U.S. DEPARTMENT OF ENERGY

2020 Sustainability Report and Implementation Plan

Report to the White House

Council on Environmental Quality and

Office of Management and Budget

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Executive Summary

This is the Department of Energy's (DOE or Department) action plan to carry out Executive Order 13834, *Efficient Federal Operations* (E.O. 13834). It is designed to be a plan that can, and will over time, propel DOE to become a leader in the government for sustainability and allow DOE to sustain its mission for decades to come. The mission of the Department of Energy is to ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions. The Department accomplishes this mission through three broad mission areas: 1. Ensuring the integrity and safety of the Nation's nuclear weapons, advancing nuclear nonproliferation, and promoting international nuclear safety; 2. Being a catalyst in the transformative growth of basic and applied scientific research, the discovery of new clean energy technologies, and prioritizing scientific innovation as a cornerstone of the Nation's prosperity; and, 3. Safe cleanup of the environmental legacy of five decades of government-sponsored nuclear weapons development and nuclear energy research. In order to accomplish this mission, DOE operates a nationwide system of 17 National Laboratories and oversees operations at 83 locations throughout the United States. DOE accomplishes this mission with over 14,000 Federal employees and 95,000 Management and Operations (M&O) contractors and other contractor employees.

The following steps are key to the action plan:

- We will understand our performance.
- We will identify initiatives to save the Department money and pursue them with vigor.
- We will actively engage with our stakeholders and private sector partners to ensure quality contracting and project execution.
- We will identify and eliminate barriers to new opportunities.

E.O. 13834 directs Federal agencies to manage their buildings, vehicles, and overall operations to optimize energy and environmental performance, reduce waste, and cut costs. DOE's real property inventory consists of approximately 12,000 buildings and trailers and 8,000 other structures and facilities located on 2.7 million acres of land. DOE's motor vehicle fleet consists of approximately 14,500 vehicles. DOE will continue to reduce facility energy and water usage intensity by promoting the installation of advanced building-level meters, implementing cost-effective efficiency measures, and exploring all funding options for infrastructure upgrades, including appropriated funds, energy savings performance contracts (ESPCs), utility energy services contracts (UESCs), and power purchase agreements (PPAs). In order to effectively and efficiently operate the motor vehicle fleet, DOE will focus on fleet optimization, vehicle right-sizing, the use of alternative fuels, and reducing petroleum consumption. In an effort to maximize our use of reliable, resilient, clean energy in meeting statutory requirements, DOE will explore on-site energy opportunities including renewable energy sources, small modular nuclear technologies, microgrids, combined heat and power systems, and other new and existing technologies. These technologies can ensure continuation of our operations and resilience to disruption from many sources, including accidents, natural disasters, and physical- or cyber-attacks, while increasing efficiency through reduced line losses, on-site use of "waste" heat, and use of state-of-the-art technology.

In Fiscal Year (FY) 2019, DOE achieved a 4.8 percent reduction in energy intensity from FY 2018, and a 41.2 percent reduction from the FY 2003 baseline. Additionally, DOE successfully reduced water intensity by 0.7 percent from the previous year, equating to a 32.8 percent reduction from the FY 2007 baseline. However, as DOE's mission activities grow, and may not be subject to exclusion criteria, it will be challenging to maintain continued reduction in consumption and waste generation, in absolute terms. Nevertheless, DOE will strive to successfully maintain reductions in resource and waste intensity.

To counter the potential costs and environmental impacts of this growth, DOE will follow the key steps of our action plan as we identify, evaluate, and implement opportunities to reduce inefficiencies and optimize performance at our sites through facility, waste, and fleet management.

A few key sustainability initiatives for the Department include:

- 50001 Ready – A free and self-guided approach to strategic energy management based on guidance from the International Organization for Standardization.
- Smart Labs Accelerator – An initiative to employ a combination of techniques to access, optimize, manage and maintain high performance laboratories.
- Savings Reinvestment Program – Establishing funding sources that can grow over time and be used to fund sustainability projects that will both support DOE's mission and further sustainability efforts at the sites.
- Technical Resilience Navigator – A risk-informed resilience planning tool to identify and prioritize resilience solutions.

Facility management activities will focus on the adoption of technologies that reduce energy and water consumption, and continued energy and water efficiency evaluations of DOE's facilities as required under section 432 of the Energy Independence and Security Act of 2007 (EISA), 42 U.S.C §8253(f)(3). Procurement opportunities will be assessed for sustainability to determine the inclusion of appropriate clauses for energy efficient products, biobased products, recycled content products, or other environmental attributes as required by statute. For waste management and pollution prevention, DOE will focus on preventing or reducing pollution at its source wherever feasible, leveraging the Environmental Management Systems (EMS) already in place. Pollutants and waste that cannot be prevented through source reduction will be diverted from entering the waste stream through environmentally safe and cost-effective reuse or recycling initiatives.

Implementation Summary: Facility Management

1. FACILITY ENERGY EFFICIENCY

FY 2019 Energy Intensity Progress (Btu/GSF):

41.2 percent reduction from FY03

4.8 percent reduction from FY18

FY 2020-FY 2021 Plan:

1.0 percent reduction in FY20 from FY19

1.0 percent reduction in FY21 from FY20

DOE employs a range of strategies to monitor and benchmark facility energy consumption. Infrastructure upgrades, building evaluations, and the use of emerging technologies have increased energy efficiency across the DOE complex. Additionally, the installation of meters and the analysis of subsequent data allows DOE sites to further identify opportunities for energy efficiency at the facility level.

