DOE/CF-0180

U.S. Department of Energy

Agency Financial Report

Fiscal Year 2021



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) 2021 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)

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 the 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.

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
- Fraud Reduction and Data Analytics Act (FRDAA) 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)

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.

View DOE's AFR and APPR Reports at https://www.energy.gov/budget-performance

Photo Captions: see inside back cover

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Message from the Secretary of Energy



I am pleased to present the United States Department of Energy's (DOE) Fiscal Year (FY) 2021 Agency Financial Report. This report provides DOE's key performance and financial information and demonstrates DOE's commitment to meeting the Administration's priorities in part by:

1) Driving U.S. Energy Innovation and Deployment on a Path to Net-Zero Emissions by 2050;
2) Advancing Scientific Discovery to Increase Resilience to Climate Impacts;
3) Strengthening and Modernizing National Nuclear Security;
4) Advancing Interim Storage and Environmental Management; and
5) Building a Modern, Sustainable Cybersecurity Infrastructure.

Progress was made in achieving each of the Administration's priorities in FY 2021 through continued investments in scientific research, renewable energy, energy efficiency, nuclear security, and environmental cleanup, all while facing the ongoing challenges related to the COVID-19 global pandemic.

In FY 2021, the Department supported the Energy Storage program, which demonstrated a 50 percent performance improvement over FY 2020 for a grid-scale storage system using earth-abundant materials. DOE also launched the Energy Storage for Social Equity Initiative to assist up to 15 underserved and frontline communities in leveraging energy storage to increase resilience and lower energy burdens, helping to deliver affordable electricity to disadvantaged communities.

In FY 2021, DOE also announced the Long Duration Storage Energy Earthshot. The initiative establishes a target to reduce the cost of grid-scale energy storage by 90 percent for systems that deliver 10+ hours of duration within the decade. DOE completed the Wheatridge Wind customer interconnection, a $5 million project that added 500 megawatts (MW) of transmission capacity to support transmission of power generated from a new wind project. The Energy Storage Program, the Long Duration Storage Shot target, and projects like the Wheatridge Wind project are key to reaching President Biden's goal of net-zero carbon emissions from the electricity grid by 2035, and economy-wide by 2050.

DOE-supported technology won the grand prize in the prestigious NRG COSIA Carbon XPRIZE global competition for the development of an eco-friendly process that infuses a revolutionary concrete with carbon dioxide (CO_2) emissions directly captured from power plants and other industrial facilities. The DOE-supported CO_2NCRETE product is an effective, long-term storage option for CO_2, reducing CO_2 emissions and building materials costs.

In FY 2021, the Department initiated the Exascale era with the installation of Frontier, the Nation's first exascale supercomputer, at Oak Ridge National Laboratory. Frontier, built by HPE and AMD, is expected to be capable of reaching 1.5 exaflops performance, when fully accepted, using only 30 megawatts of power. This represents an increase of 7-8X in compute capability, but only a 2X increase in power consumption compared to Summit, the Nation's current fastest supercomputer. Using Frontier, scientists and engineers will be able to address challenges in areas such as understanding the earth's system, developing new smart materials, fighting cancer, modeling the next generation electric grid, and accelerating scientific discovery.

DOE partnered with international stakeholders that work in conjunction with Federal agencies to provide guidance and insights on a range of topics, from adversarial Artificial Intelligence (AI) to workforce development to clean energy. In FY 2021, DOE released the AI Risk Management Playbook (AIRMP) to DOE program offices as a toolkit to support mitigation of adversarial and irresponsible use of AI. The playbook displays AI related risks and provides solution patterns and recommendations to: 1) prevent irresponsible application of AI; and/or 2) mitigate the impacts of risks (including cyber considerations) before they become significant issues. AIRMP allows users to filter by trustworthy AI principles, ethical considerations, and the entire AI lifecycle so that mitigations are integrated into all aspects of solutions, from problem identification to monitoring of the models and algorithms post-deployment.

In FY 2021, DOE was awarded the National Federal Facility Excellence in Site Reuse Award for the Rocky Flats and Las Colonias Park sites in Colorado. These awards are given to four outstanding facilities by the U.S. Environmental Protection Agency (EPA) to Federal agencies, states, tribes, local partners, and developers who have made significant accomplishments in restoring and reusing contaminated land at Federal facilities. DOE further advanced clean-up of radioactive and chemical waste by successfully commencing Salt Waste Processing Facility (SWPF) operations in FY 2021 and transferred more than 1.8 million gallons of salt solution to SWPF for treatment at the Savannah River Site (SRS) in South Carolina.

DOE's critical national nuclear security responsibilities yielded major accomplishments in FY 2021. DOE continued plutonium pit production-related activities to restore the Nation's capability to produce no less than 80 pits per year, including completion of five pit builds in FY 2021. DOE completed the first production unit of the W88 Alteration (Alt) 370. This Alt is a major warhead acquisition program that ensures the future viability of the sea-launched ballistic missile strategic deterrent. The National Ignition Facility (NIF) made a significant step toward ignition, achieving a yield of more than 1.3 megajoules. This advancement puts researchers at the threshold of fusion ignition, an important goal of the NIF, and advances the science that NNSA depends on to modernize our nuclear weapons and production. DOE launched the RadSecure100 Initiative to remove, where feasible, radioactive material from facilities and to improve security at the remaining facilities located in 100 U.S. metropolitan areas. DOE initiated downblend processing of NNSA plutonium (Pu) materials which will result in the safe and secure disposal of 34 metric tons of Pu 2050. Finally, DOE continued to test and field new tools for the Federal Bureau of Investigation's (FBI) regional teams as part of the "Capability Forward" initiative to accelerate life-saving responses to nuclear and radiological threats.

The independent public accounting firm KPMG LLP conducted an audit of the FY 2021 DOE financial statements contained in this report and issued an unmodified audit opinion for the 15th 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 2021.

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 Granholm
Secretary of Energy
November 15, 2021

DOE AFR Awards



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Management's Discussion and Analysis



Agency Highlights (Unaudited)

MISSION

To enhance United States (U.S.) security and economic growth through transformative science, technology innovation, and market solutions to meet our energy, nuclear security, and environmental challenges.

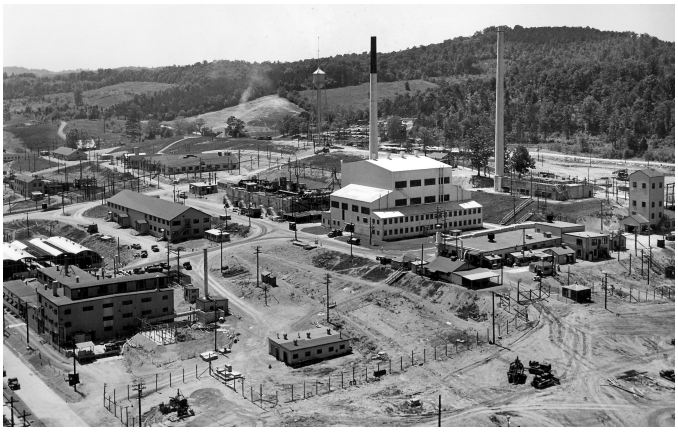
History

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.



Historical photo: Hanford 184-B Power House under construction. Provided steam for heating and processing to the B Reactor and surrounding support facilities.

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.



Historical photo 3537: Oak Ridge Clinton Engineer Works.

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.

FY 2021 DOE Highlights



Clean Hydrogen. Photo credit: https://twitter.com/energy/.



Cybersecurity. Photo credit: https://twitter.com/energy/.



President Biden and Secretary Granholm at NREL. Photo credit: 9/14/21.



Geothermal Energy. Photo credit: https://www.linkedin.com/company/u-s--department-of-energy.



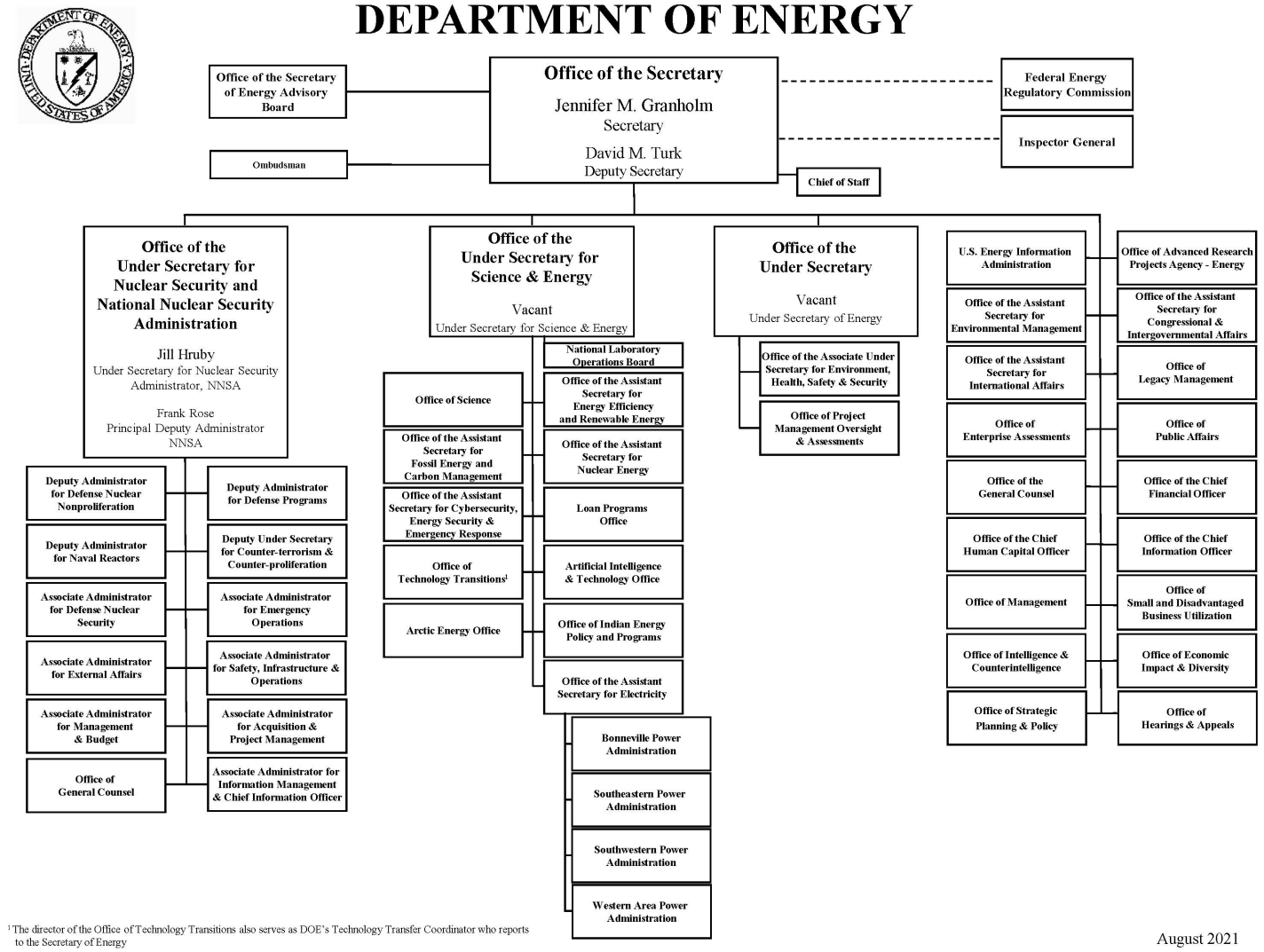
Solar Energy. Photo credit: https://twitter.com/energy/.



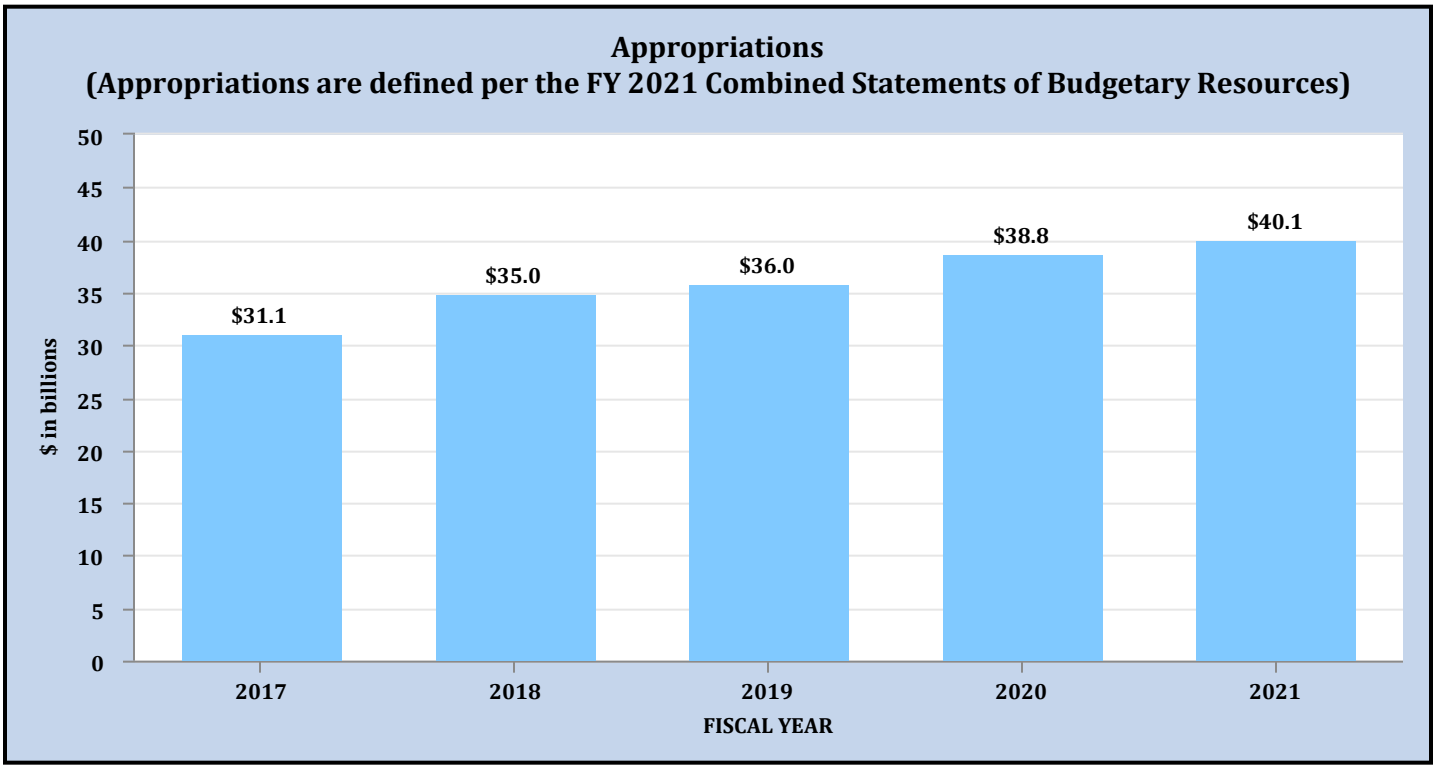
Wind Energy. Photo credit: https://twitter.com/energy/.

Organizational Structure

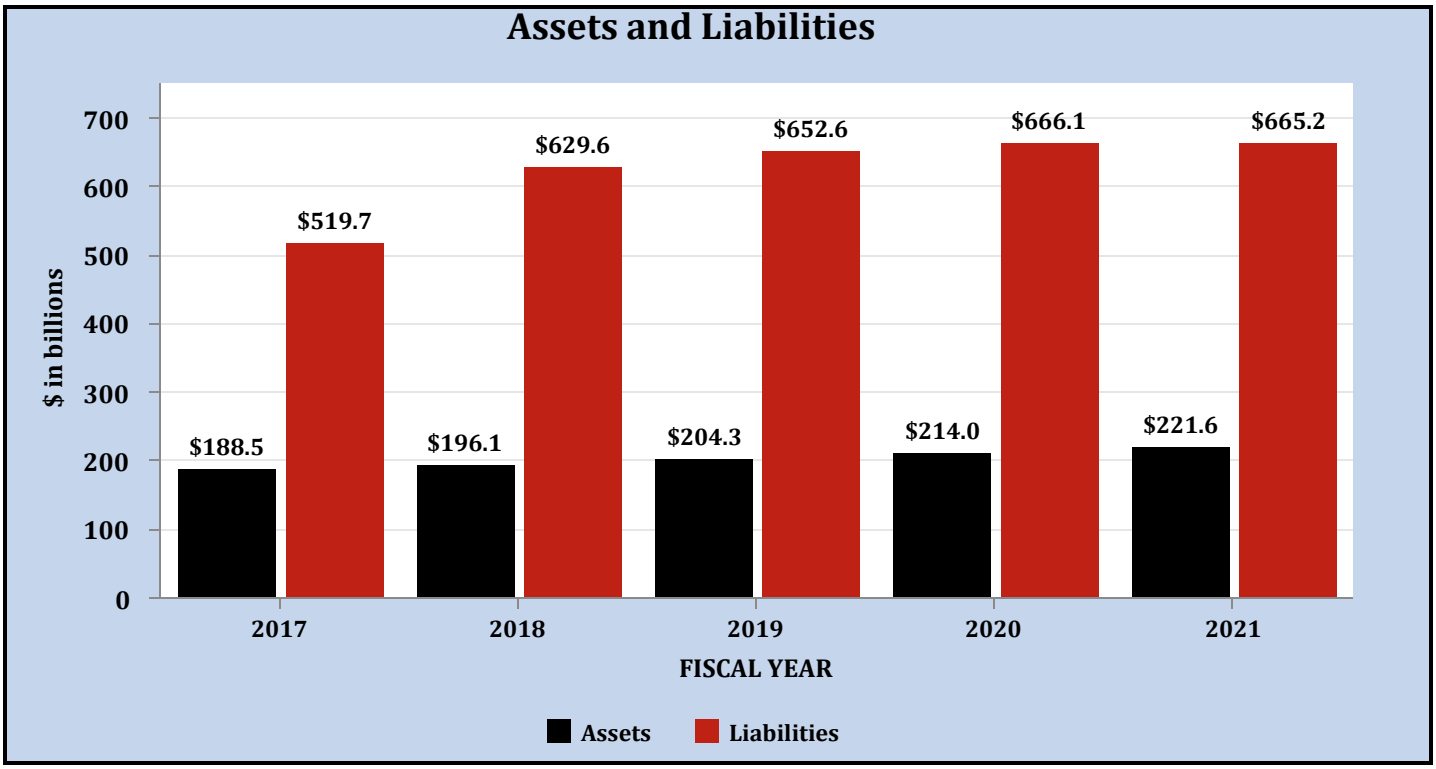
As of August 2021: https://www.energy.gov/leadership/organization-chart



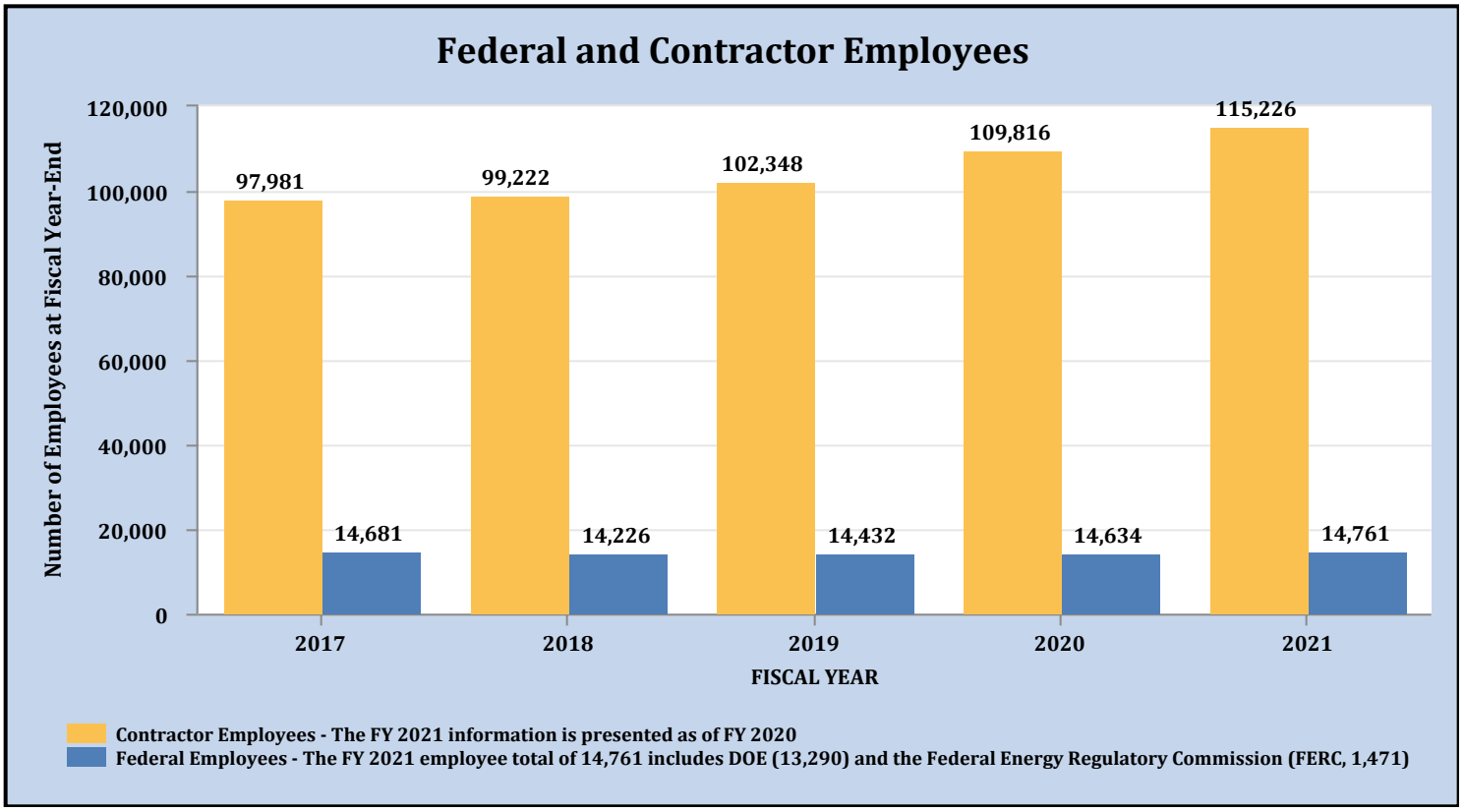
Financial Resources



Appropriations amounts are net of adjustments and include appropriated receipts, transfers, reductions, and temporarily not available. The $40.1 billion of FY 2021 appropriations shown above differs from the budget scorekeeping amount of $39.6 billion and is primarily attributable to receipts that are available without further appropriations.



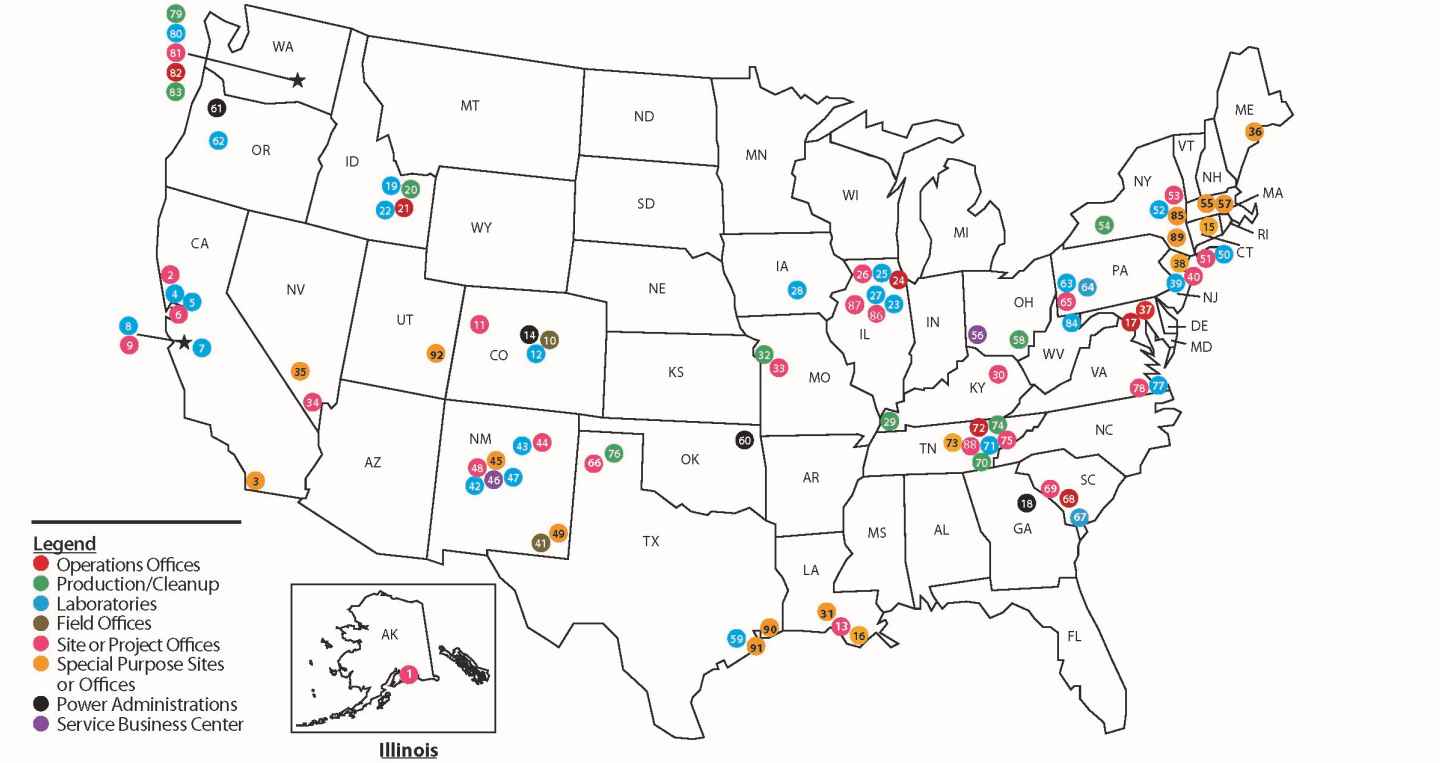
Human Capital Resources



FY 2021 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 132-140)
✓		Federal Managers' Financial Integrity Act (FMFIA) of 1982 – Internal Controls (Section II) – Financial Systems (Section IV)	No Material Weaknesses (Section II) (see pages 40-41 and 150) Financial Systems generally conform to (Section IV) requirements and no FISMA significant deficiencies identified (see pages 40-41 and 150)
✓		Appendix A to OMB Circular No. A-123, Management of Reporting and Data Integrity Risk (2018)	No Material Weaknesses (see pages 40-41 and 150)
✓		Federal Financial Management Improvement Act (FFMIA) of 1996	Substantially comply with Federal financial management system requirements (see pages 40-41 and 150)
✓		Federal Information Security Modernization Act (FISMA) of 2014	Substantially comply with FISMA requirements as evidenced by annual FISMA reporting data (see pages 40-41 and 150)
✓		Payment Integrity Information Act of 2019 (PIIA)	<1% overall Erroneous Payment Rate and not susceptible to significant improper payments (see pages 151-152)

Major Laboratories and Field Facilities



Legend
- Operations Offices
- Production/Cleanup
- Laboratories
- Field Offices
- Site or Project Offices
- Special Purpose Sites or Offices
- Power Administrations
- Service Business Center

Alaska
1 Arctic Energy Office

California
2 Berkeley Site Office
3 Energy Technology Engineering Center
4 Lawrence Berkeley National Laboratory
5 Lawrence Livermore National Laboratory
6 Livermore Field Office
7 Sandia National Laboratories
8 SLAC National Accelerator Laboratory
9 SLAC Site Office

Colorado
10 Golden Field Office
11 Grand Junction Office
12 National Renewable Energy Laboratory
14 Western Area Power Administration

Connecticut
15 Northeast Home Heating Oil Reserve

District of Columbia
17 Washington D.C. Headquarters

Georgia
18 Southeastern Power Administration

Idaho
19 20 Idaho National Laboratory
21 Idaho Operations Office
22 Radiological Environmental Sciences Laboratory

Illinois
87 Ames Site Office
23 Argonne National Laboratory
86 Argonne Site Office
24 Consolidated Service Center (Lemont)
25 Fermi National Accelerator Laboratory
26 Fermi Site Office
27 New Brunswick Laboratory

Iowa
28 Ames Laboratory

Kentucky
29 Paducah Gaseous Diffusion Plant
30 Portsmouth/Paducah Project Office

Louisiana
13 Strategic Petroleum Reserve (SPR) Project Management Office
16 SPR - West Hackberry Site
31 SPR - Bayou Choctaw Site

Maine
36 Northeast Gasoline Supply Reserve

Maryland
37 DOE Headquarters - Germantown Campus

Massachusetts
55 Northeast Gasoline Supply Reserve
57 Northeast Home Heating Oil Reserve

Missouri
32 Kansas City National Security Campus
33 Kansas City Field Office

Nevada
34 Nevada Field Office
35 Nevada National Security Site

New Jersey
38 Northeast Home Heating Oil Reserve
39 Princeton Plasma Physics Laboratory
40 Princeton Site Office

New Mexico
41 Carlsbad Field Office
42 Inhalation Toxicology Research Institute
43 Los Alamos National Laboratory
44 Los Alamos Field Office
45 National Training Center
46 NNSA Albuquerque Complex
47 Sandia National Laboratories
48 Sandia Field Office
49 Waste Isolation Pilot Plant

New York
50 Brookhaven National Laboratory
51 Brookhaven Site Office
52 Knolls Atomic Power Laboratory
53 Naval Reactors Laboratory Field Office - Schenectady
54 West Valley Demonstration Project
85 Separations Process Research Unit
89 Northeast Gasoline Supply Reserve

Ohio
56 EM Consolidated Business Center
58 Portsmouth Gaseous Diffusion Plant

Oklahoma
60 Southwestern Power Administration

Oregon
61 Bonneville Power Administration
62 National Energy Technology Laboratory – Albany

Pennsylvania
63 Bettis Atomic Power Laboratory
64 National Energy Technology Laboratory –Pittsburgh
65 Naval Reactors Laboratory Field Office - Pittsburgh

South Carolina
67 Savannah River National Laboratory
68 Savannah River Operations Office
69 Savannah River Field Office

Tennessee
70 East Tennessee Technology Park
71 Oak Ridge National Laboratory
88 Oak Ridge National Laboratory Site Office
72 Consolidated Service Center (Oak Ridge)
73 Office of Scientific and Technical Information
74 Y-12 National Security Complex NNSA
75 NNSA Production Office - Oak Ridge

Texas
76 Pantex Plant
66 NNSA Production Office - Amarillo
59 National Energy Technology Lab – Sugar Land
90 Strategic Petroleum Reserve - Big Hill Site
91 Strategic Petroleum Reserve - Bryan Mound Site

Utah
92 Moab UMTRA Project

Virginia
77 Thomas Jefferson National Accelerator Facility
78 Thomas Jefferson Site Office

Washington
79 Hanford Site
80 Pacific Northwest National Laboratory
81 Pacific Northwest Site Office
82 Richland Operations Office
83 Office of River Protection

West Virginia
84 National Energy Technology Laboratory – Morgantown

Program Performance (Unaudited)

This report provides DOE's FY 2021 key performance information and demonstrates DOE's commitment to achieving the Administration's priorities through results and outcomes for DOE programs. DOE is conducting an ongoing effort to develop new agency goals.

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

Participating Programs	Cybersecurity, Energy Security, and Emergency Response; Electricity; Energy Efficiency and Renewable Energy; Fossil Energy Research and Development; Indian Energy; Nuclear Energy; Strategic Petroleum Reserve

DOE is a national leader in cutting-edge research and development on an extensive range of energy technologies, identifying and promoting technological advances to increase energy affordability and efficiency. DOE also leads national efforts to research and develop technologies to modernize the electric grid through improving its reliability and resilience; enhance the security, reliability, and resilience of energy infrastructure. Examples of FY 2021 program accomplishments in these areas include:

Advancing Renewable Energy and Carbon Management

Energy Efficiency and Renewable Energy

Long Duration Storage Energy Earthshot: In July, DOE announced the Long Duration Storage Energy Earthshot. The initiative establishes a target to reduce the cost of grid-scale energy storage by 90 percent for systems that deliver 10+ hours of duration within the decade. The Long Duration Storage Shot target is key to reaching President Biden's goal of net-zero carbon emissions from the electricity grid by 2035 and economy-wide by 2050. Developing the technology and manufacturing to reach the Long Duration Storage Shot cost targets will also establish a new, U.S.-based manufacturing industry for storage products. In September, in conjunction with World Energy Storage Day, the Department held a series of events to engage communities, industry and other stakeholders, including a Long Duration Storage Shot Summit.

Electricity

Distributed Energy Resource Technologies: The Office of Electricity's (OE) Resilient Distribution System program successfully developed cost-effective technologies to increase the utilization of clean distributed energy resources (DERs) demonstrating the feasibility of using microgrid building blocks (MBB) as fundamental units for microgrids to reduce costs and project implementation time, focusing on integration of power conversion and microgrid communication and control as a standard, modular unit and developing the Beyond Distributed Energy Resource Management System (DERMS) software platform to provide automated scheduling of DERs to offset costs associated with peak loads. The DERMS platform successfully demonstrated the integration of over 300 DERs with two utility partners for peak load reduction and load shaping for real-time energy price arbitrage.

Energy Efficiency and Renewable Energy

Developing Affordable Renewable Energy and Energy Efficiency Technologies: In FY 2021, the Office of Energy Efficiency and Renewable Energy (EERE) was successful in meeting the annual performance targets for reducing the modeled cost of electric vehicle battery packs to $133/kWh (rated energy) and electric drive systems to $8/kW without using heavy rare earth magnet materials. This is important because this will enable cost competitive market entry of electric vehicles by reducing the cost of electric vehicle batteries by approximately 70 percent (roughly $14,000) from FY 2012. Battery cost projections are derived by battery manufacturers using US Advanced Battery Consortium LLC (USABC's) battery manufacturing cost model for specific battery cell and module designs that meet DOE/USABC system performance targets and are based on a production volume of at least 100,000 batteries per year. EERE also supported R&D efforts to reduce the modeled Levelized Cost of Energy (LCOE) for both offshore and land-based wind power generation. Lowering LCOE for renewable energy power generation is a critical step to enable the decarbonization of electricity generation as it helps companies understand the overall lifetime cost of deploying a generation source. In FY 2021, EERE efforts supported by the Wind Energy Technologies Office resulted in a modeled LCOE for offshore wind of 7.6 cents per kilowatt hour, exceeding its FY 2021 target of 8 cents per kilowatt hour and a modeled LCOE for land-based wind of 3.1 cents per kilowatt hour, exceeding the FY 2021 target of 3.3 cents per kilowatt hour. Achieving lower modeled LCOE costs will lower the cost of deployment of new wind energy generation assets.

Fossil Energy Research and Development

Carbon Capture: ION Engineering LLC, in partnership with Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO), is conducting a comprehensive test campaign utilizing natural gas-fired flue gas to evaluate key performance indicators of the novel ION capture solvent, "ICE-31." The project,

designated by ION as Apollo, aims to scale-up a novel amine-based solvent technology with transformational stability and excellent carbon dioxide (CO_2) capture performance from bench-scale to pilot-scale (0.5 megawatt-electric [MWe]) at the National Carbon Capture Center in Wilsonville, Alabama. The team recently validated more than 95 percent capture efficiency with natural gas flue gas and improved oxidative degradation stability for their ICE-31 solvent technology.

Carbon Storage: Five CarbonSAFE Projects Launch into Phase III Activities. The Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Phase III projects commenced in FY 2021. 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 (CO_2). In FY 2021, these projects completed data acquisition activities, such as drilling stratigraphic test wells and conducting surface seismic reflection surveys, that will provide the information needed for the preparation and submission of an Underground Injection Control (UIC) Class VI permit to construct for each proposed injection well at the site(s).

Carbon Dioxide Removal: Svante received Fossil Energy and Carbon Management (FECM) funding for both point source capture and direct air capture projects which facilitated foundational technology improvements and technology readiness advancement prior to private sector funding. Svante also received $75 million in funding from Chart and Carbon Direct to scale-up development of their capture sorbent materials and also process components. Additionally, the government of Canada provided $25 million to Svante to commercialize the technologies that DOE/FECM matured.

With DOE/FECM's funding, Susteon initiated development of a novel direct air capture process using abundantly available and inexpensive alkali carbonate sorbents. Susteon discovered and patented a unique chemical pathway enabled by high concentration of moisture (~2 percent) compared to 400 ppm of CO_2 in air which allowed lower heat of regeneration compared to a standard carbonate-bicarbonate reaction. This discovery was leveraged to develop a scalable DAC process design and a cost model which showed significantly lower cost of capture compared to the current state-of-the-art amine sorbents. This attracted significant investor interest in the technology. Susteon negotiated a $10 million investment from two leading climate investors this summer to form a spinout (Sustaera) to develop this technology to 1 ton/day scale by 2023. In addition, Susteon was awarded a project under FOA2402 from DOE/FECM to continue to make refinements in the foundational technology to optimize sorbent composition, manufacturing, and process design.

Carbon Utilization: UCLA Wins Carbon XPRIZE for CO_2 Uptake Concrete Alternative. A DOE-supported technology from the University of California, Los Angeles (UCLA) won the grand prize in the prestigious NRG COSIA Carbon XPRIZE global competition for the development of an eco-friendly process that infuses a revolutionary concrete with carbon dioxide (CO_2) emissions directly captured from power plants and other industrial facilities. UCLA's CarbonBuilt team was awarded the grand prize on April 19, 2021, and will receive $7.5 million. UCLA's entry was one of 47 submissions from 38 teams in seven countries. The CO_2NCRETE product developed by UCLA is an effective long-term storage option for CO_2, reducing CO_2 emissions and building materials costs.

DOE invested in five Field Work Proposals investigating reactive capture and conversion (RCC). RCC is distinct from other capture technologies, such as amine-absorption, in that the captured CO_2 becomes incorporated into the final product and is neither regenerated, transported for further use, nor stored as pure CO_2. RCC offers amelioration of the energy and infrastructure costs associated with capture, compression, transportation, and storage. Proposed utilization technologies incorporating RCC can leverage the more reactive captured carbon species, as well as operational benefits of transporting and reacting CO_2 in a different medium.

In a DOE-sponsored project, Opus 12 has developed a process for electrochemical conversion of CO_2 into fuels and chemicals using a modified polymer electrolyte membrane (PEM) electrolyzer. The core of the PEM electrolyzer is the membrane-electrode assembly (MEA) that contains polymer-electrolytes and catalysts that enable the CO_2 conversion process. In this project, which was completed in January 2021, Opus 12 successfully increased the CO_2 electrolysis energy efficiency (by ~22 percent) and demonstrated material durability with less than 1 percent performance loss. Looking beyond this project, Opus 12 has already initiated integration of scale-up pathways into electrolyzer designs and is partnering with electrolyzer producers to build CO_2 conversion systems.

NETL has scaled novel microwave catalysts from atomic-level design to pre-pilot scale demonstration and kilogram-scale synthesis. NETL's microwave catalysts convert captured CO_2 and waste methane into carbon neutral CO and H_2 with record breaking efficiency. This effort supports the DOE's goal of recycling carbon emissions, generating carbon neutral H_2, and reducing methane emissions. The microwave system can operate using excess, carbon-neutral electricity, which makes it similar to state-of-the-art electrochemical technologies. However, NETL's microwave catalysts demonstrate twice the energy efficiency of electrochemical CO_2 conversion technologies, and have exceeded the DOE's 2020 goal for electrochemical H_2 production (<44 kWh/kg H_2). NETL has filed a patent and is engaging potential external partners.

Economic Extraction, Recovery, and Upgrading of Rare Earth Elements from Coal-Based Resources: In FY 2021, FECM/NETL initiated "First Mover" Engineering Scale Pilot Projects, awarding nearly $18 million for eight projects to complete comprehensive pre-Front End Engineer and Design (pre-FEED) studies for facilities capable of generating 1–3 metric tons per day of mixed oxides/salts and for further refinement into metals.

These studies, building on success of previous small-scale pilots, further improve/validate the cost-estimates and technology advancements that can improve economic and environmental performance, including optimization of conventional technologies and development of transformational technologies to help build resilient, sustainable, domestic supply chains.

Fossil Energy Research and Development
Comprehensive Methane Emissions Monitoring Campaign: In FY 2021, DOE partnered with GSI Environmental Inc., an engineering and environmental science consulting firm, to measure methane emissions from oil and natural gas production sites in the Uinta Basin of Colorado and Utah. Basins monitored in earlier field trials included the Anadarko, Permian, and Appalachian basins. All three field campaigns have measured methane emissions from more than 550 oil and natural gas production sites in order to collect and evaluate representative, defensible, and repeatable data and draw quantifiable conclusions on the extent of methane emissions from marginal wells (low production rate wells) across oil and gas producing regions of the U.S. These results will be compared to published data available on the emissions from non-marginal wells. With more than 1 million oil and natural gas wells in the U.S., of which about 770,000 (~77 percent) are considered marginal, the project seeks to provide science-based data and analysis to stakeholders regarding the extent to which marginal well sites should be subject to or exempt from fugitive emissions monitoring and associated leak detection and repair (LDAR) requirements. Results from the project will help inform and guide Federal and State regulators on developing science-based methane emissions measurement regulations applicable to marginal oil and gas wells.

Electricity
RAPID Toolkit: The Office of Electricity (OE) expanded the Regulatory and Permitting Information Desktop (RAPID) Toolkit to include information on Clean Air Act (CAA) compliance for bulk transmission project development in all 50 states. The RAPID Toolkit facilitates communication between project developers and permitting agency personnel, among permitting agencies at all jurisdiction levels, and among all project stakeholders—including the public. The expansion will enhance understanding of CAA permitting processes and compliance for constructing electric transmission facilities in the United States.

Support the U.S. Nuclear Industry

Nuclear Energy
Advanced Reactor Demonstration Program (ARDP) Demonstration Projects: The Office of Nuclear Energy (NE) completed negotiations on awards for two major advanced reactor demonstration projects selected under the ARDP in FY 2020: 1) the X-energy Xe-100 high temperature gas reactor; and 2) the TerraPower Natrium sodium-cooled fast reactor, and in both cases project execution is fully underway. NE has established a fully functioning project management structure for both awards and is actively overseeing the Government investment in these technologies. Both vendors have met all of their early-stage milestones, primarily focused on design development, licensing, and siting activities, as they proceed on their seven-year schedules toward deployment and operation. TerraPower announced its intent to site the Natrium reactor at a retiring coal plant in Wyoming, which will couple clean energy with jobs in an energy transition community.

Renewing the Advanced Test Reactor (ATR): Staff at DOE's Idaho National Laboratory initiated activities to replace the internal core components of the ATR through a roughly 9-month overhaul process known as the Core Internals Changeout (CIC). Designers knew that ATR's high level of neutrons would eventually take its toll on the reactor's reflector blocks and other internal core components, so the engineers tailored ATR's unique design to enable replacement of its key internal components. The goal of this CIC, the sixth CIC since ATR began operations in 1967, is to improve the reliability and resiliency of the reactor/energy infrastructure to support vital Office of Nuclear Energy and Naval Reactors research and development activities.

Nuclear Energy University Program (NEUP): In FY 2021, 69 NEUP research and development (R&D) and 24 infrastructure support cooperative agreements and grants were awarded, providing R&D solutions most directly relevant to the near-term, significant needs of NE R&D programs. Currently, there are 216 active NEUP R&D projects supporting over 1,100 students spanning a variety of nuclear energy-related science and engineering degrees. Student involvement in NEUP R&D awards supports NE's efforts to develop a workforce capable of meeting future U.S. nuclear energy career needs.

