as possible.

¹³ *Assessment of Department of Energy's Interpretation of the Definition of High-Level Radioactive Waste*, a Notice by the Department on December 21, 2021, 86 Federal Register 72220, available at <https://www.federalregister.gov/documents/2021/12/21/2021-27555/assessment-of-department-of-energy-s-interpretation-of-the-definition-of-high-level-radioactive-waste>.

At SRS, the Department will need to continue improving the DWPF's and SWPF's long-term reliability and availability. When the Next Generation Solvent is implemented at the SWPF, it will enable processing greater than the 6 million gallons of waste per year capability provided by the original solvent. To complete the bulk of the tank waste mission at SRS in the next decade, the Department will need effective management of the spent nuclear fuel processing mission at the Savannah River H-Canyon facility, which contributes to the site's tank waste mission.

At INL, the Department completed a confirmatory run using waste simulant to assess readiness for radiological operations of the IWTU, which will treat the remaining liquid tank waste. Following the readiness assessments, the IWTU will undergo inspections and decontamination system testing in preparation for the targeted start of radiological operations. Finally, the Department will need a pathway for the disposal of the calcined material currently stored at INL.

Artificial Intelligence and Technology Office —Establishing the Department as a Federal Enterprise Leader in Developing and Deploying Artificial Intelligence

Significance of the Issue

In February 2019, the President directed the Department and other Federal agencies to pursue strategic objectives to promote and protect American advancements in Artificial Intelligence (AI). These objectives include, among others: sustained investment in AI research and development (R&D) in collaboration with industry; enhanced access to high-quality and fully traceable Federal data, models, and computing resources; and minimized vulnerability to AI-enabled attacks from malicious actors. Maintaining American leadership in AI will require a “whole-of-government approach” that will include meaningful contributions from Department and other Federal agencies working in partnership with experts in the private and academic sectors. In particular, the Executive Order on *Maintaining American Leadership in Artificial Intelligence* states:

Maintaining American leadership in AI requires a concerted effort to promote advancements in technology and innovation, while protecting American technology, economic and national security, civil liberties, privacy, and American values and enhancing international and industry collaboration with foreign partners and allies.

As highlighted in our Management Challenges reports dating back to November 2020, AI has the potential to transform many aspects of discovery and applied technology science; manufacturing, infrastructure, finance, and commerce; Government operations; and national security. As the custodians of the most advanced high-

performance supercomputers and massive multimodal data sets stemming from diverse research, the Department and its national laboratories are well-situated to work in conjunction and take a leading role in developing and deploying AI. For instance, the Department's Summit supercomputer at the Oak Ridge National Laboratory, which has unsurpassed AI capabilities, played an important role in COVID-19 investigations of the virus and potential therapeutic responses. Moreover, because the Department is charged with wide-ranging and complex missions in environmental stewardship, energy infrastructure, and national security, the deployment of advanced AI technologies is vital to enhancing its operations and resisting threats from the adversarial use of AI.

Department Progress

The Department has made progress related to its AI efforts in recent years. For example, the Secretary of Energy established the Artificial Intelligence and Technology Office (AITO) in September 2019 to foster the strategic coordination and development of AI capabilities across the Department by serving as the central point of coordination for the broad and extensive capabilities of the Department and its national laboratory complex. Since then, various progress has been made, including a number of immediate collaborations that were leveraged as pillars for the development of the Department's AI Strategy, partnerships with the intelligence community, improved relationships and joint workshops with the national laboratories, and identification of cross-cutting challenges coordinated and led by the AITO on behalf of program offices.

The AITO also announced the Department's establishment of the inaugural Artificial Intelligence Advancement Council, a first-of-its-kind at the Department, to coordinate strategic research priorities and ensure investment decisions are effectively leveraged. Further, the AITO coordinated the development of the *Department of Energy Artificial Intelligence Strategy FY 2022 – FY 2025* in partnership with 15 program offices, 11 laboratories, the Western Area Power Administration, the Chief Research Officer, the Advanced Scientific Computing Research program, and NNSA. The AITO also issued its *FY22 Program Plan and FY23 Forecast*, which includes various goals, activities, and key outcomes to be accomplished in FY 2022.

Achieving the ambitious goal of establishing the Department as a leader among Federal agencies in developing and deploying AI technology will require well-coordinated initiatives, including focused cross-cutting investments. As such, the AITO has been active with efforts sponsored by the White House and is the responsible AI Official, guiding the Department toward conformance with Executive Order 13960, *Promoting the Use of Trustworthy Artificial Intelligence in the Federal Government*, that involves implementation planning, and if necessary, retirement of systems.

The AITO is also an active member of the Equity AI Interagency Policy Committee and the Interagency Task Force on Military and Veteran's Mental Health. The AITO has been instrumental in forming cross-cutting, global collaborations to showcase national laboratory AI initiatives, solving challenges that further the mission of the administration, and amplifying awareness and use of research to further the Department's mission. For example, the Department's Exascale Computing Project, a collaboration among six national laboratories, is working to bring the next generation of world-leading, AI-optimized supercomputers online along with mission-critical applications that will effectively use these systems.

Challenges

While progress has been made by the Department related to its AI efforts, many challenges remain that could impact the Department's goals of being a leader in AI R&D. For instance, realizing the Department's goal of AI leadership will require cross-cutting and enterprise-wide efforts with contributions from diverse elements such as the AITO; the Office of Science; the Office of Cybersecurity, Energy Security, and Emergency Response; the Office of the Chief Information Officer; Department national laboratories; and NNSA. Achieving success in such a collaborative effort is inherently challenging.

The Department's investment in AI R&D and demonstration has been largely fragmented. Efforts have been made by various Department elements drawing on their respective resources for research or operations, but these resources are not dedicated exclusively to AI. Therefore, AI investment must compete with other important initiatives sharing the same resource pools. These other important initiatives include quantum information science and the Exascale Computing Initiative. While investments in these other initiatives may also further AI development, the benefits to AI are often incidental to the primary purpose of the projects. Likewise, some of the Department's investments in cybersecurity R&D encompass elements of AI technology, but not exclusively. Such a fragmented approach to AI investment poses the risk that the Department will miss opportunities to leverage all its resources strategically.

Additionally, the Department's full potential as a leader in AI will be realized only if it develops and deploys the technology in a wide range of its missions. For example, opportunities exist for the Department to deploy advanced AI technology to enhance the defense of the agency and the security of the electric grid through the development of surrogate models, to improve operations of the national laboratory system, to protect infrastructure against cyberthreats, to monitor financial records, and to detect potential waste or improper billings by Department contractors. Identifying and making investments in cross-cutting AI opportunities that do not fall solely within the arena of a single program may also benefit Department elements and stakeholders. However, the effectiveness of this approach may be limited by resources.

Finally, the Department identified various gaps that could impact its ability to effectively achieve AI goals. The gaps focused around five major themes, including the impacts associated with Department mission applications; AI techniques and fundamentals needed to advance the mission; AI requirements for disaster response and resiliency; opportunities for AI in supporting the Department's critical infrastructure; and the ethical framework needed to support Department researchers. By addressing gaps in these areas, the Department should be in a better position to advance science and technology, and automate the mechanisms that facilitate discovery, critical infrastructure, sustainable environmental management, future scientific facilities, security, scaling, and deployment.

In summary, while the Department plans to continue addressing and mitigating the challenges associated with AI, doing so requires expanded investments in AI research and workforce development, resources and support of the AITO, ongoing support to sustain AI software and tools developed in the Exascale Computing Initiative, and identification and coordination of cross-cutting AI R&D projects. Meeting these goals will require a coherent, enterprise-wide strategy, excellent intradepartmental collaboration, and large-scale investments.

Payment Integrity Reporting (FY 2022 Reporting of FY 2021 Payments)

The Payment Integrity Information Act (PIIA) of 2019, Public Law (P.L.) 116-117 enacted March 2, 2020, repeals the Improper Payments Information Act (IPIA) of 2002, Public Law (P.L.) No. 107-300, as amended by the Improper Payments Elimination and Recovery Act (IPERA) of 2010, and the Improper Payments Elimination and Recovery Improvement Act (IPERIA) of 2012.

PIIA requires Federal agencies to annually review their programs and activities to identify those susceptible to significant improper payments, and to measure and report improper payment rates and amounts for programs that are found to be susceptible to improper payments.

