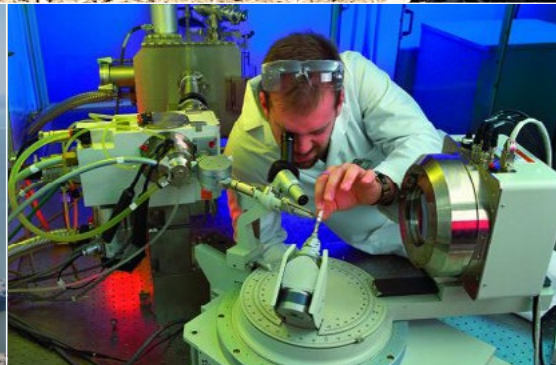


Department of Defense Sustainability Report & Implementation Plan 2020



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Executive Summary

DoD's Mission and Sustainability

The Department of Defense (DoD) strongly supports the goals of Executive Order (EO) 13834, Efficient Federal Operations, to “enhance the resilience of Federal infrastructure and operations and enable more effective accomplishment of its mission.” This EO affirms “that agencies shall meet such statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment.” By increasing the efficiency of operations, Federal agencies cut waste, save taxpayer dollars, reduce impacts on the environment, and promote clean air, land, and water, while enhancing the mission.

DoD's mission is to provide the military forces needed to deter war and protect the security of our country. To successfully execute this mission, our Military Services must have the energy, land, air, and water resources necessary to train and operate, today and in the future. The Department published the National Defense Strategy (NDS) of the United States of America in 2018, which is aimed at restoring the Nation's competitive military advantage. The DoD is focused on the lines of effort described in the NDS:

1. Rebuilding military readiness capabilities while building a more lethal, resilient, and rapidly innovating Joint Force;
2. Strengthening alliances and creating new partnership; and
3. Increasing efficiencies for greater performance and affordability.

The NDS established goals to carry out the Department's enduring mission of providing combat credible military forces needed to deter war and protect national security. Strong environmental programs increase training access, improve mission readiness, and provide the capabilities required to prevail in conflict and preserve peace – all of which support DoD's lines of effort to accomplish NDS objectives. In support of the NDS lines of effort and EO 13834, the Sustainability Report and Implementation Plan (SRIP) outlines how DoD is integrating sustainability into its mission and operations for doing business more efficiently and sustainably. The Department leverages technology to create new and innovative solutions to existing and emerging human health and environmental challenges and is focused on improving military readiness through resilient infrastructure and business reforms to increase efficiency and reduce costs. It is important for the Department to safeguard personnel and protect the environment, all while increasing mission readiness, supporting alliances, and improving affordability.

The DoD has a worldwide footprint – almost 3 million military and civilian personnel, more than 26 million acres, and over 603,385 facilities encompassing more than 2.2 billion square feet and valued at more than \$1,210 billion (B); many of which serve specialized, mission-critical purposes. These assets are distributed across the Services (Army, Air Force, Navy, Marine Corps, Space Force) and numerous DoD agencies, each with distinct operations. In addition, these assets can change significantly over time in support of the Department's mission, which may affect annual progress on sustainability goals. The Department's scale and operations are unlike those of any other agency or industry partners, and present unique challenges which we must meet in order to ensure military superiority and national security. For example, the majority of the Department's energy use is operational -- required for training, moving, and sustaining military forces and weapons platforms for military operations -- and therefore excluded from sustainability reporting.

The Department's sustainability efforts increase training access, improve mission readiness, and provide the capabilities required to prevail in conflict and preserve peace; all of which support DoD's lines of effort to accomplish NDS objectives. By strategically planning and investing to protect our people, installations, natural resources, and military assets, DoD achieves its objectives of creating and sustaining resilient installations and to deliver performance at the speed of relevance. The Department can pursue its three NDS lines of effort more effectively and efficiently by conserving our Nation's natural and cultural resources, protecting human health, maximizing efficient use of energy,

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preventing or eliminating pollution at the source, and incorporating environmental requirements into weapons systems acquisition. It is important for the Department to safeguard personnel and protect the environment, all while ensuring mission readiness.

DoD's Sustainability Successes and Priorities

This SRIP describes ways DoD is advancing its mission through resilient infrastructure and business practices that improve performance and affordability of its facilities and non-tactical vehicles. Further, the SRIP describes how the Department meets the goals of EO 13834 and how those goals tie into the NDS. The Department's priorities for continuing our sustainability initiatives into FY 2020-2021 include improving performance via energy resilience and water efficiency through a variety of measures ranging from performance-based contracting to innovative water conservation approaches. Additionally, DoD expects to improve affordability through cross cutting sustainable acquisition and electronics stewardship. Several performance highlights include the following:

Energy Resilience. The Department implements energy resilience and energy security measures in support of advancing readiness and mission assurance objectives. Aligning facility energy requirements directly to mission and readiness requirements, agnostic of specific technologies or practices, is the DoD's key opportunity to improve energy resilience. The Department continues to view performance-based contracting, such as Energy Savings Performance Contracts (ESPCs) and Utility Energy Service Contracts (UESCs), as a method to improve energy resilience and energy security at the installation level where and when it is cost effective, in other words, when the requirement can be met through projected energy cost savings of the proposed ESPC/UESC. In FY 2019, DoD awarded 27 ESPCs and UESCs totaling approximately \$821.7 million (M). Additionally, the Department uses a variety of authorities to implement distributed energy, including renewable energy, as an option to advance its installation energy resilience. The Department seeks to leverage all its available authorities to maximize improvements to mission readiness and mission assurance, even when the return on investment is not sufficient to use third-party financing.

Water Efficiency. The potable water intensity of DoD facilities was more than 28% lower in FY 2019 than the FY 2007 base year. The Department is using innovative approaches to conserve water, reduce costs, and assure access to an adequate water supply for mission success. These approaches include high-efficiency plumbing; leak detection and repair; reclaiming, recycling, and reusing water; and water conservation in landscaping.