Improve Electric Grid Reliability and Resilience

Energy Efficiency and Renewable Energy
Working with its partners in the Office of Electricity (OE), EERE made substantive advancements in areas such as resilience, energy storage and system flexibility, cybersecurity, hybrid systems, and managing distributed energy resources (DER) in FY 2021 via the Grid Modernization Initiative. In addition, EERE continued to provide institutional support and technical assistance to independent system operators, public utility commissions, and other stakeholders to help them decarbonize the electricity sector.

EERE has also worked with the National Renewable Energy Laboratory (NREL) to develop the Advanced Research in Integrated Energy Systems (ARIES) which is a

research platform that can match the complexity of the modern energy system and conduct integrated research to support the development of groundbreaking new energy technologies. In FY 2021, EERE funded the deployment of $16.36 million in ARIES-related infrastructure at NREL.

Fossil Energy Research and Development

Advanced Energy and Hydrogen Systems: NETL developed a strategy and successfully demonstrated 50 percent load change in less than 10 seconds for a Solid Oxide Fuel Cell (SOFC)-Gas Turbine (GT) hybrid power system. These rapid load transitions were accomplished using air from the GT compressor to manage temperature gradients in the SOFC. This work was performed by the Advanced Systems Integration team under NETL's Research and Innovation Center. These results are significant because they demonstrate that SOFC-GT can provide the fast ramping characteristics essential to accommodate higher levels of variable renewable energy sources necessary to meet DOE goals for carbon mitigation while maintaining grid resilience and reliability. The test shows that the feasibility of hybrid energy systems have the potential for quick turndown to adeptly respond to a fast-changing electric grid.

North American Energy Standards Board (NAESB) Digital Ledger Technology (DLT) Pilot: In FY 2021, in cooperation with and support from DOE, NAESB partnered with the Tennessee Valley Authority, Spire Energy, and Big Data Energy Services Inc. to evaluate cybersecurity, efficiency, and operational improvements to the current processes used to settle natural gas transactions (e.g., buying/selling). The processes currently used by the natural gas industry for executing and settling natural gas transactions lack automation and digitalization and are reliant on the exchange of physical documents. Reliance on the exchange of physical documents leads to delays, higher transactional costs, and inefficiencies while also increasing the risk of fraud and cybersecurity/data privacy breaches. Utilizing Distributed Ledger Technology (DLT), which also includes blockchain technology to provide a trusted, tamper-proof and distributed consensus-based digital platform will lead to a faster, more cost effective and secure method of completing natural gas transactions, imbalance reconciliations and business process automation and thereby improve efficiency, transparency and cybersecurity of the transactions subject to this test. Results from this effort will inform Federal and State officials in the development of regulations designed to improve the efficiency and security of the natural gas infrastructure system.

Electricity

Research and Development Results: In FY 2021, OE R&D programs developed and demonstrated a significant number of technological accomplishments. The Microgrid program completed simulation testing of integrated software capabilities for resilient distribution design and restoration control on a distribution utility feeder circuit, and also developed a methodology to quantify the resilience value under extreme weather and cyber-physical events. The Energy Storage program demonstrated a kW-scale prototype stack of aqueous soluble organic (ASO) flow battery technology operating at 225 mA/cm^2, a 50 percent improvement over the FY 2020 target and capable of meeting a $200/kWh cost target for a 1MW/4MWh system. OE also launched the Energy Storage for Social Equity Initiative to assist up to 15 underserved and frontline communities in leveraging energy storage to increase resilience and lower energy burdens, helping to deliver affordable electricity to disadvantaged communities and reach the Biden Administration's goal of net-zero carbon emissions by 2050.

Transmission Innovation: OE hosted a Transmission Innovation Symposium which focused on modernizing the U.S. power grid. OE published a series of white papers covering the technologies required to address current and future challenges facing transmission infrastructure and to identify research and development opportunities. The white papers guided a dialogue focused on preparing the industry for the transmission system of the future.

North American Energy Resiliency Model (NAERM): OE has developed the platform for NAERM, a first-of-a-kind advanced modeling and analysis of the Nation's energy infrastructure and interdependent systems. OE continues to demonstrate its capabilities internally and externally to other Federal agencies and stakeholders.

Wildfire Mitigation: OE hosted a webinar series focused on wildfire mitigation. The four-part series highlighted DOE national laboratory wildfire mitigation capabilities and available technologies to improve electric infrastructure resilience during fires. The webinar series connected stakeholders with the national laboratories and their world-class capabilities to help prevent equipment failures that can lead to these dangerous fires.

Cybersecurity, Energy Security, and Emergency Response (CESER)

CESER's Cybersecurity for Energy Delivery Systems (CEDS) program supported the development of an innovative technology to rapidly identify and defend against emerging cybersecurity threats through a project with the National Rural Electric Cooperative Association (NRECA) titled "Essence 2.0 Development and Deployment." Using a set of algorithms, Essence 2.0 continuously assesses power grids for anomalies and provides real-time indicators when unusual circumstances are detected, allowing for operators to make an informed decision to counter the threat. NRECA has implemented the technology at a strategic set of electric co-op partners and seeks to expand its use to 55 additional co-ops under the DOE award. It is estimated that 30 percent of NRECA's member distribution co-op sites will be able to implement this technology through this award.

2021 Emergency Response: As the lead for DOE's responsibilities as the Sector Specific Agency for energy, and the coordinating agency for Emergency Support Function (ESF) #12 (an emergency directive to facilitate the restoration of damaged energy systems and components), CESER was activated for 130 days to respond to to five hurricanes, two tropical storms, severe winter weather, one tropical depression, one wildfire, and

a cyber incident that caused the Colonial Pipeline to shut down.

EAGLE-I: In support of DOE's responsibilities as the coordinating agency for Emergency Support Function #12 and as the Sector Risk Management Agency for the energy sector, DOE continued to expand the coverage and capabilities of EAGLE-I, incorporating new feeds and functionality. As of October 2021, EAGLE-I provides near real-time power outage information for over 92 percent of electricity customers across the U.S. New situational awareness capabilities, including updated predictive modeling, are also being integrated into the system, and work is underway to expand EAGLE-I's collaboration capabilities, including incident specific dashboards to provide a common operating picture across DOE's stakeholders.

Nuclear Energy

Light Water Reactor Sustainability (LWRS) Activities: In FY 2021, the LWRS program initiated a multi-year project to design and implement a digital safety system upgrade at a Boiling Water Reactor with Exelon Corporation. The project will build confidence in the regulatory review process and contribute to broader transformations of other plant systems and technology to ensure a sustainable and competitive operating model for the existing domestic fleet. The LWRS program also continued to partner with the Office of Energy Efficiency and Renewable Energy to support industry-led hydrogen demonstration projects through the Industry Funding Opportunity Announcement; award selections were announced in September 2021.

Bonneville Power Administration

Multi-Year Project Completion: BPA completed two multi-year projects in 2021. BPA completed The Dalles dam transformer replacement project, a $37 million project to replace seven transformers at The Dalles dam located on the Columbia River near The Dalles, Oregon. BPA completed the Wheatridge Wind customer interconnection – a $5 million project that added 500 megawatts (MW) of transmission capacity in the Northeast Oregon area to support transmission of power generated from a new wind project.

Fossil Energy Research and Development

Advanced Energy and Hydrogen Systems: NETL researchers used MFiX, an open-source, virtual modeling software that makes coal gasification processes more efficient, on a gasifier located at the University of Alaska. These results represent an international collaboration and provide data on gasifier behavior when a multi-material feedstock is used which is necessary to design future systems for site-specific needs. Through gasification systems, multi-feedstock mixtures that include biomass, coal wastes, municipal solid waste, and plastic waste have the potential to provide isolated communities with a mixture of hydrogen, chemicals, electricity, and heat as needed and with net-zero carbon emissions when coupled with carbon capture and storage.

Geologic Storage of Hydrogen: To improve electric grid reliability, resilience and support an increasingly efficient, fuel-flexible gasification-based plants able to use coal, natural gas, biomass, and waste plastics for valuable hydrogen and fuels production (integrated with pre-combustion carbon capture), in FY 2021 FECM explored large-scale hydrogen storage that will be required as the Nation transitions to a virtually carbon- and emissions-free clean energy economy. Storage opportunities in porous media, which are similar to underground natural gas storage reservoirs are being evaluated through the *Subsurface Hydrogen Assessment, Storage, and Technology Acceleration* (SHASTA) project. SHASTA (launched April 2021) and its partners will determine the technical feasibility of hydrogen storage in subsurface systems and quantify the operational risks associated with storage in those systems. The research effort will establish the technical basis for using the much larger capacities available in porous media storage, as well as the ability to re-use existing natural gas storage infrastructure for the hydrogen economy. The project will help accelerate and expand the use of hydrogen as a fuel option for transportation, electricity generation, manufacturing applications, and clean energy technologies by assessing and mitigating technical and operational risks associated with subsurface hydrogen storage.

Improve Access to Clean Energy

Indian Energy Policy and Programs

The Office of Indian Energy (IE) provided cost share reductions valued at $14.8 million to 27 grantees to provide some financial relief to Native communities struggling with COVID. Invested $5 million in nine tribal energy technology projects valued at over $10 million. Combined, these projects add up to over 3.7 megawatts of new installed generation that will power over 180 tribal buildings, with combined lifetime savings of over $24 million. In July, an additional $12 million was announced for 13 American Indian and Alaska Native communities across the Nation. Collectively, those selected projects are estimated to result in nearly 3.5 megawatts of clean energy generation and over 3.5 megawatt-hours of battery storage, serving over 1,300 tribal buildings and saving those communities a combined $1.8 million annually. These are significant investments that will yield tangible results and will continue IE's efforts to maximize the development and deployment of energy solutions in consultation with Indian tribes. The projects will install energy systems in tribal buildings and on a community scale across Indian Country, and in some cases, provide systems for autonomous operation, thereby increasing community resilience.

Effectively Manage the Strategic Petroleum Reserve

Petroleum Reserves

In support of Congressional Mandated Oil Sales, 16.7 million barrels of Strategic Petroleum Reserve (SPR) crude oil was sold in FY 2021, meeting requirements of Section 501 of the Consolidated Appropriations Act of 2018 (P. L. 115-141) and both Sections 403 and 404 of the Bipartisan Budget Act of 2015 (P.L. 114-74). These sales were conducted from April through June 2021, generating a total revenue of approximately $1.1 billion (approximately $644.1 million going to the U.S. Treasury and $450 million for the Energy Security Infrastructure Modernization (EISM) fund for facility & operational improvements at the SPR). To date, $1.4 billion has been raised to fund the modernization efforts. Additionally, the SPR provided response to Hurricane Ida impacts which occurred August 2021 to Louisiana Gulf of Mexico crude oil production and onshore oil distribution facilities with delivery of 3.3 million barrels to two refiners, under emergency exchange agreements, in order to aid the region with much needed fuel.

Advancing Scientific Discovery to Increase Resilience to Climate Impacts

Participating Programs	Science, National Nuclear Security Administration, Artificial Intelligence & Technology, Technology Transitions

DOE is the largest Federal sponsor of basic research in the physical sciences. DOE's world-leading research in the physical, chemical, biological, and computational sciences contributes fundamental scientific discoveries and technological solutions. DOE also leads the national effort in high-performance computing. Examples of FY 2021 program accomplishments in these areas include:

Research to Increase Our Understanding of Climate Reducing Matter and Materials

Science

New Polymer Offers a Path to Tough, Circular Plastics: Development of chemicals and materials that minimize environmental impacts requires new sustainable approaches that include the reuse of discarded products at the end of their useful lifetime. Plastics offer a great opportunity, as large quantities are produced each year with just a small percentage being recycled. Polymers, long chains of repeating molecular units, make up plastics with valuable properties, such as resistance to chemicals, durability, strength, and light weight. Recent attention has turned to including a new property – the ability to deconstruct the polymers selectively into uniform molecular components that can be rebuilt back to products of equal or greater value (i.e., the ability to be upcycled). Polymer upcycling is key to developing sustainable approaches for creating circular plastics; recently a new class of circular plastics has been successfully developed. Small molecular rings containing carbon and oxygen are opened and added selectively to the end of growing chains to produce long polymers with the desired mechanical and stability properties. These polymers can be deconstructed back to monomers that can then be repolymerized to the original chain length with similar properties. The depolymerization to monomers can be achieved with high degree of control using acid catalysts at temperatures lower than the melting point of the polymer. This sustainable process provides a near quantitative yield under mild conditions, enabling multiple reuses of the plastic.

New Estimates of Carbon Storage in Permafrost-Region Soils: The first high-resolution maps of soil organic carbon distributions for the northern hemisphere permafrost region were produced by combining over 2,700 field measurements with spatially explicit information on environmental factors that influence soil formation. Geospatial analysis identified dominant environmental predictors of soil carbon quantities and their uncertainties in different geographic areas and for sequential depth intervals to 3 meters below the surface. Total regional carbon stored in the top 3 meters of the northern hemisphere permafrost-region soils was estimated at 1,014 PgC (PgC = petagrams carbon; 1 PgC = 10^{15} gC). This new assessment also indicates that more carbon is stored within a meter of the surface and thus is more vulnerable to top-down warming.

Keeping It Cool While Maintaining Plasma Performance: A **tokamak** is a machine that confines a plasma using magnetic fields in a donut shape that scientists call a torus. Fusion energy scientists believe that tokamaks are the leading plasma confinement concept for future fusion power plants. A challenge facing tokamaks is how to keep the plasma core hot enough that fusion can occur while maintaining low edge temperatures so the tokamak walls do not melt. For the first time, impurity radiation was used in DIII-D's new small angle slot divertor to reduce exhaust heat, a process known as divertor detachment. Researchers performed the first simultaneous observation of plasma cooling without degrading plasma performance. In related work, the same advanced divertor control algorithm was used to sustain plasmas with excellent core confinement by integrating divertor detachment with an additional internal transport barrier further inside the plasma. When the injected radiative gases dissipate heat and cool the edge plasma, this tends to further reduce turbulence, and isolate the high-temperature core from the walls. This work offers a promising approach to addressing the challenge of core-edge integration, which is important both for the ITER experiment and for the design of future commercial fusion reactors.

Results from the Muon g-2 Experiment Provide Strong Evidence for New Physics: Muons, subatomic particles 200 times larger than electrons, are sensitive probes of their environment. When muons generated by the Fermilab accelerator are circulated in the external magnetic field of the muon g-2 experiment, the muons internal magnetic field precesses, and the rate of precession, called the g-factor, can be calculated with very high precision. The muon as it circulates is also interacting with the quantum foam of subatomic particles that come into and out of existence. These interactions lead to a change in the value of the g factor. The standard model can be used to predict the deviation of the value of the g factor. However, if the standard model is incomplete, and the quantum foam contains other particles or forces not accounted for, the measured value of the g factor will deviate from the prediction. Evidence of such a deviation was first detected in 2001 by the predecessor to the muon g-2 experiment. Now, the international team of researchers at Fermilab have gathered additional data that strengthens the case that this measured deviation is statistically significant, and that the behavior of the muon

cannot be accounted for by the standard model as it is currently understood. The combined data from all planned experimental runs will allow researchers to make more precise measurements of the muons g factor and provide the significance needed for the community to confirm this result.

Scientists See Evidence of First-Order Phase Change in Nuclear Matter: The Relativistic Heavy Ion Collider (RHIC) is a user facility that was built in part to study how nuclear matter transitions to a soup of free quarks and gluons-the quark gluon plasma (QGP). RHIC accelerates and collides the nuclei of gold atoms at different energies to study how they melt to form this QGP. For more than three decades, theorists have predicted experimental signatures that scientists could look for that would demonstrate that protons and neutrons undergo a first order phase transition when they "melt" to form the QGP. Physicists at RHIC's STAR detector have collected data that adds new evidence to support this behavior. Researchers searched for these signatures by measuring the sideways deflection of particles and the size of the system created. Measuring such tiny size changes required using particles with a wavelength smaller than a femtometer. Generating collisions at the lowest energy for this study required running RHIC with one particle beam colliding with a stationary gold foil inside the STAR detector. Data from these lowest-energy, "fixed-target" collisions extend the energy range and align with the predicted patterns long theorized to occur in a first-order phase transition. Further data collection at additional energies will help characterize this transition in more detail.

New Imaging Isotope Meets Promising Therapy Isotopes: Actinium-225 (Ac-225) and thorium-227 (Th-227) are promising radioisotopes for treating cancer. In order to facilitate research and to promote understanding of the impact and fate of Ac-225 and Th-227 in the body, imaging radioisotopes are needed that mimic the transport behavior of the therapy radioisotope. A multidisciplinary team demonstrated the production, purification, and potential application of cerium-134 (Ce-134), which is very well-suited for this task as it is chemically similar to both Ac-225 and Th-227. Positron emission tomography imaging Ce-134 in a mouse model demonstrated how Ac-225 and Th-227 would move through a body. The research provides a powerful tool for helping to develop additional Ac-225 and Th-227 based treatments for cancer and other diseases.

Science

Lowering the Temperature in Next-Generation Optics for Future X-Ray Light Sources: The next generation of storage rings and high-repetition-rate free electron lasers requires unprecedented accuracy of optical elements in order to preserve the ultra-high brightness and coherent flux that these sources will produce. Water-cooled solutions have reached the end of their development potential, and so cryo-optics are the logical next step forward. New cryo-optics experiments being carried out at the Basic Energy Sciences (BES) program's scientific user facilities are expected to be a mainstay of all high-power coherent beamlines in the future. A research team from multiple DOE national laboratories have completed the design of a liquid Argon-cooled mirror system and developed a prototype platform necessary to test the performance. Computational analysis of the design predicts that the mirror systems performance is capable of delivering on the full promise of next-generation light sources.

ARM Data and Machine Learning Improve Cloud Processes in Climate Models: Observation data from the Atmospheric Radiation Measurement (ARM) User Facility were combined using machine learning techniques to provide insights into the parameters that are most important for cloud processes, including warm rain formation and convective cloud triggering. Parameterizations developed through this research outperformed the current model formulations and improved the simulation of cloud processes. The machine learning approaches used here can be applied directly in climate models or used to provide insight into development of model parameterizations.

A New Tool for Studying Novel Particle Acceleration Concepts Completed: The Facility for Advanced Accelerator Experimental Tests II (FACET II) was completed in September 2021 and has begun operation for users. The high intensity and short length of the electron beams produced by FACET II are ideal for the study of plasma wakefield acceleration. Plasma wakefields have been shown to produce accelerating gradients much larger than are produced in accelerating cavities made of metal. FACET II will allow scientists to study this mode of acceleration to understand how to control it with enough precision to replace conventional accelerators with significantly smaller or higher energy accelerators.

Searching for the Origins of Presolar Grains: Some meteorites that hit the Earth contain microscopic grains of stardust. These "presolar grains," created by nucleosynthesis during the explosions of stars before our solar system existed, provide important insights into how the elements in our Galaxy formed. To better understand the origin of presolar grains, researchers pioneered a new approach using the Gamma-Ray Energy Tracking In-beam Array (GRETINA) coupled with the Fragment Mass Analyzer (FMA) at the Argonne Tandem Linac Accelerator System (ATLAS). The technique was used to complete the first detailed gamma-ray spectroscopy study of the nucleus of argon-34, an element critical to the production of sulfur isotopes formed during novae and supernovae. By collecting the properties of this element and applying astrophysical models of novae and supernovae, the researchers determined the ratios of sulfur isotopes generated by these two types of stellar explosions. Astrophysics can now use this information to determine whether particular presolar grains are of nova or supernova origin.

Machine Learning System Improves Accelerator Diagnostics: Reducing the down time in complex machines like particle accelerators offers more opportunities for the thousands of researchers that use Office of Science user facilities to conduct their research. At

the Continuous Electron Beam Accelerator Facility, a user facility at Thomas Jefferson National Accelerator Facility for studying the nature of matter in the atomic nucleus, staff have implemented a novel machine learning method to detect and diagnose faults within accelerator cavities. For the first test of the system, about 20 percent of the accelerators cavities were connected. During the two-week test run, the machine learning system successfully identified which of the connected cavities experienced faults 85 percent of the time, and correctly identified the type of fault 78 percent of the time. The system enabled operators to detect and diagnose faults in near real time, and more quickly resolve the problem, increasing the time available to researchers for experiments. Further tests are underway to determine the effectiveness of the system. If successful, the system will be expanded to more accelerator cavities.

Create Computing Technologies to Ensure a Modern Sustainable Infrastructure

Science

Closing In On Exascale Computing: The Oak Ridge Leadership Computing facility began installing Frontier – a Hewlett Packard Enterprise/Advanced Micro Devices (HPE/AMD) supercomputer expected to be capable of 1.5 exaflops using only 30 Megawatts of power – in late Summer of 2021. The system will be deployed before the end of calendar year (CY) 2021 and available for Exascale Computing Program testing, early science, and national priorities in CY 2022.

Accelerating COVID-19 Drug Discovery with Deep Learning and High-Performance Computing: The COVID-19 pandemic has highlighted the need for computational tools to automate and accelerate drug design for novel targets. An Exascale Computing Project team from ORNL leveraged deep learning language models to generate and score drug candidates based on predictions of how well these candidates could bind to viral proteins. The team pre-trained a deep learning language model (BERT) on ~9.6 billion molecules and achieved peak performance of 603 petaflops in mixed precision on the Summit supercomputer. The work reduces pre-training time from days to hours, compared to previous efforts with this architecture, while also increasing the dataset size by nearly an order of magnitude. The language model was fine-tuned using an assembled set of thousands of protein targets with binding affinity data and searched for inhibitors of specific protein targets, including the SARS-CoV-2 main protease. This work has immediate applications in accelerating drug discovery for SARS-CoV-2 and other novel viruses.

Exploiting Machine Learning to Understand Energy Flow in Molecular Systems: Excited electronic states of molecules play important roles in many clean energy applications. For example, photosynthesis harnesses solar energy using chromophores – molecular systems that absorb light at specific energies – to form excited states with excess energy that promotes motion of the atoms. The subsequent dynamics of the coupled system of electrons and nuclei on timescales of femtoseconds (10^{-15} seconds) determines the outcome of the initial excitation, for example, leading to a chemical conversion such as splitting water for hydrogen production. Time-resolved multidimensional spectroscopies provide a key tool to investigate these ultrafast processes, and computational studies that directly link the structure of the chromophore and its environment to the spectra provide an important complement to the experimental probes. These studies are computationally intensive, however, requiring large numbers of excited-state electronic structure calculations, which severely limit first-principles predictions of the spectra. Researchers have recently developed novel machine learning models to predict the excited-state energies of chromophores. The new models greatly accelerate the calculations needed to interpret optical spectra, leading to dramatically reduced computational cost. These types of advanced computational tools are essential for interpreting complex experimental spectra and gaining insight into excited-state processes in chemical systems that are important for clean energy applications, such as hydrogen production.

High-Performance Computing and AI/ML Help Develop a Predictive Formulation for the Heat-Flux Width in Tokamaks: Predicting the width of the narrow channel through which the power produced in the core plasma is exhausted to the material surfaces is a critical issue for ITER and future fusion reactors. The heat-flux width determines whether the plasma facing materials (PFCs), including the divertor plates, can survive the extreme heat fluxes anticipated in reactor-grade plasmas. While a number of formulas for the heat-flux width exist, they predict very narrow widths for ITER, raising concerns about whether the PFCs would fail prematurely. To better understand this issue, large-scale simulations were performed by a PPPL-led multi-institutional SciDAC team on the Science leadership computing facilities. Their results showed that when turbulence effects are properly considered, the heat-flux width is much larger, relaxing the constraints on the PFCs. These extreme-scale simulations are computationally expensive. To help reduce computational cost, the SciDAC researchers used AI/ML techniques and large datasets from their first-principles simulations to develop a physics-informed surrogate formula that reproduces the heat-flux widths observed in the present tokamaks and the predicted heat-flux width on ITER. This capability will be invaluable for ITER and for the design of future fusion reactors.

National Nuclear Security Administration

Exascale Supercomputer, El Capitan: Lawrence Livermore National Laboratory (LLNL) is working closely with Oak Ridge National Laboratory (ORNL) on the development and deployment of the two jointly procured Hewlett Packard Enterprise/AMD exascale systems, of similar architectures, to ensure on-schedule delivery for the NNSA system in FY 2023. Additionally, in FY 2021, all three NNSA Laboratories successfully ported select

existing and next-generation weapons codes onto the Sierra supercomputer in preparation for NNSA's first exascale computer, El Capitan.

Advanced Simulation and Computing: NNSA applied LLNL computing expertise to accelerate scientific discovery related to the COVID-19 virus. With CARES Act funding, this effort developed rapid, accurate diagnostic technologies and supported rapid discovery of potential medical countermeasures.

Artificial Intelligence & Technology

Artificial Intelligence Exchange 2.0: In September 2021 the Artificial Intelligence and Technology Office (AITO), in partnership with the Office of the CIO, advanced the artificial intelligence exchange (AIX) system to better support strategic portfolio alignment and optimization of AI and Machine Learning investments, with integrated tracking of AI / ML use cases. AIX 2.0, encompasses revised 2021 and 2022 budget cross-cut traceability as an option for users, including justice 40, in support of the DOE-wide mission and improved reporting. AIX remains a digital platform that tracks AI activities across the DOE enterprise and capabilities that facilitate acceleration of AI research, development, deployment, and adoption to advance the agency's core missions.

Advancing Trustworthy and Responsible AI: In 2021, AITO operated as convener and facilitator in the AI space, partnering with international stakeholders, across Federal agencies and with other DOE program offices providing guidance and insights on a range of topics from adversarial AI to workforce development to clean energy. In September 2021, AITO released the AI Risk Management Playbook (AIRMP) to DOE internal users as a toolkit to support mitigation of adversarial and irresponsible use of AI. The playbook displays AI related risks and provides solution patterns and recommendations to 1) Prevent irresponsible application of AI and/or 2) Mitigate the impacts of risks (including cyber considerations) before they become significant issues. AIRMP allows users to filter by trustworthy AI principles, ethical considerations, and the entire AI lifecycle so that mitigations are integrated into all aspects of solutions from problem identification to monitoring of the models and algorithms post deployment.

Workforce Development, Skilling and Upskilling: In 2021 AITO led development of AI leadership training and execution in March and September. Training scaled all program offices and AITO teamed with Sandia and Pacific Northwest National Laboratories to deliver the sessions. The classes emphasized growth and talent cultivation so that leaders are more effective at guiding teams through the adoption and integration of AI, Machine Learning and Deep Learning to address critical mission needs and use cases such as climate and energy resiliency. Students were introduced to scientific and statistical pattern recognition, computer vision, and anomalies' detection through AI.

Convert Lab Work into Good Paying Jobs

Technology Transitions

Energy Program for Innovation Clusters (EPIC): The Office of Technology Transitions (OTT) implemented a competitive funding program for incubators supporting energy innovation clusters. EPIC is a two-part strategy: 1) an EPIC Prize that awarded $1 million to 20 incubators focused on developing strong regional innovation clusters, and 2) an EPIC Funding Opportunity Announcement (FOA) that recognized innovation-accelerating organizations focused on stimulating energy hardware development and related supportive ecosystems. In June 2021, DOE awarded $9.5 million to 10 incubators and accelerators across the country as part of the EPIC FOA. These projects include collaborations with 5 national abs.

Energy I-Corps: The two-month Energy I-Corps (EIC) program empowers national laboratory teams with the tools, resources, and relationships necessary to discover potential market pathways for their innovations. Over the course of the training and by interviewing at least 75 industry stakeholders, teams identify and pursue potential commercial opportunities for their selected technologies, as well as identify opportunities where further development could lead to commercial value. In FY 2021, OTT administered two cohorts (spring and fall) of the EIC program and leveraged over $2.2 million in funding from 11 different DOE program offices to allow for 31 national lab teams to participate in the program. To date, DOE's investment in the EIC program has attracted over $83 million in follow-on funding and catalyzed the creation over 12 new businesses.

Technology Commercialization Fund (TCF): OTT issued selections for the 2021 TCF on June 24, 2021. These projects will advance the commercialization of promising energy technologies and strengthen partnerships between DOE's National Laboratories and private sector companies to deploy these technologies to the marketplace. In 2021, 68 projects were selected and are supported by $30 million in DOE funding and private matching funds exceeding $35 million.

Summer Entrepreneurship Program: The OTT Entrepreneurship Program was launched in the Summer of 2021 and was designed to support OTT's mission by offering undergraduate students the opportunity to participate in programs, projects, and activities at DOE Headquarters and DOE national labs. A highly diverse mix of students from different backgrounds participated in OTT's first year of this new program. A total of fourteen Undergraduate Students from Universities across the U.S. participated and each one worked on a project with 9 of the 17 DOE national labs. Each lab provided each student with a mentor and worked closely together over the 10-week summer program. At the end of the program the students worked together as teams and presented pitch-

deck proposals for the technology they worked on. All student participants provided positive feedback to OTT on the experience, and several indicated the experience has motivated them to pursue careers in technology related fields.

The program will benefit OTT and the Nation by helping to develop a pool of talented technology commercialization professionals from which DOE and the national labs can draw to achieve our mission to expand the public impact of the Department's research and development portfolio while advancing the economic, energy and national security interests of the Nation.

Science

Advancing particle accelerator technology: The Office of Accelerator R&D and Production issued selections for the 2021 Accelerator Stewardship Program funding opportunity announcement on August 26, 2021. 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 Laboratories and companies such as Varian Medical, ScanTech Sciences, AML Supercon, L3Harris, II-IV, IPG Photonics, CPI, Tibaray, and General Atomics to pursue collaborative R&D leading to new products.

Strengthen and Modernize National Nuclear Security

Participating Programs	National Nuclear Security Administration

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 2021 program accomplishments in these areas include:

Safety, Security, and Effectiveness

National Nuclear Security Administration

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) replaces 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. In FY 2021, the B61-12 LEP achieved first production unit on 115 of 115 weapon components, completed seven system joint flight tests on PA-200, F-16 Mid-Life Upgrade (MLU), and F-35A aircraft platforms. The B61-12 LEP also completed all system level electrical and electromagnetic testing required because of the six capacitor affected components, verifying that the B61-12 meets military requirements. In addition, the LEP Program completed all four First Production Capability Units (FPCU) activities at the Pantex Plant, including two Weapons Evaluation Test Laboratory (WETL) system level testing and two Development Joint Test Assembly (DJTA) builds. The B61-12 is scheduled to achieve system first production unit in the first quarter of FY 2022.

W88 Alteration (Alt) 370 Program: The W88 Alt 370 modernizes the arming, fuzing, and firing subsystem; improves surety; replaces the conventional high explosive and associated materials; and incorporates a lightning arrestor connector, trainers, flight test assemblies, and associated handling gear. The W88 Alt 370 received authorization to enter Phase 6.5, First Production, in the first quarter of FY 2021, completed all qualification activities and first production unit for components affected by the capacitor issue and system first production unit in July 2021, and completed Joint Test Assembly first production unit in September 2021.

W87-1 Modification Program: The W87-1 Modification Program will meet DoD and DOE/NNSA requirements for performance, safety, and security and is slated to deploy as part of the Ground-Based Strategic Deterrent (GBSD) by 2030, as specified in the 2018 Nuclear Posture Review. It will replace the aging W78 warhead by modifying the existing legacy W87-0 design. In FY 2021, the W87-1 finalized and documented W87-1 down-select decisions, formalized W87-1/Mk21A Memorandum of Understanding with the U.S. Air Force, completed down-select to a single warhead architecture, and entered Phase 6.2A, Design Definition and Cost Study.

W80-4 Life Extension Program (LEP): The W80-4 Life Extension Program (LEP) is extending the life of the W80-1 warhead for use in the U.S. Air Force's Long Range Standoff (LRSO) weapon. Key design requirements of the W80-4 include use of the existing insensitive high explosive design, incorporation of modern components and safety features, extensive use of non-nuclear component technology developed for other LEPs, and parallel engineering with the U.S. Air Force on the warhead-missile interface. In FY 2021, the program completed the Program Protection Plan (PPP), Nuclear Explosive Package (NEP) Certification Plan, and Nuclear Weapon Subsystem Test Plan. Additionally, it kicked off Baseline Cost Report development in March 2021, and the Preliminary Design Review and Acceptance Group in August 2021. Finally, it conducted joint testing with U.S. Air Force LRSO weapon, including a successful Environmental Test Unit (ETU) 1; Instrumented Captive Carriage (ICC) 4 test; ETU3-501 delivery for Separation and Control Test Vehicle (SCTV)-2; and delivery of a Functional Ground Test Unit (FGTU)-501 for the Functional Ground Test Vehicle (FGTV)-1 test.

W93 Program: The W93 is a new Navy/NNSA joint program of record being established to meet requirements set by the DoD. The W93 will reduce current over-reliance on the W76 system and will allow the U.S. to keep pace with future adversary threats. In FY 2021 the W93 Program identified nuclear and non-nuclear design space, initiated Class 5 Cost Estimates, and conducted Technology Readiness Assessments. The Program also initiated Phase 1, Concept Study, executive summary and report.

Modernize the National Security Infrastructure

Infrastructure Modernization: NNSA has 34 post-Analysis-of-Alternatives infrastructure projects underway valued at $31 billion. These are necessary to maintain and execute the Stockpile Stewardship Program by providing modern, responsive infrastructure. In FY 2021, NNSA:

- Completed one project (Chemistry and Metallurgical Research Replacement Plutonium Facility-4 Equipment Installation Phase 1) with a Total Project Cost (TPC) of $394 million, which was delivered under budget by $110 million and ahead of schedule by sixteen months.
- Began construction for TA-55 Reinvestment Project Phase 3, 138 kV Power Transmission System Replacement, and the West End Protected Area Reduction, which have a combined TPC of $446 million.
- Began conceptual design on two projects (Energetic Materials Characterization and Digital Infrastructure Capability Expansion) worth $484 million and Preliminary/Final Design on three projects (Los Alamos Plutonium Pit Production Project; High Explosive Synthesis, Formulation, and Production; and Savannah River Pu Processing Facility) worth $15.7 billion. Performed $600 million of design and $1.0 billion of construction.
- An August 2021 experiment at Lawrence Livermore National Laboratory's (LLNL's) National Ignition Facility (NIF) made a significant step toward ignition, achieving a yield of more than 1.3 megajoules (MJ). This advancement puts researchers at the threshold of fusion ignition, an important goal of the NIF, and opens access to a new experimental regime. NNSA will continue building on knowledge and technology improvements that enabled >1 MJ fusion yield performance on NIF to explore reproducibility and further performance improvements.

Reduce Global Nuclear Security Threats

Nuclear Incident Response/Nuclear Emergency Support Team: NNSA provided preventative radiological/nuclear detection and analytical support to multiple national-level security events, including three National Special Security Events, and 16 regional events. NNSA also deployed in support of 19 radiological/nuclear emergencies. NNSA continued to test and field new tools for the Federal Bureau of Investigation's (FBI) regional teams as part of the NNSA-FBI "Capability Forward" initiative to accelerate life-saving responses to nuclear and radiological threats.

Nuclear Threat Science: NNSA achieved increased confidence and accuracy in predictive modeling capabilities in support of the counter-weapons of mass destruction (WMD) device mission through the completion of Tier Threat Modeling Archive-Validation Campaign 1 and the ongoing characterization of the new energetic disablement tools. NNSA executed a major foundational science experiment obtaining key data in support of nuclear materials characterization assessments. Additionally, NNSA completed a series of 14 diagnostic validation experiments to finalize designs in preparation for a major integrated experimental series in future fiscal years.

National Technical Nuclear Forensics: NNSA participated in two interagency exercises for pre- and post-detonation nuclear forensics. NNSA completed initial identification of high-value nuclear forensics specimens needed for the National Nuclear Material Archive and improved analytical capacity. 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.

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 topics including crisis communication, nuclear incident response, medical response, and security of major public events.

Defense Nuclear Nonproliferation Research and Development (DNN R&D): In FY 2021, 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 Global Positioning System III navigation satellites. NNSA awarded a 5-year, $5 million/year grant to the Nuclear Science and Security Consortium, led by the University of California, Berkeley to conduct nuclear engineering and nuclear physics research in support of DNN's nuclear nonproliferation goals. NNSA completed three 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. NNSA also successfully conducted three collection campaigns against Defense Programs' subcritical experiments at the Nevada National Security Site (NNSS).

Material Management and Minimization (M3): In FY 2021, NNSA awarded two cooperative agreements to a U.S. commercial industry partner for the molybdenum-99 (Mo-99) program to support accelerating domestic non-HEU Mo-99 production by 2023. In FY 2021, nuclear material removal accomplishments included executing

HEU removals from Asia; signing a new agreement with Norway to eliminate all remaining HEU from that country; and completing a CONUS exercise of the Mobile Uranium Facility and both CONUS and OCONUS exercises of the Mobile Plutonium Facility to improve readiness posture. For material disposition during FY 2021, construction was completed on the K-Area Characterization and Storage facility at Savannah River Site (SRS) that will store downblended plutonium and characterize in preparation for disposal at the Waste Isolation Pilot Plant. In addition, the Surplus Plutonium Disposition (SPD) project at SRS completed 60 percent of project design activities and completed Critical Decision-3A Phase I early site preparations in support of the disposition of 34 MT of surplus plutonium.

Global Material Security (GMS): In FY 2021, NNSA partnered with hospitals, universities, and industry to provide voluntary security enhancements for high-activity radioactive sources in the United States. NNSA is prioritizing securing cesium-137 through accelerated domestic and global efforts. In FY 2021, NNSA also led high-priority international nuclear security initiatives to improve cybersecurity for nuclear facilities, mitigate insider threats, and improve transportation security practices with nearly 60 countries. NNSA provided security upgrades to nuclear facilities in five priority partner countries, based on thorough assessments of threats and vulnerabilities. NNSA continued to partner with the International Atomic Energy Agency (IAEA) to strengthen and support the Nuclear Security Series guidance documents and the Nuclear Security Support Centers through advisory missions, educational programs, and subject matter expert assistance to build sustainable, effective global nuclear security. NNSA equipped an additional 23 official crossing points with radiation detection systems in seven countries and provided an additional six mobile detection systems for use by foreign law enforcement partners. NNSA completed three projects to strengthen radiation detection and interdiction capabilities of partners responsible for security along green borders and administrative lines.

Nonproliferation and Arms Control (NPAC): In FY 2021, NNSA partnered with the International Atomic Energy Agency (IAEA) to strengthen the international nuclear safeguards regime and the IAEA's ability to verify peaceful uses of nuclear materials and facilities and detect non-compliance by enhancing the IAEA's technology base. During 2021, NNSA transferred seven safeguard tools and technologies to the IAEA.

Nuclear Propulsion

COLUMBIA Class Core and Reactor Plant Manufacturing: Manufacture of the first S1B core in support of COLUMBIA Class submarines continues. In FY 2021, NNSA completed reactor plant heavy equipment design and supported component fabrication and testing for various reactor systems. Lead ship construction commenced in FY 2021 as scheduled.

Advancing Interim Storage and Environmental Management

Participating Programs	Nuclear Energy, Environmental Management, Legacy Management

DOE leads the effort to address the Federal Government's nuclear waste management responsibility through implementation of a robust interim storage program, and continuation of the largest cleanup effort in the world to remediate the environmental legacy of six decades of nuclear weapons development and production and Government-sponsored nuclear energy research. Examples of FY 2021 program accomplishments in these areas include:

Interim Storage

Nuclear Energy

Spent Nuclear Fuel/High-level Radioactive Waste

Railcar Projects: Four new specialty railcars are being developed for transportation of spent nuclear fuel (SNF) and high-level radioactive waste (HLW). The 12-axle Atlas railcar is capable of carrying the heaviest SNF casks, the 8-axle Fortis railcar is capable of transporting small- to medium-sized SNF casks, the buffer railcar will separate railcars carrying radioactive material from railcars carrying rail carrier crews and security personnel, and the security escort railcar will house security personnel and railcar safety monitoring systems. The Atlas, buffer, and escort railcars have all finished the early stages of their testing programs. The design for the Fortis railcar was approved by the authoritative body in FY 2021 and will next move into fabrication and testing.

Environmental Management

Hanford: Successfully completed construction of the Low-Activity Waste (LAW) Facility and the Effluent Management Facility to support the Direct-Feed Low-Activity Waste program. Completed construction of the Tank-Side Cesium Removal (TSCR) system and fabrication and testing of the Immobilized LAW Transporter System. Also, successfully completed the removal of the Plutonium Finishing Plant (PFP) rubble and slab.

Savannah River Site (SRS): Successfully commenced Salt Waste Processing Facility (SWPF) operations in the second quarter of FY 2021, and treated more than 1.8 million gallons of salt solution at SWPF in FY 2021.

Idaho: Successfully continued activities in preparation of the start-up of the Integrated Waste Treatment Unit (IWTU), including final component testing and completion of facility modifications.

Waste Isolation Pilot Project (WIPP): Successfully continued to receive and emplace transuranic (TRU) waste at the rate of 5-10 shipments per week in Panel 7.

Brookhaven National Laboratory: Completed demolition of the High-Flux Beam Reactor Exhaust Stack in February 2021.

Oak Ridge: Successfully completed the demolition of the Biology Complex at Y-12, providing valuable real estate for the National Nuclear Security Administration (NNSA) to construct the high priority Lithium Facility.

Energy Technology Engineering Center (ETEC): Completed demolition of the remaining 18 DOE-owned buildings.

Legacy Management

Environmental Remedies: Conducted long –term surveillance and maintenance (LTS&M) activities at 101 sites to monitor the effectiveness of cleanup remedies in accordance with legal agreements or to identify sites subject to additional remedial action. LTS&M activities were completed by employing sound project management, engineering, and science-based solutions. The sites within Legacy Management's (LM) responsibility include those remedied under 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.

Surveillance and Maintenance Cost Savings: Reduced the cost of performing LTS&M activities by two percent compared to an estimated cost baseline while meeting all regulatory requirements to protect human health and the environment. LM achieved the cost reduction by utilizing sound project management, engineering, and science-based solutions.

2021 National Federal Facility Excellence in Site Reuse Awards: The Rocky Flats site in Colorado and the Las Colonias Park site in Colorado received 2021 National Federal Facility Excellence in Site Reuse Awards. These awards are given to four outstanding facilities by the U.S. Environmental Protection Agency (EPA) for Federal agencies, states, Tribes, local partners, and developers who have made significant accomplishments in restoring and reusing contaminated land at Federal facilities.

Building a Modern, Sustainable Cybersecurity Infrastructure

Participating Programs	Cybersecurity, Energy Security, and Emergency Response; Chief Information Office; National Nuclear Security Administration

DOE's Office of Cybersecurity, Energy Security, and Emergency Response (CESER) supports the Government's effort to assist energy infrastructure owners and to ensure cyber/physical attacks do not have a catastrophic impact on the energy sector. DOE's OCIO and the NNSA OCIO are responsible for the cybersecurity and resilience of the DOE enterprise infrastructure. Examples of FY 2021 program accomplishments supporting achievement of the strategic objectives in these areas include:

Chief Information Office

Integrated Joint Cybersecurity Coordination Center: iJC3 provides 24/7 National-Strategic Situational Awareness and actionable Cyber Threat Intelligence capabilities to DOE, OCIO and constituent program offices and sites, in order to inform timely Departmental risk analysis, decision making, and proactive countermeasure deployment. For FY 2021, the iJC3 Cyber Threat Intelligence (CTI) delivered the inaugural "2021 Annual Assessment of Advanced Persistent Threats" report which informed and enabled DOE stakeholders to align security priorities to the current threat landscape. In improving the Departments sharing of cyber threat data, iJC3 introduced an automated platform which facilitated DOE stakeholders to bolster existing safeguards and enhance incident analysis. Additionally, iJC3s improved coordination response to Federal emergency directives has provided the Department to rapidly identify, address, and remediate urgent security issues across the enterprise. This was most evident during the recent SolarWinds Compromise (2020), which enabled iJC3 to respond with lessons learned and identify gaps in processes and resources to improve the DOE Incident Response Plan (IRP) and inform future budget requirements.

