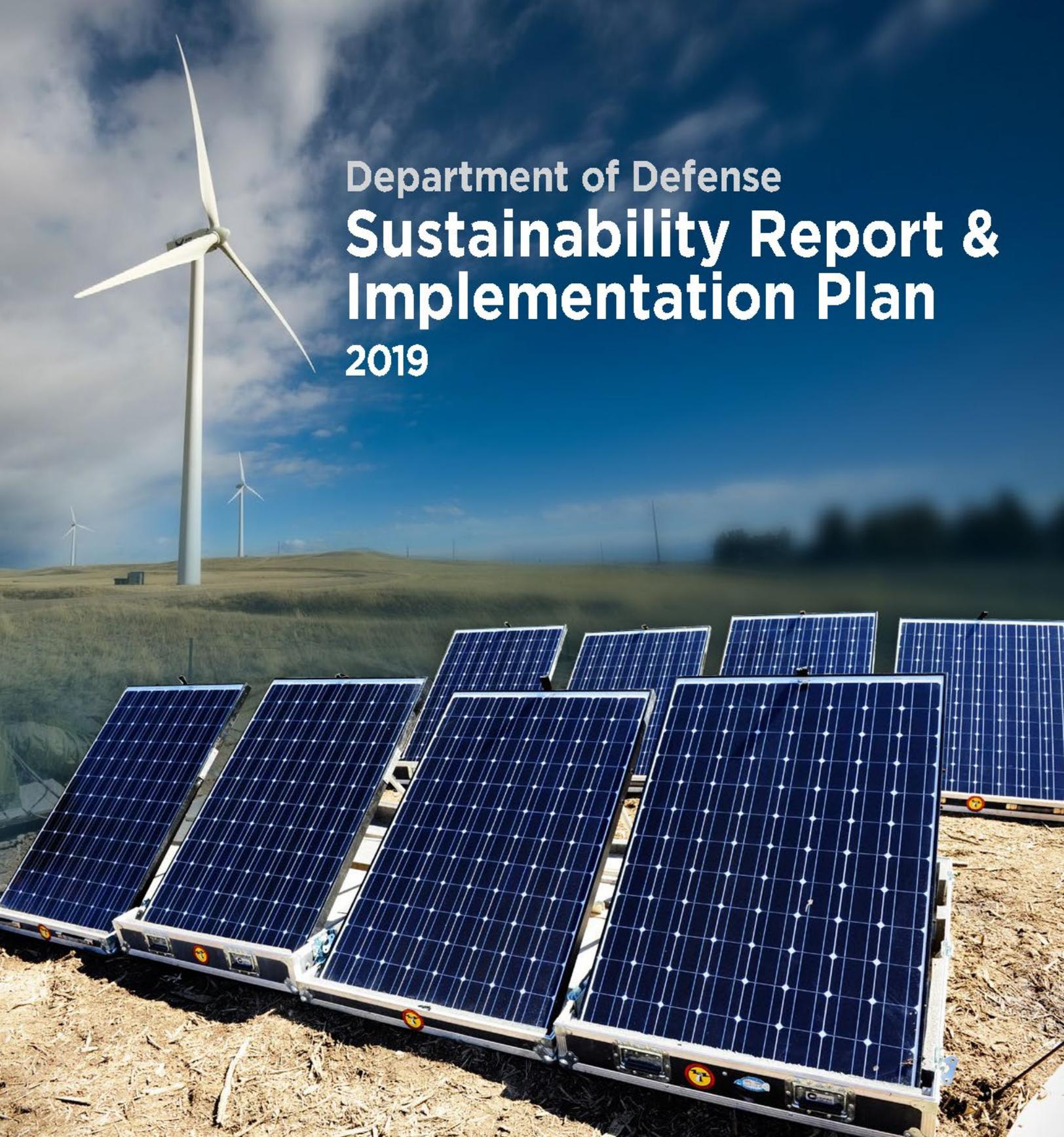


Department of Defense Sustainability Report & Implementation Plan 2019



Department of Defense
2019 Sustainability Report and Implementation Plan

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Executive Summary

The Department of Defense (DoD) strongly supports the goal of EO 13834, Efficient Federal Operations, to “enhance the resilience of Federal infrastructure and operations and enable more effective accomplishment of its mission.” The 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 Departments must have the energy, land, air, and water resources necessary to train and operate, today and in the future. The DoD is focused on the lines of effort described in the National Defense Strategy:

- a. First, rebuilding military readiness as we build a more lethal Joint Force;
- b. Second, strengthening alliances as we attract new partners; and
- c. Third, reforming the Department’s business practices for greater performance and affordability.