Implementation Status

In FY 2019, DOE achieved a 4.8 percent energy intensity reduction from FY 2018 and a 41.2 percent energy intensity reduction from FY 2003. DOE leverages infrastructure investments to improve the sustainability and efficiency of its operations. DOE utilizes strategies such as redesigning interior space, upgrading aging equipment, and installing energy meters and sub-meters according to the DOE metering plan to monitor, benchmark, and help identify opportunities to reduce facility energy consumption. Meters allow sites to identify where energy is most consumed and direct their efforts to maximize energy reductions and financial savings. DOE sites continue to conduct energy evaluations to comply with section 432 of EISA. The evaluations are used to identify efficiency and conservation measures along with assessing performance of implemented measures. Furthermore, a few sites also incorporate energy efficiency and sustainability evaluations into all on-site facility projects using appropriate checklists. Specific highlights from FY 2019 include:

- Idaho National Laboratory (INL) reduced their energy consumption through the completion of numerous emerging technology projects in their high performance computing (HPC) centers, such as installing water-cooled rear-doors to increase the efficiency of the most energy-intensive systems and hot-cold aisle containment to decrease system loads and increase the effectiveness of heat transfer.
- Oak Ridge National Laboratory's (ORNL) Space Management Program evaluates existing buildings and their utilization to determine whether the available space can meet specified needs. This program has helped ORNL reduce their building space by 3.4 percent from FY 2018 and 33.9 percent from FY 2003.
- Pacific Northwest National Laboratory (PNNL) instituted an Occupancy Comfort and Energy Savings project that uses employee feedback to make real-time temperature adjustments and modify building operation set points. After a 12 month pilot, PNNL has saved over 8,000 kWh (~5 percent) of electricity, over 400 MMBtu (~34 percent) of natural gas, and approximately 70 tons in chilled water, all while increasing occupants' comfort and optimizing building operations.

Some of DOE's largest sites have experienced significant increases in energy consumption due to increases in their mission activities. DOE excludes approximately 14.1 percent of its roughly 127 million gross square footage (GSF) from the facility energy efficiency goal (in accordance with published guidelines). These excluded facilities make up 39.5 percent of DOE's total energy use. Most excluded facilities are High Energy Mission-Specific Facilities (HEMSF) engaged in scientific research and industrial processes that are critical to meeting the missions of the Department and are extremely energy intensive compared to typical government building assets. Additional high performance computers (HPCs) to meet exascale performance levels, as well as other HEMSFs, are anticipated in the near future. As DOE's mission activities increase, we must build the business case for implementing cost-effective energy efficiency measures, help sites prioritize money-saving projects, and focus on non-traditional reduction methods to continue achieving energy intensity reductions.

Priority Strategies & Planned Actions

DOE prioritizes the improvement of energy and water efficiency, and works with sites on key initiatives, such as 50001 Ready and Smart Labs Accelerator. At least three sites have implemented 50001 Ready and/or ISO 50001, with several others starting the process. Ten DOE National Laboratories are participating in the Smart Labs initiative and we hope to expand the program. DOE will continue to work with its sites to improve their energy and water management.

DOE's Federal Energy Management Program (FEMP) began a Technical Resilience Navigator (TRN) pilot, with the goal to help organizations manage risks to critical mission activities from energy and water service disruptions. Available as of August 2020, the full TRN tool enables organizations to systematically identify and address vulnerabilities to critical energy and water systems. This will reduce outage impacts and support continuous mission operations. Several DOE sites assisted with the development and piloting of the TRN. Others are encouraged to use this tool, as appropriate.

As required by section 432 of EISA, DOE sites will continue to evaluate buildings to identify energy and water efficiency measures. DOE will continue to work with programs and sites to prioritize cost effective projects for implementation via the most appropriate funding mechanism, including performance contracts. DOE will explore the use of performance contracts, such as ESPCs and UESCs, alternative such as PPAs, and projects with appropriated funds that include performance guarantees.

2. EFFICIENCY MEASURES, INVESTMENT, AND PERFORMANCE CONTRACTING

FY 2019 Performance Contracting – Investment value and number of new projects awarded:

$0.03M/1 project modification in FY19

FY 2020-FY 2021 Plan:

$0 M/0 project anticipated in FY20
$0 M/0 projects anticipated in FY21

DOE utilizes appropriations, performance contracts and alternative finance to fund efficiency and conservation measures. Cost analysis and return on investment calculations are used to assess the feasibility of projects as well as prioritize funding.

Implementation Status

DOE uses life-cycle cost analysis when selecting all projects for funding. Return on investment and net present value are calculated in accordance with OMB Circular A-94, Guidelines and Discount Rates For Benefit-Cost Analysis of Federal Programs. An example in FY 2019 on efficiency measures and investments includes:

- Argonne National Laboratory (ANL) used appropriated funds to complete a lighting retrofit of 476 fixtures in their Experiment Hall. Existing 400-W metal halide fixtures were replaced with new 240-W light-emitting diode (LED) high bay fixtures. Relative to the baseline, the project will save an estimated $50,000 in energy costs per year, while improving the light quality in the space for occupants.