Detailed information on improper payments and information reported in prior AFRs can be found on the Payment Accuracy website, <https://paymentaccuracy.gov>.

Risk Assessments

When performing risk assessments, the Department evaluates eight of OMB's suggested risk assessment factors, plus five other risk factors:

1. Evaluate whether the payment process(es) over the payment category is new. (OMB risk factor 1)
2. Evaluate the complexity of the payment process for each type of payment, especially with respect to determining correct payment amounts. (OMB risk factor 2)
3. Evaluate the volume and dollar amount of payments for FY 2021. (OMB risk factor 3)
4. Evaluate whether payments or payment eligibility decisions are made by those outside of the payment reporting site. (OMB risk factor 4)
5. Evaluate whether there have been any significant changes in program outlays, authorities, practices, or procedures. (OMB risk factor 5)
6. Evaluate the level, experience, and quality of training of personnel responsible for determining program eligibility, certifying that payments are accurate, and conducting post-payment reviews. (OMB risk factor 6)
7. Evaluate the inherent risk of improper payments due to the nature of agency programs or operations. (Other risk factor 1)
8. Evaluate the results of Office of Inspector General (IG), Government Accountability Office (GAO), Defense Contract Audit Agency (DCAA), and other External Audits/Reviews or management findings that might hinder accurate payment certifications. (OMB risk factor 7)
9. Evaluate the results of OMB Circular A-123 assessments and other internal reviews designed to prevent or detect improper payments. (Other risk factor 2)
10. Evaluate contractor payment processing oversight. (Other risk factor 3)
11. Evaluate the availability of information or data systems to confirm eligibility, conduct post-payment reviews, or provide for other payment integrity needs. (OMB risk factor 10)
12. Evaluate the impact of Coronavirus Aid, Relief, and Economic Security (CARES) Act and/or American Rescue Plan Act of 2021 (ARPA) funding on existing payment processes in response to COVID-19. (Other risk factor 4)
13. Evaluate the impact, or anticipated impact, of the Infrastructure Investment and Jobs Act (IIJA) funding from a payment integrity perspective. (Other risk factor 5)

In accordance with the requirement to perform a risk assessment at least once every three years, DOE performed Department-wide risk assessments in FY 2021. In FY 2022, the Department's payment reporting sites were not required to perform a risk assessment unless there were significant: (1) changes in legislation, including legislation related to COVID-19; (2) increase in site outlays (10 percent or more compared to last fiscal year), including increases in funding related to COVID-19; (3) changes to the site's payment processes, including processes created in response to COVID-19, that would make the site susceptible to significant improper payments; or (4) impact from natural disasters, national emergencies, or a change to site structure that increases payment integrity risk.

Although FY 2022 is an off-cycle year for risk assessment, 20 of the 46 payment reporting sites met one or more of the four criteria and performed a risk assessment. Based on the site risk assessments performed in FY 2022, and consolidated at the Departmental level, it was determined that the Department was not susceptible to significant improper payments. DOE is considered one program for improper payment reporting and assesses its program by payment types identified in the table on the next page.

DOE continues to maintain a <1 percent overall improper payment rate (0.16 percent). Actual improper payments plus unknown payments¹ for payments made in FY 2021 are below OMB's \$100 million threshold. The Departmental improper payment rate has remained below 1 percent since the inception of its program in FY 2002.

For FY 2021 information reported in FY 2022, the Department's total payment outlays were \$48.42 billion and identified improper payments plus unknown payments were \$81.46 million, of which \$38.95 million were overpayments identified for recapture. The remaining improper payments include underpayments of \$0.63 million, lost discounts of \$0.34 million, and

¹ Per Office of Management and Budget (OMB) Circular A-123, Appendix C, (M-21-19), *Requirements for Payment Integrity Improvement*, an Unknown Payment is a payment that could be either proper or improper, but the agency is unable to discern whether the payment was proper or improper at the time of reporting.

OTHER INFORMATION (Unaudited)

technically improper payments² of \$39.22 million, all of which cannot be recaptured. Unknown payments of \$2.32 million were also identified.

Recapture of Improper Payments Reporting

The Department's low improper payment rate of 0.16 percent reported in FY 2022 for FY 2021 payments, and the high recapture rate of 89.80 percent reported for the same period, support the Department's determination that it is not cost-effective to employ traditional payment recapture audit contracts, and the Department notified OMB of this fact in September 2015. For FY 2022, \$9,720 is deemed uncollectible due to amounts being below the threshold minimum established for pursuing recapture, international disputes, bank transfers, vendor disputes or fraud amounts that cannot be recovered.

The Department conducts site-specific reviews and analysis of accounting and financial records, supporting documentation, and other pertinent information supporting payments. These activities are detective and

corrective in nature, and are designed to identify and recapture overpayments. Activities include prepayment review and approval of invoices, performing quarterly prompt-payment reviews, post-payment reviews, contractor internal audits, leveraging the results of cost allowability audits of integrated contractors and interim and close-out reviews of contracts and grants, reviews of grant credits in the Automated Standard Application for Payments (ASAP), and results from travel audits. The Department will continue to scrutinize improper payment activity and controls through its internal control program by emphasizing, evaluating, and strengthening controls as needed to maintain the Department's record of low payment errors and to continue the effective stewardship of public funds.

Table 1 identifies FY 2021 overpayments identified and recaptured outside of payment recapture audits reported in FY 2022, and **Table 2** identifies root causes of overpayments identified for recapture in FY 2021.

Table 1

FY 2021 Overpayments Identified and Recaptured Outside of Payment Recapture Audits Reported in FY 2022 (\$ in millions) ¹						
PROGRAM/ PAYMENT TYPE	Amounts Identified For Recapture of Payments Made in FY 2021	Amounts Identified For Recapture of Payments Made in FY 2020 & Prior	TOTAL Amounts Identified For Recapture of Payments Made in FY 2021 & Prior	AMOUNTS RECAPTURED FOR FY 2021 AND REPORTED IN FY 2022	AMOUNTS RECAPTURED FOR FY 2020 AND PRIOR YEARS AND REPORTED IN FY 2022 ²	TOTAL AMOUNTS RECAPTURED FOR FY 2021 AND PRIOR AND REPORTED IN FY 2022 ²
Vendors/Contracts	\$30.01	\$10.65	\$40.67	\$26.38	\$9.48	\$35.85
Benefits - Payroll	\$2.81	\$0.74	\$3.55	\$2.48	\$0.69	\$3.17
Benefits - Travel	\$0.12	\$0.10	\$0.22	\$0.11	\$0.10	\$0.21
Grants	\$5.97	\$0.47	\$6.45	\$5.97	\$0.44	\$6.41
Loans	\$—	\$—	\$—	\$—	\$—	\$—
Other	\$0.03	\$1.47	\$1.51	\$0.03	\$1.47	\$1.51
TOTAL	\$38.95	\$13.44	\$52.39	\$34.98	\$12.18	\$47.16

¹ DOE reports prior year payment activity in its current year Agency Financial Report (AFR), per OMB approval received on May 25, 2011. In addition, DOE is considered one program for improper payment reporting, and assesses the payment types included in this table for its 46 payment reporting sites, per OMB approval received on August 10, 2011.

² In FY 2021, a total of \$47.16 million was recaptured, including \$34.98 million associated with FY 2021 payments, and \$12.18 million associated with payments made in FY 2020 and prior.

² Per OMB Circular A-123, Appendix C, (M-21-19), *Requirements for Payment Integrity Improvement*, a Technically Improper Payment is a payment made to an otherwise qualified recipient for the right amount, but the payment failed to meet all regulatory and/or statutory requirements. A Technically Improper Payment is a non-monetary loss type of improper payment.

OTHER INFORMATION (Unaudited)

Table 2

Root Causes of Overpayments Identified for Recapture in FY 2021 (\$ in millions)	
ROOT CAUSE OF IMPROPER PAYMENTS	TOTAL IDENTIFIED FOR RECAPTURE
Confirmed Fraud	\$0.46
Duplicate Payment	\$16.21
Funds used for Purposes other than allowed by law or Departmental Policies	\$0.06
Goods or Services Not Received	\$6.35
Incorrect Amount	\$10.22
Ineligible Good or Service	\$1.05
Ineligible Recipient	\$5.51
Insufficient Documentation	\$0.57
Other Reason	\$0.48
Settlement as the Result of Litigation	\$8.50
Unallowable Cost	\$2.99
TOTAL	\$52.39

Grants Programs

All reporting entities with grant programs must submit a brief high-level summary of expired, but not closed, grants. A summary table of the total number of Federal grant and cooperative agreement awards and balances for which closeout has not yet occurred, but for which the period of performance has elapsed by two years or more prior to September 30, 2022, is to the right.