Sustainable Acquisition. DoD continues to increase mission readiness through sustainable acquisition and procurement activities that increase mission capability, reduce harm to the DoD workforce, reduce life cycle costs, and help ensure availability of critical products. In FY 2019, the total value of DoD's approximately 212,000 applicable Federal Procurement Data System (FPDS) contract actions containing sustainable clauses was over \$23,823 M, an increase of over 20% from the previous year.

Electronics Stewardship. DoD continues to reduce environmental and energy impacts through a suite of electronic stewardship initiatives. These activities occur at each life cycle phase of electronic products, including acquisition, operations and maintenance, and end-of-life. Collectively, these activities have resulted in 100% of newly purchased or leased equipment meeting energy efficiency requirements and 100% of electronic equipment disposed of using environmentally sound methods.

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Implementation Summary: Facility Management

1. FACILITY ENERGY EFFICIENCY

FY 2019 Energy Intensity Progress (Btu/GSF):

20.9% reduction from FY03

0.4% reduction from FY18

FY 2020-FY 2021 Plan:

2.9% reduction to 2.0% increase in FY20 from FY19

0.7% reduction to 2.0% increase in FY21 from FY20

DoD continues to seek opportunities to improve facility energy efficiency in concert with its strategic efforts to strengthen energy resilience and energy security. DoD continues to leverage all available authorities to implement energy efficient solutions, as well as to utilize education and outreach efforts to promote energy efficient behaviors, in order to achieve its energy resilience, energy security and mission readiness objectives. Third-party financed projects executed in FY 2017 have the potential to further reduce energy consumption by an estimated 2.9% in FY 2019, and projects executed in FY 2018 have the potential to further reduce energy consumption by an estimated .7% in FY 2020, based on savings data provided in the contracts.

Implementation Status

DoD seeks to reduce installation energy demand through energy efficiency measures. Energy efficiency measures correlate positively to Department energy resilience and energy security objectives by helping reduce the energy demand from distributed energy production resources during commercial grid disruptions. Instead of specific energy efficiency goals, the Department focuses on implementing secure and energy resilient solutions to address its readiness and mission assurance requirements. While implementing its plan to pursue mission readiness objectives, the DoD has implemented over 250 ESPCs and UESCs across its portfolio of installations, since 2012.

DoD has designated energy manager positions for its installations and pursues education and outreach opportunities to train its managers as well as increase overall energy awareness across the Department. For example, DoD promotes Energy Awareness Month during October of each year, highlighting the critical role that energy plays in DoD operations and encouraging “smart” energy use and management at its facilities to improve readiness. DoD also leverages training events for its energy professionals to attend, such as the bi-annual Defense Logistics Agency (DLA) World-Wide Energy Conference (WWEC) and annual Department of Energy (DoE) Energy Exchange workshop. The DLA WWEC is an event that brings together Department employees to meet with top industry experts to discuss current trends and initiatives in the energy field, with a specific focus on supporting DoD missions. Energy Exchange is a federally sponsored training workshop that convenes the nation’s leading experts in energy policy, resilience, acquisition, technology, management, and facility operations to provide a diversified technical curriculum with over 100 training sessions. In 2019, the Department represented over half of the 1,128 total federal attendees at the workshop. Supporting attendance at these types of training opportunities equips DoDs energy professionals with the knowledge they need to pursue and implement energy efficiency strategies, in support of energy resilience, energy security and mission assurance.

Energy efficiency is an important part of strengthening energy resilience and energy security. DoD guidance ensures alignment with requirements for facility evaluations as well as for energy efficiency performance standards and design standards for new buildings and major renovations. The Department has achieved an energy intensity reduction of 20.9% from FY 2003 due in part to the implementation of a number of these types of projects. For example, United States Army Installation Management Command (IMCOM) implemented a building re-tuning initiative at Fort Benning, Fort Bliss, Fort Carson, and West Point in FY 2019 which surveyed 25 buildings (approximately 3.4M square feet). Re-tuning opportunities were identified with a 1.4-year payback and projected savings of \$700,000. These projects provide

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“cradle to grave” analysis, repair, implementation, and monitoring of re-tuning efforts that will save energy and reduce costs. IMCOM plans to continue these efforts in FY 2020.

Additionally in FY 2019, Keesler Air Force Base awarded a \$32M ESPC which supports energy improvements at over 100 facilities (approximately 3M square feet) including the Base’s airfield apron lighting. The project will upgrade items including chillers and control systems in many covered facilities. Overall the ESPC, which includes a 1.5 megawatt (MW) solar array, is projected to produce nearly \$70M in total cost savings and reduce the installation’s annual energy usage by nearly 16 percent.

Priority Strategies & Planned Actions

The range of projected EUI changes in FY 2020 and FY 2021 is reflective of the Department’s unique challenges, as mission requirements evolve based on global defense needs, which may impact, or negate, any reductions expected from energy projects. Both reduction percentages assume the estimated savings provided in ESPC and UESC contracts are fully realized, and that the gross square footage remains the same as reported in the FY 2018 Annual Energy Management and Resilience Report (AEMRR). The Department continues to manage its ESPC and UESC portfolio to ensure that projects are operating correctly and that guaranteed savings are being realized and accurately reported.

DoD will continue to analyze data from Military Services and DoD agencies for potential projects to ensure it is effectively and efficiently implementing projects that maximize benefits to readiness and mission assurance. When possible, data will be used to inform leaders, building operators, and building occupants to increase energy awareness and to promote energy efficient behaviors. The Department will continue to pursue training opportunities for its energy professionals and promote energy awareness across the military components through education and outreach efforts.