In support of these objectives, the Department is focused on improving military readiness and lethality, which includes having resilient infrastructure and business reforms to increase efficiency and reduce costs. This resilience-centered approach to sustainability ensures that DoD will endure going forward. Resilient installations are prepared for and able to recover from disruptions that impact their mission, and DoD continually seeks opportunities to improve resilience based on data that presents the most compelling case in terms of increasing readiness, supporting alliances, and improving affordability.

The Department of Defense has a worldwide footprint – almost 3 million military and civilian personnel, more than 26 million acres, and over 275,000 buildings encompassing more than 1.3 billion square feet, many of which serve specialized, mission-critical purposes. These assets are distributed across the Services (Army, Air Force, Navy, Marine Corps) 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. This DoD Sustainability Report and Implementation Plan describes ways the DoD is advancing its mission through resilient infrastructure and business practices that improve performance and affordability of its facilities and non-tactical vehicles. Several of highlights include the following:

Performance Contracting. DoD is focused on implementing energy resilience and energy security in support of advancing mission readiness and assurance. The Department continues to view performance-based contracting, such as Energy Savings Performance Contracts (ESPCs) and Utility Energy Service Contracts (UESCs), as an effective 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 the projected energy cost savings of the proposed ESPC/UESC. In FY 2018, DoD awarded 23 performance contracts totaling approximately \$622 million. However, the Department still seeks to leverage all its available authorities to maximize improvements to mission readiness and mission assurance, particularly where the return on investment is not sufficient to use third party financing.

Renewable Energy. DoD continues to evaluate the best technical and operational solutions, which may include forms of renewable energy. The Department pursues renewable energy to enhance energy security and mission assurance when the business case supports it. For example, DoD leverages its Installation Energy Plans (IEPs) that are informed by tools such as the Energy Resilience Assessment (ERA) tool, which identifies energy resilience gaps and potential solutions to close those gaps. When renewable energy is identified as a potential solution, DoD assesses it for the ability to directly support energy resilience and energy security. Typically, solutions that include renewable energy need to be combined with other technologies, such as energy storage, to be effective in providing the necessary

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mission readiness improvement. That being said, DoD has the most onsite renewable energy generation of any federal agency. In FY 2018, renewables accounted for 5.9% of the Department's electricity use.

Water Efficiency. DoD has laid the framework for water resilience and efficiency through its policies and programs and is implementing them through a variety of initiatives. The Department is using innovative approaches to conserve water, reduce costs, and assure access to an adequate water supply for mission success. For example, in FY 2017, DoD used 82,499 million gallons (MGal) of potable water, a reduction in DoD's potable water intensity by 26.9% from its 2007 baseline. DoD's approaches at installations nationwide range from regular maintenance and water system-related upgrades to alternative water sourcing and changes in water use behaviors and practices.

Waste Management and Diversion. DoD approaches waste management and diversion within the context of compliance with statutory requirements, as well as to improve performance and affordability. DoD continues to avoid generating unnecessary waste through innovative recycling and reuse tactics, reducing both procurement and disposal costs. The Department diverted 40% of its non-hazardous solid waste in FY 2018 and 75% of its Construction & Demolition (C&D) debris—well above its internal target of 60%.

Sustainable Acquisition. DoD continues to operate its Sustainable Product Demonstration Program, which is designed to increase mission capability, reduce harm to the DoD workforce, reduce life-cycle costs, and help ensure availability of critical products. In FY 2018, the total value of DoD's approximately 200,000 applicable Federal Procurement Data System (FPDS) contract actions containing sustainable clauses was over \$19,700 million (M), an increase of 43% from the previous year.

In summary, the Department's sustainability efforts focus on mission assurance, operational readiness, and cost-effective business practices. The Department strives to maximize the efficient use of mission-critical energy, water, and material resources and ensure that installations are safe places for military members and their families to live, work, play, and pray. By strategically planning and investing to protect our people, installations, natural resources and military assets, DoD can ensure we are prepared when threats arise in the future.

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Implementation Summary: Facility Management

1. FACILITY ENERGY EFFICIENCY

FY18 Energy Intensity Progress (Btu/GSF):

20.8% reduction from FY03

1.4% increase from FY17

FY19-FY20 Plan:

Est. range of 0.7% EUI reduction to 2.0% EUI increase in FY19 from FY18

Est. range of 2.7% EUI reduction to 2.0% EUI increase in FY20 from FY19

DoD continues to seek opportunities to increase facility energy efficiency through implementation of its solutions to improve energy resilience and energy security. DoD will continue to leverage all available authorities, and its education and outreach efforts, to integrate energy efficiency, reduce energy usage, and foster energy efficient behaviors of occupants in its buildings, in support of energy resilience, energy security and mission readiness. Third party financed projects executed in FY16 have the potential to further reduce energy consumption by an estimated 0.7% in FY19, and projects executed in FY17 have the potential to further reduce energy consumption by an estimated 2.9% in FY20, based on savings data provided in the contracts.¹

The range of projected EUI changes in FY19 and FY20 are 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 realized, and the gross square footage remains the same as reported in the FY18 Annual Energy Management and Resilience Report (AEMRR). Both percentage increases assume the Department may have changes in mission that could result in an increase of EUI, similar to the increase reported for FY18.