Ten grants/cooperative agreements remain open for the following reasons:

- One cooperative agreement is under management review and will be closed when the review is completed;
- One cooperative agreement is undergoing an audit and will be closed after the audit is complete;
- Three grants remain open pending reviews of outstanding questioned costs and will close when resolved;
- Four grants remain open due to ongoing litigation with the awardee and the U.S. Government and will close when the litigation is resolved; and
- One grant remains open due to the need for revised patent information prior to closing and will close when the issue is resolved.

CATEGORY	2-3 Years	>3-5 Years	>5 Years
Number of Grants/ Cooperative Agreements with Zero Dollar Balances	4	3	0
Number of Grants/ Cooperative Agreements with Undisbursed Balances	2	1	0
Total Amount of Undisbursed Balances (Dollars in Millions)	\$1.21	\$0.29	\$0.00

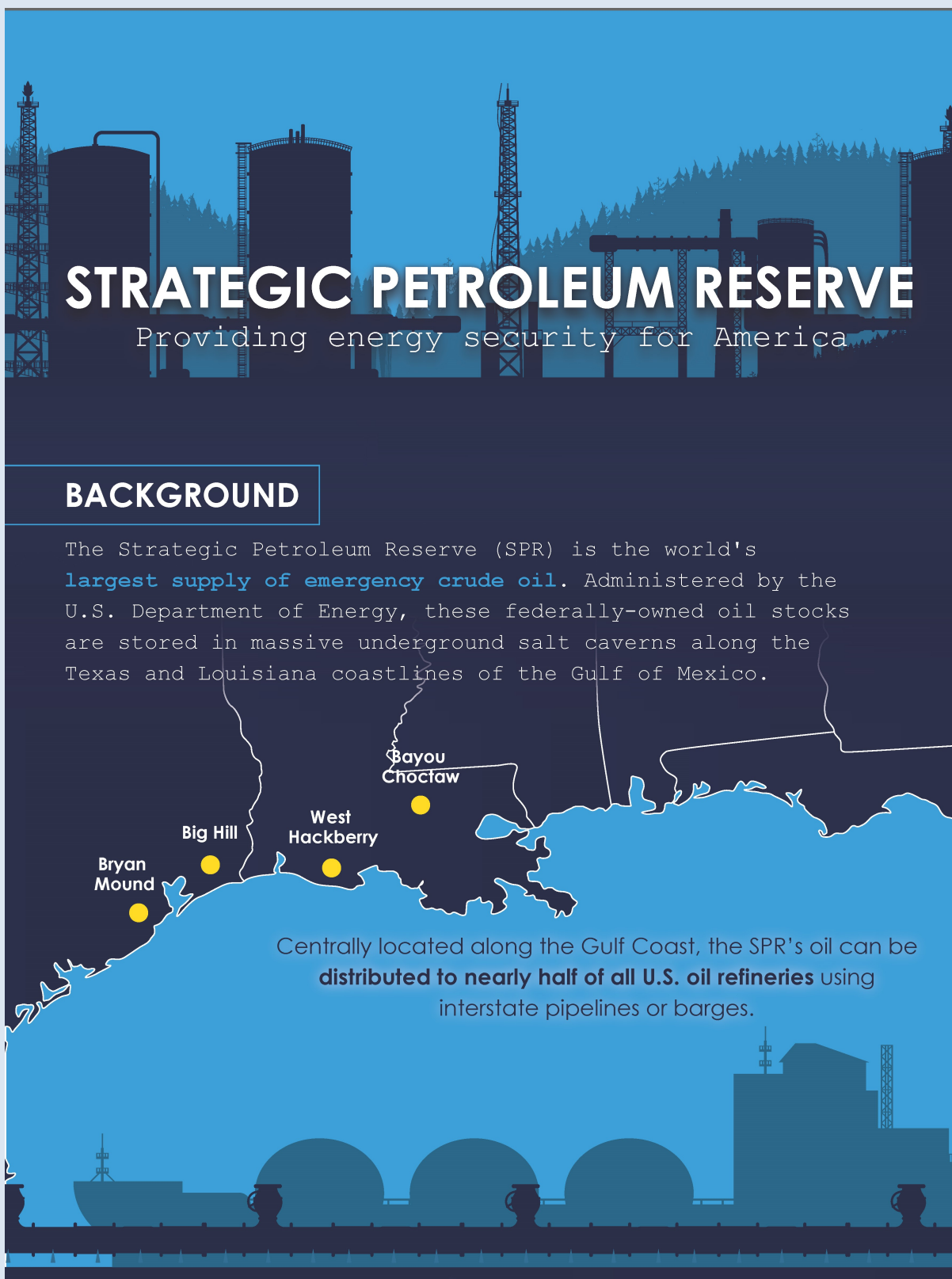
Climate-Related Risks

In response to the climate crisis, and recent Administration climate requirements, DOE developed and released the [2021 Climate Adaptation and Resilience Plan](#) and is developing a sustainability plan that will provide a

framework for Departmental initiatives to address the climate crisis. For more information, see Climate Change in the [Management Priorities](#) section.

FY 2022 DOE Highlight: Strategic Petroleum Reserve

Strategic Petroleum Reserve is one of many stories detailing Fossil Energy and Carbon Management accomplishments. For more information, visit <https://www.energy.gov/fecm/articles/infographic-strategic-petroleum-reserve> and <https://www.energy.gov/fecm/strategic-petroleum-reserve>.



HISTORY

In 1973, the Organization of Arab Petroleum Exporting Countries (OAPEC) imposed an oil embargo against the United States, triggering an energy crisis that sent the U.S. economy into a recession. **To mitigate damage from any future shortages of oil**, President Gerald Ford signed the *Energy Policy and Conservation Act of 1975*, which established the SPR.

BENEFITS

The SPR is **a tool used to alleviate the market impacts of both domestic and international disruptions**, caused by weather, natural disasters, labor strikes, technical failures/accidents, political disputes or conflicts.

U.S. leaders also have the option of filling the SPR during times of demand destruction (in order to minimize the shut in of U.S. oil production) through the use of exchanges or an appropriation from Congress to purchase oil directly.

The SPR **fulfills the nation's obligations under the International Energy Program**, which requires member nations to hold the equivalent of 90 days of net imports of oil and petroleum products as a reserve stock.



