

estimate of collections in fiscal year 2023 is \$45,770,000.

CALIFORNIA BAY-DELTA RESTORATION
(INCLUDING TRANSFERS OF FUNDS)

The agreement provides \$33,000,000 for the California Bay-Delta Restoration Program.

POLICY AND ADMINISTRATION

The agreement provides \$65,079,000 for Policy and Administration.

ADMINISTRATIVE PROVISION

The agreement includes a provision limiting Reclamation to purchase not more than thirty passenger vehicles for replacement only.

GENERAL PROVISIONS—DEPARTMENT OF THE
INTERIOR

The agreement includes a provision outlining the circumstances under which the Bureau of Reclamation may reprogram funds.

The agreement includes a provision regarding the San Luis Unit and Kesterson Reservoir in California.

The agreement includes a provision regarding section 9504(e) of the Omnibus Public Land Management Act of 2009 (Public Law 111-11).

The agreement includes a provision regarding the Calfed Bay-Delta Authorization Act.

The agreement includes a provision regarding section 9106(g)(2) of the Omnibus Public Land Management Act of 2009.

The agreement includes a provision regarding the Reclamation States Emergency Drought Relief Act of 1991.

The agreement includes a provision regarding WRDA of 2000 (Public Law 106-541).

The agreement includes a provision prohibiting the use of funds in this Act for certain activities.

TITLE III—DEPARTMENT OF ENERGY

The agreement provides \$46,243,359,000 for the Department of Energy to fund programs in its primary mission areas of science, energy, environment, and national security.

REPROGRAMMING REQUIREMENTS

The agreement carries the Department's reprogramming authority in statute to ensure that the Department carries out its programs consistent with congressional direction. The Department shall, when possible, submit consolidated, cumulative notifications to the Committees.

Definition.—A reprogramming includes the reallocation of funds from one program, project, or activity to another within an appropriation. For construction projects, a reprogramming constitutes the reallocation of funds from one construction project to another project or a change of \$2,000,000 or 10 percent, whichever is less, in the scope of an approved project.

FINANCIAL REPORTING AND MANAGEMENT

The Department is still not in compliance with its statutory requirement to submit to Congress, at the time that the President's budget request is submitted, a future-years energy program that covers the fiscal year of the budget submission and the four succeeding years, as directed in the fiscal year 2012 Act. While the Committees appreciate the small progress of including some information in the budget request, the information provided was inadequate because it clearly was not a "meaningful and comprehensive multi-year budget" as required. In addition, the Department has an outstanding requirement to submit a plan to become fully compliant with this requirement. The Department is directed to provide these requirements not later than 30 days after enactment of this Act. The Department may not obligate more than 75 percent of amounts provided to the Office of the Sec-

retary until the Department briefs the Committees on options for ways to provide future-years energy program information.

Commonly Recycled Paper.—The agreement reiterates House direction on this topic.

Congressional Reporting Requirements.—The Department is directed to provide quarterly updates to the Committees on congressional reporting requirements. Further, the Department is directed to provide all congressionally required reports digitally in addition to traditional correspondence.

SBIR and STTR Programs.—The agreement reiterates House direction on this topic.

Mortgaging Future-Year Awards.—The agreement reiterates House direction on this topic.

General Plant Projects.—The agreement reiterates House direction on this topic.

Competitive Procedures.—The agreement reiterates House direction on this topic.

Cost Share Waivers.—The agreement reiterates House direction on this topic.

Notification of Funding Availability.—The agreement includes no direction on this topic.

WORKFORCE DEVELOPMENT AND
DIVERSITY

Workforce Development.—The agreement reiterates House direction on this topic.

The Department is encouraged to prioritize training and workforce development programs that assist and support workers in trades and activities required for the continued growth of the U.S. energy efficiency and renewable energy sectors, including training programs focused on building retrofit, the construction industry, and the electric vehicle industry. The Department is encouraged to continue to work with 2-year, community and technical colleges, labor, and nongovernmental and industry consortia to pursue job training programs, including programs focused on displaced fossil fuel workers, that lead to an industry-recognized credential in the renewable energy and energy efficiency workforce. The agreement recognizes the Department's collaborations with the Department of Defense to address national security priorities including climate change and electric infrastructure. The agreement recognizes the Department's individual education and workforce development programs relating to the intersection of national security and energy but encourages interdepartmental coordination on the creation or modification of these programs.

CROSSCUTTING INITIATIVES

Carbon Dioxide Removal.—The agreement provides not less than \$140,000,000 for research, development, and demonstration of carbon dioxide removal technologies, including not less than \$20,000,000 from the Office of Energy Efficiency and Renewable Energy (EERE), not less than \$70,000,000 from Office of Fossil Energy and Carbon Management (FECM), and not less than \$50,000,000 from the Office of Science.

The Department is encouraged to carry out activities under the Carbon Dioxide Removal Research, Development, and Demonstration Program authorized in section 5001 of the Energy Act of 2020. The Department is directed to coordinate these activities among FECM, EERE, the Office of Science, and any other relevant program offices or agencies, including the Environmental Protection Agency and Department of Agriculture.

The agreement reiterates House direction on the development of diverse carbon management technologies and methods.

The agreement reiterates House direction on the development and commercialization of carbon dioxide removal technologies at significant scale.