The Department is evaluating its currently implemented ESPCs and UESCs to ensure they are operating correctly and that the guaranteed savings are being achieved and accurately reported.

Implementation Status

DoD seeks to reduce the demand for installation energy through energy efficiency measures, as energy efficiency is an important part of gaining energy resilience and energy security. However, DoD does not have specific energy efficiency goals. The Department is focused on implementing energy resilience and energy security in support of advancing mission readiness and assurance. DoD provides policies and guidance for Military Services and DoD agencies to reference as they develop and implement energy solutions at their installations. This guidance also ensures compliance with requirements for facility evaluations as well as for energy-efficiency performance standards and design standards for new buildings and major renovations. DoD strives to have a designated energy manager at each military installation responsible for meeting these requirements. Notably, while implementing its plan to pursue mission readiness objectives, the DoD has executed over 200 Energy Savings Performance Contracts (ESPCs) and Utility Energy Savings Contracts (UESCs) across its portfolio of installations, since 2011. The energy performance contracts awarded between FY11 and FY15 have contributed to EUI reductions by decreasing the Department's energy consumption by an estimated 2.9% in FY18, based on savings data provided in the contracts.¹

Additionally, DoD pursues education and outreach opportunities to train and promote energy-efficient behaviors at its installations to support energy resilience and energy security. For example, DoD promotes Energy Awareness Month during October of each year by 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

¹ Both figures assume a FY 2017 baseline, as listed in the Annual Energy Management and Resilience Report (AEMRR). These figures represent contributions to the DoD's efficiency improvements, but they do not account for changing requirements arising from mission growth.

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events for its energy professionals to attend, such as the annual Department of Energy's "Energy Exchange." 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 2018, the Department represented over half of the 1,100 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.

For example, the U.S. Army Reserve's 81st Division developed a long-term, proactive program that focuses on facility investment and customer service to cut costs and improve operational processes, resulting in a 36.5% decrease in energy intensity from FY 2015. The program avoids costly emergency fixes by preparing for facility needs and equipment failure before issues become critical. A preventive maintenance program optimizes the performance and extends the life of existing systems, reducing energy consumption via improved operations.

Naval Magazine (NAVMAG) Indian Island replaced heating boilers with heat pumps in three buildings, resulting in annual reductions of 3,188 million British thermal units (MBtu), 28,000 gallons of diesel fuel, \$85,300 in energy costs, and 627,200 pounds of CO₂. The installation also replaced 505 permanent incandescent and fluorescent light fixtures with LED lighting and installed occupancy sensors in offices, corridors and lunchrooms. These upgrades resulted in a further savings of 450 megawatt-hours (MWh) and \$36,000 annually.

Priority Strategies & Planned Actions

DoD will continue to analyze data from Military Services and DoD agencies for potential projects to ensure DoD is effectively and efficiently implementing projects that maximize benefits to mission readiness and assurance. When possible, data will be used to inform leaders, building operators, and building occupants for increased situational awareness of the need for energy conservation and energy efficiency practices. The Department will continue to pursue training opportunities for its energy professionals and promote energy efficient behaviors through education and outreach methods.

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 are due at the end of FY 2019. IEPs for installations that consume 75% of a DoD Component's installation energy use are due at the end of FY 2020.

The Air Force will continue to expand its Energy-as-a-Service (EaaS) procurement initiative, with RFIs for pilots at Altus Air Force Base in Oklahoma and Hanscom Air Force Base in Massachusetts. EaaS envisions a realignment of Air Force energy procurement and management functions through a single, comprehensive contract to deliver holistic energy solutions to an installation. Ideally, the EaaS provider would be solely responsible for operation of and investment in the on-base electricity system, including any onsite generation; the procurement of electricity supplies; and the implementation of energy conservation and demand management measures.

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2. EFFICIENCY MEASURES, INVESTMENT, AND PERFORMANCE CONTRACTING

FY18 Performance Contracting – Investment value and number of new projects awarded:

\$622.0M / 23 projects in FY18

FY19-FY20 Plan:

DoD continues to pursue ESPCs and UESCs when they are the best fit to improve energy resilience and energy security. DoD anticipates awarding an estimate of 16 performance contracts (ESPCs and UESCs) in FY19, with a value of over \$733M.