Offers the nation an **insurance policy** against potential supply interruptions



Provides a **deterrent** to hostile threats to cut off oil supplies



Protects the U.S. **economy**

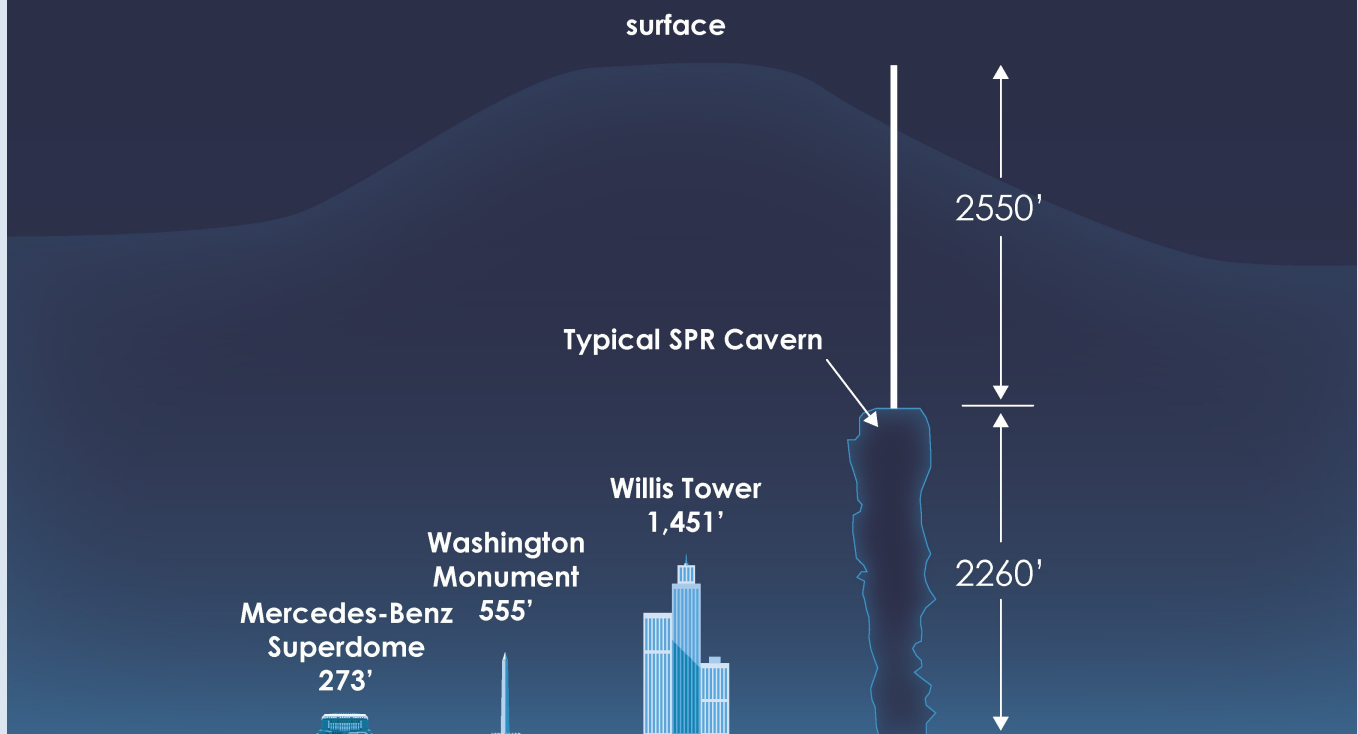
USE

With a storage capacity of up to 713.5 million barrels, as of August 31, 2022 the SPR currently holds in approximately 445 million barrels of crude oil. That amount of crude oil, refined into motor gasoline, could fill over 700 million sedans.



 = 11 million sedans

The SPR comprises 60 salt caverns. Each cavern is roughly cylindrical in shape with an average diameter of about 200 feet and a height of 2,550 feet, which is large enough for Chicago's Willis Tower to fit inside with room to spare.



Decisions to withdraw crude oil in the event of an energy emergency are made by **the President under the authority of the Energy Policy and Conservation Act** and done through a competitive sale. **The SPR is always drawdown ready**, which means it stands ready to release crude oil to the market within 13 days of Presidential direction; this is the time it takes to conduct the sales process, award contracts and to arrange the logistics for oil transportation.

In addition to the President's authority, **the Secretary of Energy may also authorize limited releases** in the form of a test sale of up to 5 million barrels. The Secretary may also conduct exchanges, or a crude oil loan, with non-governmental entities. During an exchange the SPR provides crude oil to the requesting refinery in an exchange for a return of the crude oil barrels plus a premium barrel amount to cover the SPR cost for the exchange. This type of exchange agreement can be completed within a few days of an entity's request. In another type of exchange—an exchange for storage—the SPR receives crude oil through the Request for Proposals process and returns it at a later date. In any exchange, winning bidders “pay” a small premium of oil to cover the SPR's cost.

For more information on the **SPR** and the Office of Cybersecurity, Energy Security, Emergency Response visit energy.gov/ceser.

Last updated: August 2022

U.S. DEPARTMENT OF
ENERGY

Office of
Cybersecurity, Energy Security,
and Emergency Response

Civil Monetary Penalty Adjustment for Inflation

Federal Energy Regulatory Commission (FERC)

FERC Civil Monetary Penalty Adjustment for Inflation						
Statutory Authority	Description of Penalty	Year Enacted	Latest Year of Adjustment	Current Penalty Level	Sub-Agency/Bureau/Unit	Location for Penalty Update: Federal Register Vol. 87, No. 9 (January 13, 2022) Rules and Regulations pages 2036-2037
16 U.S.C. § 825o-1(b), Sec. 316A of the Federal Power Act	Violation of any provision of Part II of the FPA or related rule or order.	2005	2022	\$1,388,496 per violation, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2022/01/13/2022-00616/civil-monetary-penalty-inflation-adjustments
16 U.S.C. § 823b(c), Sec. 31(c) of the Federal Power Act	Violation of or failure/refusal to comply with any rule or regulation issued under Part I of the FPA or any related order or term of a license, permit, or exemption.	1986	2022	\$25,075 per violation, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2022/01/13/2022-00616/civil-monetary-penalty-inflation-adjustments
16 U.S.C. § 825n(a), Sec. 315(a) of the Federal Power Act	Violation of or willful failure to comply with any order of the Commission; file any report required under the FPA; or submit any information or document or respond to subpoena required by the Commission in the course of an investigation conducted under the FPA.	1935	2022	\$3,275 per violation	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2022/01/13/2022-00616/civil-monetary-penalty-inflation-adjustments
15 U.S.C. § 717t-1, Sec. 22 of the Natural Gas Act	Violation of any provision of the NGA or any related rule, regulation, restriction, condition, or order.	2005	2022	\$1,388,496 per violation, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2022/01/13/2022-00616/civil-monetary-penalty-inflation-adjustments
15 U.S.C. § 3414(b)(6)(A)(i), Sec. 504(b)(6)(A)(i) of the Natural Gas Policy Act of 1978	Violation of any provision of the NGPA or any related rule or order.	2005	2022	\$1,388,496 per violation, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2022/01/13/2022-00616/civil-monetary-penalty-inflation-adjustments
49 App. U.S.C. § 6(10) (1988), Sec. 6(10) of the Interstate Commerce Act	Violation of or failure/refusal to comply with regulations or orders concerning posting and filing rate schedules issued by the Commission under section 6 of the ICA.	1910	2022	\$1,453 per offense and \$73 per day after the first day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2022/01/13/2022-00616/civil-monetary-penalty-inflation-adjustments
49 App. U.S.C. § 16(8) (1988), Sec. 16(8) of the Interstate Commerce Act	Violation of or failure to comply orders issued by the Commission under sections 3, 13, or 15 of the ICA.	1910	2022	\$14,536 per violation, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2022/01/13/2022-00616/civil-monetary-penalty-inflation-adjustments
49 App. U.S.C. § 19a(k) (1988), Sec. 19a(k) of the Interstate Commerce Act	Violation of or failure to comply with Commission's requirements to provide information in connection with the Commission's valuation of a pipeline carrier's property under section 19(a) of the ICA.	1913	2022	\$1,453 per offense, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2022/01/13/2022-00616/civil-monetary-penalty-inflation-adjustments
49 App. U.S.C. § 20(7)(a) (1988), Sec. 20(7)(a) of the Interstate Commerce Act	Violation of or failure to keep or submit certain accounts, records, or memoranda required by the Commission under authority granted in section 20 of the ICA.	1940	2022	\$1,453 per offense, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2022/01/13/2022-00616/civil-monetary-penalty-inflation-adjustments

Civil Monetary Penalty Adjustment for Inflation

U.S. Department of Energy (DOE)