The agreement reiterates House direction on the carbon removal implementation plan

and the roles and responsibilities of each program participating in the implementation plan.

The Department is directed to establish a competitive purchasing pilot program for the purchase of carbon dioxide removed from the atmosphere or upper hydrosphere, in support of carbon dioxide removal projects authorized in section 969D of the Energy Policy Act of 2005.

Critical Minerals and Materials.—The agreement provides not less than \$248,500,000 for research, development, demonstration, and commercialization activities on the development of alternatives to, recycling of, and efficient production and use of critical minerals and materials, including not less than \$112,000,000 from EERE, not less than \$50,000,000 from FECM, not less than \$25,000,000 from the Office of Science, and not less than \$61,500,000 from the Office of Nuclear Energy (NE).

The agreement reiterates House direction on university initiatives for critical mineral extraction; the Critical Materials Institute and the Critical Materials Consortium; the Critical Materials Supply Chain Research Facility; and workforce needs in critical minerals and materials industries.

The Department is encouraged to carry out these activities pursuant to sections 7001 and 7002 of the Energy Act of 2020.

Energy Storage.—The agreement provides not less than \$540,000,000 for research, development, demonstration, commercialization, and deployment of energy storage, including not less than \$347,000,000 from EERE, not less than \$95,000,000 from the Office of Electricity (OE), not less than \$5,000,000 from FECM, not less than \$10,000,000 from NE, and not less than \$83,000,000 from the Office of Science.

The Department is directed to carry out these activities in accordance with sections 3201 and 3202 of the Energy Act of 2020.

The agreement notes support for the Department's Energy Storage Grand Challenge (ESGC) and Long-Duration Storage Shot Initiatives, which includes cost-shared demonstrations of energy storage technologies.

Energy-Water Nexus.—The agreement reiterates House direction on this topic.

Industrial Decarbonization.—The agreement provides not less than \$685,000,000 for industrial decarbonization activities, including not less than \$420,000,000 from EERE, not less than \$200,000,000 from FECM, and not less than \$65,000,000 from the Office of Science. The Department is directed to establish the Industrial Emissions Reduction Technology Development Program authorized in section 6003 of Public Law 116-206 for clean industrial research, development, and demonstrations that are both sector-specific and technology-inclusive. The program shall coordinate with EERE, FECM, the Office of Science, Office of Clean Energy Demonstrations, and other relevant program offices. Not later than 60 days after enactment of this Act, the Department is directed to detail on how it will improve coordination and align different program offices to implement the recently released Industrial Decarbonization Roadmap strategy, including who within the Department will lead this work. The funds provided are for the development of a suite of technologies to strengthen the competitiveness of America's industrial sector, with an emphasis on heavy industrial sectors, including iron, steel, steel mill products, aluminum, cement, concrete, glass, pulp, paper, industrial ceramics, and chemicals. Within available funds, the agreement provides not less than \$25,000,000 for clean heat alternatives for industrial processes.

Further, the agreement notes a lack of coordination across the Department regarding Industrial Decarbonization activities. Not later than 60 days after enactment of this

Act, the Department is directed to detail on how it will improve coordination and align different program offices to implement the recently released Industrial Decarbonization Roadmap strategy, including who within the Department will lead this work. The Department is encouraged to specify the value-added roles that distinct federal funding streams will play in achieving the emissions reduction goals of the Industrial Decarbonization Roadmap, including across the Department's program offices.

Alternative Modes of Transportation.—The agreement notes the Department's ongoing efforts to develop technologies and low carbon fuels that will reduce emission in shipping, aviation, agricultural, and long-distance transportation.

The agreement provides not less than \$380,000,000 to further the research, development, testing, and demonstration of innovative technologies and solutions for low- or no-emission alternative fuels for ongoing efforts to develop technologies and low carbon fuels that will reduce emission in shipping, aviation, agricultural, and long-distance transportation. This funding level includes not less than \$300,000,000 from EERE, not less than \$35,000,000 from FECM, not less than \$35,000,000 from OE, and not less than \$10,000,000 from the Office of Science.

Further, there are technologies that will reduce emissions in existing locomotive fleets, such as different blends of renewable diesel and biodiesel, as well as to accelerate the commercial viability of innovative technologies and alternatives to traditional diesel fuel, including batteries and hydrogen fuel cells. The agreement notes that hastening the availability of low- and no-carbon alternatives to diesel fuel for locomotives will be essential to addressing climate change while also meeting our nation's projected 50 percent growth in freight transportation demand by 2050. Further, the agreement notes that the decarbonization of the rail industry will be essential to achieving a net-zero emissions economy as rail will continue to play a vital role in such a broad cross-section of industrial economic sectors well into the future. Further, the Department is encouraged to accelerate its work on sustainable aviation fuels, with a focus getting feedstocks and biorefining processes for net-zero emission fuels into demonstration as it works to meet the goals of the Sustainable Aviation Fuel Grand Challenge. The Department is encouraged to develop a clear framework for evaluating the emissions reduction potential of different sustainable aviation fuel pathways and to prioritize research and development of fuels with the greatest potential to reduce GHG emissions while avoiding unintended consequences on forests and food supply chains. The Department is encouraged to work with other federal agencies and the national labs to coordinate efforts to advance sustainable aviation fuels.