Cybersecurity, Energy Security, and Emergency Response

In support of DOE's responsibilities as the coordinating agency for Emergency Support Function #12 and as the Sector Risk Management Agency for the energy sector, DOE continued to expand the coverage and capabilities of EAGLE-I, incorporating new data feeds and functionality. As of October 2021, EAGLE-I provides near real-time power outage information for over 92 percent of electricity customers across the U.S. Additionally, CESER continues to support development of the Rapid Vulnerability Impact Analysis (RIVAL) by Lawrence Livermore National Lab, which allows DOE to quickly understand potential impacts of new vulnerabilities on energy sector industrial control systems technology. In FY 2021, RIVAL began providing pilot assessments. DOE also continues to exercise cyber incident response capabilities, in coordination with the Department of Homeland Security (DHS) and FBI.

CESER's Cybersecurity for Energy Delivery Systems (CEDS) program supported the development of an innovative technology to detect and protect against cyber-attacks through a project with General Electric (GE) Company titled "Time-Sensitive Quantum Key Distribution (TSQKD)." TSQKD leverages time-sensitive networking (TSN) and quantum key distribution (QKD) technologies to provide industrial and utility control networks with quantum cybersecurity. The GE project team conceptually designed a photonic integrated circuit chip that may be able to simplify and reduce cost of future QKD equipment. A field test of this technology was completed at EPB in Chattanooga, TN, including QKD-protected time synchronization, network configuration, data transfer between sites, and resilient grid functions.

CESER's Cybersecurity for Energy Delivery Systems (CEDS) program leverages the National Laboratories to drive innovation in cybersecurity technologies such as quantum information science (QIS). Los Alamos National Laboratory (LANL), Oak Ridge National Laboratory (ORNL), and Brookhaven National Laboratory (BNL) have partnered with CESER to develop quantum cryptographic solutions such as Quantum Key Distribution (QKD) to achieve secure systems. QKD uses photons to exchange secret keys among trusted parties, which are then used in traditional cryptographic algorithms. QKD uses the principles of quantum physics to reveal the presence of an adversary at the moment an attempt to steal the secret keys is made. Due to quantum cryptography's reliance on fundamental laws of nature, they do not expire when faster computers are developed; thus, quantum cryptographic approaches promise to secure grid infrastructure for its many decades of service life.

NNSA – CIO

The NNSA workforce shifted to maximum telework posture due to the COVID-19 pandemic, which further prioritized making certain computer assets, such as laptops, available for staff.

NNSA OCIO and DOE OCIO continue to work together to ensure software and hardware resources are provisioned to meet the requirements of employees, this also includes providing classified network support and coverage for mission essential projects, ensuring that security protocols are maintained, and adequate protections are applied to classified data.

Chief Information Office

Supply Chain Risk Management Program (SCRM): The DOE SCRM program, offered as a service by the OCIO, assess suppliers to enable Departmental leadership in making informed risk-based decisions during the acquisition process, reducing enterprise risk, and

complying with emerging Federal regulations. In FY 2021, the DOE SCRM program conducted 1500+ assessments on 600+ suppliers, as well as several advancements to the DOE SCRM program including but not limited to: 1) Streamlining existing processes by increasing the timeliness and delivery of risk-based information to DOE leadership, 2) Enhancing SCRM assessments with additional supplier information, 3) An approved Authority to Operate (ATO), enabling direct responses and communication from suppliers. Additionally, the DOE SCRM program released an Information and Communications Technology (ICT) SCRM strategy and established an executive stakeholder group to enable holistic governance across the enterprise.

Data Center Migration: The OCIO completed planned migrations of all applications and servers from the legacy Germantown and Albuquerque on-premises data centers to the Amazon Web Services environment. OCIO also successfully completed the planned migrations of 275 servers from the legacy on-prem data centers to the Microsoft Azure Government cloud environment.

RedSeal Implementation: The OCIO successfully implemented a secure cloud security solution providing enterprise visibility and enterprise risk management. RedSeal is expected to reduce trouble ticket investigation times by enabling operations staff to quickly identify hosts and devices on the network, as well as their network location and associated information. In addition to resource identification, it demonstrates network pathing and access between endpoints, reducing the troubleshooting time for related issues.

Cloudspace Implementation: The OCIO successfully implemented a cloud-based virtual desktop service and migrated all users from on-premises systems to ensure a more consistent user experience between the desktop and virtual desktop use. The move to Cloudspace reduced the number of daily reported incidents by 50 percent and reduced costs to end users. It also provided users with a significantly improved quality of service that was more responsive and upgraded the technology to increase compatibility with end-user home peripherals.

NNSA – CIO

In FY 2021, the NNSA OCIO continued to work closely with the Department, element CIOs and IT Managers to move to Windows 10 and Microsoft 365. NNSA continues to rely on necessary services and solutions to provide operational connectivity during the maximized telework posture of COVID-19. NNSA OCIO has met stringent requirements to maintain critical classified connectivity while adapting to personnel safety requirements throughout the pandemic.

Management's Analysis, Assurances and Priorities

Analysis of Financial Statements

The principal financial statements are prepared to report the financial position, financial condition, and results of operations, pursuant to 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 Obligated balances not yet disbursed. General Property, Plant and Equipment increased primarily due to increases in Construction work in process. Loans and Loan Guarantees increased primarily due to the net activity of disbursements, scheduled repayments of principal, and the change in present value.

Significant changes in Liabilities are detailed in **Chart 3.** The increase is primarily due to modifications of liability estimates driven by changes in technical approach, scope of activities, regulatory and legal changes, and inflation adjustments. All Other Changes in Liabilities with the Public decreased primarily due to decreases 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 2021 net costs and unfunded liability estimates decreased by $7.4 billion for contractor pension plans and decreased by $0.6 billion for contractor postretirement benefits other than pensions (PRB) plans.

The major components of these estimate changes are shown in **Chart 5**. The most significant components of the change in the contractor pension plan net costs and liabilities resulted largely from favorable asset experience and was also supported by changes to valuation assumptions, such as an increase in the rate used to discount liabilities and an update to the mortality improvement scale. The asset returns decreased the unfunded pension liability estimate by $7.2 billion, which was $4.7 billion more than the expected $2.5 billion asset return during FY 2021; the actual pension asset return was approximately 16.1% versus a 5.75% expected return. The discount rate is based on the yields of high-quality fixed income securities as of September 30, 2021 and September 30, 2020. The most significant components of the change in contractor PRB net costs and liabilities resulted from continued employer contributions made to satisfy the employer portion of annual claims and changes to the valuation assumptions, including an increase in the rate used to discount the liability to present value and changes in the rate of mortality improvements. The change in the unfunded PRB liability due to assumption changes included a decrease of $0.3 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 capital claims, medical trend assumptions, and mortality improvement scale.

Chart 1: FY 2021 Total Liabilities Breakdown by Funded/Unfunded

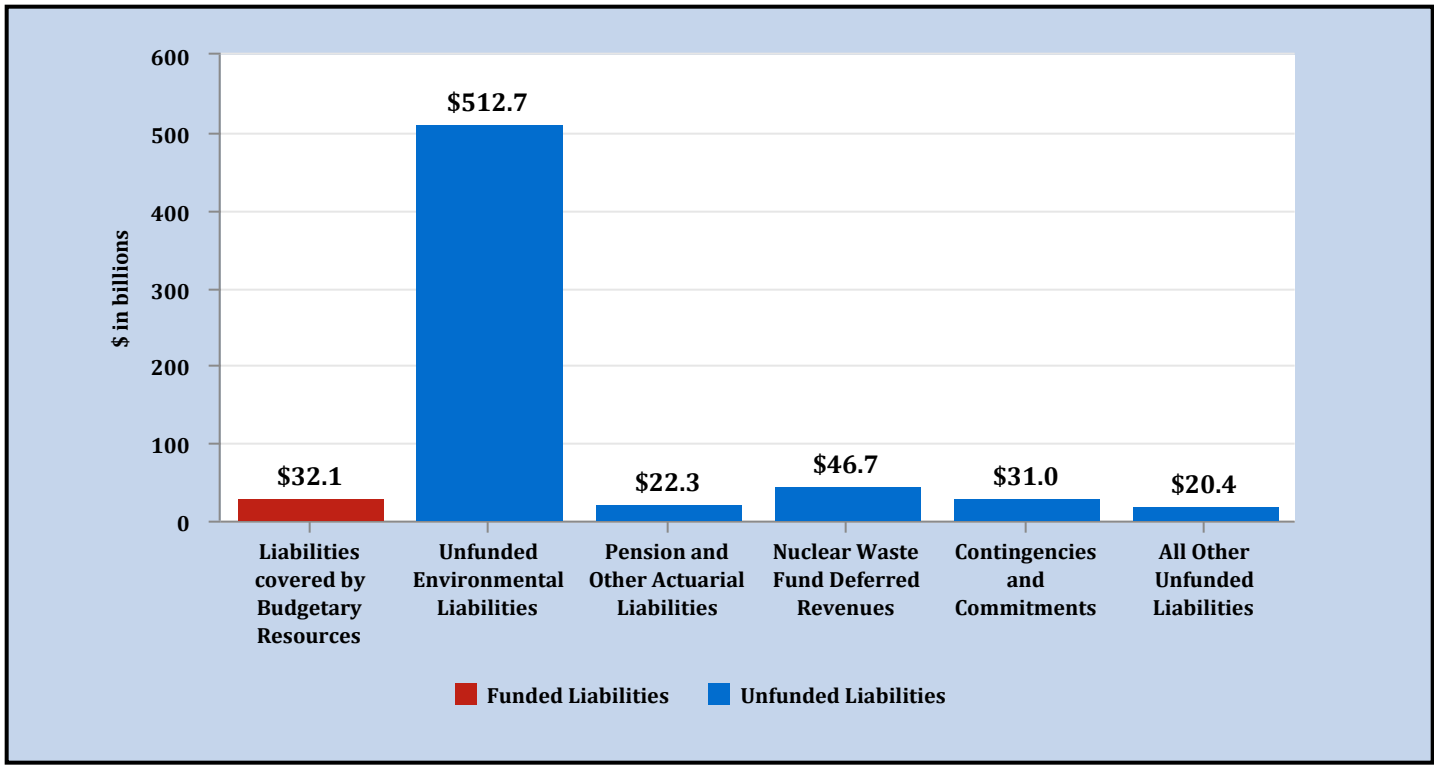


Chart 2: FY 2021 Significant Changes in Assets

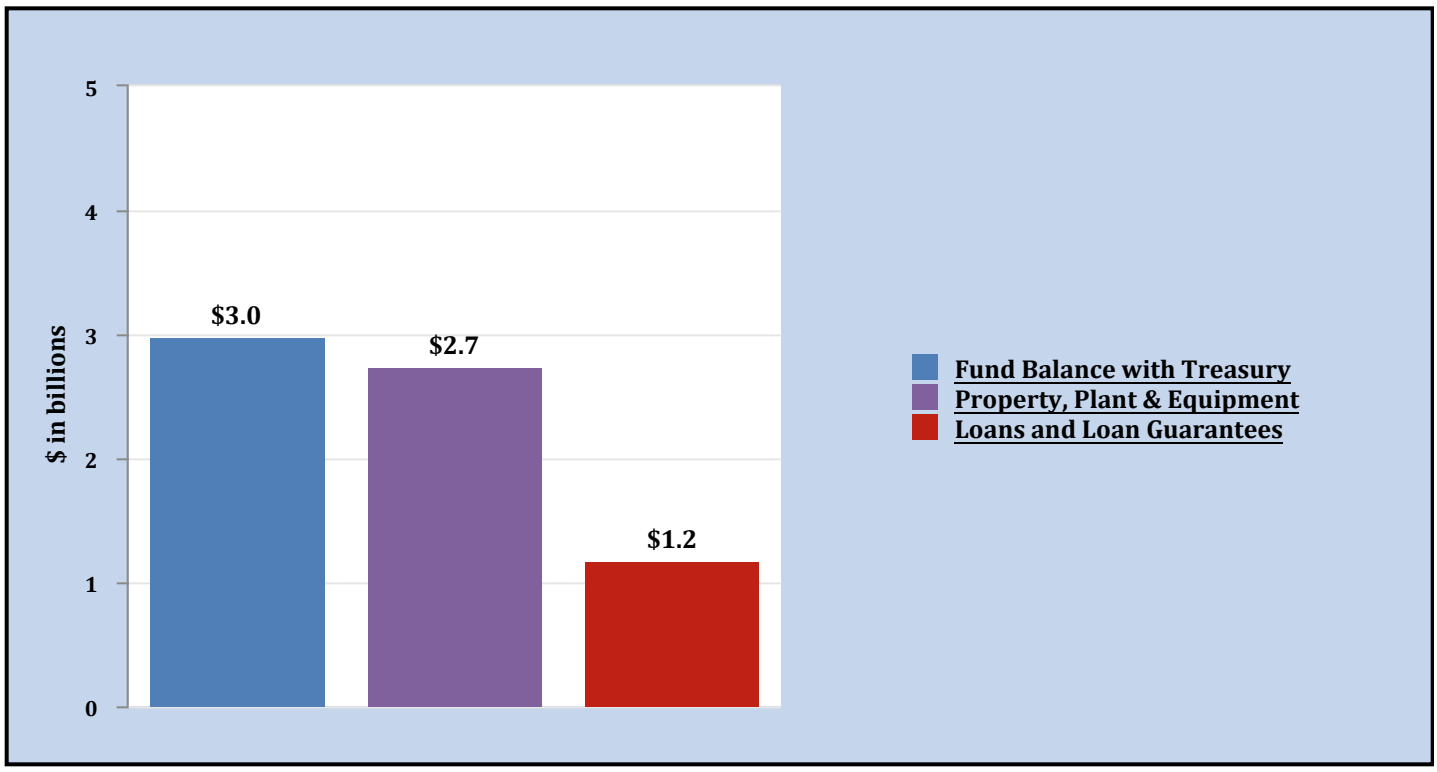


Chart 3: FY 2021 Significant Changes in Liabilities

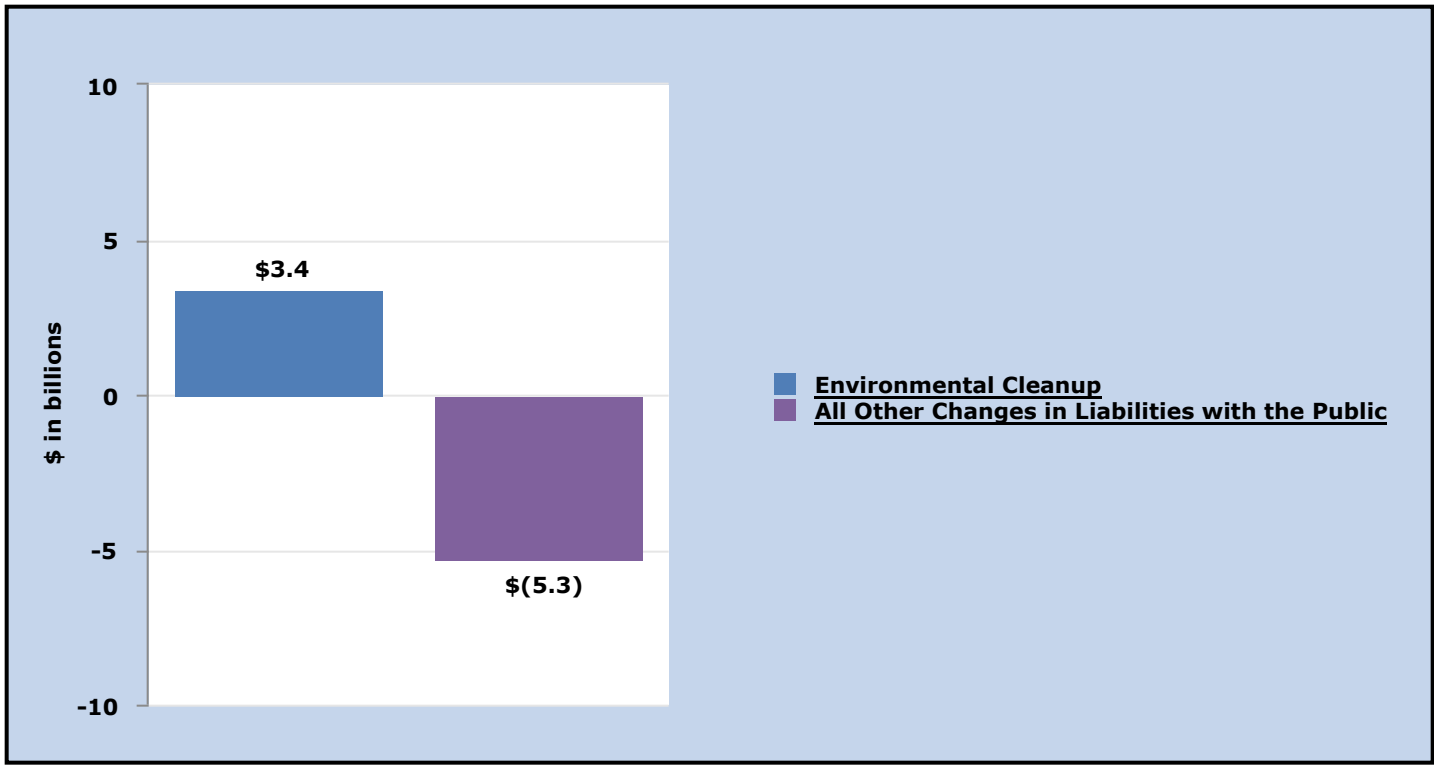


Chart 4: Composition of Environmental Cleanup and Disposal Liability

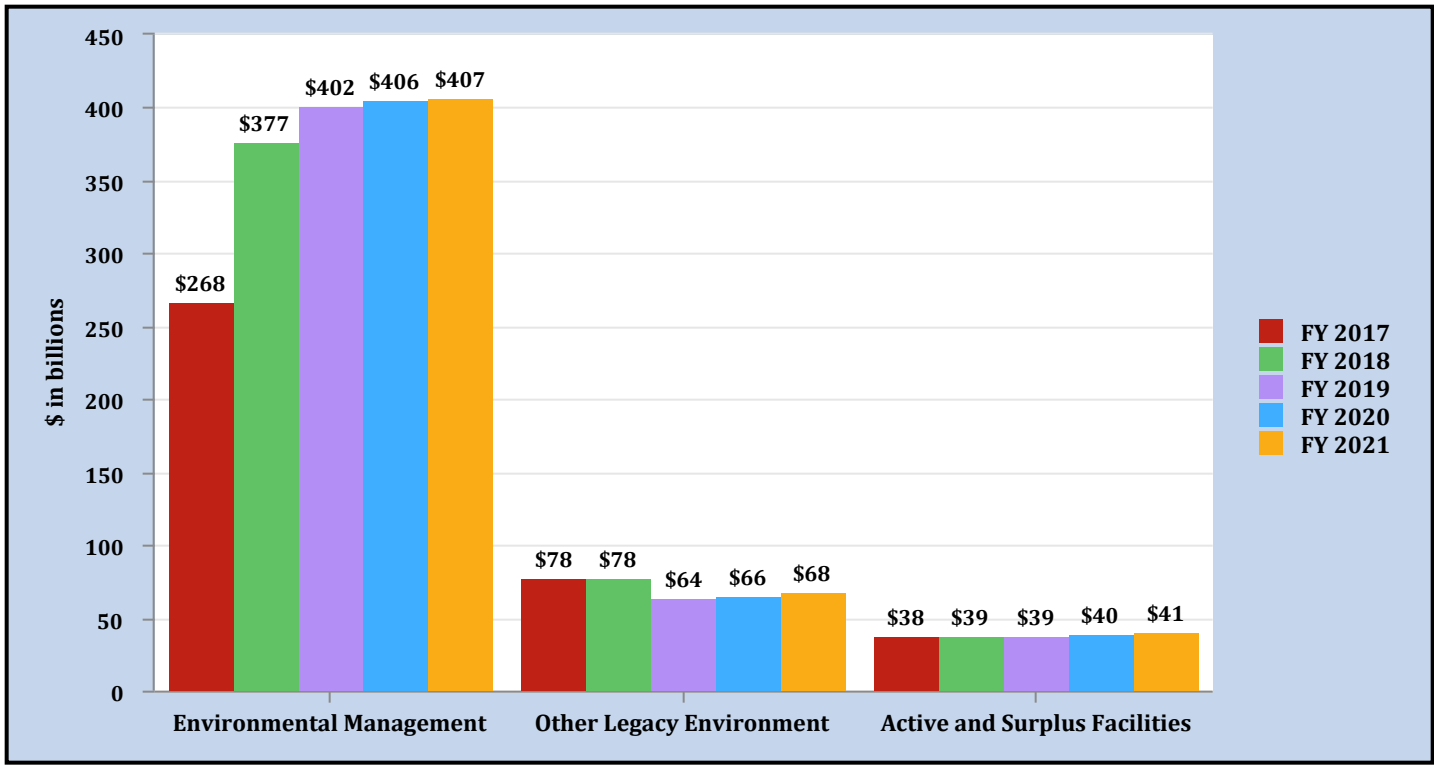
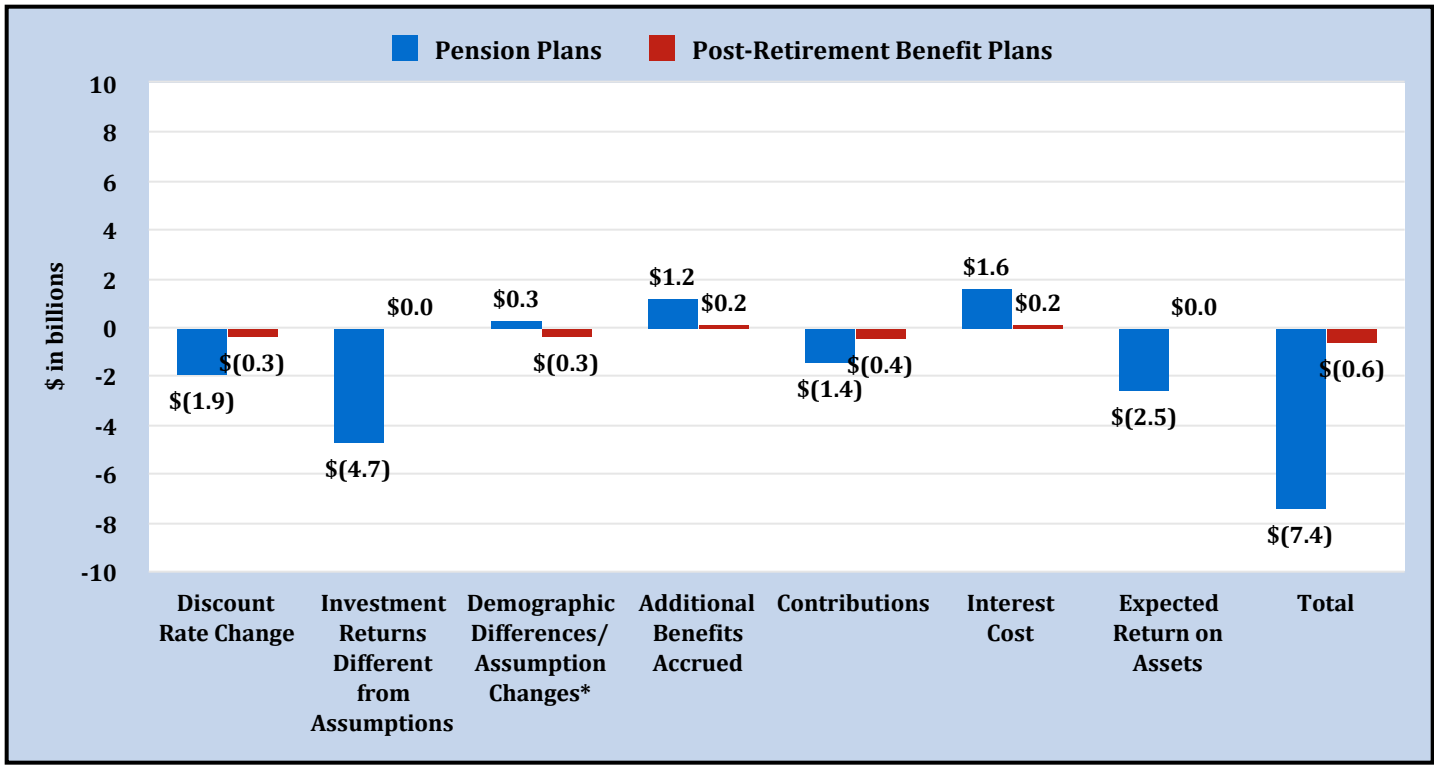


Chart 5: FY 2021 Changes in Contractor Employee Pension and Other Postretirement Benefit Plans



***Includes impact from the repeal of the excise tax for PRB**

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 2021 is environmental liabilities estimates costs and is attributed to refined estimates.

The largest change within Cost Not Assigned is attributable to pension and PRB estimates net costs in FY 2021 due to a change in the rate used to discount the liabilities to present value in **Chart 8**. The components of pension and PRB costs are included in Note 16 for FY 2021 and FY 2020. The pension and PRB estimates net costs in the Cost Not Assigned amount are offset due to the change in Occupational Illness Program.

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 decreased by $0.4 billion in FY 2021.

Chart 6: Elements of Net Cost

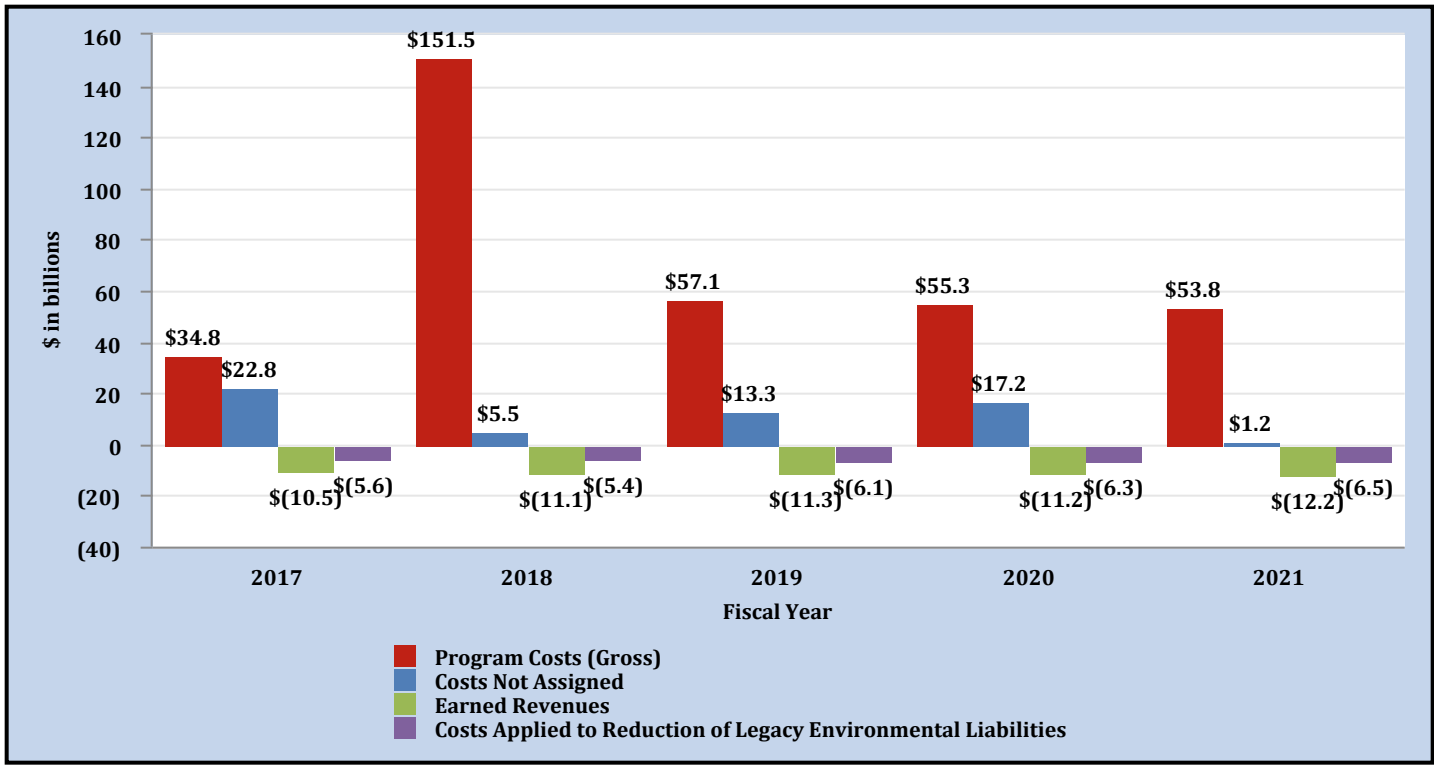


Chart 7: FY 2021 Program Costs (Gross)

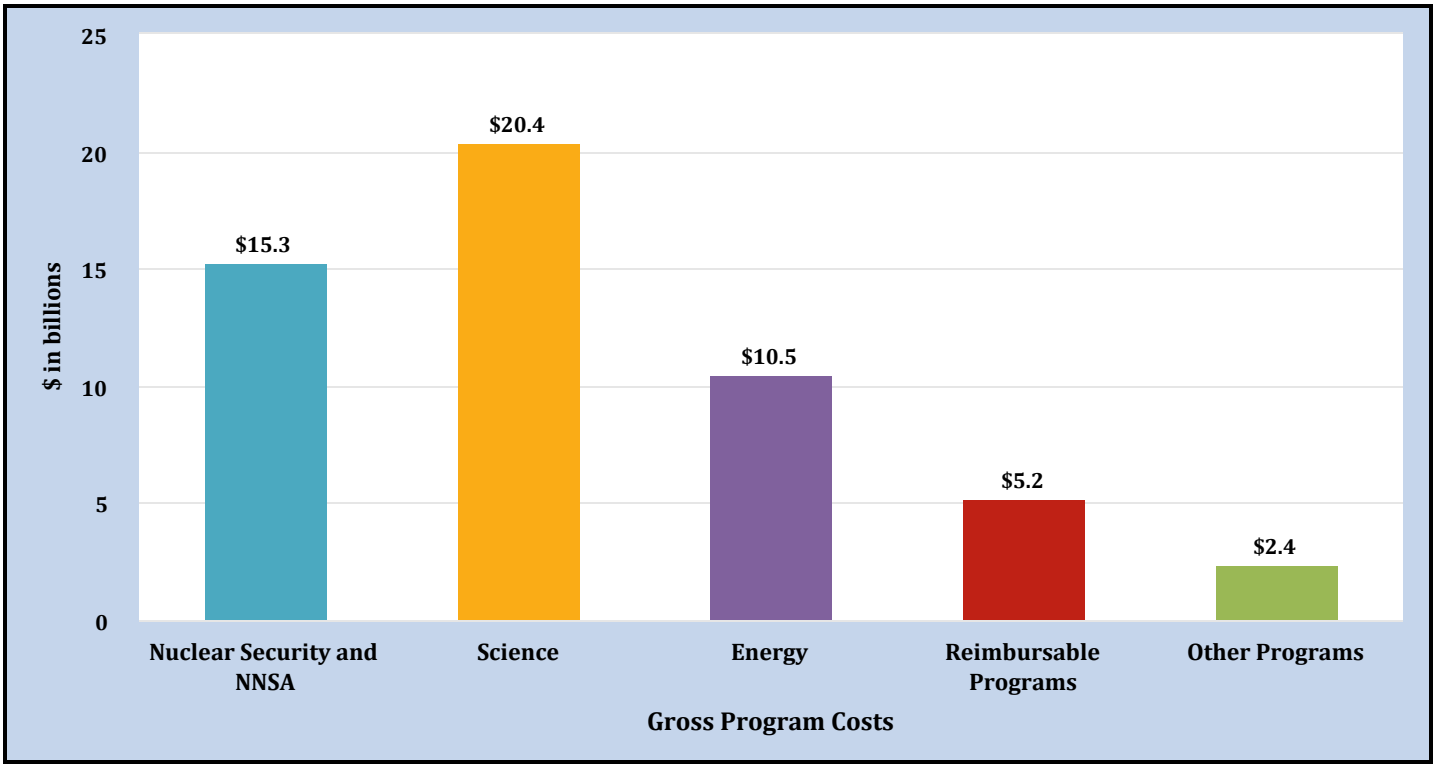


Chart 8: **FY 2021 Major Elements of Costs Not Assigned**

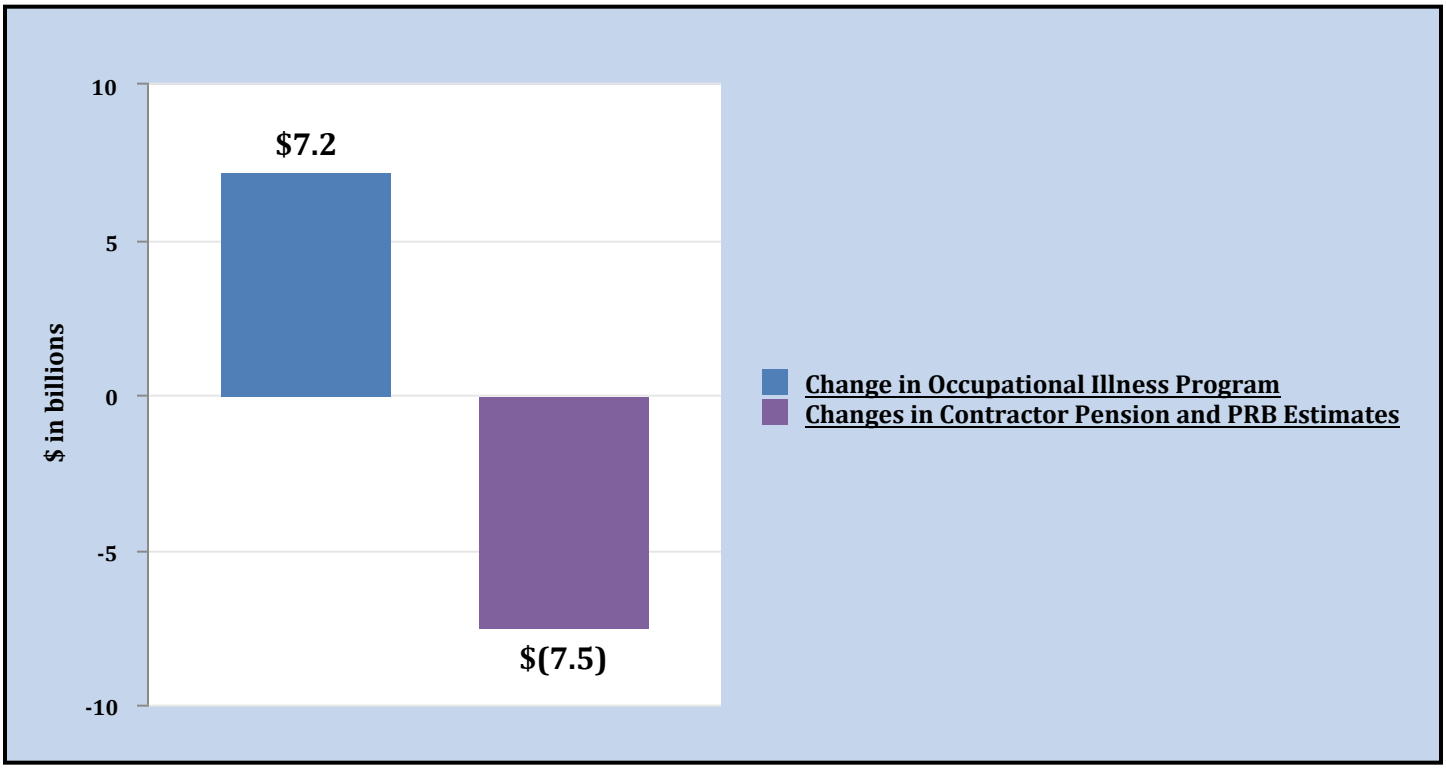
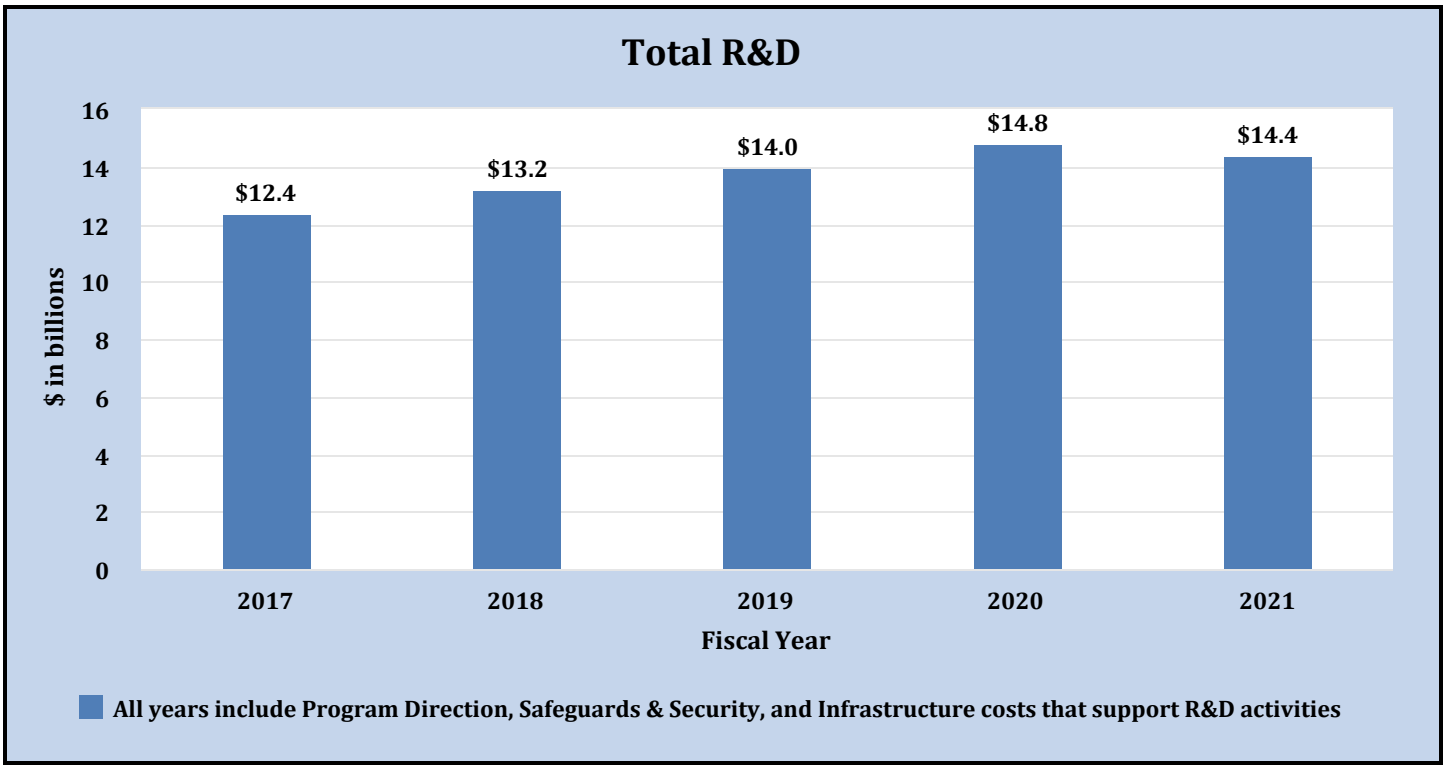


Chart 9: **Research & Development**

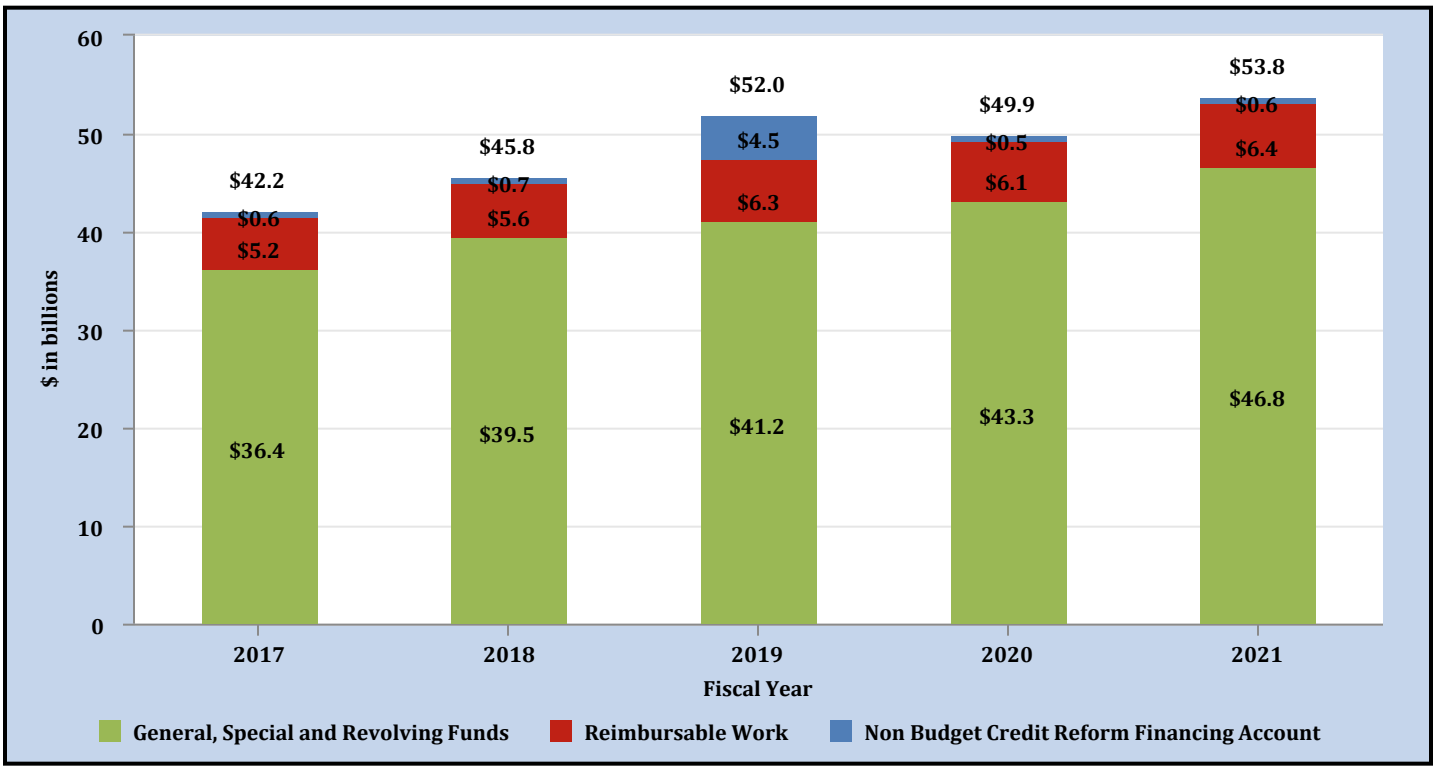


Budgetary Resources

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 Fiscal Year. 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 2021 by $1.3 billion.