DOE Civil Monetary Penalty Adjustment for Inflation						
Authority	Description of Penalty	Year Enacted	Latest Year of Adjustment	Current Penalty Level	Sub-Agency/Bureau/Unit	Location for Penalty Update: Federal Register Vol. 87, No. 6 (January 10, 2022) Rules and Regulations pages 1061-1065
Energy Supply and Environmental Coordination Act of 1974, 10 CFR 207.7	Enforcement/Sanctions	1974	2022	\$11,630	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
Energy Policy and Conservation Act, 10 CFR 218.42	Enforcement/Sanctions	1975	2022	\$25,189	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
Energy Policy and Conservation Act, 10 CFR 429.120	Enforcement/Maximum civil penalty	1975	2022	\$503	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
Energy Policy and Conservation Act, 10 CFR 431.382	Enforcement/Prohibited Acts	1975	2022	\$503	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
Energy Policy Act of 1992, 10 CFR 490.604	Enforcement/Penalties and Fines	1992	2022	\$9,751	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
Powerplant and Industrial Fuel Use Act of 1978, 10 CFR 501.181	Civil penalties/Sanctions	1978	2021	\$103,050; \$8/mcf; \$41/bbl	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
31 U.S.C. 1352(c), 10 CFR 601.400 and App A	Limitation on use of appropriated funds to influence certain Federal contracting and financial transactions/Penalties	1989	2022	\$22,021 (minimum); \$220,213 (maximum)	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
Price-Anderson Amendments Act of 1988, 10 CFR 820.81	Civil monetary penalties for violation of DOE safety regulations/Amount of penalty	1988	2022	\$230,107	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
Atomic Energy Act of 1954, 10 CFR 824.1 and App A	Civil monetary penalties for violations of DOE Regulations regarding security of classified or sensitive information or data/Purpose and scope	1999	2022	\$164,438	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
Atomic Energy Act of 1954, 10 CFR 824.4 and App A	Civil monetary penalties for violations of DOE Regulations regarding security of classified or sensitive information or data/Civil penalties	1999	2022	\$164,438	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
Atomic Energy Act of 1954, 10 CFR 851.5 and App B	Worker health and safety rules for DOE nuclear facilities/Enforcement	2002	2022	\$106,790	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
Program Fraud Civil Remedies Act of 1986, 10 CFR 1013.3	False claims and statements; liability/Basis for civil penalties and assessments	1986	2022	\$12,537	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
Atomic Energy Act of 1954, 10 CFR 1017.29	Dissemination of unclassified information/Civil penalty	1981	2022	\$296,132	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
5 U.S.C. 7342(h), 10 CFR 1050.303	Receipt and disposition of foreign gifts and decorations/Enforcement	1977	2022	\$22,450	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
42 U.S.C. 2282(a)	Violations of licensing requirements	2018	2022	\$112,131	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf
50 U.S.C. 2731(b)(2)	Worker protection at nuclear weapons facilities	1991	2022	\$10,066	N/A	https://www.govinfo.gov/content/pkg/FR-2022-01-10/pdf/2021-28446.pdf

Other Statutory Reporting – Management’s Response to Audit Reports

Pursuant to the Inspector General Act Amendments of 1988 (Public Law 100-504), agency heads are to report to Congress on the status of final action taken on Inspector General (IG) audit recommendations. This report is provided consistent with the requirements of the Inspector General Act and complements a separate report prepared by the Department’s Inspector General that provides: (1) information on audit reports issued during the period; (2) the status of management decisions made on previously issued IG audit reports; and (3) information on the disposition of funds put to better use and questioned costs. The IG report is available at <http://www.ig.energy.gov>.

This report also contains information on the closure of Government Accountability Office (GAO) audits. There are no unresolved GAO audit reports as of September 30, 2022, according to the definition of resolution in OMB Circular A-50, *Audit Follow Up*.

Inspector General Audit Reports

The Department resolves IG audit reports by evaluating the recommendations they contain, formally responding to the IG, and implementing agreed-upon corrective actions. In some instances, DOE takes corrective action immediately, and in others, longer-term action plans are developed and implemented. Actions taken by management on audit recommendations increase the efficiency and effectiveness of operations and strengthen standards of accountability.

At the beginning of FY 2022, there were **52** IG reports awaiting final action. In FY 2022, the Department received **44** IG reports, of which **26** contained recommendations for corrective actions, and **18** had no recommendations. Thus, there were **78** reports pending final action during FY 2022, of which Department took final action on **34** IG reports. **Seven** of the reports for which the Department took final action identified cost impacts, including questioned contract or grant costs and recommended cost avoidance (funds put to better use). At the end of FY 2022, **44** IG reports awaited final action. Taking final action on a report includes the development of an agreed-upon management decision and completion of the corrective actions.

Government Accountability Office Audit Reports

GAO audits also are included in the Department’s audit follow-up program. At the beginning of FY 2022, there were **46** GAO reports awaiting final action. In FY 2022, the Department received **56** additional final GAO audit reports, of which **21** contained recommendations for corrective actions by the DOE, and **35** had no recommendations to DOE. Thus, there were **67** GAO reports pending final action during FY 2022, the Department completed its planned corrective actions for **18** audits during FY 2022, leaving **49** GAO reports awaiting final action at year-end.

Status of Final Action on IG and GAO Audit Reports for FY 2022

The following chart provides a summary of closure actions for IG and GAO audit and inspection reports during FY 2022.

AUDIT REPORTS	NUMBER OF IG REPORTS	NUMBER OF GAO REPORTS
Reports Pending Final Action at the end of FY 2021*	52	46
Reports Issued in FY 2022 Requiring Corrective Actions	26	21
Total Reports Pending Final Action During FY 2022	78	67
Reports Closed During FY 2022	34	18
Total Reports Pending Final Action as of the End of FY 2022	44	49

*Reflects adjustments to previously reported amounts for GAO Reports Pending Final Actions at the end of FY 2021.

Glossary of Acronyms and Abbreviations

AAL	Asynchronous Transfer Mode Adaptation Layer
2012 REP Settlement Agreement	2012 Residential Exchange Program Settlement Agreement
A&A	Assessment & Authorization
AA	Asian American
AARs	Annual Assessment Reports
ABOR	AbilityOne Representative
AC	Alternating Current
ACI	Asset Condition Index
AES	Assessment & Evaluation Standardization
AFR	Agency Financial Report
AI	Artificial Intelligence
AI RMP	AI Risk Management Playbook
AIS	Automated Indicator Sharing
AITO	Artificial Intelligence and Technology Office
Alt	Alteration
AMD	Acid Mine Drainage
AMEMs	Additively Manufactured Energetic Materials
AMERICA	A-123 Management of Entity Risk and Internal Controls Application
AMO	Advance Manufacturing Office
APPA	American Public Power Association
APPR	Annual Performance Report/Annual Performance Plan
ARC	Analysis and Referral Center
ARDP	Advanced Reactor Demonstration Program
ARO	Asset Retirement Obligation
ARPA	American Rescue Plan Act of 2021
ARRA	American Recovery and Reinvestment Act of 2009
ASAP	Automated Standard Application for Payments
ASC	Accounting Standards Codification
ASC	Advance Simulation and Computing
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASTM	American Society for Testing and Materials
ASU	Accounting Standards Update
ASU	Air Separation Unit

ATAAPS	Automated Time and Attendance Production System
ATR	Advanced Test Reactor
ATR	Autothermal Reforming
ATVM	Advanced Technology Vehicles Manufacturing
AUI	Associated Universities, Inc.
BCI	Building Condition Index
BDP	Big Data Platform
BETA	Energy Justice Dashboard
BETC	Business Event Type Code
BFADS	Budget Formulation and Distribution System
BFS	Bureau of the Fiscal Service
BIL	Bipartisan Infrastructure Law
BiOp	Biological Opinion
BLOSEM	Optimized Security and Energy Management
BNL	Brookhaven National Laboratory
BOR	Bureau of Reclamation
BPA	Bonneville Power Administration
C2M2	Cybersecurity Capability Maturity Model
CABLE	Conductivity-enhanced Materials for Affordable Breakthrough Leapfrog Electric
CarbonSAFE	Carbon Storage Assurance Facility Enterprise
CARES	Coronavirus Aid, Relief, and Economic Security Act
CBS	Corporate Business Systems
CCCA	Cooperative Construction Contracting Approach
CCI	Core Competency Interviews
CCUS	Carbon Capture, Utilization, and Storage
CD	Critical Decision
CDM	Continuous Diagnostics and Mitigation
CEC	Clean Energy Corps
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act
CESER	Office of Cybersecurity, Energy Security, and Emergency Response
CFE	Carbon-Pollution Free Electricity
CFO	Chief Financial Officer

OTHER INFORMATION (Unaudited)

