Department of Defense

Strategic Sustainability Performance Plan

FY 2015

The mission of the Department of Defense (DoD) is to provide the military forces needed to deter war and protect the security of our country. To successfully execute the DoD mission, our Military Departments must have the energy, land, air, and water resources necessary to train and operate, today and in the future, in a world where there is increasing competition for resources. Sustainability is a mission imperative for DoD. The President's recent Executive Order 13693, *Planning for Federal Sustainability in the Next Decade*, dovetails with DoD's commitment to sustainability through FY 2025 and beyond. Incorporating sustainability into planning, decision-making, and day-to-day operations assures resilience, enabling us to do our job in the face of current and emerging challenges, including those from a changing climate.

This annual update of the DoD Strategic Sustainability Performance Plan (SSPP) establishes the path by which DoD will advance our mission by ensuring the longevity of critical resources; minimizing long-term costs; addressing environmental, safety, and occupational health considerations; and advancing technologies and practices that further the Department's sustainability goals. The SSPP addresses climate change, which is having an impact on national security, whether by contributing to global instability, opening passages through the Arctic, or increasing sea level and storm surge near our coastal installations. We are actively integrating climate considerations across the full spectrum of our activities to ensure a ready and capable force. Our efforts will improve the resiliency of our fixed installations and further embed sustainability considerations into the conduct of DoD business.

The Department pursues sustainability opportunities based on data that make the most compelling case in terms of mission productivity and long-term cost performance. The goals in the DoD SSPP set the tone for our operations, but the Department's decisions are ultimately driven by practical, mission-based considerations for success in the fiscally constrained environment that exists now and for the foreseeable future.

Our pursuit of improved sustainability continued to yield gains in FY 2014, which saw further reductions in greenhouse gas emissions, facility energy and water consumption, petroleum-based fuel used by vehicles, and solid waste. Our near-term sustainability focus is to identify and implement measures that cost-effectively address EO 13693 while advancing the DoD mission. We issued our 2014 DoD Climate Change Adaptation Roadmap as a standalone document and initiated three regional adaptation planning pilots to improve awareness, strengthen coordination, ard enhance collaboration with our partners, allies, and surrounding communities. Throughout our undertaking to improve sustainability and resilience, it remains critically important to engage our people, stakeholders, and the public.

Frank Kendall
Under Secretary of Defense for Acquisition,
Technology and Logistics

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Executive Summary

Vision

The vision of sustainability for the Department of Defense (DoD) is to maintain the ability to operate into the future without decline—either in the mission or in the natural and man-made systems that support it. At the heart of sustainability is the need to preserve Earth's natural resource base for use in the future. DoD depends on these resources—energy, air, land, and water—to conduct its mission. The objective of the DoD Strategic Sustainability Performance Plan (SSPP) is for sustainability to become thoroughly woven into the everyday fabric of the DoD mission. Just as sustainability directly affects the ability of DoD to perform its mission in the future, so does the Department's ability to be resilient to the impacts of climate change. Sustainability and adaptation to climate change go hand in hand with DoD's efforts to ensure resilience and success.

Although the SSPP does not expressly address combat operations or the direct support of combat operations—such as contingency basing, ships, aircraft, and tactical vehicles—the linkages between sustainability and the DoD mission are strong and direct for combat as well as non-combat activities. Implementing sustainable practices at contingency bases or in contingency operations can reduce the associated demand of logistics and resupply, enabling our military personnel to focus on the operation, rather than on fuel and water convoys.

Leadership

The DoD Chief Sustainability Officer is the Assistant Secretary of Defense for Energy, Installations and Environment. This senior official is responsible for ensuring the effective and successful implementation of the SSPP across the Department, and for leading the Senior Sustainability Council (SSC). The SSC consists of approximately 20 senior officials from the Military Departments and key DoD Directorates, who collectively span all functions of the Department, in keeping with the cross-cutting, integrated nature of sustainability. Chartered in November 2010, the purpose of the SSC is to integrate sustainability into DoD policies, plans, budgets, and decisions, and make recommendations pertaining to sustainability, including on the adequacy of policies and resources in meeting the Department's sustainability goals. In addition to the SSC, each Military Department and the Defense Logistics Agency (DLA) have designated a sustainability officer to ensure accountability in implementing the SSPP across their organizations.