DOE and USDA Interagency Working Group.—The agreement reiterates House direction on this topic.

Fluoropolymers.—The agreement reiterates House direction on this topic.

Grid Modernization.—The agreement reiterates House direction on this topic.

The Department is directed to develop a plan for a pipeline of students, graduates, and professors to sustain a robust grid modernization research, design, and operations capability over the long-term.

Further, the agreement notes the value of a diverse range of clean distributed energy resources, and the Department is encouraged to evaluate opportunities to deploy multi-resource microgrids that incorporate dispatchable, fuel-flexible, renewable fuel-compatible, distributed generation tech-

nologies, including but not limited to linear generator technology, paired with variable output renewable resources and battery storage technology, in order to simultaneously achieve substantial carbon and criteria emissions reductions, ensure multi-day resilience, and improve energy security and independence.

Harmful Algal Blooms.—The agreement reiterates House direction on this topic.

Hydrogen.—The Department is directed to coordinate its efforts in hydrogen energy and fuel cell technologies across EERE, FECM, NE, OE, the Office of Science, the Office of Clean Energy Demonstrations, the Advanced Research Projects Agency—Energy, and any other relevant program offices to maximize the effectiveness of investments in hydrogen-related activities.

The agreement provides not less than \$316,000,000 for the Hydrogen crosscut, including not less than \$163,000,000 from EERE, not less than \$113,000,000 from FECM, not less than \$23,000,000 from NE, and not less than \$17,000,000 from the Office of Science.

The agreement provides not less than \$15,000,000 for technologies to advance hydrogen use for heavy-duty transportation, industrial, and hard-to-electrify transportation applications including trains, maritime shipping, and aviation.

Integrated Energy Systems.—The agreement reiterates House direction on this topic.

Landfill Emissions.—The agreement reiterates House direction on this topic.

ENERGY PROGRAMS

ENERGY EFFICIENCY AND RENEWABLE ENERGY

The agreement provides \$3,460,000,000 for Energy Efficiency and Renewable Energy.

Additional direction related to Department-wide crosscutting initiatives is provided under the heading Crosscutting Initiatives in the front matter of Department of Energy.

The agreement supports the budget request for the Communities to Clean Energy Program.

Aquatic Decarbonization.—The agreement provides not less than \$40,000,000 for crosscutting efforts that will contribute to multiple areas of ocean- and water-based energy technologies and include support for research, development, and infrastructure that leverages the Department's existing ocean-based assets and infrastructure. The Department is directed to provide to the Committees prior to the obligation of these funds a detailed spending plan highlighting which offices are contributing to this effort and the planned investments in research, development, and deployment, including infrastructure needs.

Database of State Incentives for Renewables and Efficiency.—The Department is directed to support needed security and software upgrades for the Database of State Incentives for Renewables and Efficiency (DSIRE), a program that provides U.S. homeowners, businesses, policymakers, and others with vital information relating to clean energy incentives and policies across the country.

Energy Transitions Initiative.—The agreement provides not less than \$15,000,000 for the Energy Transitions Initiative (ETI), including the Technology-to-Market and Communities subprogram, to support initiatives to address high energy costs, reliability and inadequate infrastructure challenges faced by island and remote communities. The Department is directed to support stakeholder engagement and capacity building and reiterates House direction on community-based initiatives. Additionally, the agreement notes that without a plan to support communities that have or are receiving technical assistance through cohorts 1 and 2, the federal investment risks being stranded. The

Department should provide some level of support and program continuity for these communities from locally relevant technical assistance providers. To facilitate improvement of this initiative, the Department is directed to provide to the Committees not later than 90 days after enactment of this Act a report detailing: 1) current status of projects supported through this program; 2) plans to ensure ETIPP program continuity and follow-up support through regional project partners; 3) offboarding processes for cohorts 1 and 2 as well as how the offboarding processes build a pipeline of projects for other programs in the Department; 4) plans for recruiting and supporting a third cohort of communities; and 5) recommendations on the inclusion of additional geographies supported with additional regional partners.

Workforce Development.—The agreement provides \$5,000,000 to support expanding efforts to include students from underserved institutions in the technology development programs within the Department's portfolio of manufacturing, solar, transportation and grid/energy storage through a university which has existing partnerships with several Historically Black Colleges and Universities and Minority Serving Institutions, and participants in several Departmental applied energy research programs.

The Department is encouraged to continue to work with two-year, community and technical colleges; labor; and nongovernmental and industry consortia to pursue job training programs, including programs focused on displaced fossil fuel workers, that lead to an industry-recognized credential in the energy workforce. The Department is encouraged to update and publish on its website the list of credentials that are recognized by the Department through its Better Buildings Workforce Guidelines and additional credentials that are relevant to designing, building, and operating building energy systems.

University Research Consortium on Resilience.—In fiscal year 2021 and fiscal year 2022, the agreement directed \$20,000,000 in total for a competitive solicitation which the Department was expected to release in Fall 2022. The Department is directed to release the funding opportunity and award funds expeditiously.