Implementation Status

DoD is focused on implementing energy resilience and energy security in support of advancing mission readiness and assurance. While performance contracts such as Energy Savings Performance Contracts (ESPCs) and Utility Energy Service Contract (UESCs) may assist in improving energy security, DoD does not have specific performance contracting goals. As indicated in the section 1, “Facility Energy Efficiency,” the ESPC and UESC portfolio have not only supported mission readiness, but also reduced total energy consumption, contributing to reductions in energy use intensity. DoD seeks to leverage all its authorities to maximize the improvements to mission readiness and mission assurance.

As an example, Naval Base San Diego has utilized both ESPCs and UESCs. A \$5M ESPC project with an estimated savings of 13,453 MBtu includes upgrades to lighting and heating, ventilation, and air conditioning (HVAC) in 68 buildings totaling over 3 million square feet. The installation also developed a UESC that includes retro-commissioning, HVAC, lighting, pool solar thermal, and replacing ice machines for six buildings with estimated savings of 2,137 MBtu.

Hill Air Force Base generated \$4,193,843 in incentives and bill credits in FY 2018 through a \$43.6M ESPC and active participation in the Rocky Mountain Power Energy Efficiency Program. Projected future cost savings are \$3,217,864 and 217,194 MMBtu/year (a simple payback period of 13.1 years). These yearly savings include 19,636 MMBtu from a newly installed 3.5 MW solar array, increasing the base’s distributed/renewable energy portfolio by 30%. Energy conservation measures (ECMs) through the ESPC span 262 buildings and 9.1M square feet, and include process improvements, lighting upgrades, steam distribution insulation, compressed air system upgrades, and industrial ventilation air reduction, reducing base overall energy consumption by 10% and energy costs by 13%. The team has also collected best practices, including cost sharing with the local utility, arranging specialized ESPC training prior to the initiation of the contract, and utilizing experts from the Air Force Civil Engineering Center and industry partners throughout the development of the measurement and verification portions of the contract as well as for evaluating proposed ECMs.

The Army’s Rock Island Arsenal Joint Manufacturing and Technology Center’s \$39.2M ESPC to modernize the site’s energy and industrial infrastructure and improve resilience has shown reductions of 26% in energy consumption and 43% in water consumption, saving about \$2.7M in utility costs annually.

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 energy resilience and energy security gaps at an installation. These plans will include the acquisition and funding strategy, which may include ESPCs/UESCs, to address these gaps. In addition, DoD is developing a measurement and verification (M&V) guidance and policy to ensure that the energy resilience and energy security objectives, and the guaranteed energy savings of performance-based contracts are realized.

Joint Base San Antonio recently awarded an ESPC for \$142.7M, supporting energy security and resilience robustness, redundancy, responsiveness, recovery, and resourcefulness. At project completion in July 2021, this project will have

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installed 15.8MW of solar photovoltaics and combined heat and power (CHP) on DoD property, and enhanced energy security via microgrid systems integrating 20MW of on-site generation, backup generation assets, and battery energy storage (8 MW-hours) to keep the facility operational in the event of an outage of utilities. The ESPC will also upgrade HVAC energy management control systems, add HVAC thermal energy storage, install new lighting & controls, and improve building envelopes.

3. RENEWABLE ENERGY

FY18 Renewable Electricity Use:

5.9% of total electricity in FY18

FY19-FY20 Plan:

DoD strives 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 the ERA tool to identify energy resilience and energy security gaps and solutions to these gaps which may include renewable energy as part of the solution. Renewable energy is implemented when it is identified as the best technology to address energy resilience and energy security gaps.

Implementation Status

DoD seeks to improve mission readiness and mission assurance and uses renewable energy in support of energy resilience solutions where appropriate. There is a legislative goal for DoD to produce or procure $\geq 25\%$ of the total quantity of facility electricity 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 FY18, 15.8% of facility electricity consumption was produced and 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 well positioned to meet the $\geq 25\%$ by FY 2025 goal.

Special contracting authorities, such as power purchase agreements (PPAs), are used to install and operate renewable energy projects on DoD installations. For example, a PPA at Vandenberg Air Force Base led to the installation of a 28.2 MW solar photovoltaic system on 129.1 acres, which became operational in FY 2018. All the energy will be used exclusively by the installation for the next 26 years. From January 2018 through the end of the fiscal year, the system generated almost 35.5 billion kilowatt-hours (kWh) of renewable energy, representing 38% of the installation's electrical energy needs. In FY 2018, the Army also added 12.8 MW of renewable energy capacity through special contracting authorities (e.g., PPA, ESPC, UESC, and GSA area-wide contract), with a further 2.0 MW added through Departmental funding. The Department has also installed new renewable energy technologies at the building level. For example, the Defense Logistics Agency (DLA) included rooftop photovoltaic panels and 252 geothermal wells (ground source heat pump system) at its new Aviation Operations Center completed in January 2018, which are estimated to save 50% of the annual energy costs for the facility.