The Department requires its DoD Components to develop comprehensive Installation Energy Plans (IEPs). This holistic planning process identifies critical energy requirements and provides a framework to make investment decisions based upon mission requirements, energy security gaps, and energy resilience needs. Solutions derived from the IEP process may include energy efficiency measures. IEPs for priority installations continue to be submitted in FY 2020. IEPs for installations that consume 75% of a DoD Component’s installation energy use are targeted for submission in the FY 2020-2021 timeframe.

2. EFFICIENCY MEASURES, INVESTMENT, AND PERFORMANCE CONTRACTING

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

\$821.7M / 27 projects in FY19

FY 2020-FY 2021 Plan:

\$732.4M / 13 Projects in FY20

To be determined in FY21

DoD continues to pursue ESPCs and UESCs when they are the best fit to meet its energy resilience and energy security requirements. DoD anticipates awarding an estimated 18 performance contracts (ESPCs and UESCs) in FY 2020, with a value of over \$732.4M.

Implementation Status

DoD is focused on implementing energy resilience and energy security in support of improving readiness and mission assurance. While performance contracts such as ESPCs and UESCs may assist in improving energy security, DoD does not have specific performance contracting goals.

As indicated in section 1, “Facility Energy Efficiency,” the ESPC and UESC portfolios have not only supported mission readiness, but have also reduced total energy consumption, contributing to reductions in energy use intensity. As a recent example, in FY 2019 the Air Force awarded an ESPC at Misawa Air Base (AB) which will provide \$243M in infrastructure improvements for the main base and military housing area. Misawa is the fifth largest Air Force base in

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terms of energy cost and the 12th largest in terms of energy consumption. The ESPC will reduce the Base's energy consumption by 20 percent across 679 buildings, along with providing 70 percent of peak demand and as much as 60 percent of annual electrical load during normal operations. Power generation will be provided by two cogeneration plants with a generation capacity of 6.2 MW (combined), in addition to a 6.0 MW solar photovoltaic farm. As part of the Base's efforts to strengthen its energy resilience posture, a 500 kilowatt (kW) black start generator will be installed to bring the cogeneration assets back online during power grid failures.

Also in FY 2019, the Marine Corps Recruit Depot Parris Island completed construction for a \$91M ESPC designed to enhance energy resilience and readiness with upgrades that will reduce energy demand by 75 percent and water consumption by 25 percent. This project will deliver over 9 MW of power generation, including energy from a 3.5 MW combined heat and power plant, to ensure power supply in the event of utility failures. Built above the flood zone, the project is less susceptible to hurricanes, storms and sea level rise.

DoD uses other efficiency measures and investment strategies to support readiness and mission assurance requirements. For example, in 2019 the Air Force became the first Service to leverage authority granted under 10 U.S.C. Section 2912 to retain energy cost savings in an extended availability account (i.e., Air Force Resilient Energy Savings Resource Vault [RESERV]). The Service's innovative approach captures a given FY expiring O&M funds equal to the validated savings in that given FY. In FY 2019, \$15M was captured from an FY 2014 expiring appropriation based upon realized and validated FY 2014 energy cost savings. Funds in the "shared energy savings account," per statutory authority, are split equally, with fifty percent of funds allocated to the installation where energy cost savings were realized for commander selected projects supporting existing housing, quality of life, and Morale, Welfare, and Recreation activities. The remaining fifty percent is allocated to fund enterprise-wide energy resilience priorities in support of Air Force wide mission assurance objectives.

Priority Strategies & Planned Actions

The Department continues to view performance-based contracting as an effective method of improving energy resilience and energy security at the installation level. DoD will continue to use these contracts where they enhance DoD mission readiness, mission assurance, and ultimately DoD's warfighting capability. As each of the Services develop their IEPs, these plans will identify installation level energy resilience and energy security gaps. These plans will also include the acquisition and funding strategy, which may include ESPCs/UESCs, to address identified gaps. In addition to improving its acquisition and planning activities the Department is also strengthening its post award contract management capability. In FY 2020 the Department issued *Oversight of Third-Party Financed Energy Projects* guidance to ensure that the ESPC and UESC programs are operating correctly and that guaranteed savings are being realized and accurately reported.

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3. RENEWABLE ENERGY

FY 2019 Renewable Electricity Use:

6.0% of total electricity in FY19

FY 2020-FY 2021 Plan:

TBD of total electricity in FY20

TBD of total electricity in FY21

DoD will continue to strive to meet the statutory requirements of 7.5% renewable electricity consumption and 25% renewable energy production and procurement. The Department will continue to use its IEP process and its Energy Resilience Assessment (ERA) tool to identify and close energy resilience and energy security gaps using a technology agnostic approach. When determined to be the best fit by the IEP process, renewable energy technologies may be utilized to address an installation's energy resilience requirements.

Implementation Status

There is a legislative goal for DoD to produce or procure $\geq 25\%$ of the total quantity of facility energy DoD consumes within its facilities during FY 2025 and each fiscal year thereafter from renewable energy sources, as per Title 10, United States Code §2911(g)(1)(A) (NDAA 2007). In FY 2019, 6.0% of facility electricity consumption was procured from renewable energy sources. DoD achieved its interim goal of $\geq 15\%$ by FY 2018, as per Title 10, United States Code §2911(g)(2), and is making positive movement towards the $\geq 25\%$ by FY 2025 goal.

DoD seeks to improve mission readiness and mission assurance and uses renewable energy in support of energy resilience solutions where appropriate. For example, in 2013 Naval District Washington (NDW) explored opportunities to integrate onsite renewable energy with the goal of becoming more resilient, reliable, efficient and cost effective. Two years later in 2015, the Navy awarded a 7.1-MW solar photovoltaic Power Purchase Agreement at Joint Base Anacostia Bolling after detailed research, design, analysis and development. After one year, this renewable energy system is currently producing 9,528,550 kWh across four sites – three carports and one ground-mount system.