Coordinating with FEMP, DOE reviews and tracks all active ESPC contracts to ensure they are meeting expectations and, if not, follows up with programs to explore corrective actions. As of the latest Indefinite-Delivery Indefinite-Quality (IDIQ) ESPC Life of Contract Report (December 2019), DOE active projects are exceeding the total guaranteed savings, generally equal to the contractor payment, by approximately two percent.

Relative to other agencies, DOE underutilizes performance contracting authority. Performance contracts can be complex and resource intensive with lengthy contractual performance periods. As such, DOE sites frequently struggle to find cost effective measures that merit the upfront effort of implementing a performance contract, in large part due to DOE's low-cost electricity contract prices. Furthermore, conducting business at DOE's often remote and/or high security sites increases contracting cost and complexity compared with some other agencies.

Priority Strategies & Planned Actions

DOE will continue to explore performance contracting vehicles, including ESPCs and UESCs, as well as projects with appropriated funds that include performance guarantees. DOE will ensure that all key stakeholders in the performance contracting process, especially agency legal and procurement staff, are appropriately trained to effectively understand and develop performance contracts. Furthermore, DOE will also explore the use of performance contracts for on-site energy generation projects to increase DOE's energy security and resilience in addition to achieving energy cost savings. One potential project that may be awarded in FY 2021/22 consists of:

- Brookhaven National Laboratory (BNL) is considering a second UESC to reduce energy consumption based on an Investment Grade Audit completed in September 2019. If cost-effective, this second UESC will target deferred maintenance, similar to their first UESC, which reduced deferred maintenance by approximately $8.9 million and improved energy efficiency.

As required by section 432 of EISA, DOE sites will continue to evaluate buildings to identify energy and water efficiency measures. DOE will continue to work with programs and sites to prioritize cost effective projects for implementation via the most appropriate funding mechanism, including performance contracts. Finally, DOE will continue its efforts to explore the use of data analysis and visualization tools to determine the life-cycle cost-effectiveness of efficiency and conservation measures reported in DOE's Sustainability Dashboard.

3. RENEWABLE ENERGY

FY 2019 Renewable Electricity Use:

18.9 percent of total electricity in FY19

FY 2020-FY 2021 Plan:

30.5 percent of total electricity in FY20

7.5 percent of total electricity in FY21

DOE is committed to increasing the use of renewable energy across the complex by encouraging on-site renewable energy production and purchasing green energy and renewable energy certificates, where necessary and appropriate. DOE's priority is installation of on-site renewable system as this will support mission resilience. Advanced analytical tools are employed to identify and evaluate the potential of new on-site renewable energy projects at DOE sites.

Implementation Status

To meet renewable energy goals, DOE has installed on-site renewable energy at DOE facilities as well as purchased energy from systems located on non-DOE Federal or Indian land, and purchased green energy and renewable energy certificates (RECs). In FY 2019, DOE achieved this goal by purchasing 14.3 percent green energy and RECs and producing 4.6 percent on-site with bonus credits per 42 U.S.C. §15852 (or 2.3 percent on-site renewable electricity without bonus credits). DOE has also used the National Renewable Energy Laboratory's (NREL) Renewable Energy Planning and Optimization (REopt) tool and System Advisor Model (SAM) to prioritize and identify renewable energy potential and projects that can be implemented by FY 2020. One highlight from FY 2019 includes:

- In FY 2019, Savanah River Site (SRS) in conjunction with its local utility provider began the process to conduct a feasibility study for a 10 MW utility size solar farm in FY 2020. The energy produced would be used on-site and provide peak demand mitigation. The SRS study used historical data from 2015 to present, to determine the potential energy savings.

While several DOE sites have successfully incorporated on-site renewable projects, the economic feasibility of on-site renewable energy systems continues to challenge other sites due to low-cost electricity at DOE sites. DOE's Office of Asset Management, Sustainability Performance Division (SPD) continues to work with sites to identify opportunities and build business cases for investing in on-site renewable energy systems.

Priority Strategies & Planned Actions

DOE will exceed the legal requirement of 7.5% of total electricity from renewable sources in FY 2021 and strive to maintain the level achieved in FY 2020. The procurement of energy and renewable energy credits are directed by the site office with site-level execution. As such, it is difficult to predict what percentage of total electricity will come from renewable energy credits in FY 2021. Regardless, DOE will continue to advocate use of renewable energy and will utilize advanced analytical tools, such as REopt, to determine feasibility for renewables at the various site locations. DOE will continue to explore options such as PPAs to construct and operate renewable generation systems and consider a variety of renewable energy sources and energy storage capabilities for implementation to increase the resilience of our energy infrastructure, wherever feasible. Where appropriate, long-term off-site renewable sources and RECs will be considered for purchase, if necessary, to meet statutory requirements. DOE will work to encourage inter- and intra-agency collaboration to share best practices and lessons learned from investing in on-site renewable energy sources.

Over the next few years, sites with mission critical energy security concerns will evaluate microgrid applications, such as local generation, on-site renewables, and energy storage. SPD continues to work with DOE sites to evaluate the feasibility of installing renewable energy systems.

4. WATER EFFICIENCY

FY 2019 Water Intensity Progress (Gal/GSF):

32.8 percent reduction from FY07
0.7 percent reduction from FY18

FY 2020-FY 2021 Plan:

0.5 percent reduction in FY20 from FY19
0.5 percent reduction in FY21 from FY20

DOE has improved water efficiency through operational changes, retrofitting, leak detection and system upgrades. DOE sites continue to conduct water evaluations to identify new water conservation measures and assess the results of implemented measures.