By the end FY 2018, Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms provided 25 MW of cogeneration and photovoltaic capacity, which significantly increases mission security and produced 9.6% of MCAGCC's energy from renewable sources. In addition, Marine Corps Air Station (MCAS) Miramar broke ground in 2017 on an installation-wide microgrid project that will provide 100% renewable and "islandable" energy distribution capable of supporting over 100 mission-critical facilities for three weeks. The system leverages natural gas, diesel, and landfill gas-fueled generators, battery storage, and photovoltaics to offset electricity purchases, reduce peak demand charges, and foster participation in utility demand-response programs. As part of this effort, MCAS Miramar also installed 3MW of new large-scale energy storage.

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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.

As far as notable planned projects, Mountain Home Air Force Base in Idaho is developing a 10 to 20 MW, variable production geothermal electrical and heat plant PPA project that has the potential to fully “island” the base for both resilience and day-to-day operations, with commercial power and emergency generators providing back-up. The environmental assessment is in progress, as is development of a Request for Proposal (RFP).

4. WATER EFFICIENCY

FY18 Water Intensity Progress (Gal/GSF):

27.7% reduction from FY07

1.1% reduction from FY17

FY19-FY20 Plan:

Continuous improvement in FY19 from FY18

Continuous improvement in FY20 from FY 19

Implementation Status

The Department has exceeded the 20% reduction goal from FY 2007 and will continue to improve water efficiency in FY 2019 and FY 2020.

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.

The Department has laid the framework for water security and efficiency through its policies and programs – including DoD Instruction (DoDI) 4170.11, Installation Energy Management; Directive (DoDD) 4270.5, Military Construction; various Unified Facilities Criteria; and Military Department guidances – and is implementing them through a variety of initiatives. DoD is conserving water on its installations and capitalizing on opportunities to reduce water use, improve water security, and ensure mission readiness. Best management practices at installations nationwide range from system-related upgrades (e.g., sustainable construction, fixture replacement), alternative water sourcing (e.g., recycling, reclamation), to water use-related changes (e.g., landscape and irrigation changes, public education, outreach).

DoD is using innovative approaches to conserve water, save costs, and assure access to an adequate water supply for mission success. For example, in FY 2017, DoD used 82,499 million gallons (MGal) of potable water, a reduction in DoD's potable water intensity by 26.9% from its 2007 baseline.

At Fort Irwin, an Army installation in the Mohave Desert of California, a new water treatment plant enabled the construction of a new recycled water line for irrigation through a utility privatization contract. This investment is reducing potable water consumption by 11.9 MGal annually. MCAS Miramar made upgrades to their water distribution lines that are expected to result in annual potable water savings of 11 MGal per year, or more. At Cannon AFB in New Mexico, the Air Force increased the volume of reclaimed wastewater available for non-potable uses from 0.2 to 9.0 MGal and used the reclaimed water for its MILCON needs. The dry soil at Cannon AFB must be compacted with water for construction; the installation has utilized reclaimed wastewater for this purpose to reduce potable water use.

Priority Strategies & Planned Actions

The Department will continue to build on these efforts across its installations while addressing challenges. Overall, DoD has made great progress through its effective policies and programs aimed at increasing water security and

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efficiency while realizing opportunities to maximize the strategic use of water resources and reduce consumption and unnecessary costs.

The DoD Components are incorporating water saving measures into their landscape maintenance and restoration activities. The Army's landscape projects must use water-efficient strategies and consider native plant species and dry-scape design alternatives. Additionally, for new construction projects, the Army requires consideration of alternatives to irrigation and projects that do require irrigation will consider alternative water use in place of outdoor potable water use.

The Defense Intelligence Agency (DIA) is leveraging a comprehensive water conservation program that resulted in a 37% decrease in its water use intensity. DIA has and continues to pursue permits to use non-potable water in its cooling towers, further decreasing DIA's potable water consumption.

The Department of Navy continues to develop initiatives to reduce potable water consumption and intensity. At Naval Air Station Patuxent River, Naval Support Activity Annapolis, and Naval Support Facility Carderock, installation personnel are including initiatives for low impact development measures (e.g., rainwater reclamation, graywater reclamation for irrigation, native plant species, bioretention areas for flood control) in the installations' master plans for future projects. These future endeavors will not only reduce potable water consumption but will also aid in aquifer recharge.

5. HIGH PERFORMANCE SUSTAINABLE BUILDINGS

FY18 Sustainable Buildings Progress:

603 sustainable Federal buildings
2.2% of buildings / 1.8% of gross square footage (GSF)

FY19-FY20 Plan:

Continuous improvement in FY19
Continuous improvement in FY20

Implementation Status

In FY 2018, 1.8% of DoD's building area conformed to the revised Guiding Principles, based on almost 1.2 billion applicable square feet. DoD policy requires new construction and major renovations to adhere to the Guiding Principles (UFC 1-200-02, High Performance and Sustainable Building Requirements). The Department also continuously incorporates many sustainable features in buildings where improvements meet portions of the Guiding Principles.