In July 2019, the Navy awarded its largest ever ESPC to Naval Station Guantanamo Bay, Cuba, to build a new power plant, improve resiliency and reliability, increase efficiency, and add renewable generation to this self-sufficient critical installation. The project will provide 12 MW of solar photovoltaic energy generation, battery energy storage, water and sewer improvements, major building system upgrades, and a dual-fuel (F76 fuel oil and Liquefied Natural Gas) Combined Cycle Power Plant. Annual savings for this ESPC are expected to reach nearly 4 million BTUs and 1 million gallons of water.

Priority Strategies & Planned Actions

DoD will continue to evaluate the best technical and operational solutions, which may include forms of renewable energy. The Department will pursue renewable energy to enhance energy security and mission assurance when the business case supports it.

4. WATER EFFICIENCY

FY 2019 Water Intensity Progress (Gal/GSF):

28.0% reduction from FY07

0.5% reduction from FY18

FY 2020-FY 2021 Plan:

Continuous improvement in FY20 from FY19

Continuous improvement in FY21 from FY20

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DoD has laid the framework for water security and increased efficiency through its policies and programs and is implementing them through a variety of initiatives. Managing water resources appropriately is vital to DoD's mission to "provide the military forces needed to deter war and to protect the security of our country." Further, DoD's costs will increase without action to address risks posed by water scarcity, therefore increasing the need for more aggressive water conservation.

Implementation Status

Although the Department does not have specific water efficiency goals, DoD is successfully using innovative approaches to conserve water, save costs, and assure access to an adequate water supply for mission success. For example, in FY 2019, DoD used approximately 81,258 million gallons (MGal) of potable water, a reduction in DoD's potable water intensity by 28.0% from its 2007 baseline. DoD has indirect water efficiency targets through its emphasis on and support of Unified Facilities Criteria (UFC), which outline water use percentage reductions and other conservation measures and goals. The DoD Components use the UFCs to support their specific water efficiency goals. Per DoD Directive 4270.5, *Military Construction*, the Military Departments must follow the applicable UFC. UFC 1-200-02, *High Performance and Sustainable Building Requirements*, requires water conservation measures that demonstrate a return on investment, use of water-efficient products and a reduction in water use for irrigation compared to conventional methods by at least 50 percent for new construction and major renovations. To help increase water efficiency, DoD issued UFC 2-100-01, *Installation Master Planning*, which establishes overarching planning strategies to promote water conservation and low impact development. Specifically, UFC 2-100-01 states that master planners must: incorporate strategies to reduce water consumption; ensure water conservation measures are applied wherever feasible; use plant materials suitable for the climate condition to conserve water; and, seek to understand, monitor and adapt to changing external conditions. Such conditions include, but are not limited to, changes in climatic conditions such as temperature, rainfall patterns, storm frequency and intensity and water levels. Most recently, DoD issued UFC 3-201-02, *Landscape Architecture*, supporting DoD's policy that the DoD Components reduce or eliminate the use of potable/domestic water for the purposes of landscape maintenance, consistent with existing legal and contractual obligations. It also directs the DoD Components to use water-efficient irrigation strategies that comply with UFC 1-200-02 for required DoD reduction in combined indoor and outdoor potable water use.

DoD's approaches range from regular maintenance and water system-related upgrades to alternative water sourcing and changes in water use behaviors and practices. For example, through the innovative use of metering data and capabilities, U.S. Army Garrison Fort Campbell developed a water resiliency program that reduces waste, controls cost, and establishes resilience. Fort Campbell successfully reduced the installation's water usage by 19% from 2015 through 2018. In 2017, construction of a redundant potable water supply line was completed, and this project gave the installation two separate sources of potable water. The use of the meter data contributed to identify cost savings to justify a project that replaced plumbing fixtures in the Warrior in Transition Barracks. Meter data identified a 16,500 gallon per day leak on the 1st Brigade's Central Energy Plant distribution system, and a major leak in a vehicle maintenance facility complex. Fort Campbell's effective water conservation and management have mitigated potential costs such as secondary energy costs associated with water and wastewater plant operations, chemical costs attributed to plant operations, cost avoidance for leaks that open up sinkholes in Fort Campbell's karst geology -- damaging or jeopardizing structures and other infrastructure, and premature failure of mechanical systems. The work resulted in an annual cost avoidance of \$179,709 and 14.25 MGal/yr saved.

DoD supports reduced consumption of non-potable water specifically related to sustainable landscaping. The capture and reuse of water is integrated into the design, plan, and maintenance of installation landscaping. For example, at Dyess Air Force Base in Texas, the Air Force partnered with the city of Abilene to repurpose pipelines originally built to transport oil. Today, the pipelines supply Dyess with approximately 160 million gallons of Abilene's treated wastewater each year. The Air Force uses the treated wastewater for irrigation, reducing the purchase and use of potable water for irrigation. This partnership has helped Abilene reduce water demand by 2 percent while saving the Air Force more than

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\$300,000 annually. The Department is also shifting away from landscaping that requires significant water quantities for maintenance. Defense Distribution Depot San Joaquin (DDJC) replaced 90,700 square feet of manicured lawn with artificial turf and completed a 52,000 square foot xeriscape project. These efforts resulted in 140,000 gallons of water savings, and reduction of maintenance costs and pesticide usage for FY 2019. It is projected that these improvements will save 20,000 gallons monthly in addition to air pollution reduction due to the decreased need to use gas-powered equipment.

Priority Strategies & Planned Actions

The Department will continue to use its policies and guidance to maximize the efficient use of water resources across its installations while addressing operational challenges. Additionally, the Department is developing best management practices on these efforts to help transfer and replicate successful practices. Focusing on installation with the greatest water efficiency needs, DoD is implementing water conservation strategies as quickly as resources and manpower allow. Overall, DoD has made great progress through its effective policies and programs aimed at increasing water security and efficiency while realizing opportunities to maximize the strategic use of water resources and reduce consumption and unnecessary costs. For FYs 2020 and 2021, DoD projects continuous improvements in annual reductions in water use.