SUSTAINABLE TRANSPORTATION

The agreement provides not less than \$35,000,000 to continue the SuperTruck III vehicle demonstration program and further address the energy efficiency, carbon dioxide emissions reduction potential, and freight efficiency of heavy and medium duty long- and regional-haul vehicles.

Vehicle Technologies.—The Department is encouraged to prioritize projects in states where the transportation sector is responsible for a higher percentage of the state's total energy consumption and is the largest source of greenhouse gases.

Within available funds, the agreement supports a solicitation to further develop and demonstrate advanced wireless charging technologies, including charging coils, that reduce cost and improve performance of wireless power transfer and to demonstrate opportunity wireless vehicle charging in northern climates, in areas with high ratio of renewable energy deployment.

The agreement provides up to \$250,000,000 for Battery and Electrification Technologies.

The Vehicle Technologies Office is encouraged to prioritize recycling funding awards for projects that demonstrate recycling of all battery components, including casings and enclosures made from plastics and polymer composites.

The agreement provides \$10,000,000 for research and development of engine architectures that integrate low-carbon fuels like

NAVAL PETROLEUM AND OIL SHALE RESERVES

The agreement provides \$13,004,000 for the operation of the Naval Petroleum and Oil Shale Reserves.

STRATEGIC PETROLEUM RESERVE

The agreement includes \$207,175,000 for the Strategic Petroleum Reserve.

No funding is requested for the establishment of a new regional petroleum product reserve, and no funding is provided for this purpose. Further, the Department may not establish any new regional petroleum product reserves unless funding for such a proposed regional petroleum product reserve is explicitly requested in advance in an annual budget request and approved by Congress in an appropriations Act.

SPR PETROLEUM ACCOUNT

The agreement provides \$100,000 for the SPR Petroleum Account.

NORTHEAST HOME HEATING OIL RESERVE

The agreement provides \$7,000,000 for the Northeast Home Heating Oil Reserve.

ENERGY INFORMATION ADMINISTRATION

The agreement provides \$135,000,000 for the Energy Information Administration.

The agreement provides up to \$3,000,000 to conduct a monthly survey of electric and heating service providers of final termination notices sent due to bill non-payment, service disconnections due to bill non-payment, and Service reconnections of customers disconnected for bill non-payment, in a form and manner determined by the agency.

NON-DEFENSE ENVIRONMENTAL CLEANUP

The agreement provides \$358,583,000 for Non-Defense Environmental Cleanup.

Gaseous Diffusion Plants.—The agreement provides \$130,938,000 for cleanup activities at the Gaseous Diffusion Plants, including an additional \$7,500,000 above the budget request for infrastructure improvements required for the shipping and disposal of oxide cylinders, as well as to advance the near-term shipment of cylinders and may be used to demonstrate multicar oxide rail shipment at Paducah.

Small Sites.—The agreement provides \$132,463,000 for Small Sites cleanup. Within this amount, \$26,409,000 is for the Energy Technology Engineering Center, \$13,500,000 is for Idaho National Laboratory, \$15,000,000 is for work on the B71 complex at Lawrence Berkeley National Laboratory, \$67,000,000 is for Moab, and \$10,554,000 is for excess Office of Science facilities.

The agreement reiterates House direction regarding a briefing on historic preservation efforts associated with the deactivation and decommissioning of the S1W prototype reactor.

URANIUM ENRICHMENT DECONTAMINATION AND DECOMMISSIONING FUND

The agreement provides \$879,052,000 for activities funded from the Uranium Enrichment Decontamination and Decommissioning Fund.

Portsmouth Site.—Within funds available for Pensions and Community and Regulatory Support, the agreement includes \$500,000 above the budget request to maintain community liaison activities and to provide technical and regulatory assistance to the local community and surrounding counties. Further, the agreement includes \$20,000,000 above the budget request to provide support for community-focused education and training opportunities and economic development initiatives in the local community and surrounding counties. The agreement reiterates House direction on air and ground water monitoring and reporting and land use planning.

Paducah Site.—Within available funding, \$2,000,000 is directed for a reindustrialization study to assess how the Department's efforts complement the community's long-term plans for reindustrialization and workforce development. The Department is encouraged to utilize the additional funds to advance deactivation work on the C-333 Process Building, one of the four large process buildings at the site. The agreement notes the progress of the workforce development partnership with labor unions to train workers in the fields of radiation protection and the Resource Conservation and Recovery Act to build up the next generation of field workers. The Department is encouraged to continue prioritizing partnerships by utilizing local community colleges and universities to train local citizens to advance the deactivation of C-333.

SCIENCE

The agreement provides \$8,100,000,000 for Science.

Additional direction related to Department-wide crosscutting initiatives is provided under the heading Crosscutting Initiatives in front matter for the Department of Energy.

Artificial Intelligence and Machine Learning.—The agreement includes not less than \$135,000,000 for Artificial Intelligence and Machine Learning across the Office of Science Programs.

Biomedical Sciences.—The Department is encouraged to expand its relationships with NIH, including NIMH, to work together more strategically to leverage the Department's research capabilities, including instrumentation, materials, modeling and simulation, and data science. The facilities and equipment funded in this Act support applications in many areas of biomedical research. Better coordination between the Department and NIH could be instrumental in assisting to develop the nation's health, security, and technologies with novel biomedical application. The agreement includes not less than \$2,000,000 for collaboration with NIH within the Department's data and computational mission space.