For example, the Air Force completed work on several major high-performance sustainable buildings in FY 2018. A 45-year-old pre-engineered metal building used as a jet engine shop at Joint Base Pearl-Hickam was renovated to meet current codes, including a high-performance building envelope, electrical/lighting upgrades, improved thermal efficiency, and new HVAC and plumbing systems. The Burlington Air National Guard converted a facility for the F-35 to maximize energy efficiency, including ground source heat pumps, variable refrigerant systems, roof-mounted photovoltaic systems, and direct sunlight. In addition, a maintenance hangar at McConnell Air Force Base in Kansas achieved Leadership in Energy and Environmental Design Silver certification, while maintaining architectural consistency with nearby hangars. The hangar features reflective roofing, a highly efficient thermal envelope, and high-efficiency mechanical systems. High efficiency lighting systems in the hangar bays automatically adjust to daylight levels, while low- or zero-emitting paints, coatings, and flooring materials ensure improved indoor air quality. A robust commissioning program also establishes efficient operation, improves occupant productivity, extends equipment life, and reduces ongoing maintenance. Due to the focus on cost control, the awarded construction cost was \$17M dollars less than originally planned.

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The U.S. Army Garrison Presidio of Monterey renovated an inefficient, 65,000 square-foot barracks built in the 1960's to reduce energy and water costs, conserve resources, and improve the building's resilience and security. The team set aggressive energy intensity targets to achieve larger energy savings than a conventional retrofit, resulting in a 39% reduction in electricity usage, 70% reduction in gas usage, 63% reduction in total energy usage, and 66% reduction in water usage.

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 relatively small 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. For example, the Department is planning 27 MILCON projects (\$1.6B) using supplemental funding enacted for disaster related expenses due to Hurricanes Florence and Michael as well as flooding in the mid-west.

6. WASTE MANAGEMENT AND DIVERSION

FY18 Non-hazardous Waste Management and Diversion:

1,522,564 metric tons of non-hazardous solid waste generated*
60% sent to treatment and disposal facilities

*not including construction and demolition waste

Implementation Status

DoD continues to optimize its natural resources and avoid generating unnecessary waste. The Department continues to optimize its natural resources and avoid generating unnecessary waste. In accordance with DoD Instruction (DoDI) 4715.23, "Integrated Recycling and Solid Waste Management," DoD implements reuse, recycling, and ISWM programs at installations that properly and cost effectively manage materials according to a hierarchy. The Department's Integrated Solid Waste Management (ISWM) 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:

- a. Source reduction
- b. Sustainable procurement of goods and services
- c. Reuse of materials
- d. Donation
- e. Recycling
- f. Composting and mulching
- g. Waste to energy recovery
- h. Incineration
- i. Landfilling

Throughout this process, DoD focus is on maximizing the recovery and recycling of useful materials and reducing the generation of solid waste and its disposal. 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.

The Department diverted 40% of its non-hazardous solid waste in FY 2018 and 75% of its C&D debris—well above the Department's 60% target. For example, the Burlington Air National Guard was recognized with a 2018 EPA Federal Green Challenge award for recycling asphalt, metals, plastics, cardboard, and concrete related to an apron and taxiway project. Through pre-construction planning and coordination, the team diverted 12,286 tons of milled asphalt

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pavement, 35,796 tons of demolished concrete, and 43,000 cubic yards of excavated soil from area landfills. In addition, MCAGCC Twentynine Palms installed an innovative food waste management system, increasing food waste diversion from landfill, and executed a broad solid waste and recyclable characterization study to identify opportunities for additional recycling and solid waste diversion from landfill. The installation diverted an average of 48% of solid waste from landfill internment over FY 2017 and FY 2018. Approximately 17.6M pounds of recyclable materials were processed and sold, generating over \$2M in revenue. At Naval Base San Diego, the galley partnered with the City of San Diego's Landfill Greenery to enact a Food Waste recycling program where the galley's segregated food waste was processed into rich compost products. This effort diverts approximately 30% to 40% of the galley's waste stream, or about 420,000 pounds each year.

Priority Strategies & Planned Actions

DoD will approach its integrated waste management and diversion activities in compliance with all state and federal requirements, as well as to improve performance and affordability. DoD has been evaluating current waste management practices to develop strategic goals and metrics. These new goals and metrics will reflect the significant changes in the recyclable material markets and focus on reducing disposal costs through diversion and total waste reduction.

DoD will focus on a continued effort to identify opportunities to reduce total waste generated. The Department does not propose a percent reduction in solid waste as DoD waste production is driven largely by activities that support the mission. The recycling market and the economic variability/operations tempo at each installation make establishing a goal unattainable at this time. Instead, DoD has set a 40% reduction target for solid waste that is sent to landfills. DoD will continue to track solid waste diversion, total non-hazardous waste without C&D debris, total C&D debris, and C&D debris diversion rate in FY 2019.