The Department uses the Office of the Assistant Secretary of Defense's Water Needs Assessment Tool (WNAT) to maximize water efficiency and strategic use of water resources. The WNAT estimates an installation's water requirements, by function, without the need for water sub-metering. This approach to water resources management represents a shift from managing water primarily based on conservation targets and quality monitoring, toward a risk-based approach that more directly supports mission assurance. Water conservation and quality are both key to ensuring that mission objectives are met. The shift from efficiency to resilience pulls those efforts into the broader, more holistic water resilience approach that DoD uses. Use of the WNAT has provided insight into water vulnerabilities and potential impacts to missions at installations enterprise-wide, empowering decision makers to invest in efficiency and resilience more effectively.

Despite progress, DoD has challenges increasing water efficiency. The Military Departments' challenge is to determine the best water conservation strategies based on climate and weather conditions at the installation's location. Due to the diverse climates and topographies, there is no one solution to support water efficiency across the DoD. Further, some installations lack the infrastructure to support sustainable water systems. Upgrades to existing infrastructure are cost-prohibitive for major irrigation projects. In situations where water-efficient infrastructure is too expensive, the Military Departments use more affordable conservation measures within the confines of the existing infrastructure. The Department will continue promoting water conservation strategies that work best for the varied geographical locations and existing infrastructure of its installations until funding for retrofitting existing systems is available.

5. HIGH PERFORMANCE SUSTAINABLE BUILDINGS

FY 2019 Sustainable Buildings Progress:

- 514 sustainable Federal buildings
- 1.8% of buildings / 1.9% of gross square footage (GSF)

FY 2020-FY 2021 Plan:

- Continuous improvement in FY20
- Continuous improvement in FY21

DoD policies and guidance encourage the construction of high performance and sustainable buildings, with numerous Federal laws, regulations, and executive orders connected to Military Construction (MILCON), building performance, and sustainability requirements. DoD policy requires new construction and major renovations to adhere to the *Guiding Principles for Federal Sustainable Buildings* (UFC 1-200-02, High Performance and Sustainable Building Requirements).

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DoDI 4170.11 instructs DoD Components to obtain at least the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system silver level of performance or equivalent when cost effective (based on the most current rating system aligning to DoD UFCs).

Implementation Status

In FY 2019, 1.9% of DoD's building area conformed to the revised *Guiding Principles*, based on almost 1.2 billion applicable square feet. The Department also continuously incorporates many sustainable features in buildings where improvements meet portions of the Guiding Principles.

"The Army used the U.S. Green Building Council's LEED Program as its green building rating systems to validate compliance with high performance sustainable buildings. Of the 30 new construction projects achieving LEED certification in FY 2019, 7 projects achieved a LEED Gold rating and 23 achieved a silver rating. Projects achieving LEED certification in FY 2019 had primarily began the design phase in 2014 to 2016 and completing construction in 2018 and 2019." For example, Army Aviation Support Facility located in Frankfurt, Kentucky is one of the projects that achieved a LEED Gold rating. It is a 126,000 square foot facility with 18 aircraft bays that will feature the latest in aviation support to include in-ground vaults in the hangars to house data hubs as well as lubricants, air and water ports to assist in maintenance of the rotary-wing aircraft. The building was designed and constructed to be tightly sealed, well insulated, and durable to minimize energy demand. The design uses the site orientation to take advantage of natural day-lighting, high-efficiency artificial lighting, active (photovoltaic) and passive solar strategies, geothermal heating and cooling, occupancy sensors, and programmed thermostats to schedule Heating, ventilation, and air conditioning (HVAC) shut down during periods of non-occupancy, such as nighttime and non-inactive duty training weekends. The solar photovoltaic array produces 80 kilowatts of energy, which will provide approximately 20% of the energy requirements for the building.

The Missile Defense Agency (MDA) designed and constructed a 7,824 square foot insulated metal building on Wake Island to support test mission management and monitoring between 2018 and 2020. This LEED Silver Certified project successfully overcame multiple unique challenges, including: limited population (approximately 80 Federal government and contract employees inhabit Wake Island), small size and remote location (located about halfway between Hawaii and Japan and total land mass < 3 square miles), rugged environment, limited experience on Wake Island by design and construction companies, logistics (*e.g.*, one scheduled flight every two weeks), and local transportation (*e.g.*, options are limited to walking, bicycles, 4-wheel compact All Terrain Vehicles (*e.g.*, Kawasaki Mules), and several pickup trucks and one passenger van). Additionally, many LEED requirements were infeasible or unpractical such as installation of bicycle racks when the dorm is next door. Despite these challenges, MDA succeeded in reducing the overall environmental footprint and future operational cost of this facility by focusing on the following sustainable building design elements: sustainable sites, water efficiency, energy, materials, indoor air quality, and innovation in design.

Priority Strategies & Planned Actions

The sheer magnitude of DoD's facility inventory to which the Guiding Principles apply – about 28,000 eligible buildings – coupled with fewer new or renovated facilities means that DoD will continue to make annual improvements. As the Department upgrades or rebuilds facilities, whether due to deterioration or natural disaster, they will be designed to be compliant with the Unified Facilities Criteria and Guiding Principles for High-Performance Sustainable Buildings.

6. WASTE MANAGEMENT AND DIVERSION

FY 2019 Non-hazardous Waste Management and Diversion:

- 1,546 metric tons of non-hazardous solid waste generated*
- 39% diverted and 61% sent to treatment and disposal facilities

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FY 2020-FY 2021 Plan:

2% reduction in non-hazardous solid waste generated in FY20 from FY19

40% diverted and 60% sent to treatment and disposal facilities in FY20

2% reduction in non-hazardous solid waste generated in FY21 from FY20

40% diverted and 60% sent to treatment and disposal facilities in FY21

Reduce total annual waste generation by 2% of total waste each year through FY25

**not including construction and demolition waste*

The Department continues to optimize its natural resources and avoid generating unnecessary waste. In accordance with DoDI 4715.23, Integrated Recycling and Solid Waste Management, DoD is committed to an Integrated Solid Waste Management (ISWM) approach that effectively manages solid waste generation, reduction, diversion, and disposal while maintaining compliance with Federal and DoD requirements. This approach involves examining the solid waste stream and current market opportunities to cost effectively minimize waste disposal.