Performance Review and Planned Actions

Greenhouse Gas Reduction and Energy

The Department's greenhouse gas (GHG) emissions, spanning all sources, continued to edge down in fiscal year (FY) 2014, with target subject emissions 13.1% below the FY 2008 baseline. Target subject GHG emissions from Scope 1 and 2 sources decreased in FY 2014, to 11.3% below the FY 2008 baseline, although this fell short of the 13% interim target.[1] In addition to increases in emissions factors and global warming potentials last year —which generally drove calculated GHG emissions

[1] The GHG emissions of an entity are divided into three types of emissions called Scopes. Scope 1 emissions are those from sources owned or controlled by DoD, such as fuel combusted in a furnace. Scope 2 emissions result from the generation of electricity, heat, steam or chilled water purchased by DoD. Scope 3 emissions are from sources not owned or directly controlled by DoD, but related to DoD activities. Examples include employee commuting and the energy losses that occur during the transmission and distribution of electricity consumed by DoD.

higher—the Department's year over year reductions in fossil fuel consumption have slowed in recent years due to the return of warfighters from their deployments. The transfer of personnel from the theater of operations to home installations increases energy consumption in facilities, countering ongoing advances in efficiency. The main strategy used by the Department to improve energy efficiency and security—while decreasing Scopes 1 and 2 GHG emissions—is to continue pursuing cost-effective measures to improve the efficiency and renewable energy capacity of its fixed installations. As discussed in the Performance Contracting section below, performance contracting using third-party financing is a critical path to achieve this.

The Department was much more successful reducing Scope 3 GHG emissions in FY 2014, with emissions 19.5% lower than the FY 2008 base year. Two factors contributed to this success: continued reductions in emissions from employee commuting, and continued increases in credit for hosting renewable energy facilities. The FY 2014 reduction in Scope 3 emissions far surpassed even DoD's FY 2020 target, which is 13.5%. In the near future, the main contributor to further reductions in Scope 3 emissions will likely come from increasing credit for hosting renewable energy facilities.

Sustainable Buildings

The Federal Government considers a building to be sustainable if it meets the criteria of the *Guiding Principles of Federal Leadership in High Performance and Sustainable Buildings* (the Guiding Principles). In FY 2014, of the more than 1.4 billion square feet of building space applicable to Guiding Principles, the Department had approximately 15.7 million square feet (1.1%) that met the criteria. Although a small percentage, the number has risen by more than one-third since FY 2010. DoD policy—Unified Facilities Criteria (UFC) 1-200-02, *High Performance and Sustainable Building Requirements*—requires new construction and major renovations to adhere to the Guiding Principles. However, in the near term, these are insufficient in number to appreciably offset the tens of thousands of DoD's older buildings. Further complicating the situation is the current structure of the Guiding Principles, which is an all or nothing approach that fails to give credit for high performing buildings that do not meet all of the criteria. The Department anticipates that the revision to the Guiding Principles currently underway will better reflect the progress that DoD has been making.

The Army strengthened its sustainable design and development policy in FY 2014 to improve building performance, and it has been revising Uniform Facilities Guide Specifications to integrate proven new technologies into the Army's standard designs and specifications. In FY 2015, the Army will issue additional Engineering Construction Bulletins and an updated Engineering Regulation to implement the requirements of the updated sustainable design and development policy.

Renewable Energy

As a percentage of electricity consumed by DoD facilities in FY 2014, DoD produced or procured 12.3% from renewable sources (electric and non-electric), exceeding the target of 11% set by the Department under Title 10, United States Code §2911(e). To help ensure the energy security of fixed installations, the Department will continue to emphasize projects sited on DoD or adjacent federal property. Each Military Department set a goal to develop one gigawatt of

Photo: U.S. Air Force

renewable energy on its installations, and the Services are pressing ahead with plans to continue ramping up renewable energy capacity.