As shown in **Chart 10**, the Department's New Obligations and Upward Adjustments increased in FY 2021 by $3.9 billion.

Chart 10: New Obligations and Upward Adjustments (Total)



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, 2021, 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.

Jennifer M. Granholm
Secretary of Energy
November 15, 2021

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) 2021 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. **Table 1a-c** identifies the DOE management priorities, GAO high-risk list issues, and IG challenges. 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 **Table 1b** **Table 1c**

DOE MANAGEMENT PRIORITIES	GAO HIGH RISK LIST - GAO-21-119SP (as of March 2021; updated every two years)	IG CHALLENGE AREAS FY 2022
Contract and Major Project Management	Contract Management for the NNSA and EM Management of major ($750 million or greater) projects and programs	• Cross-Cutting – Reducing Fraud, Waste, & Abuse: ◦ Access to DOE & Contractor Systems for Data Analytics ◦ Improving Incurred Cost Audits ◦ Building Stronger Suspension & Debarment Program ◦ Enforcing Mandatory Disclosure Rule ◦ Combatting Theft of Intellectual Property
Safety and Security		
Cybersecurity		• Developing & Deploying Artificial Intelligence (AI)
Environmental Cleanup	U.S. Government's Environmental Liability	• Managing Tank Waste
Nuclear Waste Disposal		
Infrastructure		
Human Capital Management and Diversity and Inclusion		
Climate Change		
Energy Justice		
Nuclear Stockpile Stewardship		• Restoring Plutonium Pit Production Capability

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 2019 through 2021, DOE completed 92 percent of construction projects, with no more than a 10 percent increase over original cost baseline.

In March 2021, GAO published a High-Risk List Update. 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.

DOE's 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 contractors are implementing agreed-upon corrective actions.

Departmental Initiatives: In FY 2021, DOE continued to make progress in addressing contract and major project management.

- DOE continued efforts to address GAO criteria to improve contract and major project management, including:
  - 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 2020, DOE published the CM acquisition guide chapter and conducted training to facilitate the Department's progress towards achieving goals pertaining to Spend Under Management (SUM) and the use of Best-in-Class (BIC) contracting vehicles. In FY 2021, DOE continued conducting training, corrected data to ensure small business utilization properly reflected in SUM, and issued guidance for DOE CM policy to clarify implementation.
- 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, 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 man-made 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 (AFFF), and other DOE operations and processes have released quantities of PFAS to 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-Pandemic Response and Natural Disaster or Long-Term Disruption Events**: Capturing lessons learned from the national response to the recent COVID-19 pandemic, the Department has the opportunity and responsibility to reevaluate our response to make certain we maintain a clear understanding of what constitutes mission critical work and the steps we can take to guarantee mission needs continue to be met while remaining protective of the employees, the public and the environment.
- **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-Nuclear or Radiological Threat 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. The focus will remain on communications, training, community of practice, contracts, monitoring means and methods, and integration of safety and security with the focus on continually strengthening how the Department performs work safely.
- **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. Cleanup activities can continue for decades, often requiring first-of-a-kind solutions and/or facilities.

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: EM continued pursuing numerous initiatives in FY 2021 to address its key challenges and improve performance. The ongoing initiatives supporting EM's mission include the implementation and development of various strategies, operations, technologies, and partnerships.

- At the Hanford Site, EM's Office of River Protection implemented the Direct-Feed Low-Activity Waste strategy and made significant progress towards the installation of the Tank Side Cesium Removal (TSCR) system, including:
  - Completing construction and operational acceptance testing of the TSCR system; and
  - Beginning startup readiness activities for the TSCR system.
- At the Savannah River Site, initiated operations of the Salt Waste Processing Facility (SWPF):
  - In early October 2020, commenced hot commissioning;
  - Began operations in January 2021; and
  - Transferred more than 1.8 million gallons of salt solution to SWPF in FY 2021.
- At the Lawrence Livermore National Laboratory (LLNL), continued partnering with the National Nuclear Security Administration (NNSA) to complete facility stabilization activities:
  - Continued Building (B)175 stabilization activities;
  - Continued B280 reactor removal activities; and
  - Commenced B251 characterization activities and award of the building demolition task order.
- Across the EM complex, accomplished significant decommissioning and demolition progress, including:
  - At the Oak Ridge Reservation (ORR), completed the demolition of the Biology Complex at Y-12, providing valuable real estate for NNSA to construct the high priority Lithium Facility;
  - At ORR, accelerated the cleanup of high-risk excess contaminated facilities at the Oak Ridge National Laboratory and Y-12 by redeploying the highly-skilled workforce that completed the successful demolition and removal of the former K-25 Oak Ridge Gaseous Diffusion Plant at the East Tennessee Technology Park;
  - At the Energy Technology Engineering Center, completed the demolition of the remaining 18 DOE-owned buildings;
  - At the Brookhaven National Laboratory (BNL), completed demolition of the High-Flux Beam

Reactor Exhaust Stack in February 2021. Physical work, including demobilization, completion of waste disposition off-site, final status surveys and submission of required regulatory documents to the EPA was completed in FY 2021;
    - At the West Valley Demonstration Project, continued preparations for the demolition and removal of the Main Plant Process Building by installing a water collection and treatment system, restoring rail service to the site to support waste shipment and disposal, and continuing the remaining high-hazard deactivation activities. Also, completed demolition and removal of all remaining unneeded facilities;
    - At the Hanford Site, the EM Richland Operations Office completed the demolition and disposal of the Plutonium Finishing Plant, including the associated Plutonium Reclamation Facility, and is continuing to conduct soil sampling of the building footprint to prepare for the installation of a soil cover;
    - At the Moab site, continued shipment and relocation of uranium mill tailings. Completed removal of a cumulative 12 million tons of uranium mill tailings at Moab; and
    - At the Lawrence Berkeley National Laboratory (LBNL), completed the Bayview Parcel 1 demolition of the Bevatron tunnels and completed demolition of Building 7.
- Given the scope and magnitude of the cleanup work to be tackled over the coming decades, it is essential EM is best-in-class when it comes to project management. In recent years, EM has made significant strides in strengthening its project management capabilities.
    - EM strengthened the effectiveness of program management across the EM complex, 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;
    - The EM Nevada Program continues to support cleanup activities across the DOE complex by providing disposal capacity and services for mixed low-level waste, and classified waste annually through 2030. Also in 2021, the EM Nevada Program:
        - Successfully completed the Area 5 Radioactive Waste Management Facility infrastructure improvements, including the addition of new power lines, and a drainage berm and channel; and
        - Initiated characterization and hazard reduction activities to prepare for upcoming demolition and closure work at two large, unique, and complex legacy nuclear facilities at NNSS.
    - Also, EM is working with its sites to update Federal life-cycle cost estimates. This effort is being led by EM's Consolidated Business Center.
- 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 2021-2031* (EM Vision) in FY 2021, 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; 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 is partnering with 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, 2021, the Judgment Fund paid over $9.0 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 almost $44.3 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.

- In FY 2021, Nuclear Energy (NE) formed a team of personnel to focus on implementing a Federal interim storage facility following a consent-based process.
- NE continued ongoing technical work to support eventual interim storage, disposal, SNF transportation, and related future waste management program operations including: development of a dedicated legacy document management software capability, completing single-car testing of the Atlas railcar, buffer railcar, and rail escort vehicle; receiving approval from the Association of American Railroads for the design of the smaller Fortis railcar to provide operational and cost flexibility to the transport system; maintaining current detailed data on the national SNF inventory; development and validation of software tools to support environmental analyses; and research to support continued safe storage and eventual disposal of SNF.
- NE continued engagement with State and Tribal government representatives to prepare for future large-scale SNF transportation through cooperative agreements to facilitate information exchange and coordination among States and Tribes, informational webinars and technical presentations on cask safety and nuclear power plant infrastructure provided by National Laboratory personnel through DOE's National Transportation Stakeholders Forum, ongoing development of a railcar safety inspection protocol for future DOE SNF shipments by rail, and multiple virtual meetings with State and Tribal representatives to share updates to Federal policy and program plans.

CYBERSECURITY

Key Challenges: Today's rapidly evolving cyber landscape presents unprecedented opportunities and challenges. Achieving a safe, secure, and resilient cyber environment requires DOE to continually pursue cost effective investments and activities to reduce cyber risk. Cyber is an enterprise-wide responsibility and demands an expanded view to encompass the broad scope of information sharing and information safeguarding. The Cyber Council, which is the principal forum for collaboration and coordination of key cyber policies and DOE enterprise-wide activities, leads the Information Technology (IT) and cyber governance for DOE. 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 Human Capital 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 the DHS's Cybersecurity Workforce Toolkit and National Institute for Science and Technology's (NIST) National Initiative for Cybersecurity Education (NICE) Capability Maturity Model. The Department continues to implement workforce improvements to develop and maintain crucial skillsets in DOE 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. In alignment with the EO, 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 2021, the Office of the Chief Information Officer (OCIO) continued pursuing numerous initiatives to improve performance, including:

- EO 14028 requiring agency reporting within 60 days of the EO's release.
- In FY 2021, the OCIO stood up ZTA and Cloud Adoption Working Groups with stakeholders and subject matter experts across the Department to develop DOE's ZTA and Cloud Adoption Plans, which were submitted as required. OCIO organized a data call to complete and submit the MFA & Encryption Progress Report for the Department.
- In FY 2021 the DOE conducted a Current State Assessment to evaluate its cloud adoption progress, focusing on three key areas: enterprise-wide Configuration Management Databases (CMDBs) and/ or Asset Management Systems Identification, Existing Cloud Model Utilization Analysis, and Identification of Providers and Capabilities in Use. The OCIO is evaluating the results to identify the degree of cloud adoption across the Department and identify configuration management database tools and capabilities currently in place or required.
- DOE's Integrated Joint Cybersecurity Coordination Center (iJC3) has continued to improve cybersecurity posture, increase operational visibility, and reduce Departmental risk. The iJC3 addresses the current enterprise Security Operation Center (SOC) capabilities, providing recommendations on improvements, and initiating projects based on those recommendations to the DOE Information Management Governance Board.
- In FY 2021, the iJC3 launched a Ticketing and Automation System (TAAS). TAAS supports iJC3 Security Incident tracking and reporting to the DHS Cybersecurity & Infrastructure Security Agency (CISA) and enterprise Federal Information Security Modernization Act (FISMA) response. The TAAS tool provides a Visualization and Portal function to provide operational situational awareness for active security incident management and reporting. Through TAAS, the iJC3 continued to assist efficient process automation and cross-organizational collaboration.
- iJC3 managed the Crowdsourced Penetration Testing program to support DOE's security posture and enhance enterprise operational visibility. In collaboration with DOE leadership, at least 38 Program Office, site, lab-specific or enterprise-wide assessments and 190+ assessments with 150 critical vulnerabilities and 130+ high vulnerabilities have been conducted throughout FY 2021.
- In FY 2021, OCIO launched a Threat Intelligence Platform solution enabling Automated Indicator Sharing (AIS) between iJC3, 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, 11,000+ IOCs have been identified, 6 million+ IOCs have been automatically published, and ~20 percent of DOE Sites have connected to the interface.
- In FY 2021, as part of a Network Segmentation Pilot Program, the DOE completed deployment of the Zscaler Client Connector (ZCC) and concurrent enablement of Zscaler Internet Access (ZIA), to all Windows laptops and began removal of Zscaler on 70 percent of desktops. DOE plans to proceed with removal of Zscaler to the remaining 30 percent of all desktops by FY 2022.
  - In FY 2021, DOE has completed deployment of ZIA to 93 percent of iOS mobile devices and 15 percent of Android devices, with 100 percent completion targeted by FY 2022.
  - DOE completed enablement of Zscaler Private Access (ZPA) on Windows laptops and iOS and Android devices for ~90 early adopters. Deployment of ZPA to all remaining Information Management (IM) mobile users is targeted for FY 2022.
- DOE's Unified Credentialing Working Group continued development of criteria and guidance on meeting Federal requirements for MFA based on OMB and Cross-Agency Priority goals.
- The Department has full accounting of privileged and unprivileged user accounts and is monitoring reported progress and completion dates of local MFA implementations and deployments. Over the past five-years, DOE implemented requirements for Personal Identity Verification (PIV) or other Asynchronous Transfer Mode (ATM) Adaption Layer 3 (AAL3) authenticators for privileged user network access and PIV, other AAL3, or AAL2 MFA authenticators for standard use network access requirements. The requirements increased adoption from 11 percent for both privileged and standard accounts to 98 percent for privileged user network access and 78 percent for standard use network access.
- In FY 2021, DOE continued the transition from the Electronic Capital Planning and Investment Control (eCPIC) system to the Enterprise Cybersecurity Governance System (ECGS). As part of the transition, DOE is working to validate metrics for privileged and unprivileged user accounts through ECGS and identify and reduce or eliminate non-MFA for network accounts. Currently, 81 percent of the DOE user population is managed through one authoritative digital identity.
- The OCIO started a software pilot test in FY 2021 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 PIV cards, will extend the use of MFA across DOE devices and containers.
- DOE participated in the DHS CISA-led High Value Asset (HVA) Program for assessing the cybersecurity of DOE's self-identified HVAs (the number of HVAs fluctuates but has remained at 19 over the last year). The Department updated and proposed the latest HVA inventory to DHS on September 30, 2020, in compliance with DHS Binding Operational Directive (BOD) 18-02, and engaged in the expanded FY 2021 annual HVA data call.

- In FY 2021, the OCIO continued the Supply Chain Risk Management (SCRM) program in alignment with National Institute of Standards and Technology (NIST) 800-53, NIST 800-171, North American Energy Reliability Corporation (NERC) Critical Infrastructure Protection (CIP)-13 and Cybersecurity Maturity Model Certification (CMMC). The program provides risk assessments, risk treatment, and continuous monitoring of suppliers, products, and services.
- In FY 2021, the DOE SCRM program drafted a strategy document and acquisition letter, established stakeholder groups, added Government – Industry Data Exchange Program (GIDEP) information to assessments, and stood up the SCRM Vendor Risk Management (VRM) tool.
  - In FY 2021, ~1200 SCRM assessments assessing 600+ suppliers were delivered. Assessments use validated open source information, impact information from the entities and responses from suppliers so executives can make risk based informed decisions.
- The DOE SCRM program is continuously evolving by adding new capabilities to establish consistency and enhance visibility in Governance, Assessment Enhancements and Technology. Future capabilities in Governance, include incorporating risk tolerance guidance, and integrating with Risk Management Framework (RMF) and Federal Information Technology Acquisition Reform Act (FITARA). The DOE SCRM technology completed a recent milestone in July 2021 with an update about increased communication efficiency for users and suppliers.
- 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 2021, the ECRM Program began to manage the DOE's Cybersecurity Risk Register and initiated Working Groups to review reported risks. Updates to the ECRM program's amplification guidance and resources including the Risk Management Methodology were ongoing throughout FY 2021. 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.
- In FY 2021, phishing simulations, awareness, and resources continued to be developed and disseminated. An Outlook Phishing Report Message button was deployed to ease the reporting of suspicious emails and targeted trainings to users continuously failing phishing exercises will be implemented.
- In FY 2021, 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 Asset Management capabilities to support asset verification as part of advancing DOE's ZTA adoption.
  - In early FY 2022, DOE will start with a 30 percent increase in Vulnerability and Configuration Setting Management endpoints and achieve ~70 percent by year's end. A 20 percent increase in Hardware Asset Management endpoints is also projected by FY 2022.
  - Tool testing and software asset management application development began in FY 2021 to support the procurement process, which is anticipated to begin once FY 2022 funding is available.
- In FY 2021, OCIO provided on-demand recorded training videos and executive-level webinars to key cyber roles (e.g., Authorizing Officials, Information System Security Officers, and Systems Owners) focusing on DOE-related policies and procedures to safeguard information and information systems. Community of Practice on OMBMAX site will continue to be updated for notification of events, trainings, and publications to the respective cyber roles.

DOE's ongoing efforts to improve include:

- Creation of a Zero Trust/Cloud Working Group to support ZTA and Cloud Adoption implementation plans across the Department per the DOE's ZTA and Cloud Adoption Plans. The Working Group features stakeholders across the Department and through all levels of the organization to support reference architecture and document development, lessons learned, and creation of pilots and shared services.
- OCIO's Big Data Platform (BDP) initiative achieved Full Operational Capability (FOC) in April 2020 with 100 percent cloud-based operations. The solution provides for ingestion and storage of large data sets from across the DOE Enterprise into a cloud-based data lake that supports creation of analytics to enhance rapid analysis of, and response to, anomalies or suspected events. In FY 2021, BDP featured 100+ users across the Department, featured participation from 52 Labs and Sites, and ingests 4.5 terabytes of data daily with a 6-month DOE enterprise data retention period.
- To advance efforts to improve the Department's cybersecurity posture, increase operational visibility and reduce Departmental risk, iJC3 will collaborate with independent cyber centers to develop threat-driven cyber operations to protect the entire DOE enterprise, including the Office of Cybersecurity, Energy Security and Emergency Response (CESER), program offices, National Laboratories, plants, field offices, and PMAs.
- DOE is on track to assess 100 percent of HVAs by Q4 FY 2021, as the key milestone to meet the Department's cybersecurity Agency Priority Goal (APG). DOE continues to collaborate with DHS CISA to monitor the security postures and risk profiles for the Department's high value assets, including participation in two inter-agency HVA working groups.
- OCIO continues to focus on improving Corrective Action Plan (CAP) goal scores in the areas of Information Security Continuous Monitoring (ISCM); Identity, Credential, and Access Management (ICAM);

and Advanced Network and Data Protections (ANDP). OCIO is working with Departmental Elements and sites to address reporting inconsistencies and refine data collection techniques to provide an accurate reflection of the security posture of DOE as a whole. As a result of these efforts, there was significant improvement in the quarterly OMB risk assessments.

- In FY 2021, the OCIO completed a Security Impact Analysis (SIA) of its current automation system to begin development planning for an automated FISMA data collection capability. A mockup detailed FISMA dashboard to provide better visibility of the Department's FISMA data has been presented.
- OCIO continues to support Department-wide implementation of DOE Order 205.1C, *Cyber Security Program*. In FY 2021, DOE released amplification guidance and references resources including the Plan of Action & Milestones (POA&M) Guide, Information System Security Officer (ISSO) Guide, and Risk Register template to support policy implementation, cybersecurity program efficacy, and assist Offices with tailoring solutions to unique mission needs. OCIO 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 2021, the OCIO began planning for a full re-write of its standing Cyber Security Program Order, draft DOE Order 205.1D, DOE Cyber Security Program.
- To meet Federal mandates and support cybersecurity policy efforts, OCIO led two Integrated Project Teams (IPT) to develop the Department's Controlled Unclassified Information (CUI) Order and the Vulnerability Disclosure Program (VDP) Attachment to DOE Order 205.1C, DOE Cyber Security Program.
  - The CUI Order stipulates the handling and marking requirements for sensitive unclassified information requiring safeguarding or dissemination controls pursuant to and consistent with law, regulations, and Government-wide policies. IPT membership included CUI and policy subject matter experts across the Department. In FY 2021, the CUI Order was submitted for final review and approval; signature and release are pending.
  - In July 2020, in response to DHS CISA BOD 20-01, *Develop and Publish a Vulnerability Disclosure Policy*, the OCIO began development of a Vulnerability Disclosure Program (VDP) policy. In FY 2021, the final draft VDP Attachment to DOE O 205.1C was submitted for final review and approval; signature and release are pending. The DOE's VDP establishes a formal mechanism for the DOE to receive, triage, and take action regarding information from third parties about potential security vulnerabilities on internet facing systems.
  - Implementation of the VDP began in FY 2021 with initial onboarding of 21 systems across the Department. Receipt, review, triage, and tracking of submitted vulnerabilities through VDP is underway.
- The OCIO supported the DHS Interagency Federal Mobility Group on International Travel Guidance through development of supporting guidance and best practices. The OCIO continued finalization of the DOE Foreign Travel with Government Furnished Equipment (GFE) Memorandum to provide baseline requirements and procedures for personnel with GFE while on foreign travel.

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 D&D of process-contaminated facilities.

Departmental Initiatives: In FY 2021, the Department continued to make progress in addressing infrastructure challenges, including:

- DOE's Laboratory Operations Board (LOB) provides an enterprise-wide forum for engaging the DOE laboratories and program secretarial offices (PSOs) in a joint effort to identify opportunities to improve effectiveness and efficiency. LOB addresses aspects of laboratory operations and includes a chartered group, the Infrastructure Executive Committee (IEC), comprised of senior DOE line managers and facility experts to focus on laboratory infrastructure. IEC assists the LOB with identifying and resolving strategic infrastructure issues. IEC focuses on understanding leadership's intent concerning the long-term vision of DOE's laboratories and provides insight to the LOB for improving the effectiveness and efficiency of managing DOE infrastructure.
- Program Office Infrastructure efforts, within individual offices, are an integral part of laboratory planning and evaluation processes. Program Office plans include reduction of deferred maintenance, removal of excess facilities, and proposals for potential construction of facilities. Evaluation of laboratory performance related to infrastructure stewardship is

included in laboratory performance plans. 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 ten-year plan to revitalize the deteriorating security technology and infrastructure across the enterprise.

- In FY 2021, the Office of Asset Management developed a Departmental directive, DOE Order 437.1, "Bridge and Tunnel Management" which was issued December 11, 2020. This directive establishes agency-wide policies and procedures for bridge inspections, quality management, and maintenance of a bridge and tunnel inventory. The DOE also developed its first Real Property Capital Plan in response to OMB memo M-20-03, "Implementation of Agency-Wide Real Property Capital Planning". The Real Property Capital Plan outlines the DOE's processes for infrastructure budgeting, performing needs assessments, conducting alternative analyses and life cycle cost estimates, prioritizing real property projects, and establishing metrics for success. The DOE Office of Asset Management and the DOE Office of the Chief Financial Officer worked closely together to develop the capital plan and to integrate more detailed real property information into the Department's budgeting process.
- In 2021, the DOE remained very active in the interagency efforts of the Federal Real Property Council (FRPC) to help guide and improve the way Federal agencies manage their real property. The DOE actively participated and contributed to the Capital Planning and Business Standards working groups and served as chair for both the FRPC Data Quality and Metrics working groups.

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
- Employee engagement

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

- Strategic Human Capital Planning
- Talent Management
- HR Service Delivery

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 Program and Staff Offices, the National Nuclear Security Administration, and Power Marketing Administrations to assess the status of DOE's Diversity, Equity, Inclusion, and Accessibility (DEIA) efforts and to identify barriers to equal opportunity that will inform a Department-wide DEIA strategic plan. 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
- Development and implementation of a DOE-wide DEIA strategic plan that aligns with the Government-Wide DEIA Strategic Plan that 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. In FY 2021, DOE employed strategic human capital initiatives to meet the workforce needs of today and plan for those of the future, including:

- Strategic Human Capital Planning: DOE will 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.
- Continued 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.

  - For FY 2021, a balanced overall ratings distribution was maintained, with the Outstanding rating demonstrably reserved for executives who clearly showed exceptional performance by producing significant, mission-aligned results—Level 5 ratings at 41 percent, with a more normalized distribution of Level 4. Meaningful distinctions in performance were clearly evident for SES members, whose award percentages were based on award ranges established for each rating level. In some cases, the award percentages for individuals in key leadership positions who were rated at the Outstanding level were increased to make sure a consistent application across the DOE complex and to appropriately reflect the difficulty of the position and the impact of the results achieved.
- Completed the development of operational staffing plans for DOE program offices to ensure staffing allocations were properly aligned to support mission priorities and streamline the hiring process.
  - Staffing plans were reviewed by HC and approved by senior Departmental leadership to ensure equity across functions and organizations.
  - Staffing plans identify the full mapping of positions for each DOE program office to strategically manage all positions, including executive-level positions, necessary to accomplish each Departmental Element's mission and goals.
  - Plans included a position-by-position review of Future of Work categories to create a robust framework for integrating hybrid/remote work planning into staffing planning efforts.
- Continued the use of the Human Capital Framework as the set of strategic criteria for internal audits and evaluations of human capital programs and processes, focusing on four human capital management systems: Talent Management, Performance Management, Strategic Planning and Alignment, and Evaluation. Bonneville Power Administration (BPA) completed Human Capital Management Accountability Program (HCMAP) with an outstanding total score of 97 percent across all areas.
- Talent Management: Continued development of the Departmental Learning Management System (LMS) to support the development needs of the DOE workforce, to include the release of a training evaluation module and a tool to track compliance with assigned Continuing Service Agreements.
  - Continued to expand access to LMS and invest in functional enhancements to help program managers assess, assign, and evaluate employee training and development, resulting in over 60,000 mandatory training completions and over 30,000 non-mandatory self-development training completions registered in LMS in 2021.
- Continued 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.
- Furthered 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 50 targeted recruitment and outreach efforts designed to meet the agency's immediate and emerging workforce needs.
  - Leveraged technology and cultivated targeted communication channels—such as college/university resource boards and alumni publications, professional associations, and job boards serving underrepresented communities and veterans and military spouses—to market job opportunities and expand DOE's applicant pool.
- Developed and delivered effective employee development programs and resources to strengthen the DOE workforce, with a focus on improving awareness of and expanding access to those resources.
  - Developed competency models for both the cybersecurity and program manager workforce communities, supporting enhanced talent management and ensuring DOE remains compliant with legislatively mandated workforce assessment requirements. These competency models will be loaded into the Department's LMS, enabling future competency assessments to inform targeted gap closure strategies.
  - In response to employee feedback on future of work challenges, partnered with a leading provider of online development resources to curate a collection of courses focused on managing and working in a virtual or hybrid environment. Courses support employees facing critical projects and include leadership development courses aligned to Federal Executive Core Qualifications.
  - Leveraged learner feedback and available needs assessment data to deliver virtual, instructor-led courses to over 2,200 DOE employees with an employee evaluation rating of 9.2 out of 10.
  - Effectively managed the FY 2021 Federal Employee Viewpoint Survey (FEVS) cycle with a response rate exceeding 72 percent and delivered over 600 customized Organizational Management Reports to help customer organizations identify engagement strengths and weaknesses.
  - BPA completed career path models for 20 major occupations across the organization. The career paths serve as a general guide and recommendations meant to prepare BPA employees for each career stage.
- HR Service Delivery: Continued to seek ways to improve the efficiency and effectiveness of HR services by engaging more with customers, improving service time through enhanced automation, and realigning staff and functions to be more responsive to customer needs; all while ensuring safe and secure delivery of HR services in a virtual environment.
  - In continuing the Department's maximum telework posture in response to COVID-19, HC

continued virtual onboarding for employees, onboarding 933 General Schedule (GS) employees and 151 Senior Executive Service and excepted service employees in FY 2021.
- The Oak Ridge HR Shared Service Center (ORSSC) launched an HR Hotline to help streamline inquiries and reduce the number of interruptions HR practitioners face while working specific actions for customers.
- Transitioned from the Monster talent acquisition system to USA Staffing to streamline communication with hiring managers on recruitment products and improve efficiency of recruitment actions. The Onboarding feature of USA Staffing was also implemented, providing greater efficiency and automation of issuance of job offers and onboarding documents. In the early stages of transition to the Onboarding feature, the ORSSC staff was able to submit 75 percent of the onboarding packages to the Processing Branch on the first day of employment, where previously these actions took a week or more.
- Developed 168 standardized job analysis evaluation tools to further time-to-hire improvement efforts in ORRSC.
- Launched a series of short courses under the program "ORSSC Essentials for Supervisors" aimed at helping supervisors fulfill HR responsibilities. Sixteen (16) courses were delivered from March – September.
- Developed the Accelerated Merit Promotion (AMP) process that provides a streamlined competitive process for hiring managers to expedite internal merit promotion selections for positions not covered by a Collective Bargaining Agreement. The AMP process relies on the targeted recruitment of qualified internal employees, simplified job analysis and assessment methods, and reduced announcement period and application requirements to streamline hiring.
- Developed a revised process to expedite hiring by initiating suitability and security reviews before incentives are fully approved and conveyed to candidates. This new process has the potential to speed up the hiring process by several weeks.
- ORSSC conducted a recruitment workload capacity analysis that benchmark and found the Talent Acquisition Division (TAD) was understaffed to manage the steady state workload of recruitment actions. ORSSC realigned 13 HR Business Partner positions into the TAD to improve time-to-hire, increase workload capacity, streamline processes, and increase efficiency.
- Established the Office of Employee and Labor Relations, Policy, and Oversight (ELRPO) to better align resources and raise the importance and visibility of the Employee/Labor Relations function with specialized Employee Relations (ER) and Labor Relations (LR) services. This service delivery model allows specialists to focus on the specific skills necessary to carry out each individual specialty with greater effectiveness and efficiency.
- Issued DOE's first Reasonable Accommodation (RA) Policy Memorandum that replaces the RA Desk Reference the Department had been operating under since September 2019. The RA policy formalizes Department's policy in accordance with Equal Employment Opportunity Commission (EEOC) requirements and provides step-by-step guidance for supervisors to be able respond to requests for accommodation, including 14 templates to be used at different stages of the process. These templates will decrease the administrative burden on supervisors, help them efficiently address reasonable accommodation requests, and ensure compliance with laws and regulations. Provided 7 training sessions for employees and supervisors on the new RA policy with 92 percent responses indicating the sessions enhanced the knowledge of the students.
- BPA leveraged automated solutions within its Human Resources Management Information System (HRMIS) to develop a range of tools, including automated employee telework agreements and a benefits self-service feature.

Diversity and Inclusion

The Department's Office of Economic Impact and Diversity (ED) will lead the implementation of the DEIA EO on behalf of DOE. On August 2, 2021, the Domestic Policy Council issued guidance on the Survey on the Use of DEIA Promising Practices Across the Federal Government, as well as guidance on the Preliminary Agency Assessment on Current Status of DEIA Within the Agency Workforce. On August 12, 2021, ED launched the Department's DEIA EO Team with the inaugural meeting of the DOE cross-agency DEIA Team.

FY 2021 Diversity and Inclusion Efforts:
- A key goal in FY 2021 was to strategically hire staff to support equity and diversity initiatives, including the conduct of barrier analysis of DOE demographic data. In December 2020, ED hired the first Diversity and Inclusion Specialist in over three years. In January 2021, ED hired its first social scientist to elevate its capacity to collect and analyze DOE demographic data for purposes of barrier analysis related to EEOC's annual Management Directive 715 (MD-715) Report. In August 2021, ED hired a contractor to serve as a Senior Advisor on Justice, Equity, Diversity, Belonging, and Inclusion and to assist the Secretary's Advisor on Equity in implementing the DEIA EO.
- During FY 2021, the Department established an Equity Steering Committee to implement EO 13985, which included a Diversity, Equity, and Inclusion (DEI) Working Group co-led by the Department's Chief Human Capital Officer and Deputy Director for Civil Rights and Diversity. The DEI Working Group brought together a diverse group of DOE senior leaders and employees.
- Also in FY 2021, ED expanded outreach efforts with the Department's seven Employee Resource Groups (ERG), establishing a cadence of quarterly ERG meetings.

- In Spring 2021, 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 2020 EEOC MD-715 Report. The Report also includes applicant flow data analyses, the identification of potential barriers, and plans for addressing potential barriers.
- During Late Spring/Summer 2021, ED developed presentations on the participation of women, African Americans, Latinos/as, and Asian American/Pacific Islanders, in the DOE workforce. ED provided the presentations to the respective Employee Resource Groups. ED also provided the presentation on the participation of women in the DOE workforce to the Department's Gender Equity Team.

CLIMATE CHANGE (New)

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 an 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.

Executive Order 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 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 E.O. 14008, DOE developed and released a 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 as well as new initiatives supporting adaptation to current and projected impacts of climate change as well as 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, but much greater efforts are needed with a focus on:

- Identify program and site vulnerabilities to climate change. DOE has 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 among 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.
- All DOE employees will be required to take training on climate adaptation and mitigation. DOE plans to improve the climate literacy of its workforce by creating 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 be building upon existing approaches and when

evaluating purchases, give preference for various types of vendors, products, and services to ensure DOE is climate ready.
- Support supply chain development, including advanced materials, critical materials, etc.

- **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 Carbon-Pollution Free Electricity (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 such as building space and water heating, electric vehicles, and industrial processes and integrating them with the grid with dynamic controls. 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.

- **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 with a focus on:
  - Use of DOE procurement mechanisms to purchase products and services that are resilient and have a low carbon footprint;
  - Mapping out entry points of climate information into management functions and responsibilities that effect funding or contracts;
  - Identification of opportunities to incorporate climate criteria in grant and loan program solicitations; and
  - Establishment of 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.

- **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 with a focus on:
  - 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 Energy and Environmental Justice Communities Near DOE Sites.

- **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 with a focus on:

- 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.

ENERGY JUSTICE (New)

Key Challenges: On January 27, 2021, President Biden issued EO 14008, *Tackling the Climate Crisis at Home and Abroad*, which established the historic Justice40 Initiative, a whole of government effort committed to delivering 40 percent of the overall benefits of climate and clean energy investments to disadvantaged communities. The ambitious and historic initiative will allow 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 the Justice40 Initiative 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: ED will lead the implementation of the Justice40 Initiative 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 the Justice40 Initiative (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 the Justice40 initiative, the Interim Guidance lists 21 Justice40 pilot covered programs, which include five DOE programs:

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

On July 8, 2021, ED established the Justice40 Community of Practice, 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 reflects the Department's commitment to the execution of the Justice40 Initiative 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. The Office of Environmental Management and the Office of Energy Efficiency and Renewable Energy 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 the Justice40 Initiative, 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.

Selected Justice40 FY 2021 programs and initiatives include:

- ED's annual program for summer interns throughout DOE. The Minority Educational Institution Student Partnership Program (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.
- DOE's Office of Energy Efficiency and Renewable Energy (EERE) continues 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.

NUCLEAR STOCKPILE STEWARDSHIP (New)

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 emerging 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 additional underground nuclear explosive testing through the application of specialized science, technology, engineering, and manufacturing.

- NNSA's nuclear deterrence mission remains the cornerstone of our Nation's security posture. To provide a viable 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 funding and long-term support are critical for continued alignment of warhead acquisitions with DoD platform requirements.
  - While the U.S. nuclear weapons stockpile and its supporting infrastructure are currently safe, secure, effective, and reliable, they are aging.
  - Sixty percent of NNSA's facilities are more than 40 years old, and over 50 percent are in poor condition. If not appropriately addressed, the age and condition of NNSA's infrastructure will put its deterrence mission, and the safety of its workforce, at risk.
- NNSA cannot accomplish its mission to sustain the nuclear deterrent without reliable infrastructure providing necessary capabilities for today and allowing for the opportunity to expand future capacities.
- NNSA and DoD together deliver the capabilities that will provide the Nation with the ability to adapt and respond to a dynamic security environment, emerging strategic challenges, and geopolitical and technological changes. Executing an increased scope of activities centered around warhead modernizations in an aged enterprise has resulted in several operational adjustments with critical equipment being operated at significantly increased rates.
  - New military requirements from DoD have required innovative adaptation of current capabilities, increased recapitalization of facilities and equipment, and the development of just-in-time capabilities. Weapons Activities capabilities are the foundational mechanisms for achieving mission deliverables and priorities.
  - NNSA must continue to invest in existing capabilities and developing emerging capabilities to assure a strong nuclear deterrent now and into the future.
- Despite the challenges imposed by COVID-19 related restrictions, NNSA has not missed any major deliverables or milestones.

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 mission priority is to sustain the Nation's nuclear weapons stockpile and industrial base, in order to provide the tools of deterrence to our Nation's military.

Defense Programs pursued numerous initiatives and accomplished achievements in FY 2021 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.

- NNSA conducted surveillance activities for all weapon systems using data collection from flight tests, laboratory tests, and component evaluations to assess stockpile reliability without nuclear testing which culminated in completion of all nuclear stockpile Annual Assessment Reports to the President.
  - The annual stockpile assessment process evaluates the state of weapons by conducting physics and engineering analyses, experiments, surveillance and flight testing, and computer modeling.
  - Assessments may also evaluate the effects of aging on performance and quantify performance thresholds, uncertainties, and margins.
- The Office of Secure Transportation (OST) maintained its record of accomplishing 100 percent of assigned missions safely and securely with no mission degradation, providing safe, secure transport of the Nation's nuclear weapons, weapon components, and special nuclear material to meet national security requirements and support NNSA missions, despite the operational challenges inherent during the COVID-19 pandemic.
- The Nuclear Enterprise Assurance (NEA)/Nuclear Weapon Digital Assurance (NWDA) program was established to prevent, detect, and mitigate potential consequences of subversion as the NNSA take part in modernization activities. It actively manages adversarial subversion risks to the nuclear weapons stockpile and associated design, production, and testing capabilities to anticipate threats and

proactively advance and evolve the nuclear security enterprise's assurance posture.

- Production Operations maintained essential stockpile work capabilities via investments in engineering, manufacturing operations, and quality labor required to grow and sustain a large and growing manufacturing complex.
- The Weapon Quality Division performed oversight activities to evaluate the effectiveness of the contractor weapon quality management system at NNSA sites through the conduct of surveys and review of performance information, while ensuring the early and continuous application of quality principles when realizing mark quality products, weapon material certified by NNSA to meet design requirements, throughout all lifecycle phases of a nuclear weapon system.
  - NNSA conducted surveillance, annual assessments, and routine maintenance of Limited Life Components (LLC) to ensure the nuclear weapons stockpile remains safe, secure, and reliable over the projected lifecycle were successfully conducted.
  - Surveillance activities provide data to evaluate the safety, security, reliability, and performance of weapons in the stockpile in support of annual assessments. The cumulative body of this data supports future stockpile decisions regarding weapon LEPs, Alts, and Mods.
- NNSA planned and executed delivery of several major weapons system acquisitions from Concept Assessment through First Production.
- The B61-12 received authorization to enter Phase 6.5, First Production, in FY 2021, with delivery of the first production unit expected in the first quarter of FY 2022.
  - The B61-12 LEP required re-planning in FY 2019 to permit re-qualification of Base Metal Electrode (BME)-affected components. All of the six BME-affected components have completed first production units.
  - The B61-12 LEP replaces 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.
- The W88 Alt 370 received authorization to enter Phase 6.5 in the first quarter FY 2021, and delivery of the first production unit was completed in the fourth quarter of FY 2021.
  - Like the B61-12, the W88 Alt 370 required re-planning to permit re-qualification of BME-affected components.
  - Requalification efforts were completed in the third quarter of FY 2021, in accordance with the re-baselined plan.
  - 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.
- The W87-1 Modification Program entered in Phase 6.2A, Design Definition and Cost Study, at the end of FY 2021 third quarter.
  - The W87-1 will be deployed alongside the W87-0 on the Ground-Based Strategic Deterrent (GBSD). It 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 W80-4 LEP received authorization to enter Phase 6.3 Development Engineering in FY 2019, commencing development, specifications, and design release of the W80-4 warhead.
  - Key design requirements extend the service life, replace critical non-nuclear components along with reuse of the W80-1 pit, incorporate modern safety features.
  - Delivery of the first production unit is scheduled for fourth quarter FY 2025 supporting U.S. Air Force achieving initial operational capability in FY 2030.
  - W80-4 LEP is expected to be completed by FY 2030.
- The Nightshade A plutonium subcritical experiment was conducted as part of the Red Sage series to examine spall behavior of new and aged materials.
  - Nightshade A provided ejecta data from multiple plutonium samples under conditions relevant to the stockpile.
  - The successful experiment followed a confirmatory preparatory experiment run by Nevada National Security Site (NNSS) resulted in 100 percent data return.
- NNSA continued to meet tritium production requirements for national security while working to increase supply chain reliability, flexibility, and resiliency.
  - Commenced irradiation of 1,792 Tritium-Producing Burnable Absorber Rods (TPBARs) in Fuel Cycle #17 at Watts Bar Unit 1 with expected completion in October 2021.
  - Commenced irradiation of 544 TPBARs in Watts Bar Unit 2 (first insertion of TPBARs in Unit 2).
  - Completed seven extractions of tritium at the Savannah River Site (SRS) Tritium Extraction Facility, with five planned.
- Pit production activities continued at Los Alamos and Savannah River Site to fulfill the requirement to produce not less than 80 pits per year as close to 2030 as possible. Initiatives included:
  - Continuing engineering evaluations of pit production processes at LANL to qualify those processes for the first production unit; and,
  - The Savannah River Plutonium Processing Facility project achieved Critical Decision-1, Alternative Selection and Cost Range, in the third quarter of FY 2021.
- Y-12 produced the first test "button" using new electrorefining technology that will replace the current

high hazard enriched uranium purification process in the Manhattan Project-era Building 9212. Operators produce purified enriched uranium metal in a disc-like shape, called a button, so it can be safely stored until it is used to produce a weapons component. Safer and more efficient, this new technology is a major step towards allowing NNSA to reduce mission dependency on Building 9212.

- NNSA applied LLNL computing expertise to accelerate scientific discovery related to the COVID-19 virus.
  - This initiative developed rapid, accurate diagnostic technologies, and supported rapid discovery of potential medical countermeasures.
  - COVID-related R&D work also included a team at LANL finding the virus' genetic sequence originated from animals.

Financial Management Systems Plan

Corporate Business Systems

The Department's enterprise-wide Corporate Business Systems (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)* –is the Department's budgetary funds distribution system, providing the capability 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 systems to capture reimbursable work transactions. FY 2021 BFADS activities include:

- Completed migration of all BFADS environments into the Azure cloud
- Created a prototype of Oracle's Narrative Reporting tool for review and analysis by CF leadership. This tool is being evaluated for the management and creation of Congressional Justifications and other formulation reporting needs
- Added mapping webforms to the task lists
- Provided training for users on the budget formulation functionality
- Created new reports related to loans processing and two new allocations reports
- Implemented requested updates related to the Continuing Resolution and Automatic Apportionment processes
- Provided enhancement to the administrative loans re-estimate process
- Actively maintained the required security posture and upgraded to the most current quarterly Oracle patch set

Looking forward to FY 2022, BFADS will focus on finalizing upgrades for Hyperion, ODI, and WebLogic. 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 2021 STARS activities include:

- Upgraded STARS from 12.1.3 to 12.2.8 to prepare for UEI and G-Invoicing
- Coordinated with the Governance, Risk and Compliance (GRC) team for a successful Phase II implementation
- Supported Treasury FY22 Standard General Ledger (SGL) changes
- Implemented additional LMS and STARS integration enhancements for reducing the possibility of erroneous payments as well as additional enhancements for group training
- Applied vendor patches to accommodate Microsoft Edge for STARS/SEPA

Future STARS activities include migrating STARS and SEPA Production environments into the cloud, implement Treasury's BETC modifications, and coordinate and implement the GSA UEI (Unique Entity Identifier) solution in STARS, and the Treasury G-Invoicing solution.

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 2021 CHRIS activities include:

- Completed the initial phase for Analysis of Alternatives (AoA) for a future Human Resource Management solution in collaboration with HC and OCIO
- Migrated Sandbox, Quality Assurance (QA), Production, and PeopleSoft Update Manager (PUM) to the Cloud
- Continued the upgrade to PeopleSoft 9.2 for SIT and UAT environments
- Installed PUM
- Supported and enhanced functionality and reporting based on user requirements

In FY 2022 CHRIS will continue the upgrade process for PeopleSoft 9.2, implement USA Staffing interface to replace the current Monster to CHRIS interface, continue conducting the Analysis of Alternatives to replace CHRIS, and migrate remaining environments to the cloud.