Implementation Status

DOE developed a Strategic Water Management Plan in 2016 that analyzed DOE's potential for achieving water consumption reductions. The plan concluded that the most cost-efficient water conservation measures include implementing operational changes and best management practices; sites are continuing to adopt these practices. Other identified measures in the plan include retrofitting and replacing equipment and processes using all available sources of funds, from appropriated general plant funds to performance contracts, to implement capital projects.

The reliance on water for water-intensive, mission critical activities presents a unique challenge for DOE. Many DOE sites use water for evaporative cooling towers, as well as industrial applications such as cooling accelerators and HPCs. In addition, some sites have low- or no-payback associated with water reductions due to no-cost water use agreements with local municipalities or through the use of on-site wells. At such sites, DOE will encourage engagement with local municipalities and water authorities to facilitate water saving projects funded by entities that bear the costs of water provision.

DOE sites continue to conduct water evaluations to comply with section 432 of EISA. The evaluations are used to identify water conservation measures and assess the performance of implemented measures. Several DOE sites employ proactive water management strategies to reduce water consumption. However, in FY 2019 water intensity reduced only by 0.7 percent relative to FY 2018. Some highlights from FY 2019 include:

- ANL shut down their central steam plant from August 23 to September 9, 2019, in order to perform maintenance and restoration activities that improved the safety and efficiency of campus buildings as well as provided potable water savings. Highlights of the steam system repairs include rework of all 9 steam isolation valves in the steam plant, repairs in all 12 steam vaults, maintenance on more than 150 steam valves, and repairing a steam leak.
- ORNL reduced their potable water consumption through the implementation of numerous projects including leak identification and repair, replacement of old lines in the water distribution system, and elimination of once-through cooling where possible.
- West Valley Demonstration Project (WVDP) decreased their potable water usage by transitioning to a new water supply system and repairing waterline leaks. In addition, new flow meters were installed to more accurately determine the total volume of water pumped that was used as either potable or non-potable water.
- Nevada National Security Site (NNSS) achieved significant potable water usage reductions by replacing leaking water lines dated from the 1950's, which has saved approximately 25,000 gallons per day since the repairs were completed.

Priority Strategies & Planned Actions

DOE will continue to implement strategies from the 2016 Strategic Water Management Plan to increase water efficiency at DOE sites. Furthermore, DOE has begun the process of updating the plan with an estimated completion date of summer of 2021. More sites now focus their water use efficiency efforts on repairing leaks and replacing water and steam-intensive equipment. Building on these successful sustainability efforts, DOE will continue to deploy closed-loop, capture, recharge, and/or reclamation systems, as applicable.

Over the next two years, DOE will focus on identifying the potential for water reduction projects. As feasible, sites will conduct periodic water balance studies to determine water sources, uses, and losses. Any inflow and infiltration issues, steam leakages, or underground non-potable and potable water leakages will be identified and addressed. High efficiency technologies will be installed during the rehabilitation of existing buildings and in the design of new buildings for more efficient water management. Additionally, SPD will continue to share best practices and lessons learned across DOE's sites to ensure the most cost-effective and innovative projects are undertaken across the DOE complex.

5. HIGH PERFORMANCE SUSTAINABLE BUILDINGS

FY 2019 Sustainable Buildings Progress:

213 sustainable Federal buildings

12.7 percent of buildings / 10.4 percent of gross square footage (GSF)

FY 2020-FY 2021 Plan:

14.0 percent of buildings in FY20

15.0 percent of buildings in FY21

DOE is encouraging sustainable building practices in all new construction and major renovation projects. DOE continues to increase the number of sustainable Federal buildings, despite the constant challenges with integrating energy and water requirements into DOE's existing buildings with aging infrastructure.

Implementation Status

In FY 2019, DOE achieved 12.7 percent of applicable buildings or 10.4 percent by GSF meeting the Guiding Principles (GPs) for Sustainable Federal Buildings. During FY 2019, DOE sites took significant action to move their facilities towards GP compliance. Examples from FY 2019 include:

- Fermi National Laboratory carried out a detailed assessment in order to create a strategic plan to certify nine buildings to reach the 15.0 percent target.
- PNNL was near complete in certifying a recently completed High Performance Sustainable Building (HPSB) using the GPs. This was the second new facility at PNNL to use the GPs as a path toward HPSB status.
- The National Nuclear Security Administration completed design and started construction of the Albuquerque Complex Project, which will implement the GPs for HPSBs and is on track to achieve Leadership in Energy and Environmental Design (LEED) Gold.

DOE is challenged with integrating sustainability into mission critical, energy intensive, and aging infrastructure, particularly for existing buildings. DOE has experienced difficulties in meeting the energy and water requirements in the GPs for existing buildings due to the age of its infrastructure (nearing end of useful life). Measures needed to meet these GPs are often cost-prohibitive, and low utility rates at many DOE sites make efficiency economics challenging.