CFR	Code of Federal Regulations
CGS	Columbia Generating Station
CHIPS Act	CHIPS and Science Act
CHRIS	Corporate Human Resource Information System
CIC	Core Internals Change Out
CIFIA	Carbon Dioxide Transportation Infrastructure Financing Innovation
CIP	Critical Infrastructure Protection
CIRT	Catastrophic Incident Response Team
CISA	Cybersecurity & Infrastructure Security Agency
CM	Category Management
CM	Critical Mineral
CMI	Critical Materials Institute
CMM	Critical Mineral and Material
CMS	Carbon Molecular Sieve
CO₂	Carbon Dioxide
COA	Commonwealth of Australia
Commission	Atomic Energy Commission
CORE-CM	Carbon Ore, Rare Earth, and Critical Mineral
COVID-19	Coronavirus Disease 2019
C-PAGE	Chronological AC Power Flow Automated Generation
CR	Continuing Resolution
CRADA	Cooperative Research and Development Agreement
CRSO	Columbia River System Operations
C-SCRM	Cyber Supply Chain Risk Management
CSF	Cybersecurity Framework
CSI	Climate Smart Infrastructure
CSRS	Civil Service Retirement System
CSWG	Control Systems Working Group
CTI	Cyber Threat Intelligence
CUAS	Counter Unmanned Aircraft Systems
Cures Act	21st Century Cures Act of 2015
CWC	Collegiate Wind Competition
CWMD	Counter-weapons of Mass Destruction
CyManII	Cybersecurity Manufacturing Innovation Institute
CyTRICS	Cyber Testing for Resilient Industrial Control System
D&D	Deactivation and Decommissioning

D&D	Decontamination and Decommissioning
DATA Act	Digital Accountability and Transparency Act of 2014
DBT	Design Basis Threat
DCAA	Defense Contract Audit Agency
DECP	Distinguished Early Career Program
DEFEND	Dynamic and Evolving Federal Enterprise Network Defense
DEIA	Diversity, Equity, Inclusion, and Accessibility
DER	Distributed Energy Resources
DFAS	Defense Finance and Accounting Service
DFLAW	Direct Feed Low-Activity Waste
DHS	Department of Homeland Security
DICARC	Department Internal Control and Assessment Review Council
DM&R	Deferred Maintenance and Repairs
DMMT	Division of Methane Mitigation Technologies
DNN R&D	Defense Nuclear Nonproliferation Research and Development
DNS	Domain Name Server
DoD	Department of Defense
DOE	Department of Energy (or Department)
DOI	Department of the Interior
DOJ	Department of Justice
DOL	Department of Labor
DOS	Department of State
DP	Office of Defense Programs
DPA	Defense Production Act
DRUM	Defense-Related Uranium Mine
DSS	Decontaminated Low Level Salt Waste Stream
DUF6	Depleted Uranium Hexafluoride
DWPF	Defense Waste Processing Facility
e.g.	For Example
E3A	EINSTEIN 3 Accelerated
E3SM	Energy Exascale Earth System Model
EA	Office of Enterprise Assessments
EAP	Equity Action Plan
EBR-II	Experimental Breeder Reactor-II
ECFM	Exascale Computing Facility Modernization
ECGS	Enterprise Cybersecurity Governance System

OTHER INFORMATION (Unaudited)

eCPIC	Electronic Capital Planning and Investment Control
ECQ	Executive Core Qualification
ECRM	Enterprise Cybersecurity Risk Management
ED	Office of Economic Impact and Diversity
EEEJ	Equity, Energy and Environmental Justice
EEOC	Equal Employment Opportunity Commission
EEOICPA	Energy Employees Occupational Illness Compensation Program Act
EERE	Office of Energy Efficiency and Renewable Energy
EHSS	Office of Environment, Health, Safety, and Security
EIR	Energy Infrastructure Reinvestment
EIV	Environmental Information Volume
EJ TCTACs	Environmental Justice Thriving Communities Technical Assistance Centers
EM	Office of Environmental Management
EM VISION	EM Strategic Vision 2022-2032
EMC2	Enhanced Minor Construction and Commercial Standards
EO	Executive Order
EOC	Emergency Operations Center
EOD	Entry on Duty
EPA	Environmental Protection Agency
EPAct05	Energy Policy Act of 2005
EPIC	Energy Program for Innovation Clusters
ERGs	Employee Resource Groups
ERICA	Energy Resilient Infrastructure and Climate Adaptation
ERISA	Employee Retirement Income Security Act
ES&H	Environment, Safety, and Health
ES4SE	Energy Storage for Social Equity Initiative
ESA	Endangered Species Act
ESCC	Electricity Subsector Coordinating Council
ESCO	Energy Service Company
ESPC	Energy Savings Performance Contracts
ESS&H	Office of Environment, Security, Safety and Health
ETTP	East Tennessee Technology Park

EV	Electric Vehicles
Evidence Act	Foundations for Evidence-Based Policymaking Act of 2018
FAIR	Factor Analysis of Information Risk
FAR	Federal Acquisition Regulation
FASAB	Federal Accounting Standards Advisory Board
FASB	Financial Accounting Standards Board
FASB ASC	Financial Accounting Standards Board's Accounting Standards Codification
FAST	Fixing America's Surface Transportation Act of 2015
FBI	Federal Bureau of Investigation
FCRA	Federal Credit Reform Act of 1990
FCRPS	Federal Columbia River Power System
FECA	Federal Employees' Compensation Act
FECM	Fossil Energy and Carbon Management
FEED	Front End Engineering Design
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FERS	Federal Employees Retirement System
FEVS	Federal Employee Viewpoint Survey
FFB	Federal Financing Bank
FFMIA	Federal Financial Management Improvement Act of 1996
Financial Report	Financial Report of the U.S. Government
FIPP	Financial Institution Partnership Program
FIPS	Federal Information Processing Standards
FISMA	Federal Information Security Modernization Act
FITARA	Federal Information Technology Acquisition Reform Act
FIU	Florida International University
FMFIA	Federal Managers' Financial Integrity Act of 1982
FOA	Funding Opportunity Announcement
FOAK	First-of-a-Kind
FPDS-NG	Federal Procurement Data System – Next Generation

OTHER INFORMATION (Unaudited)

Framework	Fraud Risk and Data Analytics Framework
FRPC	Federal Real Property Council
FTE	Full-Time Equivalents
FY	Fiscal Year
FYEP	Future-Years Energy Program
GAAP	Generally Accepted Accounting Principles
GAO	Government Accountability Office
GBSD	Ground-Based Strategic Deterrent
GCEAF	Global Clean Energy Action Forum
GDPs	Gaseous Diffusion Plants
GE	General Electric Company
GFE	Government Furnished Equipment
GGE	Gasoline Gallon Equivalent
GHG	Greenhouse Gas
GIS	Geographic Information System
GMLC	Grid Modernization Laboratory Consortium
GMRA	Government Management Reform Act of 1994
GMS	Global Material Security
GPRA	Government Performance and Results Act of 1993
GPRAMA	Government Performance and Results Act Modernization Act of 2010
GSA	General Services Administration
GTAS	Government-wide Treasury Account Symbol Adjusted Trial Balance System
H₂	Hydrogen
HALEU	High Assay Low-Enriched Uranium
HBCUs	Historically Black Colleges and Universities
HC	Office of the Chief Human Capital Officer
HCF	Human Capital Framework
HCMAP	Human Capital Management Assessment Program
HDSTEM	Humanities-driven STEM
HEU	Highly Enriched Uranium
HFM	Hollow Fiber Membranes
HLW	High-Level Waste
HMO	Health Maintenance Organization
HPC	High Performance Computing
HQ	Headquarters
HR	Human Resources
HRP	Human Reliability Program

HRSC	Human Resource Specialist Center
HVA	High Value Asset
i.e.	That Is
IAE	Integrated Award Environment
IAM	Identity and Access Management
IAS	Institute for Advanced Study
ICF	Inertial Confinement Fusion
ICS	Industrial Control Systems
ICT	Information Communications Technology
IDE	Integrated Development Environment
IDIQ	Indefinite Delivery Indefinite Quantity
IDW	Integrated Data Warehouse
IE	Office of Indian Energy Policy and Programs
IECC	International Energy Conservation Code
IFLs	Integrated Field Laboratories
IG	Inspector General
IJA	Infrastructure Investment and Jobs Act
iJC3	Integrated Joint Cybersecurity Coordination Center
IN	Office of Intelligence and Counterintelligence
INEC	International Nuclear Energy Cooperation
INFUSE	Innovation Network for Fusion Energy
INL	Idaho National Laboratory
Interview Corps	CEC Interviewers
IOC	Indicators of Compromise
IOC	Initial Operational Capability
IOUs	Investor-owned Utilities
IPERA	Improper Payments Elimination and Recovery Act of 2010
IPERIA	Improper Payments Elimination and Recovery Improvement Act of 2012
IPIA	Improper Payments Information Act of 2002
IRA	Inflation Reduction Act of 2022
IRP	Integrated Research Project
ISFSI	Independent Spent Fuel Installation
ISM	Integrated Safety Management
IT	Information Technology
ITP	Insider Threat Program
IWG	Interagency Working Group