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 2021 STRIPES activities include:

- Reviewed and provided analysis to Office of Management stakeholders on Unison Marketplace, Robotic Process Automation (RPA), Misc. Obligation, and Certification Manager functionalities
- Assisted CF-10 and MA on the OMB Justice 40 initiative
- Increased efficiencies through collaboration between STRIPES and payments teams on contract novation changes
- Coordinated UEI analysis effort between STRIPES and integration partners STARS, IDW, and Vendor Inquiry Payment Electronic Reporting System (VIPERS)
- Implemented multiple STRIPES Service Packs and Hot Fix installations including those directly supporting the DATA Act and GSA's FPDS-NG, SAM, and SAM's Contract Opportunities system applications

In FY 2022, STRIPES plans to coordinate Record Retention and Destruction specifications and Requirements Traceability Matrix with STARS, IDW, and STRIPES stakeholders. STRIPES will also implement the Unison Marketplace module within STRIPES (Reverse Auction functionality), UEI system wide changes, and migrate remaining environments to the cloud.

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, collaboration capabilities, news, reporting, web conferencing, graphing, and data exchange capabilities. FY 2021 IDW activities include:

- Established a new Disaster Recovery (DR) environment in Azure, and tested by failing over to the DR site and then failing back to the primary site
- Completed the migration of IDW production environment into the cloud
- Provided support and enhanced functionality for additional tools such as AMERICA, iBenefits, ANA, Small Business and Conference Management
- Provided continuing support for the Grants Oversight & New Efficiency (GONE) Act
- 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 2022, IDW will migrate remaining environments to the cloud, perform infrastructure optimization in the cloud to reduce operational costs, complete task to add additional SGL's identified by the Office of Finance and Accounting into the STARS subject area in IDW, and complete the upgrade of Oracle BI to Oracle Analytics Server (OAS).

Additional Efforts Underway

In FY 2022, in coordination with OCIO, Corporate Business Systems (CBS) is scheduled to finalize the migration of on-premises infrastructure to the Azure cloud service provider. CBS will also begin expanding the use of 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. Moreover, Office of CBS will focus on architecture and operation optimization in FY 2022 to drive down operational cost and up system availability through process enhancement, contract negotiation, and new technology exploration and adoption. Furthermore, Corporate Business Systems has submitted a Technology Modernization Fund request to seek funding to close the cybersecurity gaps inherited from legacy applications in alignment with the executive order 14028. Finally, the Office of CBS will begin to integrate all CBS applications with OneID to comply with the requirement for multi-factor authentication (MFA) and identity and access management (IAM).

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Financial Results



Message from the Acting Chief Financial Officer



For the 15h consecutive year, I am pleased to note DOE received an unmodified audit opinion on the 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 2021, despite continued disruptions of the COVID-19 pandemic, the CFO community met mission goals and provided high-caliber financial management and fiscal stewardship exemplified by many achievements:

- Received the Association of Government Accountants (AGA) Certificate of Excellence in Accountability Reporting (CEAR) for the FY 2020 Agency Financial Report
- Tracked and reported on departmental activity and obligations of $842.1 million in COVID-19 funding across DOE's base appropriations and supplemental appropriations under the CARES Act
- Completed Robotic Processing Automation (RPA) product evaluation and established the RPA platform for future business process automation
- Implemented the Transaction Monitoring Module for the Governance, Risk and Compliance (GRC) application within the Department's financial management system, Standard Accounting and Reporting System (STARS), to strengthen internal controls, improve data quality and reduce fraud risk
- Completed upgrades to STARS, the A-123 Management of Entity Risk and Internal Controls Application (AMERICA), and iBenefits, DOE's pension and benefit management system
- Supported creation of DOE's Justice40 public dashboard which displays DOE costs across the country and by different environmental indicators
- Led the coordination and supported the deployment of the Unaccompanied Children Program
- Migrated administrative IT systems supporting financial management, HR, contracting, and reporting from an on-premise data center to a government cloud provider; by the end of FY 2021, 61 percent of the environments (production, test/QA, development, sandbox) were successfully moved to the cloud
- Conducted 60 financial management webinars with a total attendance of over 2,500 participants, including headquarters, field, and contractor staff

Areas of Focus for the OCFO in FY 2022:

- Implementing G-Invoicing
- Transitioning to the System for Award Management-generated Unique Entity Identifier
- Incorporating data analytics into business processes for enhanced decision making
- Continuing to find the best approach and balance in preparing the workforce for return to the workplace
- Implementing an improved process to develop DOE's annual budget request

DOE's CFO community continues to manage taxpayer dollars wisely, demonstrated by these notable successes. In FY 2022, 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
Acting Chief Financial Officer
November 15, 2021

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.

Principal Statements

U.S. Department of Energy Consolidated Balance Sheets

As September 30, 2021 and 2020

($ IN MILLIONS)	FY 2021	FY 2020
ASSETS: (Note 2)		
Intragovernmental Assets:		
Fund Balance with Treasury (Note 3)	$ 48,846	$ 45,857
Investments and Related Interest, Net (Note 4)	46,092	45,736
Accounts Receivable, Net (Note 5)	547	532
Advances and Prepayments	12	32
Total Intragovernmental Assets	**$ 95,497**	**$ 92,157**
With the Public:		
Cash	172	300
Accounts Receivable, Net (Note 5)	3,025	3,034
Direct Loans and Loan Guarantees, Net (Note 6)	16,339	15,161
Inventory, Net (Note 7)	49,306	48,849
General Property, Plant, and Equipment, Net (Note 8)	43,159	40,413
Advances and Prepayments	580	374
Other Non-Intragovernmental Assets (Note 9 & 10)	13,472	13,691
Total with the Public	**$ 126,053**	**$ 121,822**
Total Assets	**$ 221,550**	**$ 213,979**
LIABILITIES: (Note 11)		
Intragovernmental Liabilities:		
Accounts Payable	$ 751	$ 740
Debt (Note 12)	22,614	22,107
Advances from Others and Deferred Revenue (Note 15)	230	239
Other Liabilities (Note 14)	3,988	3,940
Total Intragovernmental Liabilities	**$ 27,583**	**$ 27,026**
With the Public:		
Accounts Payable	$ 4,812	$ 4,341
Debt Held by the Public (Notes 12)	5,082	5,078
Federal Employee Benefits Payable	282	283
Environmental Cleanup and Disposal Liabilities (Note 13)	515,645	512,257
Loan Guarantee Liability (Note 6)	98	117
Advances from Others and Deferred Revenue (Note 15)	48,772	47,057
Other Non-Intragovernmental Liabilities (Notes 14, 15, 16, 17, 18)	62,919	69,922
Total with the Public	**$ 637,610**	**$ 639,055**
Total Liabilities	**$ 665,193**	**$ 666,081**
NET POSITION: (Note 27)		
Unexpended Appropriations		
Unexpended Appropriations - Funds from Dedicated Collections (Note 19)	$ 27	$ 9
Unexpended Appropriations - Funds from Other than Dedicated Collections	34,928	32,757
Cumulative Results of Operations		
Cumulative Results of Operations - Funds from Dedicated Collections (Note 19)	(14,004)	(12,942)
Cumulative Results of Operations - Funds from Other than Dedicated Collections	(464,594)	(471,926)
Total Net Position	**$ (443,643)**	**$ (452,102)**
Total Liabilities and Net Position	**$ 221,550**	**$ 213,979**

The accompanying notes are an integral part of these statements.

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

For the Years Ended September 30, 2021 and 2020

($ IN MILLIONS)	FY 2021	FY 2020
MAJOR PROGRAMS: (Note 20)		
Nuclear Security and NNSA		
Program Costs	$ 15,264	$ 14,517
Less: Earned Revenues	(16)	(18)
Net Cost of Nuclear Security and NNSA	**$ 15,248**	**$ 14,499**
Science		
Program Costs	$ 20,497	$ 23,281
Less: Earned Revenues	(93)	(94)
Net Cost of Science	**$ 20,404**	**$ 23,187**
Energy		
Program Costs	$ 10,476	$ 10,063
Less: Earned Revenues	(6,429)	(5,621)
Net Cost of Energy	**$ 4,047**	**$ 4,442**
Net Cost of Major Programs	**$ 39,699**	**$ 42,128**
OTHER PROGRAMS: (Note 20)		
Reimbursable Programs		
Program Costs	$ 5,239	$ 5,160
Less: Earned Revenues	(5,223)	(5,057)
Net Cost of Reimbursable Programs	**$ 16**	**$ 103**
Other Programs		
Program Costs	$ 2,371	$ 2,296
Less: Earned Revenues	(429)	(399)
Net Cost of Other Programs	**$ 1,942**	**$ 1,897**
Costs Applied to Reduction of Legacy Environmental Liabilities (Notes 15 and 20)	$ (6,451)	$ (6,310)
Costs Not Assigned to Programs (Note 21)	$ 1,213	$ 17,191
Net Cost of Operations	**$ 36,419**	**$ 55,009**

The accompanying notes are an integral part of these statements.

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

For the Years Ended September 30, 2021 and 2020

($ IN MILLIONS)	FUNDS FROM DEDICATED COLLECTIONS (Note 19)	ALL OTHER FUNDS	ELIMINATIONS	CONSOLIDATED
	FY 2021			
UNEXPENDED APPROPRIATIONS: (Note 27)				
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: Ending	**$ 27**	**$ 34,928**	**$ —**	**$ 34,955**
CUMULATIVE RESULTS OF OPERATIONS: (Note 27)				
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 and 25)	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: Ending	**$ (14,004)**	**$ (464,594)**	**$ —**	**$ (478,598)**
Net Position	**$ (13,977)**	**$ (429,666)**	**$ —**	**$ (443,643)**
	FY 2020			
UNEXPENDED APPROPRIATIONS: (Note 27)				
Beginning Balances	$ 7	$ 29,449	$ —	$ 29,456
Appropriations Received (Note 23)	$ 10	$ 37,919	$ —	$ 37,929
Appropriations Transferred - In/(Out)	—	9	—	9
Other Adjustments	—	(97)	—	(97)
Appropriations Used	(8)	(34,523)	—	(34,531)
Net Change in Unexpended Appropriations	**$ 2**	**$ 3,308**	**$ —**	**$ 3,310**
Total Unexpended Appropriations: Ending	**$ 9**	**$ 32,757**	**$ —**	**$ 32,766**
CUMULATIVE RESULTS OF OPERATIONS: (Note 27)				
Beginning Balances	$ (12,985)	$ (464,733)	$ —	$ (477,718)
Other Adjustments	$ —	$ —	$ —	$ —
Appropriations Used	8	34,523	—	34,531
Non-Exchange Revenue	30	—	—	30
Donations and Forfeitures of Cash	—	13	—	13
Transfers - In/(Out) Without Reimbursement	(503)	(19)	—	(522)
Donations and Forfeitures of Property	19	2	—	21
Imputed Financing (Notes 22)	8	13,835	—	13,843
Other	45	(102)	—	(57)
Net Cost of Operations	**$ 436**	**$ (55,445)**	**$ —**	**$ (55,009)**
Net Change in Cumulative Results of Operations	**$ 43**	**$ (7,193)**	**$ —**	**$ (7,150)**
Total Cumulative Results of Operations: Ending	**$ (12,942)**	**$ (471,926)**	**$ —**	**$ (484,868)**
Net Position	**$ (12,933)**	**$ (439,169)**	**$ —**	**$ (452,102)**

The accompanying notes are an integral part of these statements.

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

For the Years Ended September 30, 2021 and 2020

($ IN MILLIONS)	BUDGETARY	NON-BUDGETARY CREDIT REFORM FINANCING ACCOUNTS	BUDGETARY	NON-BUDGETARY CREDIT REFORM FINANCING ACCOUNTS
	FY 2021		FY 2020	
BUDGETARY RESOURCES:				
Unobligated Balance from Prior Year Budget Authority, Net	$ 10,177	$ 670	$ 9,686	$ 785
Appropriations (Note 23)	40,123	—	38,842	—
Borrowing authority	737	113	765	46
Contract authority	2,379	—	2,519	—
Spending Authority from Offsetting Collections	7,733	838	7,084	756
Total Budgetary Resources	**$ 61,149**	**$ 1,621**	**$ 58,896**	**$ 1,587**
STATUS OF BUDGETARY RESOURCES:				
New Obligations and Upward Adjustments (Total)	$ 53,181	$ 644	$ 49,400	$ 514
Unobligated Balance, End of Year:				
Apportioned, Unexpired Accounts	$ 7,353	$ 17	$ 9,360	$ 11
Exempt from Apportionment, Unexpired Accounts	13	—	14	—
Unapportioned, Unexpired Accounts	526	960	51	1,062
Unexpired, Unobligated Balance, End of Year	**$ 7,892**	**$ 977**	**$ 9,425**	**$ 1,073**
Expired, Unobligated Balance, End of Year	76	—	71	—
Unobligated Balance, End of Year (Total)	**$ 7,968**	**$ 977**	**$ 9,496**	**$ 1,073**
Total Budgetary Resources	**$ 61,149**	**$ 1,621**	**$ 58,896**	**$ 1,587**
OUTLAYS, NET				
Outlays, Net (Total) (Note 25)	$ 37,302	$ —	$ 34,970	$ 1,125
Distributed Offsetting Receipts (-) (Note 25)	(3,612)	—	(2,968)	—
Agency Outlays, Net (Note 25)	**$ 33,690**	**$ —**	**$ 32,002**	**$ 1,125**
Disbursements, Net (Total)	**$ —**	**$ 616**	**$ —**	**$ 1,125**

The accompanying notes are an integral part of these statements.

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

For the Years Ended September 30, 2021 and 2020

($ IN MILLIONS)	FY 2021	FY 2020
SOURCES OF COLLECTIONS:		
Cash Collections: (Note 24)		
Power Marketing Administrations	$ 619	$ 638
Federal Energy Regulatory Commission	63	34
Total Cash Collections	**$ 682**	**$ 672**
Accrual Adjustment	3	(1)
Total Custodial Revenue	**$ 685**	**$ 671**
DISPOSITION OF REVENUE:		
Transferred to Others:		
Bureau of Reclamation	$ (184)	$ (200)
Department of the Treasury	(288)	(163)
Army Corps of Engineers	(194)	(309)
Others	(6)	(3)
Decrease/(Increase) in Amounts to be Transferred	(13)	4
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; the Under Secretary for Energy; 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 C*onsolidated 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.

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. For intragovernmental receivables, allowances for uncollectible accounts are not reported due to immateriality. The amounts due for non-intra-governmental (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 BPA's financial futures broker.

H. DIRECT LOANS AND LOAN GUARANTEES, NET

The Department has one loan that was obligated and disbursed prior to Fiscal Year 1992, and is presented net of an allowance for loss. All loans obligated after Fiscal Year 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 and 185.34 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 (NWF) 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 (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. 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 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 DOL for financial reporting purposes. The Department also accrues an estimated liability for earned, but unpaid, and unfunded annual leave.

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 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 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*.

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 Cos*t. 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 2021, multiple statements and footnotes were revised to align with new guidance issued in OMB Circular A-136. The presentation of the *Consolidated Balance Sheets* changed which eliminated the need for the Balance Sheet section to be included in the Reclassification of Financial Statement Line Items for Financial Report Compilation Process (see Note 27). To align with the new administration, several programs moved from the Energy line of the *Consolidated Statement of Net Costs* to the Other line. In addition, the *Consolidated Statements of Changes in Net Position*, the Other Assets footnote (see Note 9), the Regulatory Assets footnote (see Note 10), the Liabilities not Covered by Budgetary Resources footnote (see Note 11), the Debt footnote (see Note 12), the Other Liabilities footnote (see Note 14), the Dedicated Collections footnote (see Note 19), the Reconciliation of Net Cost to Net Outlays footnote (see Note 25), and the Reclassification of Financial Statement Line Items for Financial Report Compilation Process footnote (see Note 27) were modified to conform with the FY 2021 presentation in the Treasury crosswalks and/or OMB Circular A-136. Finally, certain other FY 2020 amounts have been reclassified to conform to the FY 2021 presentation.

T. ALLOCATION TRANSFERS WITH OTHER FEDERAL AGENCIES

The Department is a party to an allocation transfer with another federal agency as a transferring (parent) 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 allocates funds, as the parent, to the USACE.

2. Non-Entity Assets

($ IN MILLIONS)	FY 2021	FY 2020
Intragovernmental		
Inventories - Department of Defense stockpile oil (Notes 7)	$ 123	$ 123
Other	11	12
Subtotal	**$ 134**	**$ 135**
Inventories - Oil held for others (Notes 7 and 14)	70	149
Other	9	9
Total non-entity assets	**$ 213**	**$ 293**
Total entity assets	**$ 221,337**	**$ 213,686**
Total assets	**$ 221,550**	**$ 213,979**

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 2021	FY 2020
Status of Fund Balance With Treasury		
Unobligated balance:		
Available	$ 7,398	$ 9,042
Unavailable	1,586	1,566
Obligated balance not yet disbursed	37,811	34,837
Borrowing authority not yet converted to fund balance	(853)	(2,445)
Borrowing resources invested in Treasury securities	(320)	(782)
Non-Budgetary Fund Balance with Treasury	3,223	3,639
Total Fund Balance with Treasury	**$ 48,846**	**$ 45,857**

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. Budgetary 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. FY 2021 and FY 2022 amounts available in future years are included in Category C – Apportioned for future years specified on the annual OMB SF-132 (Apportionment and Reapportionment Schedule).

4. Investments and Related Interest, Net

($ IN MILLIONS)	FACE VALUE	UNAMORTIZED PREMIUM (DISCOUNT)	INTEREST RECEIVABLE	INVESTMENTS, NET	UNREALIZED MARKET GAINS (LOSSES)	MARKET VALUE
	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**
	FY 2020					
Intragovernmental Non-Marketable						
Nuclear Waste Fund	$ 54,666	$ (12,139)	$ 122	$ 42,649	$ 11,634	$ 54,283
D&D Fund	851	5	4	860	9	869
U.S. Enrichment Corporation Fund	1,717	2	17	1,736	3	1,739
Power Marketing Administrations	491	—	—	491	—	491
Total investments and related interest, net	**$ 57,725**	**$ (12,132)**	**$ 143**	**$ 45,736**	**$ 11,646**	**$ 57,382**

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.

BPA did not make an overnight investment of cash available on September 30, 2021, in order to make sure adequate funds were on hand to make annual Treasury payment and meet ongoing obligations. On September 30, 2020, BPA invested cash in the amount of $491 million in overnight investments with the Treasury. The change reflects the decision to hold available all cash as of September 30, 2021.

The Federal Government does not set aside assets to pay for expenditures associated with the 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 2021			FY 2020		
	RECEIVABLE	ALLOWANCE	NET	RECEIVABLE	ALLOWANCE	NET
Intragovernmental	$ 547	$ —	$ 547	$ 532	$ —	$ 532
Nuclear Waste Fund	$ 2,420	$ —	$ 2,420	$ 2,418	$ —	$ 2,418
Power Marketing Administrations	507	(1)	506	519	(3)	516
Other	184	(85)	99	206	(106)	100
Subtotal	**$ 3,111**	**$ (86)**	**$ 3,025**	**$ 3,143**	**$ (109)**	**$ 3,034**
Total accounts receivable, net	**$ 3,658**	**$ (86)**	**$ 3,572**	**$ 3,675**	**$ (109)**	**$ 3,566**

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 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. Other receivables due from the public include reimbursable work billings, trade receivables, and other miscellaneous receivable.

6. Direct Loans and Loan Guarantees, Net

($ IN MILLIONS)	FY 2021	FY 2020
Pre-FCRA loans	$ 1	$ 1
FCRA Direct loans		
ATVM	1,028	1,173
Title XVII	15,310	13,987
Total direct loans and 100% guarantee loans, net *	**$ 16,339**	**$ 15,161**
FCRA Guarantee loans (guaranteed value)		
Title XVII	1,439	1,600
Total direct loans and loan guarantees, net	**$ 17,778**	**$ 16,761**

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

PRE-FCRA LOANS

The Department has one loan outstanding as of September 30, 2021 and September 30, 2020 that was issued prior to the Federal Credit Reform Act of 1990 (FCRA). The loan presented net of an allowance for loss of $0.7 million and $0.7 million as of September 30, 2021 and September 30, 2020 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, respectively, 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 Loan Guarantee Program for Innovative Technologies (Title XVII)
- Tribal Energy Loan Guarantee Program (TELGP)

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. To be eligible for a direct loan, an advanced technology vehicle manufacturer applicant must demonstrate that the adjusted average fuel economy for its light duty vehicle fleet exceeds its fleet average for model year (MY) 2005. If the applicant is a new manufacturer of advanced technology vehicles, to be eligible for a direct loan, it must

demonstrate that its vehicles meet or exceed the industry adjusted average fuel economy for MY 2005 of equivalent vehicles. An advanced technology vehicle under Section 136 is a vehicle that is rated at or above 125% of the fuel economy standards for vehicles with substantially similar attributes for MY 2005. The FY 2009 Continuing Resolution (CR) enacted on September 30, 2008, appropriated $7.5 billion to support a maximum of $25.0 billion in loans under the ATVM Loan Program.

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.

In June 2020, one ATVM borrower modified their loan to adjust their principal repayment schedule without a change to the maturity date. The discount rates used for this modification were the economic assumption rates for fiscal year 2020. The modification resulted in a gain of $10.6 million due to the difference between the discount rate and the cohort rate. The modification resulted in no cost, or subsidy expense, to the government.

In March 2020, DOE received $20 million from the Department of Justice as a result of settlement of a claim in connection with a prior ATVM loan sale.

As of September 30, 2021, the Department obligated approximately $8.4 billion in closed loans under the ATVM Loan Program for five borrowers. Of this sum, the Department disbursed $7.3 billion and de-obligated $1.1 billion.

TITLE XVII

The Energy Policy Act of 2005 (EPAct05), P.L. 109-58 authorizes 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 EPAct05 provides 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."

Under the Revised Continuing Appropriations Resolution, 2007, P.L. No. 109-58, div. B, tit. II, ch. 3, section 20320, as amended by P.L. No. 110-5, 121 Stat.8, $4 billion in loan guarantee authority was provided. Of that $4 billion, $1.5 billion is allocated to renewable energy/energy efficiency, $500 million is allocated to advanced fossil energy, and the remaining $2 billion is allocated to nuclear. An additional $1.5 billion in renewable energy/energy efficiency loan guarantee authority, is available under the FY 2011 CR and the Omnibus Appropriations Act, 2009, P.L. No. 111-8, as amended by Section 408 of the Supplemental Appropriations Act, 2009, P.L. No. 111-32. The Omnibus Appropriations Act, 2009, P.L. No. 111-8, as amended by Section 408 of the Supplement Appropriation Act, 2009, P.L. No. 111-32 also provided $8 billion in loan guarantee authority for advanced fossil energy projects and an additional $20.5 billion for nuclear energy projects.

Under the Department of Defense and Full-Year Continuing Appropriations Act, 2011, P.L. No. 112-10 (FY 2011 CR), Congress made available approximately $170 million in appropriated funds to pay the subsidy of loan guarantees for renewable energy or efficient end-use energy technologies. Of this amount, $9 million was rescinded by the Consolidated Appropriations Act, 2017, P.L. No. 115-31.

The Consolidated Appropriations Act, 2012, P.L. 112-74, amended Section 1702 of Title XVII to provide that the Department may combine an appropriation of credit subsidy with a direct payment from the borrower to cover the subsidy of a loan guarantee. For nuclear power, front-end nuclear, and advanced fossil projects, Section 1703 continues to operate as a “self-pay” program whereby borrowers pay the subsidy cost.

In addition to the program under Section 1703 of Title XVII (Section 1703 program), the American Recovery and Reinvestment Act established a new 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). 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% guarantee, the regulations implementing Title XVII requires that the FFB provide the funding. Guarantees by the Department of 100 percent of loans made by 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 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 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, 2021, under the Section 1703 program, the Department has obligated approximately $11.6 billion for one project, of which $10.8 billion has been disbursed.

As of September 30, 2021, under the Section 1703 program, conditional commitments to issue loan guarantees have been issued for one project totaling $2.0 billion.

As of September 30, 2021, 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% 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 EPAct05 (25 USC 3502(c)) is a partial loan guarantee program that permits DOE to guarantee up to 90 percent of the unpaid principal and interest due on any loan made to a federally recognized Indian tribe for energy development. The tribal borrower will be required to invest equity in the project, and project debt will be provided by commercial lenders. Under the Consolidated Appropriations Act, 2017, Public Law 115-31 Congress made available approximately $8.5 million in appropriated funds to pay the credit subsidy of the loan guarantees under TELGP, which also must not exceed $2 billion in total volume. Any appropriated credit subsidy amounts shall be obligated at financial close. A solicitation outlining the rules of the loan program was issued on June 12, 2018.

As of September 30, 2021, under the TELGP, no loan guarantees have been obligated.

Direct Loans and 100% 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 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**
	FY 2020				
ATVM	$ 1,249	$ 1	$ (77)	$ 1,173	$ —
Title XVII	14,782	77	(872)	13,987	1,913
Total loans	**$ 16,031**	**$ 78**	**$ (949)**	**$ 15,160**	**$ 1,913**

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

($ 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)**

($ IN MILLIONS)	INTEREST DIFFERENTIAL	DEFAULTS	FEES AND OTHER COLLECTIONS	OTHER	TOTAL
	FY 2020				
Subsidy expense for new direct loans disbursed*					
Title XVII	$ (93)	$ 31	$ —	$ —	$ (62)
Total	**$ (93)**	**$ 31**	**$ —**	**$ —**	**$ (62)**
	INTEREST RE-ESTIMATES	**TECHNICAL RE-ESTIMATES**	**TOTAL RE-ESTIMATES**	**TOTAL MODIFICATIONS**	**TOTAL DIRECT LOAN SUBSIDY EXPENSE**
Re-estimates and Modifications					
ATVM	$ —	$ 14	$ 14	$ —	$ 14
Title XVII	25	419	444	—	382
Total	**$ 25**	**$ 433**	**$ 458**	**$ —**	**$ 396**

*** - New disbursements of existing loan obligations**

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

($ IN MILLIONS)	FY 2021	FY 2020
Beginning balance of the subsidy cost allowance	$ 949	$ 480
Add: subsidy expense for direct loans disbursed during the reporting years by component		
Interest rate differential costs	$ (72)	$ (93)
Default costs (net of recoveries)	27	31
Total of the above subsidy components	**$ (45)**	**$ (62)**
Adjustments:		
(a) Modification adjustment transfer	—	(11)
(b) Subsidy allowance amortization	40	84
Ending balance of subsidy cost allowance before re-estimates	**$ 944**	**$ 491**
Add or subtract subsidy re-estimates by component:		
Interest rate re-estimates	(358)	25
Technical/default re-estimates	(50)	433
Ending balance of subsidy cost allowance	**$ 536**	**$ 949**

Guaranteed Loans Outstanding

($ IN MILLIONS)	PRINCIPAL OF GUARANTEED LOANS FACE VALUE	AMOUNT OF OUTSTANDING PRINCIPAL GUARANTEED
	FY 2021	
Title XVII	$ 1,799	$ 1,439
	FY 2020	
Title XVII	$ 2,000	$ 1,600

Liability for Loan Guarantees, Present Value Method

($ IN MILLIONS)	FY 2021	FY 2020
Title XVII	$ 98	$ 117

Subsidy Expense for New Loan Guarantees by Program and Component

($ IN MILLIONS)	INTEREST DIFFERENTIAL	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)
($ IN MILLIONS)	INTEREST SUPPLEMENTS	DEFAULTS	FEES AND OTHER COLLECTIONS	OTHER	TOTAL
	FY 2020				
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	$ —	$ (69)	$ (69)		$ (69)

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

($ IN MILLIONS)	FY 2021	FY 2020
Beginning balance of the loan guarantee liabilities	$ 117	$ 174
Add interest expense on entity borrowings	4	12
Less downward re-estimates	(23)	(69)
Ending balance of the loan guarantee liabilities	**$ 98**	**$ 117**

Administrative Expenses

($ IN MILLIONS)	FY 2021	FY 2020
Direct loan program - ATVM	$ 5	$ 4
Loan guarantee program - Title XVII	$ 36	$ 32

7. Inventory, Net

($ IN MILLIONS)	FY 2021	FY 2020
Strategic Petroleum, Northeast Home Heating Oil and Gasoline Supply Reserves	$ 18,844	$ 19,498
Nuclear Materials	29,720	28,650
Other Inventory	742	701
Total inventory, net	**$ 49,306**	**$ 48,849**

Inventory includes stockpile materials consisting of crude oil and gasoline held in the Strategic Petroleum Reserve (SPR), ultra-low sulphur 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, 2021, the SPR contained crude oil with a historical cost of $18.6 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 $18.6 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, 2021 (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, 2021, stockpile materials held for sale of crude oil are valued at $30.05 per barrel. The difference between the estimated selling price and the carrying amount of stockpile materials held for sale is $45 per barrel.

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 1.7 million barrels of crude oil which is currently being stored for the COA is commingled with the Department's stock and is valued at its historical cost of $69.7 million as of September 30, 2021.

During August 2021, the SPR provided response to Hurricane Ida impacts to Louisiana Gulf of Mexico crude oil production and onshore oil distribution facilities with delivery of 3.3 million barrels to two refiners, under emergency exchange agreements, in order to aid the region with much needed fuel.

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, 2021.

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, 2021.

NUCLEAR MATERIALS

Nuclear materials include plutonium (weapon-grade, fuel-grade), uranium (highly enriched uranium [HEU], low enriched uranium [LEU], natural uranium, 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, 2021, the Department has natural uranium inventories of 3,710.7 metric tons (MTU) of uranium hexafluoride (UF6). This material can be divided into two stockpiles of material: U.S. origin (1,980.7 MTU of UF6) and Russian origin material (1,730 MTU of UF6). This 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 excess to national security needs. 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 2021.

8. Property, Plant, and Equipment, Net

($ IN MILLIONS)	ACQUISITION COSTS	ACCUMULATED DEPRECIATION	NETBOOK VALUE	ACQUISITION COSTS	ACCUMULATED DEPRECIATION	NETBOOK VALUE
	FY 2021			FY 2020		
Land and Land improvements	$ 2,591	$ (1,198)	$ 1,393	$ 2,527	$ (1,161)	$ 1,366
Structures and facilities	56,101	(36,729)	19,372	52,897	(33,658)	19,239
Internal use software	1,249	(894)	355	1,212	(877)	335
Equipment	22,032	(13,914)	8,118	21,609	(13,619)	7,990
Natural Resources	133	(22)	111	124	(21)	103
Construction work in process	13,810	—	13,810	11,380	—	11,380
Total general property, plant & equipment	**$ 95,916**	**$ (52,757)**	**$ 43,159**	**$ 89,749**	**$ (49,336)**	**$ 40,413**

($ IN MILLIONS)	PP&E	ACCUMULATED DEPRECIATION	NET PP&E
PP&E Balance beginning of year	$ 89,749	$ (49,336)	$ 40,413
Capitalized acquisitions from the public	5,913	—	5,913
Capitalized acquisitions from the government agencies	5	—	5
Dispositions	(701)	701	—
Revaluations	(1,138)	—	(1,138)
Depreciation/Amortization	—	(2,034)	(2,034)
Other	2,088	(2,088)	—
Total PP&E Balance at end of year	**$ 95,916**	**$ (52,757)**	**$ 43,159**

9. Other Assets

($ IN MILLIONS)	FY 2021	FY 2020
With the Public		
Regulatory assets (Note 10)	$ 9,340	$ 9,656
Operating non-federal generation	3,360	3,464
Other	772	571
Total other assets	**$ 13,472**	**$ 13,691**

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 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). Beginning in FY 2020, 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 WAPA's 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.

10. Regulatory Assets

($ IN MILLIONS)	FY 2021	FY 2020
Refinanced and additional appropriated capital	$ 5,215	$ 5,264
Residential exchange programs scheduled and refund amounts	1,722	1,910
Non-operating facilities	1,543	1,631
Conservation and fish and wildlife measures	377	413
Other regulatory assets	483	438
Total regulatory assets (Note 9)	**$ 9,340**	**$ 9,656**

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 between 68 and 75 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).

CONSERVATION AND FISH AND WILDLIFE MEASURES

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. 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.

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 over a period of five years beginning in FY 2020); 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; and spacer damper replacement program costs to replace deteriorated spacer dampers (amortized over a period of 25 or 30 years).

11. Liabilities Not Covered by Budgetary Resources

($ IN MILLIONS)	FY 2021	FY 2020
Intragovernmental		
Debt (Note 12)	$ 5,705	$ 5,724
Appropriated capital and other adjustments	3,324	3,646
Future reimbursements to the Treasury Judgment Fund	410	407
Other	40	16
Total Intragovernmental	**$ 9,479**	**$ 9,793**
Debt held by the public (Note 12)	5,082	5,078
Nuclear Waste Fund deferred revenues (Note 15)	46,716	45,069
Environmental liabilities (Note 13)	512,742	509,572
Pension and other actuarial liabilities (Notes 14 & 16)	22,336	30,095
Capital leases (Note 17)	57	96
Other liabilities		
Residential exchange - scheduled amounts (Note 14)	1,722	1,910
Environment, safety, and health compliance activities (Note 14)	1,994	1,431
Energy savings performance contracts and utility energy service contracts (Note 14)	475	462
Accrued annual leave for federal employees	188	180
Other	166	146
Contingencies and commitments (Note 18)	30,963	30,656
Total liabilities not covered by budgetary resources	**$ 631,920**	**$ 634,488**
Total liabilities covered by budgetary resources	32,133	30,732
Total liabilities not requiring budgetary resources	1,140	861
Total liabilities	**$ 665,193**	**$ 666,081**

12. Debt

($ IN MILLIONS)	BEGINNING BALANCE	NET BORROWINGS	ENDING BALANCE	BEGINNING BALANCE	NET BORROWINGS	ENDING BALANCE
	FY 2021			FY 2020		
Intragovernmental - not covered (Note 11)						
Borrowing from Treasury	$ 5,724	$ (19)	$ 5,705	$ 5,356	$ 368	$ 5,724
Subtotal	**$ 5,724**	**$ (19)**	**$ 5,705**	**$ 5,356**	**$ 368**	**$ 5,724**
Intragovernmental - covered						
Borrowing from Treasury	$ 935	$ 362	$ 1,297	$ 781	$ 154	$ 935
Borrowing from FFB	15,448	164	15,612	14,422	1,026	15,448
Subtotal	**$ 16,383**	**$ 526**	**$ 16,909**	**$ 15,203**	**$ 1,180**	**$ 16,383**
Total Intragovernmental debt	**$ 22,107**	**$ 507**	**$ 22,614**	**$ 20,559**	**$ 1,548**	**$ 22,107**
Debt held by the public (Note 11)	5,078	4	5,082	5,479	(401)	5,078
Total debt	**$ 27,185**	**$ 511**	**$ 27,696**	**$ 26,038**	**$ 1,147**	**$ 27,185**

BORROWING FROM TREASURY

BPA is authorized by Congress to issue and sell bonds to the Treasury, and to have outstanding at any time up to $7.7 billion aggregate principal amount of bonds. Of the $7.7 billion in Treasury borrowing authority, $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 $6.4 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 $7.7 billion, $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, 2021, and 2020, BPA had no bonds outstanding related to Northwest Power Act expenses. As of September 30, 2021, $531 million of variable-rate bonds were callable by BPA at par value on their interest repricing dates, which occurs every three to six months.

As of September 30, 2021, 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, 2020, $1.0 billion 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, 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. As of September 30, 2020, the maturity range of the debt was September 30, 2024 to September 30, 2048 and the interest rate range was 2.32 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.

BORROWING FROM 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, 2021 and September 30, 2020, the maturity range of the debt was from October 4, 2021 to April 3, 2045 and October 2, 2020 to April 3, 2045, respectively. The interest rate range was from 1.356 percent to 3.00 percent and from 2.08 percent to 3.00 percent as of September 30, 2021 and September 30, 2020, respectively. All debt from the FFB is considered covered by budgetary resources as there is no congressional action necessary to pay the debt.

DEBT HELD BY 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, 2021, Energy Northwest could borrow $110 million under a line-of-credit borrowing arrangement with a banking institution. In FY 2020, Energy Northwest obtained two line-of-credit borrowing arrangements with banking institutions in an aggregate amount of $300 million. As of September 30, 2021, and 2020, Energy Northwest had $0 and $10 million outstanding respectively, on these lines of credit. During fiscal year 2021, Energy Northwest amended one of the line-of-credit borrowing arrangements to extend the due date and reduce the principal amount by $40 million available under a line-of-credit borrowing arrangement. Also during fiscal year 2021, the other line of credit was terminated upon repayment of the outstanding $10 million.

BPA has agreements with four regional COUs 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, 2021, BPA's remaining liability is $186 million.

13. Environmental Cleanup and Disposal Liabilities

($ IN MILLIONS)	FY 2021	FY 2020
Beginning balance	$ 512,257	$ 505,302
Changes to environmental cleanup and disposal liability estimates (Note 20)	10,877	14,485
Costs applied to reduction of legacy environmental liabilities (Note 20)	(6,451)	(6,310)
Capital expenditures related to remediation activities	(1,038)	(1,220)
Ending environmental cleanup and disposal liabilities	**$ 515,645**	**$ 512,257**
Unfunded environmental liabilities (Note 11)	$ 512,742	$ 509,572
Funded environmental liabilities	2,903	2,685
Total environmental cleanup and disposal liabilities	**$ 515,645**	**$ 512,257**

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 (NWPA) 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 11,836 potential release sites from which contaminants could migrate into the environment. Although virtually all of these 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 is 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 2021 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 postclosure activities are estimated for a period of 75 years after the balance sheet date, i.e., through 2096 in FY 2021 and through 2095 in FY 2020. While some post-cleanup monitoring and other long-term stewardship activities post 2096 are included, there are others the Department expects to continue beyond 2096 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, 2021, and $942 million at September 30, 2020.

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, 2021, and September 30, 2020, are stated in FY 2021 dollars and FY 2020 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 2021 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 closure and have been grouted in place. The majority of the liquid tank waste is processed through the Salt Waste Processing Facility into two streams, HLW and decontaminated low level salt waste stream (DSS). 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 stored in canisters. The DSS is sent to the Saltstone Production facility where it is combined with a cementitious material and 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. On October 9, 2018, the U.S. Court of Appeals lifted the Preliminary Injunction, allowing the Department to move forward with termination of construction of the Mixed Oxide (MOX) facility. On January 8, 2019 the U.S. Court of Appeals issued a final ruling holding that the State of South Carolina lacks standing to challenge the decision to terminate the MOX project. In FY 2019, the 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 Idaho 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, as well as maintain the Idaho Nuclear Technology and Engineering Center.

- The Solid Waste Stabilization and Disposition Project dispositions 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 ETTP in FY 2020.

- 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.

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 2021	FY 2020
Intragovernmental		
Appropriated capital	$ 1,187	$ 1,450
Refinanced and additional appropriations	1,184	1,178
Capitalization adjustment	953	1,018
Other	664	294
Total other intragovernmental liabilities	**$ 3,988**	**$ 3,940**
Pension and other actuarial liabilities (Note 11 & 16)	22,336	30,095
Obligations under capital leases (Note 17)	2,220	2,319
Contingencies and commitments (Note 18)	30,966	30,660
Environment, safety, and health compliance activities (Note 11)	1,997	1,436
Accrued payroll, benefits, and withholding taxes	1,791	1,727
Residential exchange program (REP)(Note 11)	1,722	1,910
Asset retirement obligations	929	891
Energy savings performance contracts and utility energy service contracts (Note 11)	475	462
Oil held for others (Notes 2 & 7)	70	149
Other	413	273
Total with the public	**$ 62,919**	**$ 69,922**
Total other liabilities	**$ 66,907**	**$ 73,862**

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 27. 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

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 Columbia River Fish Mitigation 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. 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.

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 2021 and FY 2020.

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 being amortized over a 40-year period through FY 2036. Amortization of the capitalization adjustment was $65 million for FY 2021 and FY 2020 (see Note 10).

FUTURE REIMBURSEMENTS TO THE TREASURY JUDGMENT FUND

This amount is comprised of future reimbursements the Department will need to make to the Treasury Judgment Fund for litigation payments made on behalf of the Department.

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, BENEFITS, AND WITHHOLDING TAXES

Accrued payroll and benefits represent amounts owed to the Department's federal and contractor employees for accrued payroll, unfunded accrued annual leave for federal employees, funded accrued annual leave for contractor employees, payroll withholdings owed to state and local governments, and Thrift Savings Plan withholdings and employer contributions.

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 fiscal years 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 IOU's 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. As of September 30, 2021, the remaining Scheduled Amounts total $2.0 billion. Amounts recorded of $1.7 billion at September 30, 2021 represent the present value of future cash outflows for these IOU 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 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.

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 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, 2021, 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, 2021, 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.

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, 2021.

($ IN MILLIONS) AS OF SEPTEMBER 30, 2021	NON-FEDERAL PARTNERS' IMPLEMENT-ATION AMOUNT	TOTAL DOE PAYMENTS TO BE MADE OVER THE EXPECTED LIFE OF ARRANGEMENT	TOTAL CUMULATIVE PAYMENTS
ESPCs	$ 619	$ 1,982	$ 829
UESCs	20	23	14
Total	**$ 639**	**$ 2,005**	**$ 843**

The following table presents the actual payments in FY 2021 and FY 2020, and the estimated amount to be paid in FY 2022 and beyond.

($ IN MILLIONS) AS OF SEPTEMBER 30, 2021	FY2021	FY2020	FUTURE PERIODS
Agreements/ Contracts	Actual amount paid	Actual amount paid	Estimated amount to be paid in FY 2022+
ESPCs	$ 107	$ 107	$ 1,153
UESCs	2	2	9
Total	**$ 109**	**$ 109**	**$ 1,162**

OTHER LIABILITIES

Non-Federal Other Liabilities with the Public "Other" represents Contract Holdbacks, limited payroll related liabilities, Undistributed Advances, and various other miscellaneous liabilities.

15. Deferred Revenues and Other Credits

($ IN MILLIONS)	FY 2021	FY 2020
Intragovernmental	$ 230	$ 239
Nuclear Waste Fund (Note 11)	$ 46,716	$ 45,069
Power Marketing Administrations	1,494	1,441
Reimbursable work advances	330	328
Other	232	219
Subtotal	**$ 48,772**	**$ 47,057**
Total deferred revenues and other credits	**$ 49,002**	**$ 47,296**

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 for amounts previously collected through rates for accumulated plant removal costs as part of depreciation and decommissioning and site restoration costs as well as the unrealized gains from BPA's derivative portfolio. These amounts 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 intertie transmission line capacity agreements reflecting unearned revenues from customers related to the Third Alternating Current intertie transmission line capacity project.
- Derivative instruments reflect the unrealized losses from BPA's derivative portfolio, which primarily includes physical power purchase and sale transactions.

16. Pension and Other Actuarial Liabilities

($ IN MILLIONS)	FY 2021	FY 2020
Contractor pension plans	$ 13,242	$ 20,455
Contractor postretirement benefits other than pensions	9,070	9,611
Contractor disability and life insurance plans	24	29
Total pension and other actuarial liabilities (Note 11 & 14)	**$ 22,336**	**$ 30,095**

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. As such, the Department follows FASB ASC 715, Compensation – Retirement Benefits, for reporting contractor pension and PRB plans for which the Department has a continuing obligation to reimburse allowable costs. The Department also reimburses these contractors for employee disability insurance plans, and estimates are recorded as unfunded liabilities for these plans.