Priority Strategies & Planned Actions

DOE will continue to actively promote energy management, cost-effective energy conservation measures, and building-level and data center metering to help move toward our target of 15.0 percent of GSF or buildings meeting the GPs. To continue to push DOE closer to the goal, DOE will continue to explore and host training sessions on the potential integration of evaluations under section 432 of EISA and GP assessments with program and site real estate master planning to streamline and reduce redundancies. We will continue to assess progress and identify areas for improvement, establish operational goals for environmental performance, and incorporate goals into building management. Identified life-cycle cost-effective projects will be implemented as feasible. Several examples of projects on the horizon include:

- SLAC National Accelerator Laboratory (SLAC) is strategizing to implement a $96 million Campus Building Renovation Project (CBRP) from FY 2022-2025 to renovate four laboratory and office buildings to meet the GPs. This effort is in addition to planned certification of three existing buildings by FY 2021, which are currently in the process of upgrades.
- Lawrence Berkeley National Laboratory's (LBNL) Integrated Genomics Building, a new construction project completed in November 2019, is designed to meet LEED Gold requirements with an energy efficiency target of about 70 percent less energy than the facility it replaced, no usage of natural gas, and offsets about 15.0 percent of its total energy use with rooftop photovoltaics.

DOE will work with its programs to ensure the GPs requirements are well understood and implemented into all new construction and major renovation projects over 10,000 GSF. In addition, DOE's Energy Facility Contractors Group's (EFCOG) Sustainability & Environmental Sub-Group (SESG) is developing an internal feedback request on GP implementation for HPSBs in either new construction or existing buildings to understand which areas are most challenging and how best to address these.

6. WASTE MANAGEMENT AND DIVERSION

FY 2019 Non-hazardous Waste Management and Diversion:

51,242.6 metric tons of non-hazardous solid waste generated*
62.7 percent diverted and 37.3 percent sent to treatment and disposal facilities

FY 2020-FY 2021 Plan:

0.4 percent increase in non-hazardous solid waste generated in FY20 from FY19
63.0 percent diverted and 37.0 percent sent to treatment and disposal facilities in FY20

0.4 percent increase in non-hazardous solid waste generated in FY21 from FY20
63.3 percent diverted and 36.3 percent sent to treatment and disposal facilities in FY21
**not including construction and demolition waste*

DOE implements various reduction and diversion tactics (e.g., material/item reuse, recycling, composting) to reduce the amount of waste sent to landfills. While DOE is anticipating an increase in operational demands to fulfill mission needs and is expecting to generate more non-hazardous waste, DOE sites are still expected to maintain or increase their waste diversion rates.

Implementation Status

DOE focuses waste management on pollution prevention (source reduction), diversion of municipal solid waste (MSW), and construction and demolition (C&D) waste. Annual site performance on reuse, recycling, composting, waste-to-energy, and other diversion tools is tracked through the DOE Sustainability Dashboard. In FY 2019, many DOE sites took steps to improve and/or expand on robust pollution prevention and waste reduction programs. As a result, several DOE sites continued to increase their non-hazardous solid waste diversion through the identification and implementation of opportunities to reuse and recycle a variety of waste streams, including (but not limited to): paper, cardboard, food and other compostable materials, aluminum cans, metals, electronics, batteries, wood pallets, lamps/bulbs, tires, and used oil. Some examples include:

- National Renewable Energy Laboratory (NREL) continued to monitor the wood recycling bins at the South Table Mountain and Flatirons campuses. This allowed NREL to notify the recycling subcontractor in advance if other waste was mixed in with the wood bin, which would mean the waste could not be recycled/diverted and would go to the landfill instead, reducing multiple trips and saving NREL money.
- In FY 2019 and FY 2020, SLAC hosted a "SLAC Swap" where employees brought over their department's excess items for sharing and picked up items that they could use. This swap has saved SLAC over $24,500 in lab/safety equipment, furniture/office hardware, and office supplies, as well as de-cluttered offices and laboratories.

In FY 2019, DOE generated 401,922 metric tons of C&D waste and diverted 258,598 metric tons from landfills. In addition to tracking and managing MSW and C&D waste, DOE sites continue to independently report on the management of toxic chemicals, including disposal, in accordance with the requirements of sections 301 through 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) (42 U.S.C. 11001-11023). Reporting is tracked through EPA's Toxic Release Inventory (TRI) web-based reporting program (TRI-MEweb). DOE sites also use chemical management systems to provide supply-chain efficiency, establish tighter control of chemical purchases, and identify alternatives. These systems assist with chemical inventory reduction by supporting just-in-time purchasing, reducing stockpiling, and tracking expired and excess chemicals—thus reducing chemical waste production. In FY 2019, the NREL Chemical Response Team added dry decontamination as the preferred method for hazardous materials responses. This is designed to reduce the volume of potentially hazardous waste that requires proper management at the conclusion of a hazmat response.

Priority Strategies & Planned Actions

With anticipated growth in operational demands to fulfill DOE's mission, the Department projects an increase in non-hazardous waste generation. However, sites are expected to continue to reduce waste sent to landfill through elimination, source reduction, and recycling, as well as maintain or increase their waste diversion rate.

DOE will continue to use source reduction as the primary waste management strategy. DOE will also track the acquisition and use of hazardous chemicals and materials at the site-level, as well as promote the use of alternative and less toxic chemicals and materials whenever possible. DOE will share lessons learned and best practices from successful and innovative MSW and C&D recycling programs, and net zero waste programs, with sites and laboratories through existing Departmental working groups and internal collaboration tools.

DOE will also continue to implement integrated pest management and improved landscape management practices to reduce and eliminate the use of toxic and hazardous chemicals and materials associated with these activities. For example, NREL maintains a comprehensive landscape management program, including an annual noxious weed control plan that identifies target species and reduces the application of herbicides to the same area each year. Most broadcast treatments have been replaced by spot spraying. Herbicides are acquired in the amount necessary for each application to eliminate the need for on-site storage and disposal of expired product. Site facilities are assessed semiannually, and a vegetation removal and control strategy is developed to reduce wildland fire potential. Winter weed control efforts incorporate a half-strength concentration of herbicide in select areas to minimize impacts to desired vegetation and reduce potential chemical loading in soils.