OTHER INFORMATION (Unaudited)

IWTU	Integrated Waste Treatment Unit
JGI	Joint Genome Institute
Justice40	Justice40 Initiative
kg	Kilograms
kWh	Kilowatt Per Hour
L&OD	Learning and Organizational Development
LACC	Learning to Adapt and Control for Complex Power Systems
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
LAP4	Los Alamos Plutonium Pit Production Project
LBNL	Lawrence Berkeley National Laboratory
LEAP	Local Energy Action Program
LEP	Life Extension Program
LLNL	Lawrence Livermore National Laboratory
LM	Office of Legacy Management
LMS	Learning Management System
LPO	Loan Programs Office
LTS&M	Long-Term Surveillance and Maintenance
LZ	LUX-ZEPLIN
M&O	Management and Operating
M3	Material Management and Minimization
MA	Office of Management
MBEs	Minority Business Enterprises
MD	Management Directive
MDR	Mandatory Disclosure Rule
MEISPP	Minority Education Institution Student Partnership Program
MFA	Multi-Factor Authentication
Mgal	Million Gallons
MGT	Mobile Guardian Transporter
MJ	Megajoules
MLEF	Mickey Leland Energy Fellowship
MOOSE	Multiphysics Object-Oriented Simulation Environment
MOU	Memorandum of Understanding
MOX	Mixed Oxide
MPPB	Main Plant Process Building
MSIPP	Minority Serving Institutions Partnership Program
MSIs	Minority-serving Institutions
MT	Metric Tons

MTU	Metric Tons of Uranium
MWe	Megawatts Electric
NAAN	Native American and Alaska Native
NARUC	National Association of Regulatory Utility Commissioners
NASEO	National Association of State Energy Officials
NAV	Net Asset Value
NBIC	National Biosurveillance Integration Center
NCA	National Climate Assessment
NE	Office of Nuclear Energy
NEAMS	Nuclear Energy Advanced Modeling and Simulation
NEAT	Networked Employee Assurance Tool
NEPA	National Environmental Policy Act
NERC	North American Reliability Corporation
NEST	Nuclear Emergency Support Team
NETL	National Energy Technology Laboratory
NEUP	Nuclear Energy University Program
NGDHT	Natural Gas Decarbonization and Hydrogen Technologies
NGS	Next Generation Solvent
NHPI	Native Hawaiians and Pacific Islanders
NICE	National Initiative for Cybersecurity Education
NIF	National Ignition Facility
NIH	National Institutes of Health
NIST	National Institute of Standards and Technology
NIWG	National Biosurveillance Integration Center Interagency Working Group
NMED	New Mexico Environmental Department
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NOAA	National Oceanic and Atmospheric Administration
Northwest Power Act	Pacific Northwest Electric Power Planning and Conservation Act
NPAC	Nonproliferation and Arms Control
NRC	Nuclear Regulatory Commission
NRECA	National Rural Electric Cooperative Association

OTHER INFORMATION (Unaudited)

NREL	National Renewable Energy Laboratory
NSE	Nuclear Security Enterprise
NTC	National Training Center
NTR	Nuclear Threat Reduction
NWF	Nuclear Waste Fund
NWPA	Nuclear Waste Policy Act of 1982
NZL	Net Zero Labs
OA	Occupancy Agreement
OA	Ongoing Authorization
OAS	Oracle Analytics Server
OCED	Office of Clean Energy Demonstrations
OCFO	Office of the Chief Financial Officer
OCIO	Office of the Chief Information Officer
OCR	Office of Civil Rights
OD	Outer Diameter
ODEIA	Office of Diversity, Equity, Inclusion, and Accessibility
ODI	Oracle Data Integrator
OE	Office of Electricity
OHROC	Office of HR Operations and Compensation
OIG	Office of the Inspector General
OMB	Office of Management and Budget
OMEI	Office of Minority Economic Impact
OMP	Office of Minority Programs
OP	Office of Policy
OPM	Office of Personnel Management
ORAS	Office of Recruitment and Advisory Services
ORNL	Oak Ridge National Laboratory
OSDBU	Office of Small and Disadvantaged Business Utilization
OSTP	Office of Science and Technology Policy
OT	Operational Technology
OTA	NNSA OT Assurance
OTT	Office of Technology Transitions
P.L.	Public Law
P3	Public-Private Partnership
PBI	Polybenzimidazole
PDNS	Protective Domain Name Server
PDP	Prescription Drug Plan
PF-4	Plutonium Facility-4
PFAS	Per- and Polyfluoroalkyl Substances

PIIA	Payment Integrity Information Act of 2019
PIV	Personal Identity Verification
PMA	Power Marketing Administration
PMIAA	Program Management Improvement Accountability Act of 2016
PMIO	Program Management Improvement Officer
PMO	Program Management Office
PMPC	Program Management Policy Council
PNM	Power Company of New Mexico
PNNL	Pacific Northwest National Laboratory
POA&M	Plan of Action and Milestones
PP&E	Property, Plant and Equipment
PPBE	Planning, Programming, Budgeting, and Execution
PPO	Preferred Provider Organization
PPY	Pits Per Year
PRB	Postretirement Benefits Other Than Pensions
QA	Quality Assurance
R&D	Research and Development
RCRA	Resource Conservation and Recovery Act of 1976
RDD&D	Research, Development, Demonstration and Deployment
REE	Rare Earth Element
Refinancing Act	BPA Refinancing Section of the Omnibus Consolidated Rescissions and Appropriations Act of 1996
RENEW	Reaching a New Energy Sciences Workforce
REP	Residential Exchange Program
RFI	Request for Information
RONM	Resilient Operations of Networked Microgrids
RPA	Robotic Process Automation
RPV	Replacement Plant Value
RSI	Required Supplementary Information
R-SOFC	Reversible Solid Oxide Fuel Cell
S3	Office of the Undersecretary for Infrastructure
SAM	System for Award Management
SBIR	Small Business Innovation Research
SBR	Statements of Budgetary Resources
SC	Office of Science

OTHER INFORMATION (Unaudited)

SCRM	Supply Chain Risk Management
SCRS	Sustainable Climate-Ready Sites
SD	Secure Digital
SDU	Saltstone Disposal Unit
SEDSB	Socially and Economically Disadvantaged Small Businesses
SEPA	Southeastern Power Administration
SES	Senior Executive Service
SESPs	State Energy Security Plans
SFFAS	Statement of Federal Financial Accounting Standards
SFHP	Spent Fuel Handling Recapitalization Project
SGL	Standard General Ledger
SLAC	SLAC National Accelerator Laboratory
SMR	Small Modular Reactor
SMR	Steam Methane Reforming
SMS	Sustainment Management System
SNF	Spent Nuclear Fuel
SNM	Special Nuclear Material
SOPs	Standard Operating Procedures
SP	Special Publication
SPD	Surplus Plutonium Disposition
SPR	Strategic Petroleum Reserve
SRMA	Sector Risk Management Agency
SRPPF	Savannah River Plutonium Processing Facility
SRS	Savannah River Site
SRT&E	Stockpile Research, Technology, and Engineering
SSC	Shared Service Center
SSP	Stockpile Stewardship Program
STA	Secure Transportation Asset
STAR	Solenoid Tracker at the Relativistic Heavy Ion Collider
STARS	Standard Accounting and Reporting System
STEM	Science, Technology, Engineering, and Math
STRIPES	Strategic Integrated Procurement Enterprise System
SUM	Spend Under Management
SWPA	Southwestern Power Administration
SWPF	Salt Waste Processing Facility
TA	Technical Area
TA	Technical Assistance