Water Use Efficiency and Management

The Department continued driving down the potable water intensity of its facilities, with intensity 21.5% lower in FY 2014 than the FY 2007 baseline level. This reduction is close to the FY 2018 target, as shown in Figure ES-1.

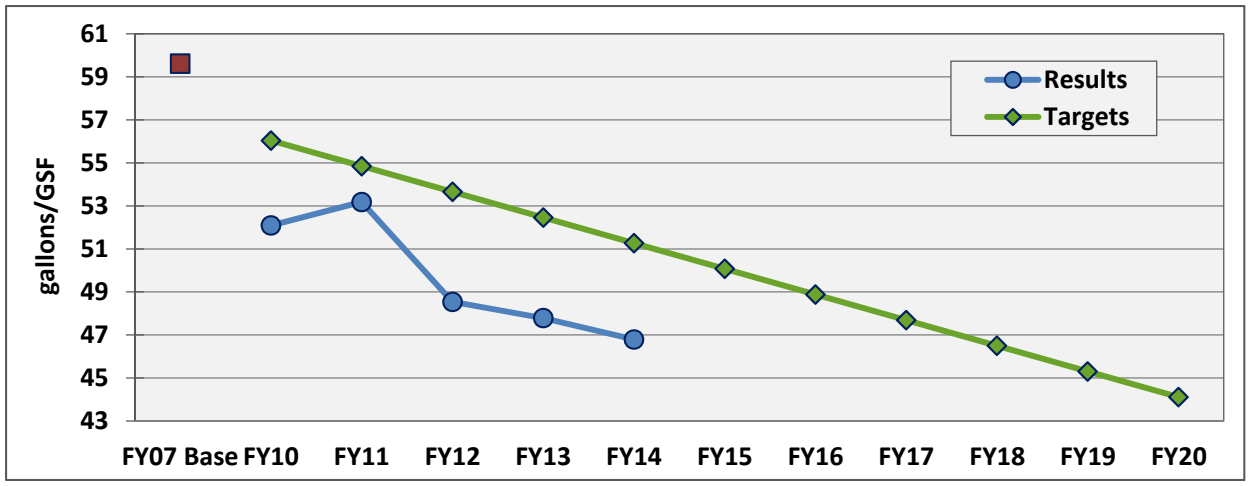


Figure ES-1. DoD Water Intensity Continues to Fall, Consistently Exceeding Targets

The Services and other DoD Components will continue to improve their stewardship over the use of potable water, through the following water efficiency and conservation measures:

- conducting water evaluations of facilities every four years;
- water reclamation, recycle, and reuse;
- low-water landscaping;
- leak detection and repair; and
- low-flow plumbing fixtures.

Fleet Management

The use of petroleum by the Department's non-tactical fleet of motor vehicles was 30% lower in FY 2014 than the FY 2005 baseline, while the vehicle fleet used 156% more alternative fuel than in FY 2005. Both of these achievements surpass the FY 2014 Federal Government targets of 18% and 136%, respectively.

The Military Services and other DoD Components have a comprehensive suite of approaches they will continue to use to reduce the environmental impacts of the Department's vehicle fleets. The most common among them are to:

- install more alternative fueling infrastructure and position alternative fuel vehicles where the fuel and fueling infrastructure are available, where practical;
- downsize vehicles, including replacing those vehicles that do not leave the base, with low-speed neighborhood electric vehicles (EVs);
- make use of the replacement cycle for vehicles procured through the General Services Administration to replace higher mileage vehicles with those that emit fewer GHGs

- downsize the vehicle fleet by eliminating all unjustified vehicles; and
- increase the number of EVs and electric hybrids that are full size and for heavy duty applications.

Sustainable Procurement

Of the 2,150 FY 2014 contract actions DoD manually reviewed for sustainable procurement requirements, 98% of them were in compliance. As part of its efforts to continuously improve procurement, the Department launched the DoD Sustainable Products Center in March 2014. The website is a repository of information on sustainable products and their performance, and serves as a forum for DoD personnel to submit questions regarding sustainable procurement and share success stories.