Implementation Status

The Department employs a hierarchy of approaches and technologies for managing materials to maximize resource conservation and protect the environment. Generally, the higher in the hierarchy the technology or process, the more benefits gained in efficiencies, retained economic value, and reduction in long-term liability. From most to least preferred, this hierarchy includes 1) source reduction; 2) sustainable procurement; 3) reuse; 4) donation; 5) recycling; 6) composting; and 7) waste-to-energy before incineration or landfilling.

DoD's focus is on maximizing the recovery and recycling of useful materials and reducing the generation of solid waste and its disposal. For example, Surface Equipment Maintenance Facility (SEMF) 14 of the Indiana Army National Guard introduced a battery recharging technology that allows it to reclaim used batteries from its own operations and from other support shops in the area. Implementation of the new technology system enabled SEMF 14 to reduce the purchase of new batteries by about 50%; this reduction represents avoidance of environmental impacts, disposal costs, and new purchase costs. Additionally, the Department's stewardship efforts are ongoing to recycle rare earth minerals and precious metals with strategic importance to the DoD to mitigate risks and decrease dependencies on foreign/single sources for supplies.

In FY 2019, DoD diverted 39% of its non-hazardous solid waste and 86% of its construction and demolition (C&D) debris. Successes are seen throughout DoD installations as qualified recycling programs and related initiatives are implemented. For example, Vandenberg Air Force Base operates a recycling center and furniture and wood reuse programs. In 2018 and 2019, the program: recycled a total of 1,998 tons of scrap metals, lead-acid batteries, and toner cartridges; diverted over 1,295 tons of wood from landfills including office furniture, treated wood poles, un-treated wood, shipping crates, pallets, cable reels, and tree rounds; and generated \$298,000 in sales proceeds used to offset program expenses. Another example is at Naval Base Kitsap where the base actively reduces solid and hazardous waste generation through pollution prevention programs. The base participated in a used oil recycling program that diverted 6.33 tons of oil, automatic transmission fluid, antifreeze, and hydraulic fluid from being treated as a hazardous waste during FY 2018-2019.

Priority Strategies & Planned Actions

DoD will approach its integrated waste management and diversion activities in compliance with all state, Federal and Departmental requirements, as well as to improve performance and affordability. To demonstrate the Department's commitment to ISWM, DoD updated the existing solid waste objectives. The updated objectives continue diversion, promote reduction in waste generation, optimize cost avoidance, and minimize environmental impacts from solid waste disposal. The objectives are: 1) Divert 40% of non-hazardous solid waste (excluding C&D debris) from incineration and landfilling; 2) Divert 60% of C&D debris from incineration and landfilling; and 3) Reduce total annual waste generation by 2% each year through FY 2025.

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Implementation Summary: Fleet Management

1. TRANSPORTATION / FLEET MANAGEMENT

FY 2019 Petroleum Reduction Progress (Gal):

40.7% reduction in petroleum fuel since 2005
2.2% increase in petroleum fuel since FY18

FY 2019 Alternative Fuel Use Progress (Gal):

188% increase in alt fuel since 2005
3.8% decrease in alt fuel since FY18

FY 2020-FY 2021 Plan:

< 1% reduction in FY20 from FY19
< 1% reduction in FY21 from FY20

FY 2020-FY 2021 Plan:

2% increase in FY20 from FY19
2% increase in FY21 from FY20

DoD reduces petroleum fuel use in its covered fleet by disposing of underutilized vehicles and increasing acquisition of Low Greenhouse Gas (LGHG), alternative fuel, and electric vehicles. All newly acquired light-duty vehicles and medium-duty passenger vehicles are low greenhouse gas (GHG)-emitting vehicles unless they qualify for a Functional Needs Exemption, and all dual-fueled alternative fuel vehicles use alternative fuel only unless granted a waiver. DoDI 4500.36, Acquisition, Management, and Use of Non-Tactical Vehicles (NTVs), assigns responsibility for NTV fleet management. Direction for establishing fleet efficiency is found in DoD Manual (DoDM) 4500.36, Management, Acquisition, and Use of Motor Vehicles. The Department ensures that its annual vehicle-level data is properly and accurately captured in the formal Fleet Management Information System (FMIS) and is submitted to the Federal Automotive Statistical Tool (FAST) reporting database.

Implementation Status

Because the Department is replacing vehicles which use E-85, an ethanol fuel blend, with LGHG or gas dedicated vehicles, which use petroleum, there was approximately a 2.2% increase in petroleum fuel use since FY 2018. The process of vehicle replacement is restricted because vehicle types required to meet the defense mission are not available from original equipment manufacturers (OEMs) using LGHG; vehicle type will not be substituted to meet fleet efficiency. In FY 2019, there were over 166,000 vehicles in the Department's fleet, with approximately 44% classified as alternative fuel vehicles (AFVs), resulting in a 2.2% increase in alternative fuel use since FY 2018. When including bonus credit, the percentage of covered AFV acquisitions was approximately 143.8%, which exceeds Energy Policy Act (EPA) of 1992 requirements. Alternative fuel use as a percentage of total covered fleet fuel was approximately 8.4% in FY 2019.