Established Program to Stimulate Competitive Research.—The agreement provides not less than \$35,000,000 for EPSCoR. The Department is directed to continue annual or at minimum, biennial implementation grant solicitations. Further, EPSCoR shall be implemented and funded across all the Department of Science Programs.

Facility Operations.—The agreement notes disappointment with the Department's lack of support for robust user facility operations in the budget request. Supporting these vital user facilities should be a top priority for the Department to advance scientific discovery. The Department is directed to prioritize the stewardship of the user facilities in fiscal year 2023 and in future budget requests.

HBCU/MSI Engagement.—The agreement provides not less than \$60,000,000, including through the Reaching a New Energy Sciences Workforce (RENEW) and Funding for Accelerated, Inclusive Research (FAIR) programs, in support of the Office of Science's engagement with Historically Black Colleges and Universities (HBCUs) and other Minority Serving Institutions (MSIs) to build research capacity and workforce development.

Quantum Information Sciences.—The agreement provides not less than \$245,000,000 for quantum information science, including not less than \$120,000,000 for research and \$125,000,000 for the five National Quantum Information Science Research Centers. The Department shall continue its coordination efforts with the National Science Foundation, other federal agencies, private sector stakeholders, and the user community to promote

researcher access to quantum systems, enhance the U.S. quantum research enterprise, develop the U.S. quantum computing industry, and educate the future quantum computing workforce. Further, the Department is directed to provide to the Committees not later than 90 days after enactment of this Act a report of near-term application developments and of the research funding breakdown across the five National Quantum Information Science Research Centers.

ADVANCED SCIENTIFIC COMPUTING RESEARCH

High Performance Computing and Network Facilities.—The agreement provides not less than \$175,000,000 for the Argonne Leadership Computing Facility, not less than \$255,000,000 for the Oak Ridge Leadership Computing Facility, and not less than \$130,000,000 for the National Energy Research Scientific Computing Center at Lawrence Berkeley National Laboratory. The agreement includes not less than \$90,000,000 to support necessary infrastructure upgrades and operations for ESnet.

The Department is directed to support continued planning and design for the High Performance Data Facility.

Mathematical, Computational, and Computer Sciences Research.—The agreement provides not less than \$300,000,000 for Mathematical, Computational, and Computer Sciences Research.

The agreement includes not less than \$15,000,000 and up to \$45,000,000 for the development of advanced memory technologies to advance artificial intelligence and analytics for science applications by a U.S.-based manufacturer of memory systems and memory semantic storage.

The agreement supports the Center for Advanced Mathematics for Energy Research Applications (CAMERA) and encourages the Department to support the creation of a crosscutting research program that leverages applied math, computer science and computational science to deliver artificial intelligence research, development, and deployment to increase the scientific productivity of the user facilities.

The agreement provides not less than \$20,000,000 for computational sciences workforce programs.

BASIC ENERGY SCIENCES

The agreement provides not less than \$130,000,000 for Energy Frontier Research Centers, \$25,000,000 for the Batteries and Energy Storage Hub, and not less than \$20,000,000 for the Fuels from Sunlight Hub.

The agreement provides \$1,000,000 to establish a center, with coordination between the national laboratories and universities, focused on computational research for precision design of materials. This research should be focused on developing computational research relevant to the Materials Genome Initiative, the National Quantum Initiative and Computational Materials Science in order to discover and understand advanced materials with unique properties that are able to develop new quantum device capabilities, such as enhanced resolution in imaging, sensors, and detectors, as well as significantly larger computational capabilities.

The agreement provides not less than \$566,000,000 for facilities operations of the nation's light sources, not less than \$311,000,000 for facilities operations of the high-flux neutron sources, and not less than \$149,000,000 for facilities operations of the Nanoscale Science Research Centers (NSRC).

The agreement provides not less than \$17,500,000 for other project costs, including \$5,000,000 for Advanced Photon Source Upgrade, \$4,000,000 for Linac Coherent Light Source-II-HE, \$5,000,000 for the Second Target Station, not less than \$2,000,000 for HFIR Pressure Vessel Replacement, and \$1,500,000 NSLS-II Experimental Tools III.

The agreement includes \$25,000,000 for NSRC Recapitalization and not less than \$25,000,000 for NSLS-II Experimental Tools-II.

BIOLOGICAL AND ENVIRONMENTAL RESEARCH

The agreement includes not less than \$405,000,000 for Biological Systems Science and not less than \$425,000,000 for Earth and Environmental Systems Sciences.

The agreement provides up to \$20,000,000 to support low-dose radiation research. The Department is directed to coordinate this work with the Office of Environment, Health, Safety, and Security.

The agreement provides not less than \$110,000,000 for the Bioenergy Research Centers to accelerate research and development needed for advanced fuels and products.

The Department is directed to maintain Genomic Science as a top priority, and the agreement provides not less than \$109,000,000 for Foundational Genomics Research. Further, the agreement includes not less than \$45,000,000 for Biomolecular Characterization and Imaging Science. The agreement provides not less than \$90,000,000 for the Joint Genome Institute.