CONTRACTOR PENSION PLANS

As of September 30, 2021, 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 $238 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 $13.2 billion. The Department has a continuing obligation to reimburse allowable costs for a variety of contractor-sponsored pension plans (32 qualified and 13 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 include the discount rates, mortality assumptions, and an expected long-term inflation rate of 2 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 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 2.50 percent for FY 2021 and 3.00 percent for FY 2020; the weighted average long-term rate of return on assets was 5.75 percent for FY 2021 and 6.17 percent for FY 2020; and the average rate of compensation increase was 3.3 percent for FY 2021 and 3.2 percent for FY 2020. The average long-term rate of return on assets shown above is the average rate for all of 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, 2021, and September 30, 2020, were 2.70 percent and 2.50 percent, respectively.

The aggregate accumulated benefit obligation and aggregate fair value of plan assets for plans with accumulated benefit obligations in excess of plan assets are $56.3 billion and $47.1 billion as of September 30, 2021, and are $59.6 billion and $43.4 billion as of September 30, 2020, respectively. The aggregate projected benefit obligation and aggregate fair value of plan assets for plans with projected benefit obligations in excess of plan assets are $62.7 billion and $49.4 billion as of September 30, 2021, and 63.9 billion and $43.4 billion as of September 30, 2020, respectively.

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 POSTRETIREMENT BENEFITS OTHER THAN PENSIONS

The Department's contractors sponsor a variety of postretirement benefits other than pensions. As of September 30, 2021, 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 $17 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 $9.1 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 7.12 percent in 2021 down to 5.00 percent in 2035 and later for under age 65; and 5.01 percent in 2021 down to 5.00 percent in 2035 and later for age 65 and older. The medical trend rates for a traditional indemnity or similar plan grade from 6.94 percent in 2021 down to 5.00 percent in 2035 and later for under age 65; and 5.01 percent in 2021 down to 5.00 percent in 2035 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 5.01 percent in 2021 down to 5.00 percent by 2035 and later. The trend rates for a Part D PDP grade from 6.87 percent in 2021 down to 5.00 percent in 2035 and later; and for a Non-Part D PDP grade from 8.06 percent in 2021 down to 5.00 percent in 2035 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 2.94 percent in 2021 up to 4.00 percent in 2035 and later.

The weighted average discount rates of 2.5 percent for FY 2021 and 3.00 percent for FY 2020, and the weighted average long-term rate of return on assets of 3.38 percent for FY 2021 and 3.4 percent for FY 2020 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 all of 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, 2021, and September 30, 2020, were 2.70 percent and 2.50 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 $9.2 billion and $120 million as of September 30, 2021, are $9.7 billion and $123 million as of September 30, 2020, respectively.

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 Costs*. Service costs are recorded by program and all other net periodic costs are recorded as costs not assigned (see Note 21).

The FY 2021 and FY 2020 values reflect the impact of health care reform legislation passed in March 2010. The liabilities reflect the contractors' best estimates given the guidance and regulations available for these laws. Liabilities in future years may need to be adjusted if new health care legislation is passed.

($ IN MILLIONS)	PENSION BENEFITS		OTHER POSTRETIREMENT BENEFITS	
	FY 2021	FY 2020	FY 2021	FY 2020
NET AMOUNT RECOGNIZED IN THE COMBINED BALANCE SHEET				
Accumulated benefit obligation	$ 59,798	$ 60,949		
Effect of future compensation increases	4,125	4,264		
Benefit obligation	**$ 63,923**	**$ 65,213**	$ 9,194	$ 9,739
Plan assets	50,918	44,829	141	144
Net amount recognized in the balance sheet (net funded status)	**$(13,005)**	**$(20,384)**	**$ (9,053)**	**$ (9,595)**
RECONCILIATION OF AMOUNTS RECOGNIZED IN THE COMBINED BALANCE SHEET				
Asset (prepaid plan costs) (Note 10)	$ 237	$ 71	$ 17	$ 16
Liability	(13,242)	(20,455)	(9,070)	(9,611)
Net amount recognized in the balance sheet (net funded status)	**$(13,005)**	**$(20,384)**	**$ (9,053)**	**$ (9,595)**
COMPONENTS OF NET PERIODIC COSTS				
Service costs	$ 1,203	$ 1,097	$ 165	$ 149
Interest costs	1,618	1,779	232	265
Expected return on plan assets	(2,535)	(2,517)	(4)	(5)
(Gain)/loss due to curtailments, settlements or special termination benefits	—	—	—	—
Net prior service cost/(credit)	5	11	(1)	(15)
Net (gain)/loss	(6,282)	2,412	(578)	(339)
Total net periodic costs	**$ (5,991)**	**$ 2,782**	**$ (186)**	**$ 55**
CONTRIBUTIONS AND BENEFIT PAYMENTS				
Employer contributions	$ 1,389	$ 1,259	$ 355	$ 345
Participant contributions	96	87	71	70
Benefit payments	2,593	2,472	439*	425*

*Includes $13 million paid from plan assets for FY 2021, and $10 million paid from plan assets for FY 2020. 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. For FY 2020, gross benefit payments were $437 million including $2 million of Federal Medicare subsidy. This resulted in net benefit payments of $425 million for FY 2020.

($ IN MILLIONS)	PENSION BENEFITS	OTHER POSTRETIREMENT BENEFITS
Expected contributions for fiscal year ending September 30, 2020		
Employer contributions	$1,204	$398
Participant contributions	90	80

($ IN MILLIONS)	PENSION BENEFITS	OTHER POSTRETIREMENT BENEFITS		
		GROSS PAYMENT	LESS FEDERAL MEDICARE PART D SUBSIDY *	NET PAYMENT
ESTIMATED FUTURE BENEFIT PAYMENTS FY:				
2022	$ 2,684	$ 492	$ 3	$ 489
2023	2,785	506	3	503
2024	2,880	519	3	516
2025	2,961	531	4	527
2026	3,014	540	4	536
2027 to 2031	16,007	2,741	17	2,724

* 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.

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 2021 and FY 2020 allocations of assets are also shown.

	PENSION BENEFITS			OTHER POSTRETIREMENT BENEFITS		
	TARGET ALLOCATION	PERCENT OF PLAN ASSETS AT END FY 2021	PERCENT OF PLAN ASSETS AT END FY 2020	TARGET ALLOCATION	PERCENT OF PLAN ASSETS AT END FY 2021	PERCENT OF PLAN ASSETS AT END FY 2020
Cash and Equivalents	1.6 %	2.2 %	2.3 %	0.1 %	0.1 %	0.4 %
US Government Bonds	11.3 %	10.0 %	10.1 %	2.9 %	2.9 %	1.7 %
State and Municipal Government Bonds	0.2 %	0.3 %	0.4 %	1.1 %	1.1 %	1.0 %
Foreign Government Bonds	0.4 %	0.4 %	0.4 %	0.0 %	0.0 %	0.0 %
High-yield Corporate Bonds	1.9 %	1.2 %	1.3 %	0.0 %	0.0 %	0.0 %
Corporate Bonds other than high-yield	14.3 %	18.1 %	19.2 %	4.1 %	4.1 %	5.2 %
Domestic Equities	22.2 %	18.0 %	19.0 %	2.4 %	2.4 %	2.2 %
International Equities	20.5 %	15.4 %	13.2 %	1.1 %	1.1 %	0.8 %
Real Estate Investment Funds	6.6 %	4.8 %	4.4 %	0.0 %	0.0 %	0.0 %
Other Real Estate	0.2 %	0.1 %	0.1 %	0.0 %	0.0 %	0.0 %
Mortgage-Backed Securities	0.5 %	0.5 %	0.6 %	0.2 %	0.2 %	0.3 %
Asset-Backed Commercial Paper	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
Bonds/Notes Issued by Structured Investment Vehicles	0.2 %	0.1 %	0.0 %	0.0 %	0.0 %	0.0 %
Derivatives, including Collateralized Debt Obligations and Credit Default Swaps	0.1 %	0.1 %	0.2 %	2.3 %	2.3 %	2.2 %
Private Investment Funds, including Hedge Funds	4.4 %	4.9 %	4.6 %	0.0 %	0.0 %	0.0 %
Insurance Contracts (general accounts)	0.0 %	0.2 %	0.2 %	77.7 %	77.7 %	79.4 %
Insurance Contracts (separate accounts)	0.0 %	0.0 %	0.1 %	7.5 %	7.5 %	6.4 %
Employer Securities	0.4 %	0.5 %	0.4 %	0.0 %	0.0 %	0.0 %
Aggregate Bond Index, Long Bond Index	1.6 %	1.1 %	1.2 %	0.0 %	0.0 %	0.0 %
Other	13.6 %	22.1 %	22.3 %	0.6 %	0.6 %	0.4 %
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.

The following chart shows the allocation of the assets for FY 2021 and FY 2020 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 reflect 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	
Asset Class	Total		Level 1		Level 2		Level 3		NAV	
	FY 2021	FY 2020	FY 2021	FY 2020	FY 2021	FY 2020	FY 2021	FY 2020	FY 2021	FY 2020
Cash and Equivalents	$ 1,134	$ 1,012	$ 137	$ 108	$ 621	$ 659	$ —	$ —	$ 375	$ 245
US Government Bonds	5,110	4,508	2,148	1,758	2,017	2,164	—	—	945	586
State and Municipal Government Bonds	148	172	—	—	145	168	1	1	2	3
Foreign Government Bonds	221	186	68	62	114	90	—	—	39	34
High-yield Corporate Bonds	616	571	6	7	300	252	—	—	310	312
Corporate Bonds other than high-yield	9,195	8,587	577	85	8,057	8,016	—	—	561	487
Domestic Equities	9,170	8,517	5,218	5,145	850	938	6	—	3,096	2,434
International Equities	7,856	5,929	2,636	2,431	1,005	522	—	—	4,215	2,975
Real Estate Investment Funds	2,432	1,963	80	61	—	—	—	—	2,352	1,901
Other Real Estate	52	45	—	—	—	—	52	45	—	—
Mortgage-Backed Securities	255	271	4	10	133	190	—	—	118	71
Asset-Backed Commercial Paper	2	3	—	—	—	—	—	—	2	3
Bonds/Notes Issued by Structured Investment Vehicles	71	21	—	—	—	—	—	—	71	21
Derivatives	69	73	—	—	12	—	—	—	57	73
Private Investment Funds	2,511	2,073	29	21	32	31	96	75	2,354	1,946
Insurance Contracts (general accounts)	83	84	—	—	1	1	82	83	—	—
Insurance Contracts (separate accounts)	18	33	—	—	18	33	—	—	—	—
Employer Securities	244	187	244	187	—	—	—	—	—	—
Aggregate Bond Index, Long Bond Index	569	541	45	—	360	390	—	—	164	150
Other	11,162	10,053	(240)	86	82	96	94	70	11,226	9,803
Total Assets	**$ 50,918**	**$ 44,829**	**$ 10,952**	**$ 9,961**	**$ 13,747**	**$ 13,550**	**$ 331**	**$ 274**	**$ 25,887**	**$ 21,044**

The following chart shows the reconciliation of the Level 3 assets for FY 2021 and FY 2020 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 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**
	FY 2020						
Beginning Balance	$ —	$ 82	$ 44	$ 342	$ 84	$ 63	$ 615
Actual return on plan assets:							
Relating to assets still held at the reporting date	—	—	3	1	1	1	6
Relating to assets sold during the period	—	—	(2)	—	—	6	4
Purchases, sales, and settlements	—	—	(4)	45	(2)	1	40
Transfers in and/or out of Level 3	—	(82)	—	(313)	—	1	(394)
Other	—	—	4	—	—	(1)	3
Ending Balance	**$ —**	**$ —**	**$ 45**	**$ 75**	**$ 83**	**$ 71**	**$ 274**

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. U.S. 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 FY.

The $140 million of assets in the five other postretirement benefit plans include $109 million of investments in insurance contracts (General Accounts) of which $78 million is valued using significant unobservable inputs (Level 3). The balance of the Level 3 insurance contracts decreased by $5 million during FY 2021 from $83 million to $78 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. 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 2021	FY 2020
SUMMARY OF ASSETS UNDER CAPITAL LEASE		
Power Line Equipment	$ 2,010	$ 2,071
Buildings	26	12
ADP equipment	248	300
Construction work in progress	117	124
Lease-purchase trust funds	15	23
Total capital lease assets	**$ 2,416**	**$ 2,530**
Less accumulated depreciation	(461)	(398)
Net assets under capital leases	**$ 1,955**	**$ 2,132**

($ IN MILLIONS) FISCAL YEAR 2021	POWER LINE EQUIPMENT	OTHER	TOTAL
Future lease payments:			
2022	$ 137	$ 32	$ 169
2023	135	30	165
2024	149	6	155
2025	245	2	247
2026	160	1	161
2027+	2,284	5	2,289
Total future lease payments	**$ 3,110**	**$ 76**	**$ 3,186**
Less imputed interest	(946)	(4)	(950)
Less executory costs	(15)	(1)	(16)
Net capital lease liability	**$ 2,149**	**$ 71**	**$ 2,220**
Capital lease liabilities covered by budgetary resources			$ (2,163)
Capital lease liabilities not covered by budgetary resources (Note 11)			(57)
Total capital lease liability			**$ (2,220)**

Federal and Non-Federal Operating Leases:

($ IN MILLIONS)	ASSET CATEGORY		TOTAL	
FISCAL YEAR 2021	BUILDINGS/ FACILITIES	OTHER	FEDERAL	NON-FEDERAL
Future lease payments:				
2022	$ 121	$ 10	$ 89	$ 42
2023	114	10	87	37
2024	103	6	82	27
2025	93	1	78	16
2026	83	1	78	6
2027+	453	1	447	7
Total future lease payments	**$ 967**	**$ 29**	**$ 861**	**$ 135**

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, 2021. In particular, the bulk of the Department's $861 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 $757 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 2021	FY 2020
Unfunded contingencies (Note 11)		
Spent nuclear fuel litigation	$ 30,878	$ 30,604
Other	85	52
Subtotal	**$ 30,963**	**$ 30,656**
Funded contingencies		
Other	3	4
Total contingencies	**$ 30,966**	**$ 30,660**

($ IN MILLIONS)	ACCRUED LIABILITIES	ESTIMATED RANGE OF LOSS		ACCRUED LIABILITIES	ESTIMATED RANGE OF LOSS	
		Lower End	Upper End		Lower End	Upper End
	FY 2021			FY 2020		
Legal Contingencies:						
Probable	$ 30,913	$ 30,913	$ 31,012	$ 30,608	$ 30,608	$ 30,608
Reasonably Possible	—	—	—	—	20	67
Environmental Contingencies:						
Probable	—	—	—	—	—	—
Reasonably Possible	—	113	432	—	113	432
Other Contingencies:						
Probable	53	53	53	52	52	52
Reasonably Possible	—	—	—	—	—	—
Total Contingencies	**$ 30,966**	**$ 31,079**	**$ 31,497**	**$ 30,660**	**$ 30,793**	**$ 31,159**

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 a 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 NWPA, 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 NWPA, 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, 43 suits have been settled involving utilities that collectively own 81 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 $6.5 billion as of September 30, 2021 to the settling utilities for delay damages they have incurred through September 30, 2021. In addition, 67 cases have been resolved by 59 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 51 remaining cases resulted in a total of $2.5 billion in damages that have been paid by the Judgment Fund as of September 30, 2021.

An additional 17 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 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 the 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, 2021 was $39.9 billion. After deducting the cumulative amount paid of $9.0 billion as of September 30, 2021 under these settlements and as a result of final judgments, the remaining liability is estimated to be approximately $30.9 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 spent nuclear fuel litigation liability. The previous Administration requested funds for the Yucca Mountain licensing proceeding in the FY 2018, 2019, and 2020 Budget Requests. However, no appropriations were received. In the FY 2021 Budget Request, the prior administration took a different approach and did not request any funds for the Yucca Mountain licensing proceeding but did request appropriated funds to develop and implement a consolidated interim storage program as part of a new, yet to be developed, integrated plan. The Consolidated Appropriations Act for 2021 appropriated $20 million for the Department to proceed with planning for one or more federal consolidated interim storage facilities using a consent-based approach.

The current 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 repository 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 intends to pursue a consent-based approach to site an interim storage facility or facilities and permanent disposal. As the Department intends to fulfill its contractual obligations upon the acceptance of spent nuclear fuel and high-level radioactive waste 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 assumes 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.

In the Brookhaven litigation, two class action cases, Osarczuk v. Associated Universities (AUI) and Tarzia v. Associated Universities, were filed in which residents and property owners near Brookhaven National Laboratory 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 Brookhaven National Laboratory asserted clams for negligence, abnormally dangerous activity, gross negligence, and loss of consortium and sought damages as a result of the release of 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 have been 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. 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 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 that denial. In McGowan, a complaint was filed on May 19, 2020 and Associated Universities responded to the complaint on February 19, 2021. Plaintiffs in the Brookhaven litigation are seeking $1.2 billion, collectively. However, the Department believes that if any damages are ultimately awarded, the amounts would be significantly less than what plaintiffs seek.

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 Department provides funding, as appropriate, to reimburse the plaintiffs through the Trustee Council's administrative process for natural resource damage assessments. 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.

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 Comprehensive Environmental Response, Compensation, & Liability Act (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, 2021, 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 irrigation distributions do not specifically relate to power generation. In establishing power rates, particular

statutory provisions guide the assumptions that WAPA and BPA makes 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 $263 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 $1.5 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 cost 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 are no minimum payments required.

($ IN MILLIONS) FISCAL YEAR	PURCHASE POWER AND TRANSMISSION (ALL PMA'S)	IRRIGATION ASSISTANCE (BPA and WAPA)
2022	$ 121	$ 24
2023	98	43
2024	77	16
2025	72	126
2026	73	28
2027+	127	1,480
Total	**$ 568**	**$ 1,717**

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 Environmental Impact Statement (CRSO EIS). BPA's total commitment including timing of payments under the Northwest Power Act, ESA, and BiOp, including CRSO EIS impacts, is not fixed or determinable.

As of September 30, 2021, BPA has long-term fish and wildlife agreements with estimated contractual commitments of $510 million. These long-term fish and wildlife agreements includes $502 million for the Columbia Basin Fish Accords. BPA and its federal partners USACE and BOR have agreements with Accords partners, namely certain states and tribes, for fish and wildlife protection and mitigation. The Columbia Basin Fish Accords expire September 30, 2022. Remaining fish and wildlife agreements expire at various dates through fiscal year 2027.

19. Dedicated Collections

	FY 2021					
($ IN MILLIONS)	NUCLEAR WASTE FUND	D&D FUND	PMAs	OTHER	ELIMINATIONS	TOTAL
BALANCE SHEET						
ASSETS						
Intragovernmental:						
Fund Balance with Treasury	$ 20	$ 30	$ 5,104	$ 1,238	$ —	$ 6,392
Investments and related interest, net	44,295	347	—	1,451	—	46,093
Accounts receivable, net	—	24	161	—	(35)	150
Loans receivable, amounts loaned from the Reclamation Fund	—	—	2,866	—	(2,866)	—
Advances and prepayments	—	—	2	—	(2)	—
Total intragovernmental assets	**44,315**	**401**	**8,133**	**2,689**	**(2,903)**	**52,635**
Cash	—	—	172	—	—	172
Accounts receivable, net	2,418	—	497	—	—	2,915
Direct loans and loan guarantees, net	—	—	1	—	—	1
Inventory, net	—	—	140	180	—	320
General property plant and equipment, net	—	28	10,753	172	—	10,953
Advances and prepayments	—	—	37	—	—	37
Other assets	—	(24)	13,394	—	—	13,370
Total Assets	**$ 46,733**	**$ 405**	**$ 33,127**	**$ 3,041**	**$ (2,903)**	**$ 80,403**
LIABILITIES AND NET POSITION						
Intragovernmental:						
Accounts payable	$ —	$ 40	$ 79	$ —	$ (35)	$ 84
Debt	—	—	8,605	—	(2,866)	5,739
Advances from others and deferred revenue	—	—	3	—	(2)	1
Other intragovernmental liabilities	—	—	3,568	—	—	3,568
Total intragovernmental liabilities	**—**	**40**	**12,255**	**—**	**(2,903)**	**9,392**
Accounts payable	—	175	573	8	—	756
Debt	—	—	5,082	—	—	5,082
Federal employee and veteran benefits payable	—	—	64	—	—	64
Environmental cleanup and disposal liabilities	—	25,863	20	—	—	25,883
Advances from others and deferred revenue	46,716	—	1,494	3	—	48,213
Other liabilities	—	33	4,903	54	—	4,990
Total liabilities	**46,716**	**26,111**	**24,391**	**65**	**(2,903)**	**94,380**
Unexpended appropriations	17	—	—	10	—	27
Cumulative results of operations	—	(25,706)	8,736	2,966	—	(14,004)
Total Liabilities and Net Position	**$ 46,733**	**$ 405**	**$ 33,127**	**$ 3,041**	**$ (2,903)**	**$ 80,403**
STATEMENT OF NET COST						
Program costs	$ 10	$ 1,052	$ 5,012	$ 182	$ (311)	$ 5,945
Less earned revenues	(12)	(7)	(5,628)	(1,220)	311	(6,556)
Net program costs	**$ (2)**	**$ 1,045**	**$ (616)**	**$ (1,038)**	**$ —**	**$ (611)**
Costs not assigned	—	(6)	—	(2)	—	(8)
Net cost of operations	**(2)**	**1,039**	**(616)**	**(1,040)**	**—**	**(619)**
STATEMENT OF CHANGES IN NET POSITION						
Unexpended appropriations, beginning balance	$ —	$ —	$ —	$ 9	$ —	$ 9
Appropriations received	20	—	—	7	—	27
Appropriations used	(3)	—	—	(6)	—	(9)
Unexpended appropriations, ending balance	**17**	**$ —**	**$ —**	**$ 10**	**$ —**	**$ 27**
Cumulative results of operations, beginning balance	$ —	$ (24,958)	$ 8,600	$ 3,416	$ —	$ (12,942)
Appropriations used	3	—	—	6	—	9
Non-exchange revenue	—	—	—	5	—	5
Transfers - (in)/out without reimbursement	(5)	291	(531)	(290)	—	(535)
Donations and forfeitures of property	—	—	36	—	—	36
Imputed financing	—	—	10	—	—	10
Other	—	—	5	(1,211)	—	(1,206)
Net cost of operations	2	(1,039)	616	1,040	—	619
Cumulative results of operations, ending balance	**$ —**	**$ (25,706)**	**$ 8,736**	**$ 2,966**	**$ —**	**$ (14,004)**
Net position, end of period	**$ 17**	**$ (25,706)**	**$ 8,736**	**$ 2,976**	**$ —**	**$ (13,977)**

Dedicated Collections (continued)

	FY 2020					
($ IN MILLIONS)	NUCLEAR WASTE FUND	D&D FUND	PMAs	OTHER	ELIMINATIONS	TOTAL
BALANCE SHEET						
ASSETS						
Intragovernmental:						
Fund Balance with Treasury	$ 2	$ 30	$ 4,432	$ 1,463	$ —	$ 5,927
Investments and related interest, net	42,649	860	491	1,736	—	45,736
Accounts receivable, net	—	23	145	—	(30)	138
Loans receivable, amounts loaned from the Reclamation Fund	—	—	2,916	—	(2,916)	—
Advances and prepayments	—	—	—	—	—	—
Total intragovernmental assets	**42,651**	**913**	**7,984**	**3,199**	**(2,946)**	**51,801**
Cash	—	—	300	—	—	300
Accounts receivable, net	2,418	—	511	—	—	2,929
Direct loans and loan guarantees, net	—	—	1	—	—	1
Inventory, net	—	—	135	179	—	314
General property plant and equipment, net	—	23	10,565	124	—	10,712
Advances and prepayments	—	—	36	—	—	36
Other assets	—	(23)	13,710	—	—	13,687
Total Assets	**$ 45,069**	**$ 913**	**$ 33,242**	**$ 3,502**	**$ (2,946)**	**$ 79,780**
LIABILITIES AND NET POSITION						
Intragovernmental:						
Accounts payable	$ —	$ 38	$ 80	$ —	$ (30)	$ 88
Debt	—	—	8,668	—	(2,916)	5,752
Advances from others and deferred revenue	—	—	5	—	—	5
Other intragovernmental liabilities	—	—	3,724	1	—	3,725
Total intragovernmental liabilities	**—**	**38**	**12,477**	**1**	**(2,946)**	**9,570**
Accounts payable	—	149	453	11		613
Debt	—	—	5,078			5,078
Federal employee and veteran benefits payable	—	—	64			64
Environmental cleanup and disposal liabilities	—	25,651	20	—	—	25,671
Advances from others and deferred revenue	45,069	—	1,441	11	—	46,521
Other liabilities	—	33	5,109	54	—	5,196
Total liabilities	**45,069**	**25,871**	**24,642**	**77**	**(2,946)**	**92,713**
Unexpended appropriations	—	—	—	9	—	9
Cumulative results of operations	—	(24,958)	8,600	3,416	—	(12,942)
Total Liabilities and Net Position	**$ 45,069**	**$ 913**	**$ 33,242**	**$ 3,502**	**$ (2,946)**	**$ 79,780**
STATEMENT OF NET COST						
Program costs	$ 1	$ 620	$ 4,478	$ 169	$ (289)	$ 4,979
Less earned revenues	(5)	(27)	(5,042)	(667)	289	(5,452)
Net program costs	**$ (4)**	**$ 593**	**$ (564)**	**$ (498)**	**$ —**	**$ (473)**
Costs not assigned	—	—	—	37	—	37
Net cost of operations	**$ (4)**	**$ 593**	**$ (564)**	**$ (461)**	**$ —**	**$ (436)**
STATEMENT OF CHANGES IN NET POSITION						
Unexpended appropriations, beginning balance	$ —	$ —	$ —	$ 7	$ —	$ 7
Appropriations received		—	—	10	—	10
Appropriations used		—	—	(8)	—	(8)
Unexpended appropriations, ending balance	**—**	**$ —**	**$ —**	**$ 9**	**$ —**	**$ 9**
Cumulative results of operations, beginning balance	$ —	$ (24,365)	$ 8,463	$ 2,917	$ —	$ (12,985)
Appropriations used		—	—	8	—	8
Non-exchange revenue	—	—	—	30	—	30
Transfers - (in)/out without reimbursement	(4)	—	(498)	(1)	—	(503)
Donations and forfeitures of property	—	—	19	—	—	19
Imputed financing	—	—	8	—	—	8
Other	—	—	44	1	—	45
Net cost of operations	4	(593)	564	461	—	436
Cumulative results of operations, ending balance	**$ —**	**$ (24,958)**	**$ 8,600**	**$ 3,416**	**$ —**	**$ (12,942)**
Net position, end of period	**$ —**	**$ (24,958)**	**$ 8,600**	**$ 3,425**	**$ —**	**$ (12,933)**

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 December 27, 2020, the President signed into law the Consolidated Appropriations Act, 2021, which appropriated $27.5 million for 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 December 27, 2020, the President signed into law the Consolidated Appropriations Act, 2021, which authorized the EM Program to spend $841 million in D&D activities, of which $291 million was transferred from the USEC fund.

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. 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 2021	FY 2020
Nuclear Security and NNSA		
Program Costs	$ 13,832	$ 12,953
Earned Revenues	(16)	(18)
Changes to environmental cleanup and disposal liability estimates (Note 13)	1,432	1,564
Net Cost of Nuclear Security and NNSA	**$ 15,248**	**$ 14,499**
Science		
Program Costs	$ 11,844	$ 10,837
Earned Revenues	(93)	(94)
Changes to environmental cleanup and disposal liability estimates (Note 13)	8,653	12,444
Net Cost of Science	**$ 20,404**	**$ 23,187**
Energy		
Program Costs	$ 9,685	$ 9,586
Earned Revenues	(6,429)	(5,621)
Changes to environmental cleanup and disposal liability estimates (Note 13)	791	477
Net Cost of Energy	**$ 4,047**	**$ 4,442**
Net Cost of Major Programs	**$ 39,699**	**$ 42,128**
Other Programs		
Reimbursable programs		
Program Costs	$ 5,239	$ 5,160
Earned Revenues	(5,223)	(5,057)
Net Cost of Reimbursable Programs	**$ 16**	**$ 103**
Other Programs		
Program Costs	$ 2,371	$ 2,296
Earned Revenues	(429)	(399)
Net Cost of Other Programs	**$ 1,942**	**$ 1,897**
Costs applied to reduction of legacy environmental liabilities (Note 13)	$ (6,451)	$ (6,310)
Costs not assigned to programs (Note 21)	$ 1,213	$ 17,191
Net Cost of Operations	**$ 36,419**	**$ 55,009**

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. Additionally, for the Department's environmental cleanup and disposal liability cost estimates attributable to the Nuclear Security and NNSA program, the decrease between FY 2021 and FY 2020 is due to 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 2021 and FY 2020 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; changes in the Department's allocable percentage share of future costs; legal and regulatory changes; and cleanup activities performed (see Note 13).

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 PMA revenue from selling power and transmission services. Preference for the sale of power and transmission services is given to public bodies and cooperatives. The revenue is used to repay capital investments funded by appropriations and accumulated interest (Note 14), borrowings from Treasury (Note 12), operation and maintenance costs, postretirement benefits (Note 1N) as well as other payment obligations.

For the Department's environmental cleanup and disposal liability cost estimates attributable to the Energy program, the change between FY 2021 and FY 2020 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 2021	FY 2020
Spent nuclear fuel contingency (Note 18)		
Judgment Fund payments	$ 389	$ 656
Change in estimate	273	2,068
Current year spent nuclear fuel contingency costs	**$ 662**	**$ 2,724**
Changes in contractor pension and PRB estimates	(7,545)	1,591
Change in unfunded safety and health liabilities (Notes 11 and 14)	561	—
Change in occupational illness program	7,243	12,426
Other Judgment Fund payments	121	676
Other	171	(226)
Total Costs Not Assigned to Programs (Note 20)	**$ 1,213**	**$ 17,191**

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 2021 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 2021	FY 2020
Unobligated balance brought forward, Oct 1	$ 10,569	$ 10,164
Unobligated balance transferred to other accounts	—	(3)
Unobligated balance transferred from other accounts	6	14
Adjustment to unobligated balance brought forward, Oct 1	1	—
Recoveries of prior year unpaid obligations	650	547
Unobligated balances applied to repay debt	(406)	(239)
Other balances withdrawn to Treasury	(32)	(25)
Recoveries of prior year paid obligations	59	13
Total Adjusted Unobligated Balance Brought Forward	**$ 10,847**	**$ 10,471**

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 decreased from $2.4 billion as of September 30, 2020, to $838 million as of September 30, 2021, while the amount of borrowing authority available for WAPA has remained unchanged at $3.2 billion, and for BPA has remained unchanged at $2.1 billion. The amounts available are authority that has not been converted to cash.

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. 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 $2.5 billion as of September 30, 2020 to $2.4 billion as of September 30, 2021.

UNDELIVERED ORDERS AT THE END OF THE PERIOD

($ IN MILLIONS)	FY 2021		FY 2020	
	Federal	Non-Federal	Federal	Non-Federal
Undelivered orders - unpaid	$ 2,024	$ 33,939	$ 1,846	$ 31,655
Undelivered orders - paid	12	380	26	358
Total Undelivered Orders	**$ 2,036**	**$ 34,319**	**$ 1,872**	**$ 32,013**

PERMANENT INDEFINITE APPROPRIATIONS

($ IN MILLIONS)	FY 2021	FY 2020
Definite appropriations	$ 39,813	$ 38,729
Permanent indefinite mandatory appropriations	310	113
Total Appropriations	**$ 40,123**	**$ 38,842**

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 2021	FY 2020
Loan funds reserved for future defaults	$ 960	$ 1,062
Unexpired appropriations that did not receive apportionments	19	10
Prior year deobligations in excess of apportioned amount	69	38
Non-expenditure transfers not apportioned	—	2
Actual unobligated carryover greater than estimated amounts on the apportionments	4	1
Expired appropriations	76	71
Other amounts not apportioned	434	—
Total Unobligated Balances Not Available	**$ 1,562**	**$ 1,184**

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	$ 60,483	$ 49,914	$ (2,968)	$ 36,095
OMB adjustments made to exclude:				
U.S. Enrichment Corporation Fund	—	—	—	43
Non-budgetary Credit Reform Financing Accounts	(1,587)	(514)	—	(1,125)
Expired accounts	(71)	—	—	—
Other	1	(1)	—	2
Budget of the United States Government	**$ 58,826**	**$ 49,399**	**$ (2,968)**	**$ 35,015**

The FY 2020 *Combined Statements of Budgetary Resources* are reconciled to the President's Budget that was published in May 2021. The President's Budget containing actual FY 2021 balances is expected to be published and available on the OMB website in February 2022. 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 2021			FY 2020		
	Intra-governmental	With the Public	Total	Intra-governmental	With the Public	Total
Net Cost	**$ 3,654**	**$ 32,765**	**$ 36,419**	**$ 9,563**	**$ 45,446**	**$ 55,009**
Components of Net Operating Cost Not Part of the Budgetary Outlays						
Property, plant, and equipment depreciation	$ —	$ (2,034)	$ (2,034)	$ —	$ (1,964)	$ (1,964)
Property, plant, and equipment disposal & reevaluation	—	(1,015)	(1,015)	—	(1,071)	(1,071)
Cost of goods sold	—	(512)	(512)	—	(285)	(285)
Cost capitalization offset	—	316	316	—	281	281
Year-end credit reform subsidy re-estimates	367	—	367	168	—	168
President's adjustment to re-estimates	(8)	—	(8)	(117)	—	(117)
Loan modification adjustment transfer	—	—	—	11	—	11
Gains/losses on all other investments	—	(4)	(4)	—	(5)	(5)
Other	—	(218)	(218)	—	252	252
Net cost for non-budgetary credit reform financing accounts	(194)	—	(194)	(20)	—	(20)
Increase/(decrease) in assets:						
Cash	$ —	$ (128)	$ (128)	$ —	$ 77	$ 77
Accounts receivable	219	(8)	211	(323)	(147)	(470)
Investments	(36)	—	(36)	(15)	—	(15)
Advances and prepayments	(19)	206	187	(5)	22	17
Other assets	—	(313)	(313)	—	(590)	(590)
(Increase)/decrease in liabilities:						
Accounts payable	$ 167	$ (471)	$ (304)	$ (93)	$ (157)	$ (250)
Loan guarantee liability (Non-FCRA)	(6)	—	(6)	5	—	5
Environmental and disposal liabilities	—	(3,388)	(3,388)	—	(6,955)	(6,955)
Federal employee and veteran benefits payable	—	1	1	—	(33)	(33)
Federal debt and interest payable	—	(4)	(4)	—	401	401
Advances from others and deferred revenue	9	(56)	(47)	7	32	39
Other liabilities	(31)	6,934	6,903	(101)	(3,433)	(3,534)
Financing sources:						
Imputed cost	$ (7,848)	$ —	$ (7,848)	$ (13,844)	$ —	$ (13,844)
Other	(9)	—	(9)	(82)	(1)	(83)
Total Components of Net Operating Cost Not Part of Budget Outlays	**$ (7,389)**	**$ (694)**	**$ (8,083)**	**$ (14,409)**	**$ (13,576)**	**$ (27,985)**
Components of the Budget Outlays Not Part of Net Operating Cost						
Acquisition of capital assets	$ 5	$ 5,634	$ 5,639	$ 16	$ 5,183	$ 5,199
Acquisition of inventory	(1)	1,358	1,357	7	1,384	1,391
Effect of prior year agencies credit reform subsidy re-estimate	(160)	—	(160)	(55)	—	(55)
Other	(1,635)	(2)	(1,637)	(1,565)	(26)	(1,591)
Financing sources:						
Donated revenue	$ —	$ (6)	$ (6)	$ —	$ (13)	$ (13)
Transfers out (in) without reimbursement	239	—	239	235	—	235
Total Components of the Budget outlays Not Part of Net Operating Cost	**$ (1,552)**	**$ 6,984**	**$ 5,432**	**$ (1,362)**	**$ 6,528**	**$ 5,166**
Miscellaneous Items:						
Custodial/Non-exchange revenue	$ (5)	$ (285)	$ (290)	$ (56)	$ (133)	$ (189)
Non-Entity activity	212	—	212	1	—	1
Total Other Reconciling Items	**$ 207**	**$ (285)**	**$ (78)**	**$ (55)**	**$ (133)**	**$ (188)**
Total Net Outlays (Calculated Total)	**$ (5,080)**	**$ 38,770**	**$ 33,690**	**$ (6,263)**	**$ 38,265**	**$ 32,002**
Related Amounts on the Statement of Budgetary Resources:						
Outlays, net (Total) (Note 23)			$ 37,302			$ 34,970
Distributed offsetting receipts (Note 23)			(3,612)			(2,968)
Agency Outlays, Net			**$ 33,690**			**$ 32,002**

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.

In FY 2021, Treasury published an updated crosswalk for this reconciliation impacting the overall presentation of the note. Certain FY 2020 amounts have been reclassified to conform to the FY 2021 presentation.

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. (3) The miscellaneous items section includes the custodial/non-exchange revenue and non-entity activity.

26. COVID-19 Activity

In March 2020, the Department received an appropriation of $128 million under the Coronavirus Aid, Relief, and Economic Security (CARES) Act, P.L. 116-136 to prevent, prepare for, and respond to coronavirus for necessary expenses. The Department also used previously appropriated amounts to perform other COVID-19 related work.

Total obligations incurred by the Department in FY 2020 were $686 million plus an additional $156 million in FY 2021 for a total of $842 million as of September 30, 2021. The Department's COVID-19 obligations are primarily attributable to environmental management personnel costs, updated biosecurity, and other miscellaneous obligations.

27. Reclassification of Financial Statement Line Items for Financial Report Compilation Process

($ IN MILLIONS)						
FY 2021 Statement of Net Cost	**FY 2021**	**FY 2021 Reclassified**				**Line Items Used to Prepare FY 2021 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)	$ 48,609	$ 5,387	$ —	$ 32,988	$ 38,375	Non-Federal Gross Cost
						Intragovernmental Costs
		$ 139	$ —	$ 323	$ 462	Benefit Program Costs
		10	—	7,838	7,848	Imputed Costs
		481	(311)	956	1,126	Buy/Sell Costs
		206	—	479	685	Borrowing and Other Interest Expense
		26	—	87	113	Other Expenses (w/o Reciprocals)
		$ 862	**$ (311)**	**$ 9,683**	**$ 10,234**	**Total Intragovernmental Costs**
Total Gross Costs	**$ 48,609**	**$ 6,249**	**$ (311)**	**$ 42,671**	**$ 48,609**	**Total Reclassified Gross Costs**
Earned Revenue (Note 20)	$ 12,190	$ 4,621	$ —	$ 1,207	$ 5,828	Non-Federal Earned Revenue
						Intragovernmental Revenue
		480	(209)	4,360	4,631	Buy/Sell Revenue
		1,665	—	—	1,665	Federal Securities Interest Revenue Including Associated Gains/Losses (Exchange)
		102	(102)	66	66	Borrowing and Other Interest Revenue
		—	—			Purchase of Asset Offset
		$ 2,247	**$ (311)**	**$ 4,426**	**$ 6,362**	**Total Intragovernmental Revenues**
Total Earned Revenue	**$ 12,190**	**$ 6,868**	**$ (311)**	**$ 5,633**	**$ 12,190**	**Total Reclassified Earned Revenue**
Net Cost	**$ 36,419**	**$ (619)**	**$ —**	**$ 37,038**	**$ 36,419**	
Exchange Statement of Custodial Activity						
Exchange Custodial Collections from the SCA		279		115	394	Non-Federal Earned Revenue
Disposition of Exchange Custodial Collections from SCA		385	—	117	502	Custodial Collections Transferred to a TAS Other Than the General Fund - Exchange
		(148)	—	(2)	(150)	Accrual of Custodial Collections Yet to be Transferred to a TAS Other Than the General Fund - Exchange
Total Disposition of Exchange Custodial Collections		**$ 237**	**$ —**	**$ 115**	**$ 352**	***Total Reclassified Disposition of Custodial Collections***
		$ (42)	**$ —**	**$ —**	**$ (42)**	**Net Custodial Activity**
		$ (661)	**$ —**	**$ 37,038**	**$ 36,377**	**Total Reclassified Net Cost**

($ IN MILLIONS)						
FY 2021 Statement of Changes in Net Position	**FY 2021**	**FY 2021 Reclassified**				**Line Items Used to Prepare FY 2021 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	$ 32,766	$ 9	$ —	$ 32,757	$ 32,766	Net Position, Beginning of Period
Budgetary Financing Sources:						
Appropriations Received (Note 23)	$ 41,311	$ 27	$ —	$ 41,284	$ 41,311	Appropriations Received as Adjusted
Appropriations Transferred In/(Out)	3	—	—	3	3	Non-Expenditure Transfers-In of Unexpended Appropriations and Financing Sources
Other Adjustments	(2,315)	—	—	(2,315)	(2,315)	Appropriations Received as Adjusted
Appropriations Used	(36,810)	(9)	—	(36,801)	(36,810)	Appropriations Used
Total Unexpended Appropriations	**$ 34,955**	**$ 27**	**$ —**	**$ 34,928**	**$ 34,955**	**Total Unexpended Appropriations**
CUMULATIVE RESULTS OF OPERATIONS						**CUMULATIVE RESULTS OF OPERATIONS**
Beginning Balances	$ (484,868)	$ (12,942)	$ —	$ (471,926)	$(484,868)	Net Position, Beginning of Period
Other Adjustments	(18)			(18)	(18)	Revenue and Other Financing Sources - Cancellations
Appropriations Used	$ 36,810	$ 9	$ —	$ 36,801	$ 36,810	Appropriations Expended
Non-Exchange Revenues	6	5	—	1	6	Federal Securities Interest Revenue Including Associated Gains/Losses (Non-Exchange)
Donations and Forfeitures of Cash	6	—	—	6	6	Other Taxes and Receipts
Transfers - In/(Out) Without Reimbursement	$ (526)	$ —	$ —	$ (32)	$ (32)	Transfers-In w/o Reimbursement
		(109)	—	—	(109)	Appropriation of Unavailable Special/Trust Fund Receipts Transfers-Out
		(25)	—	—	(25)	Non-Expenditure Transfers-Out of Unexpended Appropriations and Financing Sources
		(230)			(230)	Expenditure Transfers-Out of Financing Sources
		(170)	—	40	(130)	Transfers-Out w/o Reimbursement
Total Transfers In/Out Without Reimbursement	**$ (526)**	**$ (534)**	**$ —**	**$ 8**	**$ (526)**	
Donations and Forfeitures of Property	38	36	—	2	38	Other Taxes and Receipts
Imputed Financing	7,848	10	—	7,838	7,848	Imputed Financing Sources
Other	$ (1,475)	$ (1,245)	$ —	$ (244)	$ (1,489)	Non-entity Collections Transferred to the General Fund
		18	—	—	18	Other financing sources with budgetary impact
				194	194	Collections Transferred into a TAS Other Than the General Fund
				(199)	(199)	Accrual for Non-entity Amounts to be Collected and Transferred to the General Fund
		21	—	(20)	1	Other non-budgetary financing sources
Total Other	**$ (1,475)**	**$ (1,206)**	**$ —**	**$ (269)**	**$ (1,475)**	
Total Financing Sources	**$ 42,689**	**$ (1,680)**	**$ —**	**$ 44,369**	**$ 42,689**	**Total Financing Sources**
Net Cost of Operations	(36,419)	619	—	(37,038)	(36,419)	**Net Cost of Operations**
Total Cumulative Results of Operations	**$ (478,598)**	**$ (14,003)**	**$ —**	**$ (464,595)**	**$(478,598,**	**Cumulative Results of Operations**
Net Position	$ (443,643)	$ (13,976)	$ —	$ (429,667)	$(443,643)	**Net Position**
					$ 42	Net Custodial Activity Reclassified to Net Cost
Non-Exchange Custodial Collections from the SCA		$ 251	$ —	$ 39	$ 290	Other Taxes and Receipts
Disposition of Non-Exchange Custodial Collections from the SCA		$ (22)	$ —	$ —	$ (22)	Collections Transferred to a TAS Other Than the General Fund
		(6)			(6)	Other Taxes and Receipts
		(250)	—	(36)	(286)	Non-entity Collections Transferred to the General Fund
		(15)	—	(3)	(18)	Accrual for Non-entity Amounts to be Collected and Transferred to the General Fund
		$ (293)	**$ —**	**$ (39)**	**$ (332)**	***Total Reclassified Disposition of Non-Exchange Custodial Collections***
					$ —	**Net Custodial Activity**
					$(443,643	**Total Reclassified Net Position**

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 2020 Financial Report can be found on the Bureau of the Fiscal Service's website and a copy of the 2021 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.