The 441 Vehicle Support Chain Operations Squadron (Air Force Fleet Management or the 441st) manages the second largest Federal fleet, operating and maintaining 81,000 assigned vehicles valued at \$11B. With creative thinking and solid business practices, the Air Force has moved toward having a very flexible, economical, and efficient fleet to meet Air Force objectives in defense of our nation. Air Force Fleet Management ensured the purchase of 624 alternative fuel vehicles in FY 2019 and mandated to the maximum extent possible the use of re-refined oils, biodiesel, and recapped tires. It also provides training on the latest environmental policies and provides additional funding to units to assist with increasing the fleet's life expectancy. Additionally, the Air Force's vehicle telematics program garnered the first and only "Authority to Operate" in the Federal government. Actions taken reinforce Air Force data security for 40K+ assets and mitigate the possibility of network breach. Accurate vehicle information will help ensure 100% compliance with annual reporting mandates, provide commanders with information to reduce idling, increase fuel efficiency, and support our efforts to institute condition-based and predictive maintenance programs. These and other actions resulted in the Air Force recently being honored by the 100 Best Fleets in the Americas program, an annual industry awards program recognizing peak-performing fleet operations, with two awardees on the prestigious list. The 441st was ranked 6th, the fifth year in a row it placed in the top 20, and Tinker Air Force Base was ranked 50th. The 441st was also ranked

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19th in the Government Green Fleet Award category for excellence in management of government vehicle fleets based on standards in fleet composition, fuel and emissions, and other supporting programs.

Naval Base Kitsap, Washington reduced the amount of petroleum-based fuel in the installation's fleet of non-military vehicles by using alternative fuels and electricity. Personnel used fuels with bio-based content, such as E-85 and biodiesel, to replace a total of 172,831 and 171,484 gallons of petroleum fuels in FY 2018 and FY2019, respectively. The installation's vehicle inventory is also comprised of 113 electric vehicles, or 11% of the local fleet.

Priority Strategies & Planned Actions

DoD will continue to right size its non-tactical fleet as missions change, which may in turn also increase DoD inventory. The Department will also continue to pursue its successful strategy to transition gas-dedicated vehicles to LGHG, alternative fuel, and electric vehicles. Because the Department will continue to transition from vehicles that use E-85 to LGHG and gas dedicated vehicles, reductions in petroleum use will be less than 1% in FYs 2020 and 2021. This process has been restricted by the types of vehicles produced by OEMs, so DoD will continue to transition new vehicle types as they become available. In FYs 2020 and 2021, the Department will continue to increase its annual consumption of alternative fuel by 2%. In addition, DoD continues to consider bringing its entire fleet under one FMIS to optimize Federal fleet performance, reduce associated costs, and streamline reporting.

Implementation Summary: Cross-Cutting Operations

1. SUSTAINABLE ACQUISITION / PROCUREMENT

FY 2019 Sustainable Acquisition Progress:

0.3% of contract actions and 11.8% of obligations (in dollars), for a total of \$23,824M in contract actions with statutory environmental requirements

FY 2020-FY 2021 Plan:

0.4% of contract actions and 11.9% of obligations (in dollars)

0.5% of contract actions and 12.0% of obligations (in dollars)

DoD established a sustainable procurement program to enhance and sustain mission readiness through cost effective acquisition that achieves compliance and reduces resource consumption and solid and hazardous waste generation. Sustainable procurement efforts span from transportation and energy to recycled and biobased content. DoDI 4105.72, Procurement of Sustainable Goods and Services, establishes policy, assigns responsibility, and provides compliance goals and direction for the sustainable procurement of goods and services. This includes all mandates for Federal purchasing preferences in accordance with the Federal Acquisition Regulation (FAR) and the Defense Federal Acquisition Supplement (DFARS). DoDI 5000.02 and the Defense Acquisition Guidebook include DoD requirements and guidance for environment, safety, and occupational health risk reduction; hazardous materials minimization; and environmental impact analysis for DoD weapons systems acquisition.

Implementation Status

Based on FPDS data, the value of DoD's applicable contract actions containing sustainable clauses was \$23.8B for FY 2019, an increase of approximately \$4.1B from the previous year. DoD engaged in 212,217 contract actions containing sustainable actions. The percent of contract actions and obligations (in dollars) with environmental clauses is based on *all* contract actions, excluding weapons systems and contracts outside the United States. DoD is working with the Military Services and DoD agencies to identify drivers of real sustainable procurement successes against changing mission requirements and budget authority.

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In FY 2019, DoD was successful in meeting its goal of spending approximately \$3.4B on 8,000 contracts for biobased products. The Department exceeded this target, executing 9,962 biobased contracts valued at \$6.2B. For example, the United States Army Transportation Aeronautical Depot Maintenance Center implemented a project to replace nitric acid and sulfuric acid in two separate processes with citric acid, a biobased organic material. The Depot is the leading center of excellence for the modification, repair, and overhaul of rotary wing and unmanned aircraft components and platforms. For many years, the Depot has used industry standard nitric acid baths for passivation on parts to prevent corrosion and extend the life cycle. However, in 2019, the Depot experimented with citric acid as an alternative, transitioning to an environmentally preferable product, while meeting performance requirements.

Priority Strategies & Planned Actions

The Department will continue to implement DoD Instruction 4105.72, Procurement of Sustainable Goods and Services. The Sustainable Technology Evaluation and Demonstration (STED) Program is planned to be established as a Program of Record in FY 2022 and will continue to increase awareness and use of cost efficient and sustainable technologies and products across the DoD in support of mission objectives and Federal procurement mandates. The STED Program demonstrates the transition to sustainable alternatives that cost effectively meet DoD performance requirements in operational environments. In FYs 2020 and 2021, the STED Program will expand participation to all Military Services, DoD Components, and other Federal agencies.

Additionally, the Department will continue to implement the sustainable acquisition requirements of EO 13834, Efficient Federal Operations. For FYs 2020 and 2021, DoD projects 0.3% of all contract actions and 11.8% of obligation (in dollars) will have environmental clauses. Of this amount, approximately \$6.2B will be spent on 9000 contracts for biobased products.