The Department is directed to support activities to advance Artificial Intelligence for Earth System Processes (AI4ESP) for integrating diverse observations and models, with a focus on water cycles, extreme hydrology in vulnerable watersheds critical for U.S. water resilience in a changing climate, and atmospheric cloud aerosols.

The Department is directed to support activities to develop integrated mountainous hydroclimate modeling and observational capabilities. The Department is directed to leverage activities supported by other federal agencies who are also active in investigating how the snow dominated Upper Colorado mountainous systems are responding to extreme events and gradual warming and the implications for water resilience in the western United States.

The Department is encouraged to support activities for academia to perform independent evaluations of climate models using existing data sets and peer-reviewed publications of climate-scale processes in order to determine various models' ability to reproduce the actual climate.

The agreement provides \$30,000,000 to continue the development of observational assets and support associated research on the nation's major land-water interfaces, including the Great Lakes and the Puget Sound, by leveraging national laboratories' assets as well as local infrastructure and expertise at universities and other research institutions. The Department is directed to provide the ten-year research plan to the Committees not later than 30 days after enactment of this Act.

The agreement provides not less than \$36,000,000 to improve the understanding of key cloud, aerosol, precipitation, and radiation processes. The Department is encouraged to coordinate with the Department of Homeland Security to improve modernization and adaptation of capabilities from the National Infrastructure Simulation and Analysis Center to support climate impacts on infrastructure and communities. The Department is encouraged, in cooperation with other agencies as relevant, to implement a pilot program providing instrumentation for observing marine aerosols, greenhouse gases, and other environmental factors as relevant, deployed on commercial or other non-dedicated ocean vessels, and to evaluate a sustained observing network using such platforms. The agreement notes support for the Department's activities to support the previously-directed five-year plan and accompanying scientific assessment led by the Of-

fice of Science and Technology Policy on solar and other climate interventions.

The agreement supports the development and prototyping of fabricated ecosystem testbeds, sensing systems and data capabilities to enable interrogation of biological-environmental interactions across molecular to ecosystem-relevant scales under controlled laboratory conditions and through remote connections to field observatories.

The agreement provides \$2,000,000 for academia to perform independent evaluations of climate models using existing data sets and peer-reviewed publications of climate-scale processes to determine various models' ability to reproduce the actual climate.

The agreement provides not less than \$120,000,000 for Environmental System Science.

The Department is directed to continue to support the Environmental System Science Focus Areas and enabling infrastructure, such as the SPRUCE manipulation site and management of the AmeriFLUX project.

The Department is directed to give priority to optimizing the operation of Biological and Environmental Research User Facilities. The agreement provides not less than \$65,000,000 for operation of the Environmental and Molecular Sciences Laboratory and supports investment in the microbial molecular phenotyping capability project. The agreement supports activities for the Atmospheric Radiation Measurement (ARM) User Facility.

FUSION ENERGY SCIENCES

The Department is directed to follow and embrace the recommendations of the Fusion Energy Sciences Advisory Committee's "Powering the Future: Fusion and Plasmas" report, and the Committees' endeavor to provide funding that reflects the prioritization developed through the community's consensus process. The Department is directed to include an explanation in future budget requests how the Department is aligning its Fusion Energy Sciences program with the recommendations of the "Powering the Future: Fusion and Plasmas" report.

The agreement provides not less than \$45,000,000 for Theory & Simulation and not less than \$81,000,000 for Burning Plasma Science Long Pulse.

The agreement provides not less than \$104,000,000 for NSTX-U, including NSTX-U Operations and NSTX-U Research.

The agreement provides not less than \$130,000,000 for DIII-D, including DIII-D Operations and DIII-D Research. The Department is encouraged to support activities to enable completion of planned facility enhancements, revitalization of critical equipment, and critical new tools to address critical research needs and secure U.S. leadership in support of ITER and a potential future fusion pilot plant. The Department is encouraged to provide increased research operations and enable broader participation in the DIII-D program by university researchers and graduate students, to fully exploit the world leading capabilities developed at the facility. Further, the Department is encouraged to support training activities at DIII-D for the next generation of fusion scientists.

The agreement includes not less than \$25,000,000 for the Milestone-Based Development Program.

The Department is encouraged to prioritize high-performance computation activities for fusion energy research.

The agreement provides up to \$32,000,000 for the High-Energy-Density Laboratory Plasmas to advance cutting-edge research in extreme states of matter, support and expand the capabilities of the LaserNetUS facilities, and continue investments in new in-

tense, ultrafast laser technologies and facilities needed to implement the recommendations of the Brightest Light Initiative Workshop Report in order to retain U.S. leadership in these fields.

The agreement provides not less than \$14,000,000 for the Materials Plasma Exposure eXperiment.

The agreement provides \$5,000,000 to support research for facility enhancements and new development and test facilities for university-based fusion experiments.

The agreement provides \$242,000,000 for the ITER project. Within available funds for ITER, the agreement provides not less than \$70,000,000 for cash contributions.

The Department is encouraged to develop and support a national team for ITER research, operations, and commissioning, which is required to take full advantage of ITER when it is completed.

The agreement includes no direction regarding the FY22 required ITER information.

HIGH ENERGY PHYSICS

The agreement provides not less than \$35,000,000 for the Sanford Underground Research Facility. The agreement includes up to \$10,000,000 for the Cosmic Microwave Background-Stage 4.