Consolidating and Combining Schedules

U.S. Department of Energy Consolidating Schedules - Balance Sheets
As of September 30, 2021 and 2020

(See independent auditors' report)

($ IN MILLIONS)	FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
	FY 2021				
ASSETS:					
Intragovernmental Assets:					
Fund Balance with Treasury	$ 180	$ 5,109	$ 43,557	$ —	$ 48,846
Investments and Related Interest, Net	—	$ —	$ 46,092	$ —	46,092
Accounts Receivable, Net	—	150	1,003	(606)	547
Advances and Prepayments	—	—	104	(92)	12
Total Intragovernmental Assets	**$ 180**	**$ 5,259**	**$ 90,756**	**$ (698)**	**$ 95,497**
Cash	—	172	—	—	172
Accounts Receivable, Net	25	506	2,494	—	3,025
Direct Loans and Loan Guarantees, Net	—	1	16,338	—	16,339
Inventory, Net:	—	140	49,166	—	49,306
General Property, Plant, and Equipment, Net	29	10,753	32,377	—	43,159
Advances and Prepayments	—	37	543	—	580
Other Non-Intragovernmental Assets	—	13,394	78	—	13,472
Total with the public	**$ 54**	**$ 25,003**	**$ 100,996**	**$ —**	**$ 126,053**
Total Assets	**$ 234**	**$ 30,262**	**$ 191,752**	**$ (698)**	**$ 221,550**
LIABILITIES:					
Intragovernmental Liabilities:					
Accounts Payable	$ 6	$ 68	$ 1,283	$ (606)	751
Debt	—	5,739	16,875	—	22,614
Advances from Others and Deferred Revenue	—	1	321	(92)	230
Other Liabilities	7	3,582	399	—	3,988
Total Intragovernmental Liabilities	**$ 13**	**$ 9,390**	**$ 18,878**	**$ (698)**	**$ 27,583**
With the Public:					
Accounts Payable	$ 20	$ 573	$ 4,219	$ —	$ 4,812
Debt Held by the Public	—	5,082	—	—	5,082
Federal Employee Benefits Payable	25	64	193	—	282
Environmental Cleanup and Disposal Liabilities	—	20	515,625	—	515,645
Loan Guarantee Liability	—	—	98	—	98
Advances from Others and Deferred Revenue	—	1,494	47,278	—	48,772
Other Non-Intragovernmental Liabilities	38	4,903	57,978	—	62,919
Total Liabilities with the Public	**$ 83**	**$ 12,136**	**$ 625,391**	**$ —**	**$ 637,610**
Total Liabilities	**$ 96**	**$ 21,526**	**$ 644,269**	**$ (698)**	**$ 665,193**
NET POSITION:					
Unexpended Appropriations					
Unexpended Appropriations - Dedicated Collections	$ —	$ —	$ 27	$ —	$ 27
Unexpended Appropriations - Funds from Other than Dedicated Collections	—	—	34,928	—	34,928
Cumulative Results of Operations					
Cumulative Results of Operations - Dedicated Collections	—	8,736	(22,740)	—	(14,004)
Cumulative Results of Operations - Funds from Other than Dedicated Collections	138	—	(464,732)	—	(464,594)
Total Net Position	**$ 138**	**$ 8,736**	**$ (452,517)**	**$ —**	**$ (443,643)**
Total Liabilities and Net Position	**$ 234**	**$ 30,262**	**$ 191,752**	**$ (698)**	**$ 221,550**

FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
		FY 2020		
$ 166	$ 4,438	$ 41,253	$ —	$ 45,857
—	$ 491	$ 45,245	$ —	45,736
—	138	1,257	(863)	532
1	—	133	(102)	32
$ 167	**$ 5,067**	**$ 87,888**	**$ (965)**	**$ 92,157**
—	300	—	—	300
7	520	2,507	—	3,034
—	1	15,160	—	15,161
—	135	48,714	—	48,849
15	10,565	29,833	—	40,413
—	36	338	—	374
—	13,710	(19)	—	13,691
$22	**$25,267**	**$96,533**	**$—**	**$121,822**
$ 189	**$ 30,334**	**$ 184,421**	**$ (965)**	**$ 213,979**
$ 4	$ 73	$ 1,526	$ (863)	740
—	5,752	16,355	—	22,107
—	5	336	(102)	239
9	3,739	192	—	3,940
$ 13	**$ 9,569**	**$ 18,409**	**$ (965)**	**$ 27,026**
$ 19	$ 453	$ 3,869	$ —	$ 4,341
—	5,078	—	—	5,078
22	64	197	—	283
—	20	512,237	—	512,257
—	—	117	—	117
—	1,441	45,616	—	47,057
15	5,109	64,798	—	69,922
$ 56	**$ 12,165**	**$ 626,834**	**$ —**	**$ 639,055**
$ 69	**21,734**	**$ 645,243**	**$ (965)**	**$ 666,081**
$ —	—	$ 9	$ —	$ 9
—	—	32,757	—	32,757
—	8,600	(21,542)	—	(12,942)
120	—	(472,046)	—	(471,926)
$ 120	**8,600**	**$ (460,822)**	**$ —**	**$ (452,102)**
$ 189	**30,334**	**$ 184,421**	**$ (965)**	**$ 213,979**

U.S. Department of Energy Consolidating Schedules of Net Cost
For the Years Ended September 30, 2021 and 2020

(See independent auditors' report)

($ IN MILLIONS)	FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
	FY 2021				
MAJOR PROGRAMS:					
Nuclear Security and NNSA					
Program Costs	$ —	$ —	$ 15,264	$ —	$ 15,264
Less: Earned Revenues	—	—	(16)	—	(16)
Net Cost of Nuclear Security and NNSA	**$ —**	**$ —**	**$ 15,248**	**$ —**	**$ 15,248**
Science					
Program Costs	$ —	$ —	$ 20,575	$ (78)	$ 20,497
Less: Earned Revenues	—	—	(171)	78	(93)
Net Cost of Science	**$ —**	**$ —**	**$ 20,404**	**$ —**	**$ 20,404**
Energy					
Program Costs	$ —	$ 4,446	$ 6,033	$ (3)	$ 10,476
Less: Earned Revenues	—	(5,027)	(1,405)	3	(6,429)
Net Cost of Energy	**$ —**	**$ (581)**	**$ 4,628**	**$ —**	**$ 4,047**
Net Cost of Major Programs	**$ —**	**$ (581)**	**$ 40,280**	**$ —**	**$ 39,699**
OTHER PROGRAMS:					
Reimbursable Programs					
Program Costs	$ —	$ 333	$ 4,925	$ (19)	$ 5,239
Less: Earned Revenues	—	(368)	(4,874)	19	(5,223)
Net Cost of Reimbursable Programs	**$ —**	**$ (35)**	**$ 51**	**$ —**	**$ 16**
Other programs:					
Program Costs	$ 420	$ —	$ 2,208	$ (257)	$ 2,371
Less: Earned Revenues	(420)	—	(266)	257	(429)
Net Cost of Other Programs	**$ —**	**$ —**	**$ 1,942**	**$ —**	**$ 1,942**
Costs Applied to Reduction of Legacy Environmental Liabilities	$ —	$ —	$ (6,451)	$ —	$ (6,451)
Costs Not Assigned to Programs	$ —	$ —	$ 1,213	$ —	$ 1,213
Net Cost of Operations	**$ —**	**$ (616)**	**$ 37,035**	**$ —**	**$ 36,419**

FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
FY 2020				
$ —	$ —	$ 14,517	$ —	$ 14,517
—	—	(18)	—	(18)
$ —	**$ —**	**$ 14,499**	**$ —**	**$ 14,499**
$ —	$ —	$ 23,344	$ (63)	$ 23,281
—	—	(157)	63	(94)
$ —	**$ —**	**$ 23,187**	**$ —**	**$ 23,187**
$ —	$ 3,967	$ 6,096	$ —	$ 10,063
—	(4,534)	(1,087)	—	(5,621)
$ —	**$ (567)**	**$ 5,009**	**$ —**	**$ 4,442**
$ —	**$ (567)**	**$ 42,695**	**$ —**	**$ 42,128**
$ —	$ 285	$ 4,879	$ (4)	$ 5,160
$ —	$ (282)	$ (4,779)	$ 4	$ (5,057)
$ —	**$ 3**	**$ 100**	**$ —**	**$ 103**
$ 386	$ —	$ 2,154	$ (244)	$ 2,296
(386)	—	(257)	244	(399)
$ —	**$ —**	**$ 1,897**	**$ —**	**$ 1,897**
$ —	$ —	$ (6,310)	$ —	$ (6,310)
$ —	$ —	$ 17,191	$ —	$ 17,191
$ —	**$ (564)**	**$ 55,573**	**$ —**	**$ 55,009**

U.S. Department of Energy Consolidating Schedules of Changes in Net Position
For the Years Ended September 30, 2021 and 2020

(See independent auditors' report)

($ IN MILLIONS)	FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
	FY 2021				
UNEXPENDED APPROPRIATIONS:					
Beginning Balances	$ —	$ —	$ 32,766	$ —	$ 32,766
Appropriations Received	$ —	$ —	$ 41,311	$ —	$ 41,311
Appropriations Transferred - In/(Out)	—	—	3	—	3
Other Adjustments	—	—	(2,315)	—	(2,315)
Appropriations Used	—	—	(36,810)	—	(36,810)
Net Change in Unexpended Appropriations	**$ —**	**$ —**	**$ 2,189**	**$ —**	**$ 2,189**
Total Unexpended Appropriations: Ending	**$ —**	**$ —**	**$ 34,955**	**$ —**	**$ 34,955**
CUMULATIVE RESULTS OF OPERATIONS:					
Beginning Balances	$ 120	$ 8,600	$ (493,588)	$ —	$ (484,868)
Other Adjustments	$ —	$ —	$ (18)	$ —	$ (18)
Appropriations Used	—	—	36,810	—	36,810
Non-Exchange Revenue	—	—	6	—	6
Donations and Forfeitures of Cash	—	—	6	—	6
Transfers - In/(Out) Without Reimbursement	—	(531)	5	—	(526)
Donations and Forfeitures of Property	—	36	2	—	38
Imputed Financing	13	10	7,825	—	7,848
Other	5	5	(1,485)	—	(1,475)
Net Cost of Operations	**$ —**	**$ 616**	**$ (37,035)**	**$ —**	**$ (36,419)**
Net Change in Cumulative Results of Operations	**$ 18**	**$ 136**	**$ 6,116**	**$ —**	**$ 6,270**
Total Cumulative Results of Operations: Ending	**$ 138**	**$ 8,736**	**$ (487,472)**	**$ —**	**$ (478,598)**
Net Position	**$ 138**	**$ 8,736**	**$ (452,517)**	**$ —**	**$ (443,643)**

FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
FY 2020				
$ —	$ —	$ 29,456	$ —	$ 29,456
$ —	$ —	$ 37,929	$ —	$ 37,929
—	—	9	—	9
—	—	(97)	—	(97)
—	—	(34,531)	—	(34,531)
$ —	**$ —**	**$ 3,310**	**$ —**	**$ 3,310**
$ —	**$ —**	**$ 32,766**	**$ —**	**$ 32,766**
$ 109	$ 8,463	$ (486,290)	$ —	$ (477,718)
$ —	$ —	$ —	$ —	$ —
—	—	34,531	—	34,531
—	—	30	—	30
—	—	13	—	13
—	(510)	(12)	—	(522)
—	19	2	—	21
12	8	13,823	—	13,843
(1)	56	(112)	—	(57)
$ —	**$ 564**	**$ (55,573)**	**$ —**	**$ (55,009)**
$ 11	**$ 137**	**$ (7,298)**	**$ —**	**$ (7,150)**
$ 120	**$ 8,600**	**$ (493,588)**	**$ —**	**$ (484,868)**
$ 120	**$ 8,600**	**$ (460,822)**	**$ —**	**$ (452,102)**

U.S. Department of Energy Combining Schedules of Budgetary Resources
For the Years Ended September 30, 2021 and 2020

(See independent auditors' report)

($ IN MILLIONS)	FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	COMBINED
	FY 2021			
BUDGETARY RESOURCES:				
Unobligated Balance from Prior Year Budget Authority, Net	$ 58	$ 1,006	$ 9,783	$ 10,847
Appropriations	6	100	40,017	40,123
Borrowing Authority	—	737	113	850
Contract Authority	—	2,379	—	2,379
Spending Authority from Offsetting Collections	404	1,596	6,571	8,571
Total Budgetary Resources	**$ 468**	**$ 5,818**	**$ 56,484**	**$ 62,770**
STATUS OF BUDGETARY RESOURCES:				
New Obligations and Upward Adjustments (Total)	$ 445	$ 4,976	$ 48,404	$ 53,825
Unobligated Balance, End of Year:				
Apportioned, Unexpired Accounts	$ 23	$ 454	$ 6,893	$ 7,370
Exempt from Apportionment, Unexpired Accounts	—	9	4	13
Unapportioned, Unexpired Accounts	—	379	1,107	1,486
Unexpired, Unobligated Balance, End of Year	**$ 23**	**$ 842**	**$ 8,004**	**$ 8,869**
Expired, Unobligated Balance, End of Year	—	—	76	76
Unobligated Balance, End of Year (Total)	**$ 23**	**$ 842**	**$ 8,080**	**$ 8,945**
Total Budgetary Resources	**$ 468**	**$ 5,818**	**$ 56,484**	**$ 62,770**
OUTLAYS, NET				
Outlays, Net (Total)	$ 14	$ (50)	$ 37,338	$ 37,302
Distributed Offsetting Receipts (-)	(35)	(541)	(3,036)	(3,612)
Agency Outlays, Net	**$ (21)**	**$ (591)**	**$ 34,302**	**$ 33,690**
Disbursements, Net (Total)	**$ —**	$ —	$ 616	$ 616

FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	CONSOLIDATED
FY 2020			
$ 50	$ 990	$ 9,431	$ 10,471
3	100	38,739	38,842
—	765	46	811
—	2,519	—	2,519
383	1,386	6,071	7,840
$ 436	**$ 5,760**	**$ 54,287**	**$ 60,483**
$ 384	$ 4,758	$ 44,772	$ 49,914
$ 47	$ 987	$ 8,337	$ 9,371
—	11	3	14
5	4	1,104	1,113
$ 52	**$ 1,002**	**$ 9,444**	**$ 10,498**
—	—	71	71
$ 52	**$ 1,002**	**$ 9,515**	**$ 10,569**
$ 436	**$ 5,760**	**$ 54,287**	**$ 60,483**
$ (4)	$ 71	$ 36,028	$ 36,095
(13)	(439)	(2,516)	(2,968)
$ (17)	**$ (368)**	**$ 33,512**	**$ 33,127**
$ —	**$ —**	**$ 1,125**	**$ 1,125**

U.S. Department of Energy Consolidating Schedules of Custodial Activities
For the Years Ended September 30, 2021 and 2020

(See independent auditors' report)

($ IN MILLIONS)	FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
	FY 2021				
SOURCES OF COLLECTIONS:					
Cash Collections:					
Power Marketing Administrations	$ —	$ 619			$ 619
Federal Energy Regulatory Commission	63	—			63
Total Cash Collections	**$ 63**	**$ 619**	**$ —**	**$ —**	**$ 682**
Accrual Adjustment	3	—			3
Total Custodial Revenue	**$ 66**	**$ 619**	**$ —**	**$ —**	**$ 685**
DISPOSITION OF REVENUE:					
Transferred to Others:					
Bureau of Reclamation	$ (11)	$ (173)			$ (184)
Department of the Treasury	(36)	(252)			(288)
Army Corps of Engineers	(11)	(183)			(194)
Others	(6)	—			(6)
Decrease/(Increase) in Amounts to be Transferred	(2)	(11)			(13)
Net Custodial Activity	**$ —**	**$ —**	**$ —**	**$ —**	**$ —**

FEDERAL ENERGY REGULATORY COMMISSION	POWER MARKETING ADMINISTRATIONS	ALL OTHER DOE PROGRAMS	ELIMINATIONS	CONSOLIDATED
FY 2020				
$ —	$ 638	$ —	$ —	$ 638
34	—	—	—	34
$ 34	**$ 638**	**$ —**	**$ —**	**$ 672**
1	(2)	—	—	(1)
$ 35	**$ 636**	**$ —**	**$ —**	**$ 671**
$ (7)	$ (193)	$ —	$ —	$ (200)
(13)	(150)	—	—	(163)
(11)	(298)	—	—	(309)
(3)	—	—	—	(3)
(1)	5	—	—	4
$ —	**$ —**	**$ —**	**$ —**	**$ —**

Required Supplementary Information (RSI)

Unaudited – See accompanying Auditors' Report

This section of the report provides required supplementary information for the Department on deferred maintenance 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 fiscal year. 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.

Estimates were developed for:

	(Dollars in Millions)
Buildings and Other Structures and Facilities	$10,275
Capital Equipment	$ 155
Total	$10,430

Deferred Maintenance and Repairs – Buildings and Other Structures and Facilities

The Department owns over 19,800 buildings and structures with an estimated replacement value of $235.6 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 or other risk-based interval as approved by the cognizant Program Secretarial Officer to identify all deficiencies, except for 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, and excess assets; however, Departmental guidance allows component programs and sites flexibility to apply industry standard methods commensurate with each asset's status, usage, and hazards; or more thorough procedures when mandated by Federal, state, or local codes. 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. The recordation of deficiencies as DM&R depends on programmatic and site policies. Sites estimate the cost to address DM&R deficiencies using unit construction, maintenance, and repair cost data available from R. S. Means, or other providers of current unit cost data, adjusted by site-specific cost factors. For the time between updates, sites apply inflators derived from annual budget preparation guidance published by the Department's Chief Financial Officer to DM&R estimates to approximate current dollars. 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 National Academy of Sciences recommended system, 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, using a 0-to-100 point scale. By weighting the 0-to-100 component condition scores by the unit replacement costs of the components, the BUILDER SMS calculates the system and asset (or building) condition scores using a 0-to-100 point scale. This is the Building Condition Index (BCI), which defines the current condition of each asset. 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 R.S. Means, 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 Associate Administrator for Safety, Infrastructure and Operations 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.

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 Real Property Value (RPV) through the following equation: 1-(DM&R ÷ RPV). Internal reporting guidance assigns qualitative labels to ACI ranges and considers assets with an ACI equal to or greater than 0.95 in at least adequate condition. For this purpose, the Department equates the terms "adequate" and "acceptable." As of September 26, 2021, the percentage of active buildings in a condition at or above acceptable is approximately 71 percent.

Significant Changes from Prior Year and Related Events

As of September 26, 2021, the DOE had an estimated $10,275 million in total deferred maintenance which is an increase of $1.1 billion (or 12.5 percent) from FY 2020. The Department applies a year-to-year variance threshold of 10 percent and considers a greater increase or decrease as significant. In 2021, the Department recorded significant variances in estimated DM&R for Active Structures as well as Inactive/Excess Buildings. The DOE's Environmental Management (EM) program was primarily responsible for the increase in both categories. For the Active Structure category, an increase of over $430 million in DM occurred at a site that performed maintenance assessments on its underground structures (e.g., water lines, sewer lines, etc.) for the first time. In previous years, the site classified such structures as PBPI (Physical Barriers Prevent Inspection) and did not assess their condition. However, in 2021, the site changed its approach and performed studies on these underground systems to determine their condition and identify maintenance needs. In the Inactive/Excess Buildings category, two EM sites had a combined DM increase of over $246 million as a result of increased condition assessment inspections performed on assets that recently transitioned to an "excess" status. Although these assets are no longer needed to support DOE mission, they must still be maintained to ensure security and human and environmental safety while EM develops its plans to remediate them prior to disposal. As such assets were added to the excess portfolio, these EM sites performed new condition assessments to identify security and safety related maintenance requirements and added those requirements as deferred maintenance.

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 $155 million of deferred maintenance was estimated to be needed as of September 30, 2021, to return capital equipment assets to acceptable operating condition.

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)	2021 Ending Balance DM&R	2021 Beginning Balance DM&R
ACTIVE:		
General PP&E:		
Buildings	$5,889	$5,786
Structures	$2,996	$2,223
Land	$0	$0
Subtotal - General PP&E - Active	**$8,884**	**$8,009**
Stewardship Land	$0	$0
Heritage Assets	$5	$6
Subtotal - All Active	**$8,889**	**$8,014**
INACTIVE AND EXCESS:		
General PP&E:		
Buildings	$1,220	$949
Structures	$156	$160
Land	$0	$0
Subtotal - General PP&E - Inactive and Excess	**$1,377**	**$1,109**
Stewardship Land	$0	$0
Heritage Assets	$9	$9
Subtotal - All Inactive and Excess	**$1,385**	**$1,118**
Total Deferred Maintenance and Repair Cost:	**$10,275**	**$9,132**

Budgetary Resources by Major Account

For the Year Ended September 30, 2021

($ iN MILLIONS)	Weapons Activities 019 05 0240	Science 019 20 0222	Defense Environmental Cleanup 019 10 0251	Energy Efficiency and Renewable Energy 019 20 0321	Bonneville Power Administration Fund 019 50 4045
BUDGETARY RESOURCES:					
Unobligated Balance from Prior Year Budget Authority, Net	$ 398	$ 160	$ 525	$ 765	$ 11
Appropriations	15,345	7,164	6,425	2,781	—
Borrowing Authority	—	—	—	—	737
Contract Authority	—	—	—	—	2,379
Spending Authority from Offsetting Collections	2,044	578	—	169	455
Total Budgetary Resources	$ 17,787	$ 7,902	$ 6,950	$ 3,715	$ 3,582
STATUS OF BUDGETARY RESOURCES:					
New Obligations and Upward Adjustments (Total)	$ 16,892	$ 7,842	$ 6,398	$ 2,902	$ 3,573
Unobligated Balance, End of Year:					
Apportioned, Unexpired Accounts	$ 876	$ 31	$ 542	$ 808	$ —
Exempt from Apportionment, Unexpired Accounts	—	—	—	—	9
Unapportioned, Unexpired Accounts	17	28	6	—	—
Unexpired, Unobligated Balance, End of Year	$ 893	$ 59	$ 548	$ 808	$ 9
Expired, Unobligated Balance, End of Year	1	1	4	4	—
Unobligated Balance, End of Year (Total)	$ 894	$ 60	$ 552	$ 812	$ 9
Total Budgetary Resources	$ 17,786	$ 7,902	$ 6,950	$ 3,714	$ 3,582
Agency Outlays, Net	$ 12,674	$ 6,730	$ 6,079	$ 2,198	$ (254)
Disbursements, Net (Total)	$ —	$ —	$ —	$ —	$ —

	Other Defense Activities 019 10 0243	Defense Nuclear Nonproliferation 019 05 0309	Advanced Technology Vehicles Manufacturing Loan Program Account 019 20 0322	Nuclear Energy 019 20 0319	Other Budgetary Accounts
BUDGETARY RESOURCES:					
Unobligated Balance from Prior Year Budget Authority, Net	$ 172	$ 475	$ 4,340	$ 348	$ 2,983
Appropriations	920	2,247	(1,889)	1,580	5,550
Borrowing Authority	—	—	—	—	—
Contract Authority	—	—	—	—	—
Spending Authority from Offsetting Collections	1,936	6	—	212	2,333
Total Budgetary Resources	$ 3,028	$ 2,728	$ 2,451	$ 2,140	$ 10,866
STATUS OF BUDGETARY RESOURCES:					
New Obligations and Upward Adjustments (Total)	$ 2,962	$ 2,261	$ 20	$ 1,911	$ 8,420
Unobligated Balance, End of Year:					
Apportioned, Unexpired Accounts	$ 35	$ 466	$ 2,430	$ 223	$ 1,942
Exempt from Apportionment, Unexpired Accounts	—	—	—	—	4
Unapportioned, Unexpired Accounts	25	—	—	—	450
Unexpired, Unobligated Balance, End of Year	$ 60	$ 466	$ 2,430	$ 223	$ 2,396
Expired, Unobligated Balance, End of Year	5	—	2	6	53
Unobligated Balance, End of Year (Total)	$ 65	$ 466	$ 2,432	$ 229	$ 2,449
Total Budgetary Resources	$ 3,027	$ 2,727	$ 2,452	$ 2,140	$ 10,869
Agency Outlays, Net	$ 882	$ 1,969	$ 19	$ 1,370	$ 2,023
Disbursements, Net (Total)	$ —	$ —	$ —	$ —	$ —

	Subtotal of Budgetary Accounts	Title 17 Innovative Technology Direct Loan Financing Account 019 20 4455	Title 17 Innovative Loan Guaranteed Loan Financing Account 019 20 4577	Advanced Technology Vehicles Manufacturing Direct Loan Financing Account 019 20 4579	Combined Statement of Budgetary Resources Total
BUDGETARY RESOURCES:					
Unobligated Balance from Prior Year Budget Authority, Net	$ 10,177	$ 477	$ 193	$ —	$ 10,847
Appropriations	40,123	—	—	—	40,123
Borrowing Authority	737	106	—	7	850
Contract Authority	2,379	—	—	—	2,379
Spending Authority from Offsetting Collections	7,733	809	4	25	8,571
Total Budgetary Resources	$ 61,149	$ 1,392	$ 197	$ 32	$ 62,770
STATUS OF BUDGETARY RESOURCES:					
New Obligations and Upward Adjustments (Total)	$ 53,181	$ 545	$ 67	$ 32	$ 53,825
Unobligated Balance, End of Year:					
Apportioned, Unexpired Accounts	$ 7,353	$ —	$ 17	$ —	$ 7,370
Exempt from Apportionment, Unexpired Accounts	13	—	—	—	13
Unapportioned, Unexpired Accounts	526	847	113	—	1,486
Unexpired, Unobligated Balance, End of Year	$ 7,892	$ 847	$ 130	$ —	$ 8,869
Expired, Unobligated Balance, End of Year	76	—	—	—	76
Unobligated Balance, End of Year (Total)	$ 7,968	$ 847	$ 130	$ —	$ 8,945
Total Budgetary Resources	$ 61,149	$ 1,392	$ 197	$ 32	$ 62,770
Agency Outlays, Net	$ 33,690	$ —	$ —	$ —	$ 33,690
Disbursements, Net (Total)	$ —	$ 722	$ 63	$ (169)	$ 616

Auditors' Report

Memorandum from the Inspector General

DEPARTMENT OF ENERGY
OFFICE OF INSPECTOR GENERAL

MEMORANDUM

DATE: November 17, 2021

REPLY TO ATTN OF: IG-50 (A21FN010)

SUBJECT: Audit Report on The Department of Energy's Fiscal Year 2021 Consolidated Financial Statements

TO: Acting Under Secretary for Science and Energy, S4
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, 2021, and 2020, 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.

The Office of Inspector General (OIG) engaged 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.

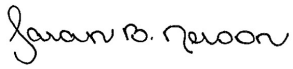
KPMG audited the consolidated financial statements of the Department as of September 30, 2021, and 2020, and the related consolidated statements of net cost, changes in net position, custodial activity, and combined statements of budgetary resources for the years then ended. KPMG concluded that these consolidated financial statements are presented fairly, in all material respects, in conformity with United States generally accepted accounting principles and had issued an unmodified opinion based on its audits and the reports of other auditors for the years ended September 30, 2021, and 2020.

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. In all instances, management concurred with the findings and recommendations. All findings

will be detailed in management letters that are provided to the 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.

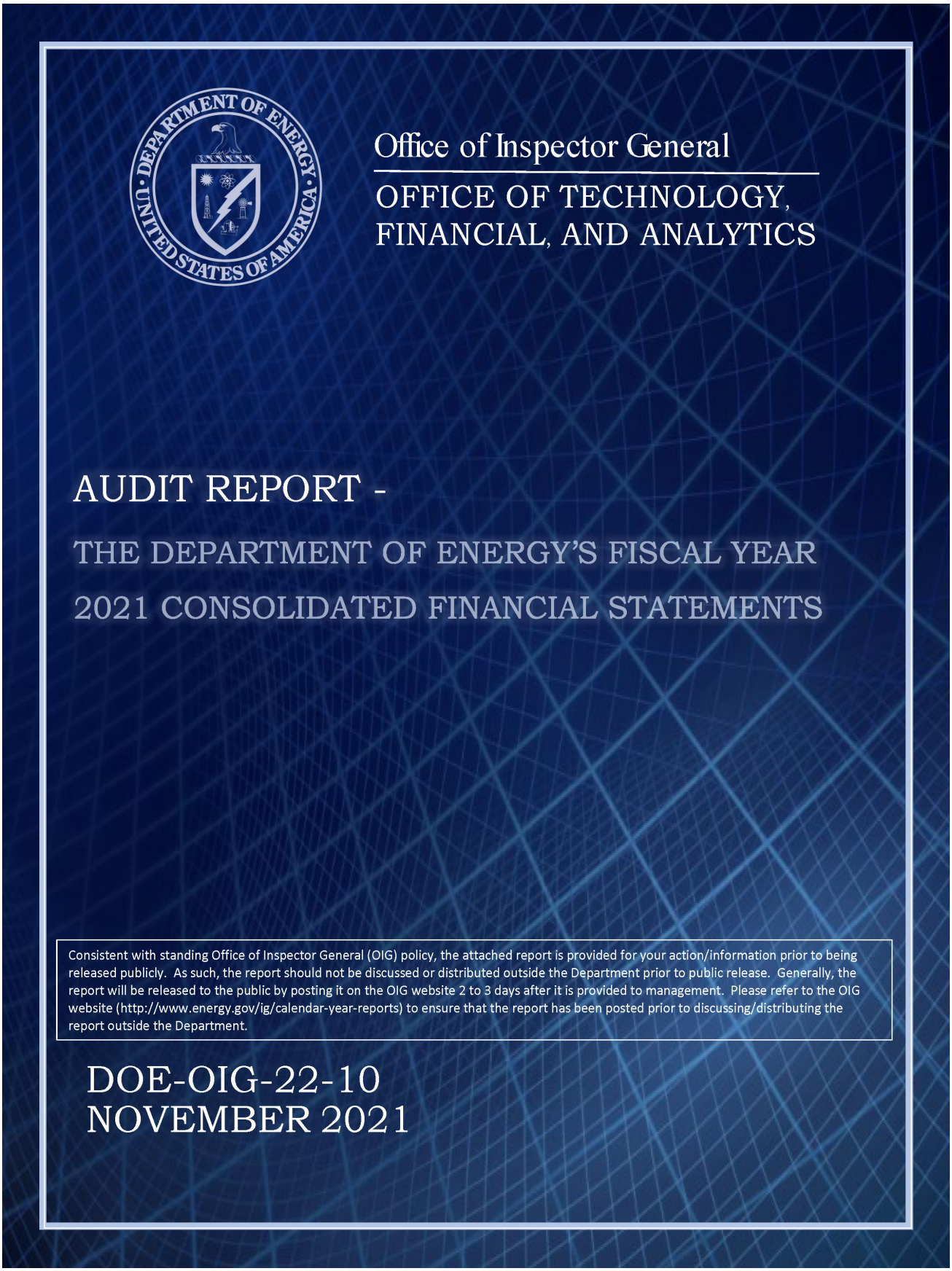


Sarah B. Nelson
Assistant Inspector General
for Technology, Financial, and Analytics
Office of Inspector General

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 for Science and Energy, S4

Independent Auditors' Report



AUDITORS' REPORT

Department of Energy
Washington, DC 20585

November 17, 2021

MEMORANDUM FOR THE SECRETARY

FROM: Teri L. Donaldson
Inspector General

SUBJECT: INFORMATION: Audit Report on The Department of Energy's Fiscal Year 2021 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, 2021, and 2020, 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.

The Office of Inspector General (OIG) engaged 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, 2021, and 2020, 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 had issued an unmodified opinion based on its audits and the reports of other auditors for the years ended September 30, 2021, and 2020.

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. In all instances, management concurred with the findings and recommendations. All findings

will be detailed in management letters that are provided to the 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 for Science and Energy, S4
Under Secretary for Nuclear Security and National Nuclear Security Administrator, S5
Deputy Chief Financial Officer, CF-2

Audit Report: DOE-OIG-22-10

Department financial reports are available for download on the Office of the Chief Financial Officer website: https://www.energy.gov/cfo/listings/agency-financial-reports

Attachment



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 Financial Statements

We have audited the accompanying consolidated financial statements of the United States (U.S.) Department of Energy (Department), which comprise the consolidated balance sheets as of September 30, 2021 and 2020, 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, and the related notes to the consolidated financial statements.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these consolidated financial statements in accordance with U.S. generally accepted accounting principles; this includes 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' Responsibility

Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America, in accordance with the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States, and in accordance with Office of Management and Budget (OMB) Bulletin No. 21-04, *Audit Requirements for Federal Financial Statements*. Those standards and OMB Bulletin No. 21-04 require that we plan and perform the audit to obtain reasonable assurance about whether the *consolidated* financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the consolidated financial statements 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 entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Department as of September 30, 2021 and 2020, 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.

KPMG LLP, 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.

Attachment

INDEPENDENT AUDITORS' REPORT

Emphasis of Matters

As discussed in Note 6 to the consolidated financial statements, the Department has total direct loans and loan guarantees, net, of $18 billion and $17 billion as of September 30, 2021 and 2020, 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 $516 billion and $512 billion as of September 30, 2021 and 2020, 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, the date specified in the *Nuclear Waste Policy Act of 1982, as amended*. The Department has recorded liabilities for likely damages of $31 billion and $30.7 billion as of September 30, 2021 and 2020, respectively. Our opinion is not modified with respect to this matter.

Other Matters

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.

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 financial statements. Such information, 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 auditing standards generally accepted in the United States of America, 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 basic consolidated 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

Our audits were conducted for the purpose of forming an opinion on the basic consolidated financial statements as a whole. The About This Report, Table of Contents, Message from the Secretary, Message from the Acting Chief Financial Officer, Introduction to Principal Statements, Memorandum from Inspector General, and Other Information sections of the Department's Fiscal Year 2021 Agency Financial Report is presented for purposes of additional analysis and is not a required part of the basic consolidated financial statements. Such information has not been subjected to the auditing procedures applied in the audits of the basic consolidated financial statements, and accordingly, we do not express an opinion or provide any assurance on it.

Attachment

Other Reporting Required by *Government Auditing Standards*

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, 2021, 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 first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

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, 2021 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 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. 21-04.

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 Other Reporting Required by Government Auditing Standards

The purpose of the communication described in the Other Reporting Required by *Government Auditing Standards* section 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 15, 2021

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



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.

Historically, the Department of Energy's Office of Inspector General (OIG) focused on broad categories of management challenges. Beginning with fiscal year (FY) 2021 management challenges, the OIG, in coordination with Department mission elements, identified the Department's most pressing management challenges, focusing on more specific issues where near-term progress is measurable and achievable. For FY 2022, we are continuing to report in this manner, addressing all challenges identified in FY 2021 and providing updates on those challenges.

The OIG has identified certain "cross-cutting" management challenges that may impact the Department more generally and promote all Department mission elements by lessening fraud, waste, and abuse. These specific issues are:

- Modernizing Oversight by Continuing to Access Systems 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
- Using All Available Tools to Combat the Theft of Intellectual Property — Research Security

Additionally, the key mission elements identified as challenge areas were the following:

- National Nuclear Security Administration — Restoring Plutonium Pit Production Capability
- Office of Environmental Management — Managing Tank Waste
- Office of Science/Artificial Intelligence and Technology Office — Establishing the Department as a Federal Enterprise Leader in Developing and Deploying Artificial Intelligence

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. Due to Department reliance on contractors to execute much of its mission, the OIG continues focusing 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.

Modernizing Oversight by Continuing to Access Systems for the Purpose of Running Data Analytics

The Fraud Reduction and Data Analytics Act of 2015 (FRDAA) was passed to improve Federal agency financial and administrative controls and procedures to assess and mitigate fraud risks. Additionally, the FRDAA was enacted to improve agencies' development and use of data analytics to identify, prevent, and respond to fraud, including improper payments. In March 2020, the Payment Integrity Information Act of 2019 was enacted and replaced the FRDAA. The Payment Integrity Information Act of 2019 incorporated select provisions from the FRDAA, as well as 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 United States 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). Using a three-phased approach, the Department will continue to implement this Framework over the next four years in the planned phases.

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. To address these immediate challenges, the Department intends to leverage industry best practices through training staff, sharing resources, contracting services, participating in interagency working groups, and applying analytic software.

The Department faces another significant challenge in identifying which data systems and sources are being used by the Department and its contractors. Once the relevant data systems are identified, the next challenge will be to assess the data and determine how to analyze it. The potential use of artificial intelligence (AI) in this area is an exciting prospect which could save the taxpayers millions and perhaps billions of dollars in the long term.

Although much work remains, the Department has taken initial 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 Framework development, the Department awarded a contract to incorporate industry best practices and has begun to establish collaborative relationships with both its management and operating (M&O) contractors and non-

M&O contractors to identify the available data. Personnel have been attending basic to mid-level Data Analytics courses. Moving forward, the Department is actively working on utilizing current year fraud risk occurrences and control test failures to develop its Fraud Risk Profile. This is slated to be completed by mid-FY 2022. The Department is also creating a Planning, Programming, Budgeting, and Execution process (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. Further, the Department proposes to construct an Antifraud Strategy that will consider recommended actions from risk owners and supporting offices, provide annual updates to the Fraud Risk Profile, and identify newly confirmed fraud activities.

As part of the Department Governance, Risk, and Compliance project that is being implemented in two phases 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 Governance, Risk, and Compliance provide the Department with the ability to identify business process breakdowns, as well as manage and remediate exceptions. Remediation of the exceptions is expected to improve data quality and reduce fraud.

Similarly, the OIG is moving swiftly into the area of data analytics. Over the past three years, the OIG has developed and implemented a data analytics function focusing on two initial goals: (1) to identify and directly access relevant Department and contractor systems, and (2) to analyze high-risk areas such as labor, pay, grants, subcontracts, and contract charges.

Historically, the OIG relied on Federal and contractor employees to provide records and data supporting audits, inspections, and investigations. This hands-off approach resulted in the OIG's complete lack of knowledge as to the systems being utilized and the data available. Since its inception in 2019, the OIG Office of Technology, Financial, and Analytics has identified federally owned business systems containing data that can be leveraged to expand the capabilities of the OIG in its oversight role. These include, but are not limited to, payroll, human resource, badging, financial, and inventory systems. The OIG Office of Technology, Financial, and Analytics is currently working with the Department to gain direct "read only" access to Federal and contractor systems. Notably, direct access is the only path that has the potential 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.

Moving forward, the OIG Data Analytics team will continue to perform analyses of the highest areas of risk within the Department and implement risk models to identify adverse trends and possible fraud, waste, and abuse. During FY 2021, the OIG Data Analytics team supported more than 31 ongoing audits, inspections, and investigations, including the largest fraud investigation in Department history.

Improving Audits of Costs Incurred and Claimed

The Cooperative Audit Strategy, adopted by the Department in 1994, gave M&O contractors the responsibility to perform required incurred cost audit work, with minimal oversight from both the Federal Contracting Officer and the OIG. Over the course of the 26 years that the Cooperative Audit Strategy was in place, stakeholders, such as the United States (U.S.) General Accountability Office and the Department of Defense (DoD), expressed concerns about independence, conflict of interest, and the appropriateness of contractors auditing their own incurred costs.

For several years, the OIG evaluated whether the Cooperative Audit Strategy had been functioning as intended. From FY 2016 through FY 2020, the OIG performed several audits of incurred costs, essentially performing the work that would normally be performed by M&O contractor internal audit groups. Based on the findings in these incurred cost audits, the OIG began performing additional work pertaining to the Cooperative Audit Strategy in FY 2020. In FY 2021, a compilation of these audit reports and many other investigation, inspection, and audit reports were published 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.

The OIG discovered several foundational challenges with the Cooperative Audit Strategy including a flawed legal framework and an impact to OIG auditor independence caused by over-reliance on internal audit organizations. In addition, we found that not all internal audit groups adequately evaluated incurred costs for allowability, allocability, and reasonableness. Further, the OIG noted weaknesses in internal audit's design of the audit risk assessment and sampling approach. We also found that M&O contractors were not always compliant with Cost Accounting Standards. The Department agreed with the OIG's recommendation to transition to an independent audit strategy, and is supporting the OIG's transition plan where the OIG will begin conducting, or arranging for, independent incurred cost audits for 23 M&O contractors across the Department enterprise beginning in FY 2022.

Building a Stronger Suspension and Debarment Program

In our prior Management Challenges Report, the OIG 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. These measures are not punishment but rather seek to exclude

irresponsible parties from future transactions. The typical use of these remedies is based on a criminal conviction or a serious civil offense. The Department is second only to the DoD in the amount of Federal dollars annually spent on contractors. The Department spent more than $40 billion in FY 2020 contracting for services and supplies or acquiring assets.[1]

The prior Management Challenges Report noted other Federal agencies with a smaller contracting presence operate robust suspension and debarment programs. These programs protect the rest of the Government from continuing to do business with contractors that have committed criminal or civil offenses or have otherwise lost the trust of the Federal Government. Specifically, our prior report noted that the General Services Administration suspended 49 parties and debarred 84 in FY 2019. During the same period, the Department of Housing and Urban Development suspended 40 parties and imposed 97 debarments, and the DoD suspended 267 parties and debarred 442. In comparison, the Department of Energy issued only five suspensions and 19 debarments in FY 2019.[2] Similarly, the Department of Energy issued only 25 suspensions and 30 debarments in FY 2018.[3] The Interagency Suspension and Debarment Committee has not released official numbers for FY 2020. We anticipate, however, that once released, the numbers will be relatively consistent.

The OIG strategic initiative to enhance its capabilities in making suspension and debarment referrals in a timely manner. We established an Administrative Remedies Division and appointed a Special Counsel for Administrative Remedies in March 2021. In the following months, we reviewed and updated our internal policies to ensure increased consideration of available remedies and streamlined our referral practices. The early reviews and streamlined referrals seek to identify evidence and produce an actionable referral as early and efficiently as possible. The OIG also received helpful input from the Department's two suspension and debarment offices when refining referral processes. Among other things, the OIG referred, and the Department acted upon, a suspension evidenced by search and arrest warrants. Using material previously submitted to a court to meet the evidentiary threshold of pursuing a suspension did not appreciably increase the burden on Federal entities but did allow for proper consideration of risk while an underlying criminal matter proceeded. The OIG processes ensure engagement and deconfliction with stakeholders managing parallel proceedings.

The OIG has also enhanced its existing training program to ensure that all employees likely to encounter evidence that may support administrative remedies know how to identify the significance of any such evidence and engage with the proper parties charged with acting on that evidence.