Implementation Summary: Fleet Management

1. TRANSPORTATION / FLEET MANAGEMENT

FY 2019 Petroleum Reduction Progress (Gal):

37.6 percent reduction in petroleum fuel since 2005

0.4 percent reduction in petroleum fuel since FY18

FY 2019 Alternative Fuel Use Progress (Gal):

140.0 percent increase in alt fuel since 2005

10.2 percent decrease in alt fuel since FY18

FY 2020-FY 2021 Plan:

2.0 percent reduction in FY20 from FY19

2.0 percent reduction in FY21 from FY20

FY 2020-FY 2021 Plan:

10.0 percent increase in FY20 from FY19

10.0 percent increase in FY21 from FY20

DOE actively works with site personnel to assist with fleet/fuel acquisition and management decisions that will reduce the use of petroleum and increase the use of alternative fuel. DOE ensures fleet performance is optimized by continually evaluating and adjusting the fleet composition as missions evolve.

Implementation Status

DOE has continued to exceed the petroleum reduction goal, reducing consumption by 37.6 percent from FY 2005 and 0.4 percent from the prior year. Similarly, DOE continued to exceed the alternative fuel (AF) increase goal, increasing AF use by 140.0 percent from FY 2005, even though lack of availability and proximity to available AF resulted in a 10.2 percent decrease from the prior year. For the 21st consecutive year, DOE has exceeded the 75 percent annual alternative fuel vehicle (AFV) acquisition requirement by acquiring 1,022 AFVs and earning 396 AFV biodiesel and renewable diesel credit. For FY 2019 vehicle miles traveled decreased approximately 10% while fleet size stayed almost static (up 0.3%) despite increased mission requirements. Various actions such as right-sizing, switching to alternative fuels, or reducing miles traveled have all contributed to DOE's progress. Some examples include:

- INL operates and maintains a large bus fleet with 62 over-the-road motor coaches to provide daily commute services to over 1,750 site workers. INL has installed solar powered HVAC systems on one bus and several security SUVs to help maintain cabin environments without running the vehicle engines. In addition, INL has installed solar panels on all regularly run buses to help keep the batteries charged while the buses sit idle over the weekends. This helps reduce the load on the charging systems and ensures that the buses start during cold temperatures.
- ORNL has initiated the purchase and installation of new equipment for the on-site fueling station, including fuel dispensers, fuel island (kiosk), and tank management software. The new software will have the ability to restrict fuel selection at the pump, so that vehicles capable of using E85 or biodiesel will no longer have the option to fuel with unleaded gasoline or regular diesel.

DOE optimizes fleet performance by right-sizing and right-typing its fleet as detailed in the current Vehicle Allocation Methodology (VAM). By modernizing its fleet to the extent possible, DOE has reduced fleet management costs. DOE has also streamlined reporting and compliance requirements by leveraging the Asset Level Data (ALD) capabilities in the General Services Administration (GSA) Federal Fleet Management System (FedFMS). This helps with external reporting and provides data to support fleet management decisions. While DOE has been able to reduce fleet size at certain sites and National Laboratories, increased and accelerated defense-related missions will likely continue to require overall fleet growth. Fleet composition with respect to vehicle types and inventory is continually evaluated and adjusted as supported missions evolve.

Section 701 of EPAct 2005 (42 U.S.C. 6374) requires that agencies use alternative fuel in all dual fueled alternative fueled vehicles (AFVs) except in vehicles for which the agency received a waiver. Although waivers are permitted, DOE struggles to achieve this goal due to the timing and logistics of the waiver process combined with the remote locations of its various sites and lack of alternative fuel availability and infrastructure. To address this issue, DOE will utilize the new automated waiver process through FleetDash as well as increasing communication with the Fleet Managers on the importance of alternative fuel use and/or requesting waivers.

Priority Strategies & Planned Actions

DOE will continue to optimize fleet as detailed in the VAM, which will be updated by DOE Headquarters in FY 2021. Sites annually assess their fleet inventory for replacement opportunities and right-sizing. As a result of a recent study with GSA, where mission-compatible and cost-effective, DOE is moving from agency-owned to GSA leased vehicles.

DOE will use the most recent ALD when making fleet operations, management, acquisition, and disposal decisions. The Department will continue to improve the accuracy of ALD data in GSA Drive-thru and FedFMS.

Implementation Summary: Cross-Cutting Operations

1. SUSTAINABLE ACQUISITION / PROCUREMENT

FY 2019 Sustainable Acquisition Progress:

16.8 percent of contract actions and 57.2 percent of obligations (in dollars), for a total of $18,758 M in contract actions with statutory environmental requirements

FY 2020-FY 2021 Plan:

17.3 percent of contract actions and 57.7 percent of obligations (in dollars) in FY20

17.8 percent of contract actions and 58.2 percent of obligations (in dollars) in FY21

DOE shares resources and best practices with sites to assist with the inclusion of sustainable acquisition clauses in all eligible contracts. DOE is currently working to improve the internal collection process of sustainable acquisition contracts and biobased products in order to improve the data quality for future plans.