The Department is encouraged to fund facility operations at levels for optimal operations. The Department is encouraged to fund facility operations and MIEs at optimal levels.

NUCLEAR PHYSICS

The Department is directed to give priority to optimizing operations for all Nuclear Physics user facilities.

The agreement provides not less than \$20,000,000 for other project costs for the Electron Ion Collider.

ISOTOPE R&D AND PRODUCTION

The agreement provides up to \$4,000,000 to increase their inventory of Sr-90 in light of the nation's growing demand for Sr-90 for multiple applications.

WORKFORCE DEVELOPMENT FOR TEACHERS AND SCIENTISTS

The Department is encouraged to continue to work with 2-year, community and technical colleges, labor, and nongovernmental and industry consortia to pursue job training programs, including programs focused on displaced fossil fuel workers, that lead to an industry-recognized credential in the energy workforce.

NUCLEAR WASTE DISPOSAL

The agreement provides \$10,205,000 for Nuclear Waste Disposal for Nuclear Waste Fund (NWF) oversight activities, which is derived from the NWF.

The Department is directed to provide to the Committees not later than 90 days after enactment of this Act a briefing on anticipated future-year requirements for NWF oversight activities.

TECHNOLOGY TRANSITIONS

The agreement provides \$22,098,000 for Technology Transitions.

The agreement provides not less than \$5,000,000 to support the Energy Program for Innovation Clusters Program.

The Department is directed to provide the Committees not later than 180 days after enactment of this Act a report outlining the office's five-year roadmap to achieving its goal of commercializing the Department's technology.

CLEAN ENERGY DEMONSTRATIONS

The agreement provides \$89,000,000 for Clean Energy Demonstrations.

The agreement notes support for the Department's activities to build capacity to implement large-scale funding opportunities

(Amounts in thousands)

	FY 2022 Enacted	FY 2023 Request	Final Bill	Final Bill vs Enacted	Final Bill vs Request

SCIENCE					
Advanced Scientific Computing Research:					
Research.....	906,000	991,741	991,000	+85,000	-741
Construction:					
17-SC-20 Office of Science Exascale Computing Project (SC-ECP).....	129,000	77,000	77,000	-52,000	---

Subtotal, Advanced Scientific Computing Research.....	1,035,000	1,068,741	1,068,000	+33,000	-741
Basic Energy Sciences:					
Research.....	2,003,800	2,127,239	2,240,800	+237,000	+113,561
Construction:					
13-SC-10 LINAC coherent light source II (LCLS-II), SLAC.....	28,100	---	---	-28,100	---
18-SC-10 Advanced Photon Source Upgrade (APS-U), ANL.....	101,000	9,200	9,200	-91,800	---
18-SC-11 Spallation Neutron Source Proton Power Upgrade (PPU), ORNL.....	17,000	17,000	17,000	---	---

(Amounts in thousands)

	FY 2022 Enacted	FY 2023 Request	Final Bill	Final Bill vs Enacted	Final Bill vs Request
18-SC-12 Advanced Light Source Upgrade (ALS-U), LBNL.....	75,100	135,000	135,000	+59,900	---
18-SC-13 Linac Coherent Light Source-II-High Energy (LCLS-II-HE), SLAC.....	50,000	90,000	90,000	+40,000	---
19-SC-14 Second Target Station (STS), ORNL.....	32,000	32,000	32,000	---	---
21-SC-10 Cryomodule Repair and Maintenance Facility.....	1,000	10,000	10,000	+9,000	---
Subtotal, Construction.....	304,200	293,200	293,200	-11,000	---
Subtotal, Basic Energy Sciences.....	2,308,000	2,420,439	2,534,000	+226,000	+113,561
Biological and Environmental Research.....	815,000	903,685	908,685	+93,685	+5,000
Fusion Energy Sciences:					
Research.....	460,000	482,222	510,222	+50,222	+28,000
Construction:					
14-SC-60 U.S. Contributions to ITER (U.S. ITER).	242,000	240,000	242,000	---	+2,000
20-SC-61 Matter in Extreme Conditions (MEC) Petawatt Upgrade, SLAC.....	11,000	1,000	11,000	---	+10,000
Subtotal, Construction.....	253,000	241,000	253,000	---	+12,000
Subtotal, Fusion Energy Sciences.....	713,000	723,222	763,222	+50,222	+40,000
High Energy Physics: Research.....	810,000	824,020	868,000	+58,000	+43,980

(Amounts in thousands)

	FY 2022 Enacted	FY 2023 Request	Final Bill	Final Bill vs Enacted	Final Bill vs Request
Construction:					
11-SC-40 Long Baseline Neutrino Facility / Deep Underground Neutrino Experiment (LBNF/DUNE), FNAL.....	176,000	176,000	176,000	---	---
11-SC-41 Muon to electron conversion experiment, FNAL.....	2,000	2,000	2,000	---	---
18-SC-42 Proton Improvement Plan II (PIP-II), FNAL.....	90,000	120,000	120,000	+30,000	---
Subtotal, Construction.....	268,000	298,000	298,000	+30,000	---
Subtotal, High Energy Physics.....	1,078,000	1,122,020	1,166,000	+88,000	+43,980
Nuclear Physics:					
Research.....	708,000	719,196	755,196	+47,196	+36,000
Construction:					
20-SC-52 Electron Ion Collider, BNL.....	20,000	20,000	50,000	+30,000	+30,000
Subtotal, Construction.....	20,000	20,000	50,000	+30,000	+30,000
Subtotal, Nuclear Physics.....	728,000	739,196	805,196	+77,196	+66,000