In addition, the OIG is further developing complimentary administrative remedies such as the Program Fraud Civil Remedies Act. To support this endeavor, OIG personnel have begun training and reaching out to stakeholders. Similarly, we are building remedial assessment capabilities into the design of our new incurred cost audit function.

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, the Federal Acquisition Regulation 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 the Mandatory Disclosure Rule (MDR).

The Federal Acquisition Regulation MDR was implemented through two mechanisms: (1) by establishing a suspension and debarment mechanism that was immediately enforceable, and (2) by utilizing a contractual provision that was enforceable when agencies included it in specific contracts. Under the suspension and debarment mechanism, a contractor may be suspended or debarred for failing to "timely disclose to the Government […] credible evidence of" certain violations and overpayments. Additionally, under the contract provision mechanism, the MDR requires a contractor to timely disclose, in writing, to the Agency OIG 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 acquire preliminary data about how several Departmental contractors have been managing specific employee concerns that appear to trigger MDR requirements. The OIG is currently compiling the results of these inspections and developing a strategy to address lapses the inspections uncovered. Those lapses include 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, they did not always report the cases to the OIG, as required. In other instances,

[1] Based on USASpending.gov agency-specific detail reviewed in September 2021.
[2] Interagency Suspension and Debarment Committee FY 2019 Report issued under Section 873 of P.L. 110-417. https://www.acquisition.gov/sites/default/files/page_file_uploads/ISDC%20FY19%20873%20Report.pdf. (Last accessed September 13, 2021).
[3] Interagency Suspension and Debarment Committee FY 2018 Report issued under Section 873 of P.L. 110-417. https://www.acquisition.gov/sites/default/files/page_file_uploads/FY%202018%20873%20Report%20-%20Final%2010%2030%202019.pdf. (Last accessed October 18, 2021).

the contractors reported later than required by the contract clause.

The contractors' failure to report these issues denied 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.

Using All Available Tools to Combat the Theft of Intellectual Property — Research Security

The Department is the largest Federal sponsor of basic research in the physical sciences and awards approximately $6.6 billion in grants and contracts annually that support 25,000 researchers at over 300 institutions and its 17 national laboratories. The Department funds cutting-edge research and the deployment of innovative technologies, and it encourages collaboration between industry, academia, and Government to create a vibrant scientific ecosystem.

The Department's prominent role in advanced research and development (R&D) across multiple scientific disciplines, combined with its key role in nuclear weapons development, makes it particularly attractive to theft from adversaries of the U.S. Government. Due to the economic and scientific value of the research and intellectual property developed within the Department, foreign governments and their proxies intensified their efforts to extract information from our institutions.

Foreign governments attempt to acquire U.S.-funded research through "talent recruitment" programs, often targeting scientists, engineers, academics, researchers, and entrepreneurs working or studying in the U.S. Targeted individuals are offered rewarding and prominent opportunities at leading foreign research institutions in exchange for transferring their knowledge and expertise, often funded with Department dollars, to foreign countries. Talent recruitment programs are sponsored by many countries designated by the Department as "countries of risk." Such programs threaten the economic interests of the U.S. Government by steering cutting-edge, taxpayer-funded research to foreign adversaries for the benefit of their economies.

To highlight the magnitude of this challenge, the OIG has numerous active investigations directly involving threats to intellectual property by foreign adversaries. The OIG has seen an increase in caseload of 114 percent since 2016 regarding instances of the theft of intellectual property. In response, the OIG has been aggressive in the enforcement of this crime, working with our partners in the law enforcement community, and in concert with the Department of Justice, to carry out a variety of enforcement actions nationwide.

Due to the open nature of the scientific community, R&D conducted for the Department is inherently vulnerable to the unauthorized transfer of intellectual property to foreign governments. It is critical that the Department takes appropriate actions to mitigate these risks. For this reason, the OIG has initiated a Special Project, led by the OIG Office of Counsel, to review the most effective legal and practical strategies being used by other Federal agencies vulnerable to this type of theft. We will be working with other stakeholders in the Federal research integrity community throughout this project. In the coming months the OIG will advise on the status of our efforts. These efforts will likely include recommendations to ensure that the Department is using a "whole-of-government" approach to improve its management of these issues and utilize the full range of available tools, including criminal, civil, and administrative remedies.

Key Mission Element Challenges

The OIG, in coordination with Department mission elements, identified the Department's most pressing management challenges, focusing on more specific issues where near-term progress is measurable and achievable. The three areas identified for FY 2022 were restoring plutonium pit production, managing tank waste, and developing and deploying AI.

National Nuclear Security Administration — Restoring Plutonium Pit Production Capability

The National Nuclear Security Administration (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 reestablish 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.

The Department of Energy works closely with the DoD to meet the requirement of manufacturing no fewer than 80 war reserve (WR) PPY by 2030. 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) utilizing the existing Plutonium Facility-4 and 50 WR PPY at the Savannah River Site (SRS) using the existing 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 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 modest production capacity.

To meet these production objectives, the Department faces challenges associated with staffing and the construction and modernization of the LANL and SRS facilities. Due to the significant lapse in pit production following the closure of Rocky Flats, the Nation lost much of its expertise in pit manufacturing. Therefore, 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 for the growing subcritical plutonium experiment program. Additionally, the Department must simultaneously complete the modernization of the LANL Plutonium Facility via the Los Alamos Plutonium Pit Production Project (LAP4), while repurposing the former Mixed Oxide Fuel Fabrication Facility at the SRS through the Savannah River Plutonium Processing Facility (SRPPF) project.

Major capital acquisition projects at both sites reached key milestones in FY 2021. At LANL, in April 2021, the LAP4 project achieved Critical Decision-1 (CD-1) and Alternative Selection and Cost Range, and work has begun on developing the 90 percent design package needed for CD-2, Performance Baseline. At the SRS, in June 2021, the SRPPF project achieved CD-1, and the project is maturing the design and refining cost and schedule estimates to support CD-2 in FY 2024.

Based on the 30 percent design, which includes complete information from the LAP4 and SRPPF CD-1 submissions, the Department assessed that achieving the 30 PPY by 2026 at LANL is achievable, while producing 50 PPY by 2030 at the SRS to meet the overall 80 PPY objective is not. The SRPPF assessment is based on considerations that to produce WR[4] pits at the required rate necessitates successful completion of the following three activities: (1) complete SRPPF construction and receive startup authorization (CD-4); (2) demonstrate a WR-quality pit manufacturing capability; and (3) demonstrate the ability to manufacture at full rate capacity while maintaining WR quality control. The total time duration for achieving steps two and three is several years based on past and current experience. Since LANL already has an operating plutonium facility, these three efforts, to a large extent, are overlapped. At the SRS, since the SRPPF must undergo commissioning to authorize startup of plutonium operations, the three key activities to achieve 50 WR PPY will occur sequentially. To support warhead production needs and minimize total SRPPF costs, the Department has identified a target range from FY 2032 through FY 2035 for achieving 50 WR PPY at the SRS. The development of the CD-2 package (including 90 percent complete SRPPF design) will identify and develop options for accelerating the CD-4 completion date from those established at the time of CD-1 approval (from the first quarter of FY 2032 through the fourth quarter of FY 2035).

The Department plans to utilize information from: the SRPPF CD-2 package; ongoing work at LANL and Lawrence Livermore National Laboratory to minimize the time required for demonstrating WR manufacturing capacity; and lessons learned from LANL as it ramps up rate production to refine and establish the target date for CD-4 and for achieving 50 WR PPY at the SRS. In addition, the Department anticipates the delivery of the SRPPF CD-2 package in the first quarter of 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.

Office of Environmental Management — Managing Tank Waste

The Department 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 (known as "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), the SRS, and Idaho National Laboratory Site (INL), the remaining tank waste is stored in aging underground tanks, many of which are well past their design life. At Hanford, as many as 58 tanks are considered to have leaked into the underlying soil.

In addition to environmental risks, tank waste also represents a significant financial burden to the U.S. Government. The Department is the top contributor to the Federal Government's overall environmental liabilities. Environmental Management's current total environmental liability is approximately $406 billion (in current year dollars) according to the Department FY 2020 Agency Financial Report. As such, the Department expends significant resources to safely and effectively treat the Nation's tank waste. Since Environmental Management was established, the Department has taken noteworthy steps to address tank waste at sites across the U.S. For instance, at the West Valley Demonstration Project, the Department has vitrified 600,000 gallons of reprocessing waste into 275 canisters for long-term storage and eventual disposal. Additionally, in 2019, the Department successfully completed the demolition of the West Valley Site Vitrification Facility, marking the first time in Department history that such a facility has been successfully constructed, operated, and demolished. At the

[4] War reserve pits have been certified to meet the stringent quality assurance requirements necessary to enter the U.S. nuclear weapons stockpile.

SRS, the Defense Waste Processing Facility (DWPF) has produced approximately 4,266 canisters of vitrified tank waste, representing about half of the anticipated total. Further, approximately 16.5 million gallons of salt solution taken from the SRS underground tanks have been decontaminated and processed for onsite disposal through stabilization via grout.

In addition, the Department continues constructing and commissioning complex, first of its kind, multi-billion-dollar facilities to treat tank waste. The Department successfully completed verification of operational readiness and obtained CD-4 and Authorization to Operate the Salt Waste Processing Facility (SWPF) in August 2020. The Department initiated hot commissioning of the SWPF 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 approximately 2 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. This facility will significantly ramp up the ability to treat the remaining tank waste at the SRS, which includes enhancing the balance of tank waste systems to support higher treatment rates. Such treatment includes the DWPF, the Saltstone Production Facility, and the tank farms that prepare and batch the waste for treatment. At INL, the Department is in its final stages of startup and commissioning of the Integrated Waste Treatment Unit (IWTU), which will treat the remaining liquid tank waste. The Department anticipates the IWTU will be operational in 2022, with waste treatment expected to take five to seven years to complete. At Hanford Waste Treatment and Immobilization Plant, the Analytical Laboratory was transitioned from startup to commissioning in August 2020. An operational readiness assessment was successfully completed in December 2020, and the facility is ready to support commissioning of the Low-Activity Waste Facility. Additionally, the Department has completed construction on Hanford Waste Treatment and Immobilization Plant's Low-Activity Waste Facility, and testing and commissioning is scheduled to support commencement of radiological operations by the end of calendar year 2023.

Along with ensuring the completion and commissioning of the necessary tank waste treatment facilities, the Department has instituted new polices and approaches that have the potential to open new disposition pathways for tank waste. In 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, and not by how the waste was generated. The high-level waste interpretation could enable the Department to appropriately manage and disposition tank waste in a risk-based and more cost-effective manner that remains fully protective of human health and the environment. The first application of the high-level waste interpretation was completed with public participation in September 2020 with eight gallons of SRS DWPF recycle wastewater shipped to the Waste Control Specialists LLC low-level radioactive waste disposal facility in Andrews, Texas. Secretary Granholm committed to conduct an assessment of the high-level waste interpretation during her Congressional confirmation hearing in January 2021; this assessment is ongoing. The Department will not use the high-level waste interpretation without prior meaningful consultation with all affected stakeholders. 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.

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 startup and commissioning of those facilities involved in the Direct Feed Low-Activity Waste approach. The Low-Activity Waste facility is estimated to treat approximately 50 percent of the low-activity inventory of tank waste. The Direct Feed Low-Activity Waste approach will treat approximately one million gallons yearly. The Department will need to identify and select additional treatment options to fully address Hanford's remaining inventory. 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 would use the Waste Treatment and Immobilization Plant's Pretreatment and High-Level Waste facilities to prepare and vitrify the high-level waste for eventual final disposition. However, 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 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 on potential options for treating high-level tank waste as efficiently as possible.

At the SRS, the Department will need to continue DWPF operations and demonstrate the SWPF's long-term reliability and availability. Implementation of Next Generation Solvent at the SWPF in 2023 will enable processing of up to nine million gallons of waste per year. To complete the bulk of the tank waste mission at the 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 is in the final stages of startup and commissioning of the IWTU, which will treat the remaining liquid tank waste. The Department completed facility modifications in July 2021 for the IWTU, and it is currently undergoing readiness assessments for startup testing and commissioning to prepare for radioactive operations, which are targeted for January 2022. Finally, the

Department will need a pathway for the disposal of the calcined material currently stored at INL.

In addition to the remaining efforts, the Department will also need to identify and develop final disposition pathways for all types of treated tank waste.

Office of Science/Artificial Intelligence and Technology Office — Establishing the Department as a Federal Enterprise Leader in Developing and Deploying Artificial Intelligence

In February 2019, the President directed the Department and other Federal agencies to pursue several strategic objectives to promote and protect American advancements in AI. These objectives include, among others, sustained investment in AI 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. The Executive Order 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 an emerging strategic technology, AI has the potential to transform many aspects of discovery and applied technology science; manufacturing, infrastructure, finance, and commerce; Government operations; and national security. For example, the Department Summit supercomputer at the Oak Ridge National Laboratory, which has unsurpassed AI capabilities, has played an important role in Department urgent COVID-19 investigations of the virus and potential therapeutic responses. 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 private and academic sector experts.

As the custodians of the most advanced high-performance supercomputers and massive multimodal data sets stemming from diverse research, the Department is well-situated, working in conjunction with its national laboratories, to take a leading role in developing and deploying AI. 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. Meeting these goals will require a coherent, enterprise-wide strategy, excellent intradepartmental collaboration, and large-scale investments.

The Department investment in AI R&D and demonstration has been largely uncoordinated. Such efforts have been made by various Department elements drawing on their respective resources for research or operations, which are not dedicated exclusively to AI. This has meant that choices for AI investment have competed with other important initiatives sharing the same resource pools such as quantum information science and the Exascale Computing Initiative. While investments in those projects can further AI development, the benefits are often incidental to the primary purpose of the projects. Likewise, some of Department investments in cybersecurity R&D encompass elements of AI technology, but not exclusively so. Such a balkanized approach to AI investment poses the risk that the Department will miss opportunities to leverage all its resources strategically.

Realizing the Department goal of AI leadership will require cross-cutting and enterprise-wide efforts with contributions from diverse elements as: the Office of Science; the Office of Cybersecurity, Energy Security, and Emergency Response; the Office of the Chief Information Officer; Department national laboratories; and, among others, NNSA. Achieving success in such a collaborative effort is inherently challenging given the scope of the subject matter and the manner in which the Department conventionally operates.

As part of Department efforts, in September 2019, the Secretary of Energy established the Artificial Intelligence and Technology Office (AITO) as a new element reporting directly to the Under Secretary for Science. The secretarial order establishing the AITO specifies that this new office will foster the strategic coordination and development of AI activities across the Department enterprise by serving as a central point of coordination. In addition, the AITO is tasked with enhancing the Department sector-specific agency role and responsibility and providing support to its national security platforms. As its vision, the AITO intends to transform the Department into the U.S. Government lead agency in the civilian use of AI by accelerating its research, development, delivery, and application. The AITO's first Director was recruited from industry and joined the Department in February 2020.

To coordinate strategic research priorities and ensure investment decisions were effectively leveraged, the Deputy Secretary established the Research and Technology Investment Committee to convene the principal leaders of Department R&D activities on a regular basis. While currently this committee no longer exist, at the Research and Technology Investment Committee quarterly meeting in November 2019, the AITO demonstrated that the AI data available to leaders responsible for coordination was incomplete. Specifically, the AITO presented data showing that the sum of Department-wide AI investments increased from $102.8 million in FY 2019 to an estimated $161.9 million in FY 2020. Notably, these amounts did not include investments at Department national laboratories funded either by laboratory-directed R&D or by third parties through collaborative R&D agreements and partnerships. Additionally, although the AITO identified almost 300 distinct AI projects, it estimated that these represented only about half of all AI projects by various Department elements that were planned, underway, or

recently completed. As a result of these shortcomings, and in accordance with the Research and Technology Investment Committee guidance, the AITO established a comprehensive database, the AI Exchange, to gather a complete picture of Department AI projects and facilitate coordination for strategic advantage. The various Department elements and the national laboratories are in the process of currently validating and updating the information that was placed in AI Exchange in 2019. Additionally, the AITO has assigned an AI Exchange coordinator to manage the comprehensive database, https://www.exascaleproject.org/.

From July 2019 through October 2019, the Office of Science organized a series of "AI for Science" town hall meetings at three national laboratories and in Washington, DC, which were attended by over 1,300 scientists from the Department's 17 national laboratories, 39 private enterprises, and over 90 universities. The goal of these meetings was to discuss scientific opportunities and challenges in the coming decade in the areas of AI, big data, and high-performance computing. Scientific opportunities resulting from those discussions were captured in a report published in March 2020 that outlined the research and infrastructure needed to advance AI methods and techniques for science and energy applications.

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. One such initiative is the Exascale Computing Project, which is a collaboration among Oak Ridge National Laboratory, Argonne National Laboratory, Lawrence Livermore National Laboratory, LANL, Lawrence Berkeley National Laboratory, and Sandia National Laboratories. These laboratories and the Department, including NNSA, are working to bring the next-generation of world-leading, AI-optimized supercomputers online along with mission critical applications that will effectively use these systems. One of these supercomputers, the Frontier, is scheduled to be commissioned in calendar year 2021, followed by Aurora in 2022, and El Capitan in 2023. The Exascale Computing Project has also been investing in a co-design project, ExaLearn, focused on development of Exascale machine learning technologies. ExaLearn is building a software tool set for the Exascale platforms that is being applied to multiple challenges such as understanding the impact of extreme climate events on the use of renewals in the electric power grid or developing new energy-efficient materials and others within the Department mission space.

Additionally, in September 2020, the Advanced Scientific Computing Advisory Committee, with input from the other Office of Science Advisory Committees, industry and other federal agencies recommended a major strategic initiative for AI research, which would be a 10-year "AI for Science" plan that emulates the Department Exascale Computing Initiative. The recommended initiative would be structured around four major R&D themes: AI-enabled applications, AI algorithms and foundational research, AI software infrastructure, and new hardware technologies for AI. It is anticipated that the recommended initiative would include a near-term incubation phase that would coincide with the expected commissioning of the Department's latest supercomputing resources (including Exascale machines), followed by pursuing AI R&D goals through the current decade.

Despite the recommended initiative for the AI for Science research, it represents only one arena for Department leadership in AI. 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, to protect infrastructure against cyberthreats, to monitor financial records to detect potential waste or improper billings by Department contractors, and so forth.

The Department also needs to identify and consider making investments in cross-cutting AI opportunities that do not fall solely within the arena of a single program, yet have the potential to benefit several Department elements and stakeholders. While the Department plans to continue addressing and mitigating these challenges, doing so requires resources for AITO staff, on-going support to sustain AI software and tools developed in the Exascale project, and identification and coordination of cross-cutting AI R&D projects.

FY 2021 Summary of Financial Statement Audit and Management Assurances

Audit Opinion	**Unmodified**				
Restatement	No				
Material Weaknesses	**Beginning Balance**	**New**	**Resolved**	**Consolidated**	**Ending Balance**
TOTAL Material Weaknesses	*0*	*0*	*0*	*0*	*0*

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

Payment Integrity Reporting (FY 2021 Reporting of FY 2020 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 OMB's eight suggested risk assessment factors, plus four 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 2020. (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)
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)
10. Evaluate contractor payment processing oversight. (Other risk factor)
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 CARES Act and/or ARPA funding on existing payment processes in response to COVID-19. (Other risk factor)

In accordance with the requirement to perform a risk assessment at least once every three years, in FY 2021, the Department conducted 46 risk assessments at 47 payment reporting sites. Based on the site risk assessments performed in FY 2021, 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 erroneous payment rate (0.10 percent). Actual improper payments plus unknown payments[1] for payments made in FY 2020 are below OMB's $100 million threshold. The Departmental erroneous payment rate has remained below 1 percent since the inception of its program in FY 2002.

For FY 2020 information reported in FY 2021, the Department's total payment outlays were $46.57 billion and identified improper payments plus unknown payments were $46.16 million, of which $26.45 million were overpayments identified for recapture. The remaining improper payments include underpayments of $0.47 million, lost discounts of $0.31 million, and technically improper payments[2] of $18 million, all of which cannot be recaptured. Unknown payments of $0.87 million were also identified.

Recapture of Improper Payments Reporting

The Department's low improper payment rate of 0.10 percent reported in FY 2021 for FY 2020 payments, and the high recapture rate of 93.48 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 2021, $12.91 thousand is deemed uncollectible due to amounts being below the threshold minimum established for

[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.

[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 IP is a non-monetary loss type IP.

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 ASAP (Automated Standard Application for Payments), 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 2020 overpayments identified and recaptured outside of payment recapture audits reported in FY 2021, and **Table 2** identifies root causes of overpayments identified for recapture in FY 2020.

Table 1

FY 2020 Overpayments Identified and Recaptured Outside of Payment Recapture Audits Reported in FY 2021 ($ in millions)[1]						
PROGRAM/ PAYMENT TYPE	Amounts Identified For Recapture of Payments Made in FY 2020	Amounts Identified For Recapture of Payments Made in FY 2019 & Prior	TOTAL Amounts Identified For Recapture of Payments Made in FY 2020 & Prior	AMOUNTS RECAPTURED FOR FY 2020 AND REPORTED IN FY 2021	AMOUNTS RECAPTURED FOR FY 2019 AND PRIOR YEARS AND REPORTED IN FY 2021[2]	TOTAL AMOUNTS RECAPTURED FOR FY 2020 AND PRIOR AND REPORTED IN FY 2021[2]
Vendors/Contracts	$18.51	$28.74	**$47.26**	$17.28	$27.44	**$44.72**
Benefits - Payroll	$2.94	$0.81	**$3.76**	$2.47	$0.44	**$2.91**
Benefits - Travel	$0.21	$0.30	**$0.51**	$0.20	$0.28	**$0.48**
Grants	$4.33	$0.89	**$5.22**	$4.33	$0.45	**$4.78**
Loans	$—	$20.00	**$20.00**	$—	$20.00	**$20.00**
Other	$0.45	$4.08	**$4.53**	$0.45	$4.08	**$4.53**
TOTAL	**$26.45**	**$54.83**	**$81.28**	**$24.73**	**$52.69**	**$77.42**

[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 47 payment reporting sites, per OMB approval received on August 10, 2011.

[2] In FY 2020, a total of $77.42 million was recaptured, including $24.73 million associated with FY 2020 payments, and $52.69 million associated with payments made in FY 2019 and prior.

Table 2

Root Causes of Overpayments Identified for Recapture in FY 2020 ($ in millions)	
ROOT CAUSE OF IMPROPER PAYMENTS	TOTAL IDENTIFIED FOR RECAPTURE
Confirmed Fraud	**$1.16**
Duplicate Payment	**$4.21**
Funds used for Purposes other than allowed by law or Departmental Policies	**$0.10**
Goods or Services Not Received	**$2.82**
Incorrect Amount	**$14.17**
Ineligible Good or Service	**$0.49**
Ineligible Recipient	**$3.25**
Insufficient Documentation	**$0.62**
Other Reason	**$1.32**
Settlement as the Result of Litigation	**$50.70**
Unallowable Cost	**$2.43**
TOTAL	**$81.28**

Grant 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, 2021, is to the right.

Ten grants/cooperative agreements remain open for the following reasons:

- Two cooperative agreements remain open as a result of property issues;
- Five cooperative agreements are undergoing an audit and will be closed after the audit is complete;
- Two 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 awardee not completing necessary closeout documents.

CATEGORY	2-3 Years	>3-5 Years	>5 Years
Number of Grants/ Cooperative Agreements with Zero Dollar Balances	4	4	0
Number of Grants/ Cooperative Agreements with Undisbursed Balances	1	1	0
Total Amount of Undisbursed Balances (Dollars in Millions)	**$1.34**	**$0.29**	**$0.00**

Civil Monetary Penalty Adjustment for Inflation

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. 86, No. 22 (February 4, 2021) Rules and Regulations pages 8131-8133**
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	2021	$1,307,164 per violation, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2021/02/04/2021-00679/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	2021	$23,607 per violation, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2021/02/04/2021-00679/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	2021	$3,083 per violation	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2021/02/04/2021-00679/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	2021	$1,307,164 per violation, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2021/02/04/2021-00679/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	2021	$1,307,164 per violation, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2021/02/04/2021-00679/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	2021	$1,368 per offense and $69 per day after the first day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2021/02/04/2021-00679/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	2021	$13,685 per violation, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2021/02/04/2021-00679/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	2021	$1,368 per offense, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2021/02/04/2021-00679/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	2021	$1,368 per offense, per day	Federal Energy Regulatory Commission/Office of Enforcement	https://www.federalregister.gov/documents/2021/02/04/2021-00679/civil-monetary-penalty-inflation-adjustments

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. 86, No. 9 (January 14, 2021) Rules and Regulations pages 2953-2957**
Energy Supply and Environmental Coordination Act of 1974, 10 CFR 207.7	Enforcement/Sanctions	1974	2021	$10,949	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.pdf
Energy Policy and Conservation Act, 10 CFR 218.42	Enforcement/Sanctions	1975	2021	$23,714	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.pdf
Energy Policy and Conservation Act, 10 CFR 429.120	Enforcement/Maximum civil penalty	1975	2021	$474	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.pdf
Energy Policy and Conservation Act, 10 CFR 431.382	Enforcement/Prohibited Acts	1975	2021	$474	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.pdf
Energy Policy Act of 1992, 10 CFR 490.604	Enforcement/Penalties and Fines	1992	2021	$9,180	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.pdf
Powerplant and Industrial Fuel Use Act of 1978, 10 CFR 501.181	Civil penalties/Sanctions	1978	2021	$97,014; $8/mcf; $39/bbl	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.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	2021	$20,731 (minimum); $207,314 (maximum)	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.pdf
Price-Anderson Amendments Act of 1988, 10 CFR 820.81	Civil monetary penalties for violation of DOE safety regulations/Amount of penalty	1988	2021	$216,628	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.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	2021	$154,806	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.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	2021	$154,806	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.pdf
Atomic Energy Act of 1954, 10 CFR 851.5 and App B	Worker health and safety rules for DOE nuclear facilities/Enforcement	2002	2021	$100,535	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.pdf
Program Fraud Civil Remedies Act of 1986, 10 CFR 1013.3	False claims and statements; liability/Basis for civil penalties and assessments	1986	2021	$11,803	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.pdf
Atomic Energy Act of 1954, 10 CFR 1017.29	Dissemination of unclassified information/Civil penalty	1981	2021	$278,786	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.pdf
5 U.S.C. 7342(h), 10 CFR 1050.303	Receipt and disposition of foreign gifts and decorations/Enforcement	1977	2021	$21,135	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.pdf
42 U.S.C. 2282(a)	Violations of licensing requirements	2018	2021	$105,563	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.pdf
50 U.S.C. 2731(b)(2)	Worker protection at nuclear weapons facilities	1991	2021	$9,476	N/A	https://www.govinfo.gov/content/pkg/FR-2021-01-14/pdf/2021-00439.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 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, 2021, 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 2021, there were **62** IG reports awaiting final action. In FY 2021, the Department received **38** IG reports, of which **22** contained recommendations for corrective actions, and **16** had no recommendations. Thus, there were **84** IG reports pending final action during FY 2021, of which Department took final action on **32** 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 2021, **52** 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 2021, there were **55** GAO reports awaiting final action. In FY 2021, the Department received **55** additional final GAO audit reports, of which **17** contained recommendations for corrective actions by the DOE, and **38** had no recommendations to DOE. Thus, there were **72** GAO reports pending final action during FY 2021, the Department completed its planned corrective actions for **24** audits during FY 2021, leaving **48** GAO reports awaiting final action at year-end.

Status of Final Action on IG and GAO Audit Reports for FY 2020

The following chart provides a summary of closure actions for IG and GAO audit and inspection reports during FY 2021.

AUDIT REPORTS	NUMBER OF IG REPORTS	NUMBER OF GAO REPORTS
Reports Pending Final Action at the end of FY 2020*	**62**	**55**
Reports Issued in FY 2021 Requiring Corrective Actions	**22**	**17**
Total Reports Pending Final Action During FY 2021	**84**	**72**
Reports Closed During FY 2021	**32**	**24**
Total Reports Pending Final Action as of the End of FY 2021	**52**	**48**

*Reflects adjustments to previously reported amounts for GAO Reports Pending Final Actions at the end of FY 2020.

Glossary of Acronyms and Abbreviations

AAL	Asynchronous Transfer Mode Adaptation Layer
Ac-225	Actinium-225
ACI	Asset Condition Index
AFFF	Aqueous Film Forming Foam
AFR	Agency Financial Report
AI	Artificial Intelligence
AIRMP	Artificial Intelligence Risk Management Playbook
AIS	Automated Indicator Sharing
AITO	Artificial Intelligence and Technology Office
AIX	Artificial Intelligence Exchange
Alt	Alteration
AMERICA	A-123 Management of Entity Risk and Internal Controls Application
AMP	Accelerated Merit Promotion
ANDP	Advanced Network and Data Protections
AoA	Analysis of Alternatives
APG	Agency Priority Goal
APPR	Annual Performance Report/Annual Performance Plan
ARC	Analysis and Referral Center
ARIES	Advanced Research on Integrated Energy Systems
ARM	Atmospheric Radiation Measurement
ARO	Asset Retirement Obligation
ASO	Aqueous Soluble Organic
ASU	Accounting Standards Update
ATLAS	Argonne Tandem Linac Accelerator System
ATM	Asynchronous Transfer Mode
ATO	Authority to Operate
ATR	Advanced Test Reactor
ATVM	Advanced Technology Vehicles Manufacturing
AUI	Associated Universities, Inc.
BCI	Building Condition Index
BDP	Big Data Platform
BES	Basic Energy Sciences
BFADS	Budget Formulation and Distribution System
BFS	Bureau of the Fiscal Service
BIC	Best-in-Class

BiOp	Biological Opinion
BME	Base Metal Electrode
BNL	Brookhaven National Laboratory
BOD	Binding Operational Directive
BOR	Bureau of Reclamation
BPA	Bonneville Power Administration
CAA	Clean Air Act
CAP	Corrective Action Plan
CarbonSAFE	Carbon Storage Assurance Facility Enterprise
CARES	Coronavirus Aid, Relief, and Economic Security Act
CBS	Corporate Business Systems
CD	Critical Decision
CDM	Continuous Diagnostics and Mitigation
Ce	Cerium
CEDS	Cybersecurity for Energy Delivery System
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act
CESER	Office of Cybersecurity, Energy Security, and Emergency Response
CFE	Carbon-Pollution Free Electricity
CFR	Code of Federal Regulations
CGS	Columbia Generating Station
CHRIS	Corporate Human Resource Information System
CIC	Core Internals Change Out
CIP	Critical Infrastructure Protection
CISA	Cybersecurity & Infrastructure Security Agency
CM	Category Management
CMD	Configuration Management Databases
CMMC	Cybersecurity Maturity Model Certification
CO_2	Carbon Dioxide
COA	Commonwealth of Australia
Commission	Atomic Energy Commission
CR	Continuing Resolution
CRSO EIS	Columbia River System Operations Environmental Impact Statement
CSI WG	Control Systems Interagency Working Group

CSIRO	Australia's Commonwealth Scientific and Industrial Research Organisation
CSRS	Civil Service Retirement System
CSW+A141G	Control System Working Group
CTI	Cyber Threat Intelligence
CUAS	Counter Unmanned Aircraft Systems
CUI	Controlled Unclassified Information
Cures Act	21st Century Cures Act of 2015
CY	Current Year
D&D	Deactivation and Decommissioning
DATA Act	Digital Accountability and Transparency Act of 2014
DBT	Design Basis Threat
DCAA	Defense Contract Audit Agency
DD&R	Deactivation, Decommissioning, and Removal
DEFEND	Dynamic and Evolving Federal Enterprise Network Defense
DEI	Diversity, Equity, and Inclusion Office
DEIA	Diversity, Equity, Inclusion, and Accessibility
DER	Distributed Energy Resources
DERMS	Beyond Distributed Energy Resource Management System
DFAS	Defense Finance and Accounting Service
DHS	Department of Homeland Security
DICARC	Department Internal Control and Assessment Review Council
DJTA	Development Joint Test Assembly
DLT	Digital Ledger Technology
DM&R	Deferred Maintenance and Repairs
DoD	Department of Defense
DOE	Department of Energy (or Department)
DOI	Department of the Interior
DOJ	Department of Justice
DOS	Department of State
DR	Disaster Recovery
DSS	Decontaminated Low Level Salt Waste Stream
DWPF	Defense Waste Processing Facility
e.g.	For Example
ECFWG	Excess Contaminated Facilities Working Group
ECGS	Enterprise Cybersecurity Governance System

eCPIC	Electronic Capital Planning and Investment Control
ECRM	Enterprise Cybersecurity Risk Management
ED	Office of Economic Impact and Diversity
EEOC	Equal Employment Opportunity Commission
EEOICPA	Energy Employees Occupational Illness Compensation Program Act
EERE	Office of Energy Efficiency and Renewable Energy
EIC	Energy I-Corps
EISM	Energy Security Infrastructure Modernization
ELRPO	Office of Employee, Labor, Relations, Policy and Oversight
EM	Office of Environmental Management; Environmental Management
EO	Executive Order
EPA	Environmental Protection Agency
EPAct05	Energy Policy Act of 2005
EPIC	Energy Program for Innovation Clusters
ER	Employee Relations
ERG	Employee Resource Group
ERISA	Employee Retirement Income Security Act
ES&H	Environment, Safety, and Health
ESA	Endangered Species Act
ESCO	Energy Service Company
ESF	Emergency Support Function
ETEC	Energy Technology Engineering Center
ETU	Environmental Test Unit
Evidence Act	Foundations for Evidence-Based Policymaking Act of 2018
FACET	Facility for Advanced Accelerator Experimental Tests
FAIR	Factor Analysis of Information Risk
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
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
FGTU	Functional Ground Test Unit
FGTV	Functional Ground Test Vehicle
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
FMA	Fragment Mass Analyzer
FMFIA	Federal Managers' Financial Integrity Act of 1982
FOA	Funding Opportunity Announcement
FOC	Full Operational Capability
FPCU	First Production Capability Unit
FPDS-NG	Federal Procurement Data System – Next Generation
Framework	Fraud Risk and Data Analytics Framework
FRDAA	Fraud Reduction and Data Analytics Act of 2015
FRPC	Federal Real Property Council
FRTIB	Federal Retirement Thrift Investment Board
FY	Fiscal Year
GAAP	Generally Accepted Accounting Principles
GAO	Government Accountability Office
GBSD	Ground-Based Strategic Deterrent
GE	General Electric Company
GFE	Government Furnished Equipment
GHG	Greenhouse Gas

GIDEP	Government - Industry Data Exchange Program
GMRA	Government Management Reform Act of 1994
GMS	Global Material Security
GONE	Grants Oversight and New Efficiency Act of 2016
GPRA	Government Performance and Results Act of 1993
GPRAMA	Government Performance and Results Act Modernization Act of 2010
GRC	Governance, Risk and Compliance
GRETINA	Gamma-Ray Energy Tracking Inbeam Array
GS	General Schedule
GSA	General Services Administration
GTAS	Government-wide Treasury Account Symbol Adjusted Trial Balance System
HC	Office of the Chief Human Capital Officer
HCMAP	Human Capital Management Assessment Program
HEU	Highly Enriched Uranium
HLW	High-level Waste
HMO	Health Maintenance Organization
HPC	High-performance Computing
HR	Human Resources
HRMIS	Human Resources Management Information Systems
HRP	Human Reliability Program
HVA	High Value Asset
i.e.	That Is
IAE	Integrated Award Environment
IAEA	International Atomic Energy Administration
IAM	Identity and Access Management
ICAM	Identity, Credential, and Access Management
ICC	Instrumented Capture Carriage
ICS	Industrial Control Systems
ICSJWG	Industrial Control Systems Joint Working Group
ICT	Information and Communications Technology
IDIQ	Indefinite Delivery Indefinite Quantity
IDW	Integrated Data Warehouse
IE	Office of Indian Energy

IEC	Infrastructure Executive Committee
IG	Inspector General
iJC3	Integrated Joint Cybersecurity Coordination Center
IM	Information Management
IN	Office of Intelligence and Counterintelligence
INL	Idaho National Laboratory
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
IPT	Integrated Project Team
IRP	Incident Response Plan
ISCM	Information Security Continuous Monitoring
ISFSI	Independent Spent Fuel Installation
ISM	Integrated Safety Management
ISSO	Information System Security Officer
IT	Information Technology
ITP	Insider Threat Program
IWTU	Integrated Waste Treatment Unit
kW	Kilowatt
kWh	Kilowatt Per Hour
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
LAP4	Los Alamos Plutonium Pit Production Project
LAW	Low Activity Waste
LBNL	Lawrence Berkeley National Laboratory
LCOE	Levelized Cost of Energy
LDAR	Leak Detection and Repair
LEP	Life Extension Program
LLC	Limited Life Components
LLNL	Lawrence Livermore National Laboratory
LM	Office of Legacy Management
LMS	Learning Management System
LOB	Laboratory Operations Board
LR	Labor Relations
LRSO	Long Range Standoff
LTS&M	Long–Term Surveillance and Maintenance
LWRS	Light Water Reactor Sustainability
M&O	Management and Operating

MBB	Microgrid Building Blocks
MD	Management Directive
MDR	Mandatory Disclosure Rule
MEA	Membrane-Electrode Assembly
MEISPP	Minority Education Institution Student Partnership Program
MFA	Multifactor Authentication
ML	Machine Learning
MLU	Mid-Life Upgrade
Mo-99	Molybdenum-99
MOX	Mixed Oxide
MT	Metric Tons
MTU	Metric Tons of Uranium
MW	Megawatt
MY	Model Year
NAERM	North American Energy Resiliency Model
NAESB	North American Energy Standards Board
NARUC	National Association of Regulatory Utility Commissioners
NAV	Net Asset Value
NBIC	National Biosurveillance Integration Center
NCA	National Climate Assessment
NDAA	National Defense Authorization Act
NE	Office of Nuclear Energy
NEA	Nuclear Enterprise Assurance
NEAT	Networked Employee Assurance Tool
NEP	Nuclear Explosive Package
NERC	North American Reliability Corporation
NEUP	Nuclear Energy University Program
NICE	National Initiative for Cybersecurity Education
NIF	National Ignition Facility
NIH	National Institutes of Health
NIST	National Institute for Science 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

NPAC	Nonproliferation and Arms Control
NRECA	National Rural Electric Cooperative Association
NREL	National Renewable Energy Laboratory
NWDA	Nuclear Weapon Digital Assurance
NWF	Nuclear Waste Fund
NWPA	Nuclear Waste Policy Act of 1982
OA	Occupancy Agreement
OAS	Oracle Analytics Server
OCIO	Office of the Chief Information Officer
OE	Office of Electricity
OIG	Office of the Inspector General
OMB	Office of Management and Budget
OMEI	Office of Minority Economic Impact
OPM	Office of Personnel Management
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
ORSSC	Oak Ridge HR Shared Service Center
OST	Office of Secure Transportation
OTT	Office of Technology Transitions
P.L.	Public Law
P3	Public-Private Partnership
PDP	Prescription Drug Plan
PEM	Polymer Electrolyte Membrane
PFAS	Per- and Polyfluoroalkyl Substances
PFC	Plasma Facing Materials
PFP	Plutonium Finishing Plant
PgC	Petagrams Carbon
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
PMPC	Program Management Policy Council
POA&M	Plan of Action and Milestones
PP&E	Property, Plant and Equipment
PPO	Preferred Provider Organization
PPP	Program Protection Plan
PPY	Plutonium Pits Per Year
PRB	Postretirement Benefits Other Than Pensions
PUM	PeopleSoft Update Manager
QA	Quality Assurance
QGP	Quark Gluon Plasma
QIS	Quantum Information Science
QKD	Quantum Key Distribution
R&D	Research and Development
RA	Reasonable Accommodations
RAPID	Regulatory and Permitting Information Desktop
RCC	Reactive Capture and Conversion
RCRA	Resource Conservation and Recovery Act of 1976
REP	Residential Exchange Program
RFI	Request for Information
RFP	Request for Proposal
RHIC	Relativistic Heavy Ion Collider
RIVAL	Rapid Vulnerability Impact Analysis
RMF	Risk Management Framework
RPA	Robotic Process Automation
RSI	Required Supplementary Information
SAM	System for Award Management
SBR	Statements of Budgetary Resources
SCRM	Supply Chain Risk Management
SCTV	Separation and Control Test Vehicle
SEPA	Southeastern Power Administration
SES	Senior Executive Service
SFFAS	Statement of Federal Financial Accounting Standards
SGL	Standard General Ledger
SHASTA	Subsurface Hydrogen Assessment, Storage, and Technology Acceleration
SIA	Security Impact Analysis
SMS	Sustainment Management System
SNF	Spent Nuclear Fuel
SOC	Security Operation Center
SOFC	Solid Oxide Fuel Cell
SPD	Surplus Plutonium Disposition
SPR	Strategic Petroleum Reserve
SRPPF	Savannah River Plutonium Processing Facility
SRS	Savannah River Site
SSP	Stockpile Stewardship Program
STARS	Standard Accounting and Reporting System

STRIPES	Strategic Integrated Procurement Enterprise System
SUM	Spend Under Management
SWPA	Southwestern Power Administration
SWPF	Salt Waste Processing Facility
TAAS	Ticketing and Automation System
TAD	Talent Acquisition Division
TCF	Technology Commercialization Fund
TELGP	Tribal Energy Loan Guarantee Program
Th	Thorium
Title XVII	Title XVII Loan Guarantee Program for Innovative Technologies
TOR	Task Order Request
TPBAR	Tritium-Producing Burnable Absorber Rods
TPC	Total Project Cost
Treasury	Department of the Treasury
TRU	Transuranic
TSCR	Tank-Side Cesium Removal
TSN	Time-sensitive Networking
TSP	Thrift Savings Plan
TSQKD	Time-Sensitive Quantum Key Distribution
U.S.	United States
U.S.C.	United States Code
UAM	User Activity Monitoring
UCLA	University of California, Los Angeles
UESC	Utility Energy Service Contracts
UF_6	Uranium Hexafluoride
UIC	Underground Injection Control
USABC	US Advanced Battery Consortium
USACE	U.S. Army Corps of Engineers
USEC	U.S. Enrichment Corporation Fund
USSGL	U.S. Standard General Ledger
VDP	Vulnerability Disclosure Program
VIPERS	Vendor Inquiry Payment Electronic Reporting System
VRM	Vendor Risk Management
WETL	Weapons Evaluation Test Laboratory
WIPP	Waste Isolation Pilot Plant
WMD	Weapons of Mass Destruction
WR	War Reserve
Y-12	Y-12 National Security Complex
ZCC	Zscaler Client Connector
ZIA	Zscaler Internet Access
ZPA	Zscaler Private Access
ZTA	Zero Test Architecture

Photo Captions

Front Cover

- Photo 1 – Priority: Combating the Climate Crisis. Photo from https://www.energy.gov/.
- Photo 2 – Priority: Creating Clean Energy Union Jobs. Photo from https://www.energy.gov/.
- Photo 3 – Priority: Promoting Energy Justice. Photo from https://www.energy.gov/.

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- Photo 2 – Historical photo 3537: Oak Ridge Clinton Engineer Works.

Management's Discussion and Analysis

- Photo 1 – Priority: Combating the Climate Crisis. Photo from https://www.energy.gov/.

Financial Results

- Photo 2 – Priority: Creating Clean Energy Union Jobs. Photo from https://www.energy.gov/.

Other Information

- Photo 3 – Priority: Promoting Energy Justice. Photo from https://www.energy.gov/.

Back Cover

- DOE Twitter Composite. Photo from https://twitter.com/energy.



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