Implementation Status

DOE engages in a number of activities to ensure the acquisition of sustainable products and services. Sustainable acquisition at DOE includes statutorily required products, such as products with recycled content levels meeting the Comprehensive Procurement Guidelines, products designated as biobased or BioPreferred, products certified by ENERGY STAR or designated by FEMP as energy efficient, and substitutes for ozone-depleting substances. DOE's sustainable acquisition program extends beyond statutorily required products to other products and services that provide environmental benefits and cost savings, such as water efficient products, Electronic Product Environmental Assessment Tool-registered electronics, and non-toxic or less toxic alternatives to commonly procured and used products. The FPDS data represents sustainable acquisition data captured at the agency-level and does not represent the value of sustainable acquisition accomplished through subcontracts. Given that DOE obligates the majority of its funding through a handful of Management and Operation (M&O) contractors, obligations are a better metric for DOE than percent of contract actions.

To educate sites on the latest developments, trends, and policy updates, DOE holds bi-monthly Sustainable Acquisition Working Group (SAWG) meetings. The DOE SAWG community of practitioners also use this peer-to-peer platform to share best practices and lessons learned. In addition, DOE Headquarters provides a sustainable acquisition hotline service to its sites. In FY 2019, around 14 percent of the queries concerned biobased reporting. Another large number of queries concerned recycled content products and associated reporting on contracts. In response to these frequently asked questions, DOE has consolidated all reporting questions and answers into a resource document for all sites.

DOE continues to incentivize leadership through its voluntary GreenBuy Award program. The backbone of the program is the Priority Products List – a list of readily available products that have lower environmental and health impacts that DOE sites purchase in large quantities, spend large amounts on, and that present health and/or environmental concerns. To qualify for a GreenBuy Award, DOE sites enter their purchases from the Priority Products List in the GreenBuy Award Nomination website. Sites must purchase at least four products in at least two different categories to qualify for the lowest level award, the Bronze Award. For FY 2019, seven sites achieved GreenBuy Award recognition. Four of those sites achieved a Gold-Level, the Program's highest level. One site was recognized with the Silver Award and two with the Bronze Award. Additionally, two of the FY 2019 winners were also recognized for achieving the Gold-Level over multiple years - with a Superior Award and a Prime Award.

The majority of DOE sites are operated by M&O contractors. M&O contractors are subject to the same acquisition requirements as the DOE Federal sites and must follow the Department of Energy Acquisition Regulation (DEAR) contract clauses, which are based on the Federal Acquisition Regulation (FAR) clauses. The Sustainable Acquisition Program is prescribed in 48 CFR 970.5223-7 (DEAR 970.5223-7). However, unlike the FAR, DEAR 970.5223-7 groups all the sustainable acquisition provisions together into a single clause, which makes it difficult to identify the dollar amount specifically associated with solely biobased purchases and thus set an agency based target with the estimated dollar value.

Priority Strategies & Planned Actions

To address the inability to separate biobased purchasing actions from other sustainable acquisition actions, DOE plans to ungroup the sustainable acquisition requirements when the DEAR is updated in 2021. In the interim, DOE is asking for sites to separately provide current fiscal year and projected biobased reporting data in their Site Sustainability Plans.

DOE will continue to improve sustainable acquisition compliance and biobased reporting data by collecting supplementary data as needed, providing guidance on federal sustainable acquisition requirements to the site personnel entering the data, and helping to identify contract opportunities.

In FY 2020, DOE will introduce the GreenSpace Award as a new category to the GreenBuy Award Program. Sites will be able to achieve a GreenSpace Award by purchasing sustainable products from a variety of purchasing categories specific to one type of space, such as cafeteria or conference space.

DOE will continue to share information, tools, resources, and best practices to assist sites and programs in their efforts to purchase required sustainable products and services. It will continue to incentivize leadership sustainable acquisition efforts, and offer other training and assistance programs.

2. ELECTRONICS STEWARDSHIP

FY 2019 Electronics Stewardship Progress:

94.2 percent of newly purchased or leased equipment met energy efficiency requirements

99.6 percent of electronic equipment disposed using environmentally sound methods*

**Reuse, donation, recycling, transfer, sale, or demanufacturing.*

DOE encourages energy efficiency and environmentally responsible stewardship throughout the acquisition, use, and disposal of electronics. DOE's electronics stewardship strategies include prioritizing the purchasing and leasing of electronics with positive environmental and energy attributes, enabling power management, and reusing, donating, or responsibly recycling electronics.

Implementation Status

DOE's sustainable lifecycle management of electronics covers three phases (purchasing, use, and end-of-life) and site performance is tracked through the DOE Sustainability Dashboard. DOE uses third-party calculators to translate electronics stewardship activities into environmental and cost benefits. In FY 2019, DOE's electronics stewardship activities saved the Department 82.9 million kWh of electricity and $9.1 million.

DOE purchases and leases environmentally sustainable electronic products. Purchasing Electronic Product Environmental Assessment Tool (EPEAT) registered electronics ensures that the Department receives ENERGY STAR certified products that meet Federal low standby power requirements and have additional positive environmental attributes, such as recycled/biobased content. For electronics not covered by EPEAT, DOE requires purchase of ENERGY STAR certified and FEMP designated products, where applicable. In FY 2019, DOE's purchases of EPEAT-registered electronics avoided the use of over 8,000 kg of toxic substances. A benefit of minimized/eliminated toxics is improved worker health and safety related to exposure to these substances, and making reuse and recycling of these products easier and safer.