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Implementation Summary: Fleet Management

1. TRANSPORTATION / FLEET MANAGEMENT

FY18 Petroleum Reduction Progress (Gal):

42% reduction in petroleum fuel since 2005

11.5% reduction in petroleum fuel since FY17

FY19-FY20 Plan:

5.0% reduction in FY19 from FY18

5.0% reduction in FY20 from FY19

Implementation Status

DoD reduced 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. The Department has been exchanging gas-dedicated vehicles with LGHG, though this process is restricted by the type of vehicles that original equipment manufacturers (OEMs) produce using LGHG; vehicle type will not be substituted to meet fleet efficiency. DoD is about one Centralized Asset Management (CAM) cycle away from replacing all gas-dedicated vehicles with available LGHGs. The Department also 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 reporting database.

In FY 2018, MCAGCC Twentynine Palms developed a draft Combat Center Order for a plug-in electrical vehicle charging program, while maintaining a non-tactical vehicle fleet of 285 alternative fuel vehicles. In addition, of the 2,745 light/medium duty passenger vehicles procured and leased by Air Force Fleet Management in FY 2018, 85% were alternative fuel vehicles, a factor that contributed to the group being recognized by the 100 Best Fleets award, Government Green Fleet award, and Government Fleet Magazine.

All newly acquired light-duty vehicles and medium-duty passenger vehicles are low 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. These purchases must be approved at the Headquarters level, where the approver ensures that all dual-fueled vehicles are acquired in areas where alternative fuel is available to support their operation. DoD has difficulty meeting alternative fuel vehicle acquisition requirements in areas where alternative fuel is not available or if the vehicle type required to meet the mission is not manufactured by the Original Equipment Manufacturer (OEM) contracted by the General Services Administration (GSA). In areas where alternative fuel is not provided, DoD is using LGHG vehicles if available. If alternative fuel is not available in the area of operation and an LGHG vehicle does not exist in the vehicle type, DoD must use Gas Dedicated vehicles and a Functional Needs Exemption is documented.

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. 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 addition, the Department continues to consider bringing its entire fleet under one FMIS to optimize Federal fleet performance, reduce associated costs, and streamline reporting.

In FY 2019, the Air Force will complete its participation in a demonstration focused on analyzing bio-based engine oil in non-tactical fleet vehicles at 15 sites (eight Air Force sites) with 80 vehicles in varying climate locations over a period of four seasons. The demonstration is testing overall maintenance performance, longevity, and environmental or "green" impact.

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Implementation Summary: Cross-Cutting Operations

1. SUSTAINABLE ACQUISITION / PROCUREMENT

FY18 Sustainable Acquisition Progress:

0.58% of contract actions and 10.1% of obligations (in dollars), for a total of \$19,733.7M in contract actions with statutory environmental requirements

Implementation Status

DoD Instruction 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. The Instruction outlines procurement preferences, new contract requirements, training procedures, and program evaluation processes for sustainable procurement. This includes all mandates for federal purchasing preferences and requirements to maximize substitution of alternatives to ozone-depleting substances.

The percent of contracts and contract dollars with environmental clauses presented above is based on all contract actions (excluding weapons systems and contracts outside the United States). Based on the Federal Procurement Data System (FPDS) data, the value of DoD's applicable Federal Procurement Data System (FPDS) contract actions containing sustainable clauses was \$19,733.7M for FY 2018, an increase of \$5,825.9M from the previous year. DoD engaged in 200,679 contract actions containing sustainable actions. This is a large increase from FY 2017, driven primarily by the high number of orders issued against a DLA contract that contained recovered material clauses.

In FY 2018, the United States Army Corps of Engineers developed an Engineering and Construction Bulletin to assist requirements generators with sustainable Federal Acquisition Regulation clause compliance when developing solicitations and contracts for products and/or services. The tables summarize the sustainability provisions/clauses and provide links for additional information, identifying which provision/clauses typically apply for different types of contracts.

Priority Strategies & Planned Actions

The Department will continue to implement DoD Instruction 4105.72, Procurement of Sustainable Goods and Services. These efforts include updating Defense Acquisition University (DAU) CLC 046, "DoD Sustainable Procurement Program" to align with the requirements of EO 13834, leveraging the expertise of the Department's Sustainable Procurement Program Work Group to develop DoD-specific sustainable acquisition metrics, and considering broader adoption of procurement decision support tools that ensure sustainability clauses are integrated into appropriate contracts. In addition, DoD will continue to improve and expand its Sustainable Product Demonstration Program to identify additional sustainable products, increase mission capability, reduce harm to DoD workforce, and help ensure availability of mission essential products.