The DoD Instruction (DoDI) titled *Procurement of Sustainable Goods and Services* is currently undergoing formal coordination, and is planned for issuance by the end of calendar year (CY) 2015. DoD expects the DoDI to have a significant impact on ensuring that procurement is conducted sustainably across the enterprise, from government purchase cards to major contracts. The Army has a number of FY 2015 activities planned, including training purchasing and contracting staff and generators on sustainable procurement in common installation-level activities, and issuing a contracting checklist to help ensure that all applicable provisions and clauses are included in solicitations and resultant contracts. The Navy will use the Sustainable Military Packaging Roadmap it helped develop to identify and prioritize future efforts to reduce the environmental impact of military packaging. The Air Force will emphasize outreach and education in FY 2015, highlighting the life cycle benefits of sustainable procurement requirements and responsibilities.

Pollution Prevention and Waste Reduction

Reducing waste and preventing pollution are high priorities for the Department, which has six sub-goals aimed at achieving these goals:

1. diverting non-hazardous solid waste from disposal
2. diverting construction and demolition (C&D) debris from disposal
3. reducing the use of printing paper
4. reducing the quantity of toxic chemicals released into the environment or transferred off-site
5. ensuring all individuals applying pesticides on installations are certified
6. updating and reviewing annually all installation Integrated Pest Management Plans.

For solid waste, DoD diverted 51% of its non-hazardous solid waste from disposal in FY 2014, and 82% of its C&D debris (sub-goals 5.2 and 5.3). Both results well exceed their respective targets. Sub-goal 5.1 on reducing paper use aims to have at least 95% of its employees, by FY 2015, covered by Component-level policies that reduce the use of printing paper. By the end of FY 2014, 63.6% of all DoD employees were covered by such policies, exceeding the 60% target.

Photo: U.S. Marine Corps

Moving forward, the Services and other DoD Components will continue to reduce the amount of paper used in printing and the transition from paper-based business practices to digital. This is occurring through a wide range of actions,

including a transition to electronic document management systems, increased electronic file storage capacity, double-sided printing, avoiding overprinting by printing on demand, making desktop printers increasingly scarce, and using digital manuals, technical orders and staff actions rather than hard copies. The DoDI developed in 2013 and 2014 on integrated solid waste management, titled *Recycling of Materials and Integrated Solid Waste Management*, is currently undergoing formal coordination and is expected to be issued by the end of CY 2015. The document contains policy, responsibilities, and procedures for implementing a solid waste diversion program.

Photo: U.S. Navy

Innovative handling of materials of concern at Fleet Readiness Center East (MCAS Cherry Point, NC) reduces waste and the risk of spillage

Of the three sub-goals targeting the use and release of chemicals of environmental concern, one tracks the quantity of toxic chemicals released into the environment and transferred off-site, as reported under the Toxics Release Inventory (sub-goal 6.1). For the CY 2013 reporting year, the Department reduced these chemicals by 15.5% relative to the CY 2006 base year. The other two DoD sub-goals on chemicals address the proper use of pesticides (sub-goals 6.2 and 6.3). One of these is for individuals applying pesticides on installations to be appropriately certified, to help ensure that individuals apply pesticides only when necessary and do so safely and effectively. The overall certification rate in FY 2014 was 99.6%. The other pesticide sub-goal is for all installations to have Integrated Pest Management Plans and for these to be updated annually and reviewed every five years. In FY 2014, 100% of installations had the plans, and the percentage of those updated on time was 95.6%.

In the near-term future, each of the Military Departments has identified specific plans to reduce harmful chemicals. Some examples of these are:

- The Navy is in the process of conducting an in-depth study in FY 2015 on its top ten TRI chemical releases during the last five years, to gain insights to help further reduce these releases.
- The Army is identifying options for chemical substitutions, production process changes, and by-product synergies to reduce the use of toxic and hazardous chemicals on its installations.
- The Air Force is in the process of shifting to newer weapon system platforms, allowing processes heavily dependent on nitric acid and other chemicals to be engineered out, in favor of environmentally preferable materials and manufacturing processes.