(Amounts in thousands)

	FY 2022 Enacted	FY 2023 Request	Final Bill	Final Bill vs Enacted	Final Bill vs Request
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Isotope R&D and Production:					
Research:.....	70,000	85,451	85,451	+15,451	---
Construction:					
20-SC-51 US Stable Isotope Production and Research Center, ORNL.....	12,000	12,000	24,000	+12,000	+12,000
Subtotal, Construction.....	12,000	12,000	24,000	+12,000	+12,000
Subtotal, Isotope R&D and Production.....	82,000	97,451	109,451	+27,451	+12,000
Accelerator R&D and Production.....	18,000	27,436	27,436	+9,436	---
Workforce Development for Teachers and Scientists.....	35,000	41,300	42,000	+7,000	+700
Science Laboratories Infrastructure:					
Infrastructure Support:					
Payment in Lieu of Taxes.....	4,820	4,891	4,891	+71	---
Oak Ridge Landlord.....	6,430	6,559	6,559	+129	---
Facilities and Infrastructure.....	14,450	15,200	13,900	-550	-1,300
Oak Ridge Nuclear Operations.....	26,000	20,000	26,000	---	+6,000
Subtotal, Infrastructure Support.....	51,700	46,650	51,350	-350	+4,700
Construction:					
17-SC-71 Integrated Engineering Research Center, FNAL.....	10,250	---	---	-10,250	---
19-SC-71 Science User Support Center, BNL.....	38,000	---	---	-38,000	---
19-SC-73 Translational Research Capability, ORNL..	21,500	---	---	-21,500	---
19-SC-74 BioEPIC, LBNL.....	35,000	45,000	45,000	+10,000	---
20-SC-71 Critical Utilities Rehabilitation					

(Amounts in thousands)

	FY 2022 Enacted	FY 2023 Request	Final Bill	Final Bill vs Enacted	Final Bill vs Request
Project, BNL.....	26,000	13,000	26,000	---	+13,000
20-SC-72 Seismic and Safety Modernization, LBNL...	18,000	27,500	27,500	+9,500	---
20-SC-73 CEBAF Renovation and Expansion, TJNAF ...	10,000	2,000	15,000	+5,000	+13,000
20-SC-75 Large Scale Collaboration Center, SLAC ..	21,000	30,000	21,000	---	-9,000
20-SC-76 Tritium System Demolition and Disposal, PPPL.....	6,400	---	---	-6,400	---
20-SC-77 Argonne Utilities Upgrade, ANL	10,000	8,000	8,000	-2,000	---
20-SC-78 Linear Assets Modernization Project, LBNL	10,400	23,425	23,425	+13,025	---
20-SC-79 Critical Utilities Infrastructure Revitalization, SLAC	8,500	25,425	25,425	+16,925	---
20-SC-80 Utilities Infrastructure Project, FNAL ..	10,500	20,000	20,000	+9,500	---
21-SC-71 Princeton Plasma Innovation Center, PPPL.	7,750	10,000	10,000	+2,250	---
21-SC-72 Critical Infrastructure Recovery & Renewal, PPPL.....	2,000	4,000	4,000	+2,000	---
21-SC-73 Ames Infrastructure Modernization.....	2,000	---	2,000	---	+2,000
22-SC-71, Critical Infrastructure Modernization Project (CIMP), ORNL.....	1,000	---	1,000	---	+1,000
22-SC-72, Thomas Jefferson Infrastructure Improvements (TJII), TJNAF.....	1,000	---	1,000	---	+1,000
Subtotal, Construction:.....	239,300	208,350	229,350	-9,950	+21,000
Subtotal, Science Laboratories Infrastructure.	291,000	255,000	280,700	-10,300	+25,700

(Amounts in thousands)

	FY 2022 Enacted	FY 2023 Request	Final Bill	Final Bill vs Enacted	Final Bill vs Request
Safeguards and Security.....	170,000	189,510	184,099	+14,099	-5,411
Program Direction.....	202,000	211,211	211,211	+9,211	---
TOTAL, SCIENCE.....	7,475,000	7,799,211	8,100,000	+625,000	+300,789
NUCLEAR WASTE DISPOSAL.....	27,500	10,205	10,205	-17,295	---
TECHNOLOGY TRANSITIONS					
Technology Transitions Programs.....	11,095	8,375	8,915	-2,180	+540
Program Direction.....	8,375	13,183	13,183	+4,808	---
TOTAL, TECHNOLOGY TRANSITIONS.....	19,470	21,558	22,098	+2,628	+540
CLEAN ENERGY DEMONSTRATIONS					
Demonstrations.....	12,000	189,052	64,000	+52,000	-125,052
Program Direction.....	8,000	25,000	25,000	+17,000	---
TOTAL, CLEAN ENERGY DEMONSTRATIONS.....	20,000	214,052	89,000	+69,000	-125,052