2. ELECTRONICS STEWARDSHIP

FY 2019 Electronics Stewardship Progress:

100% of newly purchased or leased equipment met energy efficiency requirements

100% of electronic equipment disposed using environmentally sound methods*

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

The Department's electronics stewardship approach is outlined in the DoD Electronics Stewardship Implementation Plan, which includes reduction of the environmental and energy impacts through continual improvement of each of these life cycle phases of electronic products: *acquisition, operations and maintenance, and end-of-life.*

Implementation Status

The Defense Logistics Agency (DLA) manages the vast majority of *end-of-life* activities for DoD. In FY 2019, DLA processed 100% of all Continental United States e-waste following recycling disposal guidelines and through EPA's Certified Electronic Recyclers (Responsible Recycling Standard "R2"), totaling 56,361,468 pounds. *Acquisition* activities include requirements for information technology (IT) electronics to be Electronic Product Environmental Assessment Tool (EPEAT) registered. Any device meeting EPEAT requirements also qualifies under ENERGY STAR®, reducing environmental and energy impacts during *operations and maintenance.*

Because of performance needs, some Military Services and DoD agency equipment is exempted from electronics stewardship requirements. For example, electronic equipment purchased by the National Security Agency (NSA) and the National Reconnaissance Office frequently must meet mission-specific requirements that preclude purchasing restrictions, and security procedures and regulations restrict the specifications of equipment that may be procured and, upon the end of its life cycle, how it is to be ultimately destroyed.

DLA Disposition Services conducted several meetings with stakeholders from the U.S. Air Force Life Cycle Management Center Positioning, Navigation, and Timing Program Office and Safety offices, in conjunction with the U.S. Army Communication-Electronics Command (CECOM) Integrated Life Cycle Support Center and Project Manager for

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Positioning, Navigation and Timing offices, for the destruction of the Defense Advanced Global Positioning System (GPS) Receivers (DAGR). The DAGR is a DEMIL required item and requires a more stringent destruction method per NSA policy. The electronic circuit card must be destroyed to the 1-2mm level. This level of destruction requires specialized shredding equipment and components (*e.g.*, screens to filter the residue). The initial disposal solution involved sending the DAGRs back to the original manufacturer, with an estimated disposal cost of \$54M (\$85 per unit). Disposition Services worked with Military Item Managers, CECOM, NSA, DoD DEMIL Program Office, Sales Contracting Officers, and the current e-Recycling Sales Contractor to develop an inventory and disposal solution to process the DAGRs. The solution provided destruction tolerances meeting the NSA requirements and returned approximately \$54M in disposal cost savings back to the government. To date, Disposition Services performed demilitarization on 17,180 of the estimated 65,000 DAGRs resulting in a \$1.46M cost savings, and have the capability to demilitarize other military GPS devices per established DEMIL Code “F” instructions.

Priority Strategies & Planned Actions

The Department will continue to maintain 100% compliance on electronics stewardship goals in FYs 2020 and 2021. DoD will continue improving policy, guidance, and training on sustainability requirements and compliance methods for electronic office products. DoD uses strategic sourcing vehicles to ensure the procurement of equipment that meets sustainable electronics criteria, and it will continue to do so. The Department will dispose of 100% of electronics at their end-of-life through DLA Disposition Services or General Services Administration (GSA) Xcess[®], Computers for Learning, UNICOR, or Certified Recycler.

3. GREENHOUSE GAS EMISSIONS

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

23.1% reduction from FY 2008

1.0% reduction from FY 2018

The Department continues to pursue measures that improve the mission readiness and mission assurance of installations. DoD does not have any initiatives to reduce GHG; however, the implementation of energy efficiency, energy security, renewable energy, and other improvement projects collectively contribute to the reduction of GHG emissions.

Implementation Status

DoD’s GHG emissions from Scope 1 and 2 sources in FY 2019 totaled 20.7M metric tons of carbon dioxide equivalents (MTCO_{2e}), 23.1% lower than the FY 2008 base year. As there are no Department initiatives to directly reduce GHG emissions, reductions are the result of other initiatives. For example, reduced electricity use at DoD installations, along with increased use of renewable energy, contributed to a reduction of more than 150,000 MTCO_{2e} in FY 2019 across the Department. This is the equivalent of removing over 32,000 passenger vehicles from the road for one year.

Priority Strategies & Planned Actions

The Department’s focus on energy resilience and energy security will continue to facilitate reductions of GHG emissions, as it includes reducing facility energy consumption, meeting renewable energy goals, minimizing waste, increasing fleet efficiency, advancing sustainable buildings, and improving efficiency. DoD will continue to track and report Scope 1 and 2 GHG emissions and reductions pursuant to EO 13834 Section 2(h) and 42 U.S.C. Section 17143.

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Agency Priorities and Highlights

AGENCY IDENTIFIED PRIORITIES

The Department can pursue its three NDS lines of effort more effectively and efficiently by conserving our Nation's natural and cultural resources, protecting human health, preventing or eliminating pollution at the source, and incorporating environmental requirements into weapons systems acquisition. DoD Components leverage technology to create new and innovative solutions to existing and emerging human health and environmental challenges. It is important for the Department to safeguard personnel and protect the environment, all while ensuring mission readiness.

NOTABLE PROJECTS AND HIGHLIGHTS

The Secretary of Defense Environmental Awards celebrates Military Service members and civilians for their exceptional commitment to protecting human health and the environment while advancing the military mission. Each year since 1962, the Secretary of Defense has honored installations, teams, and individuals for outstanding conservation achievements, innovative environmental practices, and partnerships that improve quality of life and promote efficiencies without compromising mission success. Award categories alternate each year, many in alignment with the sustainability goals in this report. The Secretary of Defense Environmental Awards can be found at the following webpage: <https://www.denix.osd.mil/awards/home/>.

Other examples of DoD's notable projects and highlights are identified in the relevant sections in this report.