DoD plans to procure biobased products in accordance with the Farm Security and Rural Investment Act of 2002 §9002; products composed of recovered materials in accordance with RCRA §6002; and energy and water efficient products in accordance with the Energy Policy Act (EPA) 2005 §104 (b).

For FY 2019 and FY 2020, DoD projects that it will spend \$19,700M on approximately 200,000 contracts with environmental clauses each year. Of this amount, approximately \$3.4B will be spent on 8,000 contracts for biobased products. DoD will also update the Defense Acquisition University Sustainable Procurement Program training to incorporate the Environmental Protection Agency's recommendations of specifications, standards, and ecolabels for federal purchasing in FY 2019.

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2. ELECTRONICS STEWARDSHIP

FY18 Electronics Stewardship Progress:

- 100% of newly purchased or leased equipment met energy efficiency requirements
- 100% of equipment with power management enabled*
- 100% of electronic equipment disposed using environmentally sound methods

**excluding exempted equipment*

Implementation Status

DLA Disposition Services handles the vast majority of DoD electronics at the end of their useful lives. In FY 2018, DLA processed 100% of the end-of-life electronics it received through recyclers certified under the Environmental Protection Agency's Responsible Recycling Standard for Electronics Recyclers (R2), totaling 41.7M pounds. It is DoD policy, (per the DoD Electronics Stewardship Implementation Plan) that information technology (IT) electronics must be Electronic Product Environmental Assessment Tool (EPEAT) registered. Any device meeting EPEAT requirements also qualifies under ENERGY STAR®. Per DoD policy, all IT contracts must include language on DoD's power management and duplexing goals, and 100% of computers and monitors must have ENERGY STAR features enabled to the maximum degree possible based on mission needs.

Because of performance needs, some Military Services and DoD agency equipment is exempted from statutory purchasing requirements. For example, electronic equipment purchased by the National Security Agency 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.

Priority Strategies & Planned Actions

The Department will continue to maintain 100% compliance on electronics stewardship goals in FYs 2018 and 2019. 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. DoD will dispose of 100% of electronics at their end-of-life through GSA Xcess®, CFL, Unicor, or Certified Recycler.

DLA will continue its efforts to consolidate 22 data centers to reduce its overall IT footprint and power consumption. Thirteen data centers were closed prior to FY 2019, and the remaining ones will close by FY 2020.

3. GREENHOUSE GAS EMISSIONS

FY18 Scope 1&2 Greenhouse Gas (GHG) Emissions:

- 22.3% reduction from FY 2008
- 2.1% reduction from FY 2017

Implementation Status

DoD's greenhouse gas (GHG) emissions from Scope 1 and 2 sources in FY 2018 totaled 21.0M metric tons of carbon dioxide equivalents [MMT CO₂(e)], 22.3% lower than the FY 2008 base year. 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 the energy efficiency, energy security, renewable energy, and other improvement projects listed above collectively contribute to the reduction of GHG emissions. As a further example, NAVMAG Indian Island completed construction of a shore power distribution system to supply power to vessels berthed at the Ammunition Wharf. Annually, the system reduces vessel fuel consumption by an average of 65,000 gallons and CO₂ emissions by 1,456,000 pounds.

Priority Strategies & Planned Actions

The Department's focus on energy resilience and energy security will facilitate reductions of GHG emissions, as it includes reducing facility energy consumption, meeting renewable energy goals, minimizing waste, increasing fleet

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efficiency, advancing sustainable buildings, and improving efficiency. DoD will continue to track and report Scope 1 and 2 GHG emissions and reductions pursuant to E.O. 13834 Section 2(h) and 42 U.S.C. § 17143.

In addition, the transition to lower-global warming potential (GWP) refrigerants developed by industry will provide further small reductions in GHG emissions. For example, as fleet vehicles continue the shift from HFC-134a to HFO-1234yf in their air conditioners, refrigerant GHG emissions from each vehicle should be reduced by over 99%. Likewise, as new ducted air-conditioners shift to lower-GWP refrigerants in the 2023-2024 timeframe as expected, refrigerant GHG emissions from each new piece of equipment should also be reduced by 65-88% or more when compared to existing equipment.

Agency Priorities and Highlights

AGENCY IDENTIFIED PRIORITIES

Building on the priorities identified in the National Defense Strategy, specific FY 2019 priorities include strengthening supply chain operations and refining business processes. Where DoD has additional sustainability priorities, they are identified in the relevant sections above.

NOTABLE PROJECTS AND HIGHLIGHTS

Each year, the Secretary of Defense Environmental Awards celebrates the exceptional commitment of enlisted and civilian personnel to protecting human health and the environment while advancing the military mission. The awards honor individuals, teams, and entire installations 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 above.

The Department's other notable projects and highlights are identified in the relevant sections above.