DOE enables and maintains power management on eligible ENERGY STAR certified desktop computers, monitors, and notebook computers. Power management at DOE sites again increased from FY 2018 and FY 2019, with approximately 96 percent to 98 percent of eligible computers, and remained at over 99 percent for eligible monitors. Power management saved DOE $8.2 million in electricity costs in FY 2019. Following Planned Actions from the 2019 SRIP, DOE worked to reduce unnecessary exemptions to power management, reducing exemptions from around 21 percent to just 15 percent of computers. Over 75 percent of printers and copiers at DOE sites are set to automatically print double-sided.

DOE reuses, donates, sells for reuse, or responsibly recycles excess and surplus electronics. Reuse and recycling electronics diverted 1.5 million kg of non-hazardous solid waste from landfills, for reuse at schools and nonprofits, and for recovery of valuable and critical materials. Electronics that do not have reuse value are responsibly recycled through UNICOR, the U.S. Postal Service BlueEarth program, and electronics recyclers independently certified to third party standards for safe and environmentally sound recycling. In FY 2019, three DOE sites reported using non-certified electronics recyclers and these sites have transitioned to, or are transitioning to, contracts with certified recyclers. Disposal of electronics, in lieu of reuse or recycling, is only used when electronics cannot be radiologically cleared for release, and these made up only 0.4 percent of end-of-life electronics in FY 2019.

The Department has completed its first year working to achieve the goals set forth in OMB's M-19-19, *Update to Data Center Optimization Initiative*. This memorandum updated and extended the Data Center Optimization Initiative (DCOI) put in place by M-16-19, which set priorities for data center closures and efficiency improvements. In FY 2019, the Department's DCOI program received and "A" on the Federal Information Technology Acquisition Reform Act (FITARA) score card. In the coming year we will continue to work towards reducing the number of data centers in the inventory and focusing on energy saving activities. The Department will continue to review plans and requests for essential management tools, such as Data Center Infrastructure Management (DCIM) and advanced energy metering, to identify opportunities for energy savings in order to be an example for other Federal agencies and organizations in demonstrating conservation activities to best manage our resources.

Priority Strategies & Planned Actions

In early 2020, the DOE EFCOG SESG created a new group called the SESG High Performance Computing Working Group. This group will meet regularly to prioritize tasks expected to improve energy/water efficiency and resilience in HPCs by engaging the HPC, data center, and sustainability communities.

For FY 2020 and 2021, DOE plans to maintain its high performance in electronics stewardship as we continue to sustainably manage electronics, as outlined above, to ensure ongoing cost savings and environmental benefits. In mid-2020, EPEAT is expected to open the registries for networking equipment and photovoltaics. DOE will utilize successful strategies from past registry launches (i.e., information briefs, presentations, training) to assist DOE sites in identifying and buying newly registered products, where applicable.

Approximately 12.0 percent of computers at DOE are exempt from power management, and many of these are appropriately marked exempt due to their use in mission critical functions, such as laboratory experiments or security monitoring. DOE is committed to eliminating all unnecessary exemptions to computer power management, and enabling these computers, to maximize energy and cost savings. DOE will continue to provide technical assistance and site training to ensure power management continues to be used, and exemptions to power management are applied appropriately.

DOE will follow-up with sites that reported using non-certified electronics recyclers, to ensure they are transitioning to certified recyclers, which will ensure responsible end-of-life disposition of used electronics.

3. GREENHOUSE GAS EMISSIONS

FY 2019 Scope 1&2 Greenhouse Gas (GHG) Emissions:

49.3 percent reduction from FY 2008

3.0 percent reduction from FY 2018

DOE has significantly reduced Scope 1 & 2 greenhouse gas emissions and will continue to look for opportunities to further reduce fugitive emissions from high-impact greenhouse gases, such as sulfur hexafluoride. As DOE grows to support its mission, the implementation of clean technologies and the use of renewable energy will be necessary to continue reducing DOE's emissions.

Implementation Status

DOE's efforts have achieved a significant 49.3 percent reduction in Scope 1 & 2 GHG emissions from the FY 2008 baseline and a 3.0 percent reduction from the previous year. DOE's Scope 1 & 2 GHG emissions improvements from FY 2018 are a result of a 90.0 percent reduction in sulfur hexafluoride (SF_6) emissions, a 12.0 percent reduction in industrial process emissions, and a 10.0 percent reduction in non-fleet vehicles and equipment fuel emissions. At many DOE sites, mission-related activities are expected to grow, increasing energy demand, in particular electricity consumption. As a result, DOE will be challenged to sustain these reductions.

Priority Strategies & Planned Actions

In an effort to counter the cost and potential environmental impacts of increased mission activities, DOE will target additional lifecycle cost-effective reductions, including energy reductions, fugitive and refrigerant reductions, and expanding commuting options. DOE will continue to look for opportunities to further reduce fugitive emissions of high-impact GHGs and pursue the application of environmentally preferable substitute gases wherever feasible.

In the next two years, DOE will continue to perform site-level energy assessments and implement cost-effective energy conservation measures to maximize efficiency. DOE will continue to explore opportunities for on-site energy generation, including clean and renewable energy sources, using advanced resilient technologies to further drive down our environmental footprint and sustain mission critical needs. Finally, DOE will continue to share best practices and monitoring/control technologies within DOE's internal Fugitive Emissions Working Group to improve fugitive emissions management and support fugitive emissions reduction strategies.