TBM	Technology Business Management
TCE	Trichloroethylene
TCF	Technology Commercialization Fund
TEDCO	Tribal Energy Development Organization
TELGP	Tribal Energy Loan Guarantee Program
Title XVII	Title XVII Loan Guarantee Program for Innovative Technologies
TOR	Task Order Request
TPBARS	Tritium-Producing Burnable Absorber Rods
TPC	Total Project Cost
Treasury	U.S. Department of the Treasury
TRISO	Tri-structural Isotropic
TRN	Technical Resilience Navigator
TRU	Transuranic
TSCR	Tank-Side Cesium Removal
TSP	Thrift Savings Plan
TVA	Tennessee Valley Authority
U.S.	United States
U.S.C.	United States Code
UAM	User Activity Monitoring
UEI	Unique Entity Identifier
UESC	Utility Energy Service Contracts
UF6	Uranium Hexafluoride
UI-ASSIST	U.S.-India Collaborative for Smart Distribution System with Storage
UIC	Underground Injection Control
UNFCCC	United Nations Framework Convention on Climate Change
USACE	U.S. Army Corps of Engineers
USEC	U.S. Enrichment Corporation Fund
USEER	U.S. Energy & Employment Report
USG	U.S. Government
USSGL	U.S. Standard General Ledger
UTP	Unified Testing Platform
UTR	University Training and Research
VARPs	Vulnerability Assessments and Resilience Plans
VDP	Vulnerability Disclosure Program
VTO	Vehicle Technologies Office
WAPA	Western Area Power Administration
WECC	Western Electric Coordinating Council
WHIAANHPI	White House Initiative on AA and NHPI Communities

OTHER INFORMATION (Unaudited)

WIPP	Waste Isolation Pilot Plant
WOSB	Women-Owned Small Businesses
WR	War Reserve
WTP	Waste Treatment and Immobilization Project
Y-12	Y-12 National Security Complex
ZNPP	Zaporizhzhia Nuclear Power Plant
ZTA	Zero Trust Architecture

Photo Captions

Front Cover and Back Cover

- **Front Cover** – While the comet Neowise was obscured by cloud cover, photojournalist Randy Montoya took this nighttime photo of Sandia Labs' National Solar Thermal Test Facility in Albuquerque, New Mexico. Venus illuminates the cloud at right. For more information or additional images, please contact 202-586-5251, EnergyTechnologyVisualsCollectionETVC@hq.doe.gov, or search Photo #053 009 001 at <https://www.flickr.com/photos/departmentofenergy/>.
- **Back Cover** – Department of Energy 45th anniversary photos posted at <https://www.energy.gov/articles/advancing-energy-president-biden-keeps-tradition-alive>.

Table of Contents

Department of Energy's Forrestal Building in Washington, D.C.

Agency Highlights

- **Top Photo** – Historical photo: In 1937, Bonneville Dam, located 40 miles east of Portland, Oregon, in the Columbia River Gorge, was dedicated before an estimated crowd of 20,000 people. Power from early hydroelectric dams like Bonneville helped fuel the northwest economy and brought electricity to rural areas. Photo posted at <https://twitter.com/energy>.
- **Bottom Photo** – Historical photo: AVIDAC, Argonne's first digital computer, began operation in January 1953. It was built by the Physics Division for \$250,000. Pictured is pioneer Argonne computer scientist Jean F. Hall. AVIDAC (Argonne Version of the Institute's Digital Automatic Computer) was based on the IAS (Institute for Advanced Study) architecture developed by John von Neumann. Photo courtesy Argonne National Laboratory, posted at <https://twitter.com/energy>.

FY 2022 DOE Highlight: Energy Initiatives

The **Inflation Reduction Act**, signed by President Biden on August 16, 2022, contains energy initiatives to build a clean energy economy, reduce pollution, and lower energy costs for American families. For more information, visit <https://www.whitehouse.gov/briefing-room/statements-releases/2022/08/15/by-the-numbers-the-inflation-reduction-act>.

- **Top Photo** – A bald eagle looks over St. Paul Harbor in Kodiak, Alaska, and **wind turns** on the ridgeline. Photo by Dennis Schroeder/NREL, <https://www.flickr.com/photos/departmentofenergy/27775936847/in/album-72157652097688443/>. For more information or additional images, please contact 202-586-5251, EnergyTechnologyVisualsCollectionETVC@hq.doe.gov, or <https://www.flickr.com/photos/departmentofenergy/>.
- **Photo 2** – At the National Renewable Energy Laboratory, EV vehicles in the Optical Characterization (OCL) and Thermal Systems lab in the ESIF. The Optimization and Control Lab's electric vehicle grid integration research bays perform advanced high power chargers to determine how they can be added to the grid, potentially combining buildings and **EV charging**, <https://www.flickr.com/photos/departmentofenergy/51172720513/in/photolist-2kXXyYH>. For more information or additional images, please contact 202-586-5251, EnergyTechnologyVisualsCollectionETVC@hq.doe.gov, or search Photo #298 065 005 at <https://www.flickr.com/photos/departmentofenergy/>.
- **Photo 3** – Fort Thompson **Electric Substation** in South Dakota. Photo by Forrest "Joerge" Bolt of the Huron Electrician Crew, <https://www.flickr.com/photos/departmentofenergy/52144139018/in/photolist-2nrNkRC>. For more information or additional images, please contact 202-586-5251, EnergyTechnologyVisualsCollectionETVC@hq.doe.gov, or search Photo #264 013 002 at <https://www.flickr.com/photos/departmentofenergy/>.
- **Bottom Photo** – Native Village of Igigig Diesel-Powered Microgrid used to capture **water power**. Photo from ORPC, <https://www.flickr.com/photos/departmentofenergy/51039071558/in/photolist-2kL9zNo>.

Management's Discussion and Analysis

A physicist works with the Titan laser at Lawrence Livermore National Laboratory's Jupiter Laser Facility. Photo posted at <https://www.energy.gov/nnsa/maintaining-stockpile>.

FY 2022 DOE Highlight: Clean Energy Corps

Pollinator-Friendly Solar is one of many stories detailing Clean Energy Corps accomplishments. For more information, visit <https://www.energy.gov/eere/solar/articles/buzzing-around-solar-pollinator-habitat-under-solar-arrays> and <https://www.energy.gov/CleanEnergyCorps>.

FY 2022 DOE Highlight: Bipartisan Infrastructure Law

Joint Office of Energy and Transportation is one of many stories detailing Clean Energy Corps accomplishments. Catch Secretary Granholm and Secretary Buttigieg's conversation at <https://youtu.be/K3NFGIgcMg>. For more information, visit:

- <https://www.energy.gov/articles/doe-and-dot-launch-joint-effort-build-out-nationwide-electric-vehicle-charging-network>
- <https://www.energy.gov/articles/icymi-secretaries-granholm-and-buttigieg-announce-joint-effort-buildout-national-electric>
- <https://www.energy.gov/articles/charged-ready-go>
- <https://www.energy.gov/CleanEnergyCorps>

Financial Results

Scientists use the Spruce and Peatland Responses Under Changing Environments experiment in Minnesota to assess the response of northern peatlands to increases in temperature and atmospheric carbon dioxide. SPRUCE is a cooperative joint venture by scientists from Department of Energy national laboratories, the U.S. Department of Agriculture's (USDA) Forest Service, and universities. For more information or additional images, please contact 202-586-5251, EnergyTechnologyVisualsCollectionETVC@hq.doe.gov, or search Photo #335 007 004 at <https://www.flickr.com/photos/departmentofenergy/collections/72157633155150479/>.

FY 2022 DOE Highlight: Frontier Supercomputer

In May 2022, the **Frontier Supercomputer** at the Department of Energy's Oak Ridge National Laboratory (ORNL) earned the top ranking as the world's fastest on the 59th TOP500 list, with 1.1 exaflops of performance. The system is the first to achieve an unprecedented level of computing performance known as exascale, a threshold of a quintillion calculations per second. For more information, visit <https://www.ornl.gov/news/frontier-supercomputer-debuts-worlds-fastest-breaking-exascale-barrier>.

Other Information (Unaudited)

Mt. Shasta rises behind a Western Area Power Administration (WAPA) transmission line. For more information or additional images, please contact 202-586-5251, EnergyTechnologyVisualsCollectionETVC@hq.doe.gov, or search Photo #264 014 002 at <https://www.flickr.com/photos/departmentofenergy/collections/72157633155150479/>.

FY 2022 DOE Highlight: Strategic Petroleum Reserve

Strategic Petroleum Reserve is one of many stories detailing Fossil Energy and Carbon Management accomplishments. For more information, visit <https://www.energy.gov/fecm/articles/infographic-strategic-petroleum-reserve> and <https://www.energy.gov/fecm/strategic-petroleum-reserve>.

Additional Information

For additional information and hyperlinks, please see page 2, [About This Report](#).

DOE AT
45

**PROVIDING SOLUTIONS
FOR THE NEW ENERGY ECONOMY**