Electronic Stewardship and Data Centers

Of all covered electronics acquisitions in FY 2014, an estimated 96% were registered with the Electronic Product Environmental Assessment Tool (EPEAT). The DoD Electronics Stewardship Implementation Plan stipulates that contracts require all relevant electronics to be registered with EPEAT, that all information technology (IT) contracts include language on DoD's power management and duplexing goals, and that 100% of computers and monitors have ENERGY STAR features enabled to the maximum degree possible based on mission needs. The Department estimates that 77% of its computers, laptops, and monitors had power management features enabled in FY 2014. The portion of DoD excess or surplus electronic products whose end-of-life disposition was handled in an environmentally sound manner using certified recyclers is estimated to be 87% in FY 2014. The target for this sub-goal is 100% each year. DoD achieved a lower percentage in 2014 because a larger than expected volume of electronic products were turned in for disposal. DLA is

developing a solicitation for award in the fourth quarter of FY 2015 that will expand its recycling capacity and require all buyers of DoD electronic scrap in the United States to comply with Responsible Recycling© practices or e-Stewards®. For its data centers, the Department has committed to closing 251 additional data centers by the end of FY 2015, eliminating almost 408,000 square feet from its inventory. However, DoD has increased its cyber operational security activities to reduce the vulnerabilities of the network and applications. Along with encryption management and Data-at-Rest requirements, these security measures make energy management and efficiency goals more difficult to achieve.

Performance Contracting

One of the primary means by which DoD is improving the energy efficiency of its facilities and ramping up the amount of energy it generates from renewable sources is through performance-based contracts. With performance contracting, upfront investments are funded by third parties other than the Federal Government, and those investments are paid back by the Government from the resulting energy savings. During CY 2014, DoD awarded 20 energy savings performance contracts (ESPCs) worth $260 million, and 16 utility energy service contracts (UESCs) worth $43 million. Across the Department, DoD plans to award up to $1.6 billion in performance contracting in FY 2015 and 2016.

Climate Change Adaptation

Climate change is a clear national security concern, affecting us today and forecast to affect us more significantly in the future. The *2014 DoD Climate Change Adaptation Roadmap* describes the Department's approach to meeting these challenges. DoD is committed to addressing the impacts of climate change on installations and on the roles and missions it undertakes, and to meeting all requirements of Executive Order 13653, *Preparing the United States for the Impacts of Climate Change*. The Department has been actively engaged in improving its resiliency to climate change: it is conducting screening-level surveys to assess the vulnerability of DoD installations from severe weather and projected changes in climate, it is testing a tool to help installations assess how much water they need to satisfy mission requirements, and it is conducting three regional climate change adaptation planning pilot projects. The Department also issued two supporting policies in FY 2014: a new Floodplain Management policy memorandum, issued February 2014; and a new policy memorandum on water rights and water resources management on DoD installations and ranges in the United States, issued June 2014. In FY 2015, the Department will issue a DoD Directive, *Climate Change Adaptation and Resilience,* that will codify the roles and responsibilities for action across the Department.

Progress on Administration Priorities

Each year, the President asks federal agencies to address a specific set of high priority areas for the Administration. Those for the FY 2015 SSPP are discussed in this section.

Sustainable Locations for Federal Facilities

DoD routinely complies with the September 2011 *Implementing Instructions on Sustainable Locations for Federal Facilities,* because they are consistent with DoD's May 2012 UFC 2-100-01, *Installation Master Planning*.

Sustainable Practices for Designed Landscapes

The Department recently developed a new UFC on Sustainable Landscape Architecture, currently undergoing review, which conforms to the October 2011 *Guidance for Federal Agencies on Sustainable Practices for Designed Landscapes*.

Water Efficiency and Management

The Department's performance reducing the potable water intensity of its facilities has been excellent, as demonstrated by Figure ES-1. DoD has reduced its water intensity by an average of 3% per year over the past seven years since the FY 2007 baseline—50% more than the federal requirement. Using water efficiently is vital to DoD not only for reasons of environmental stewardship, but because it is a mission imperative.

President's Performance Contracting Challenge

As explained in the preceding section, performance contracting is critically important to the Department's facility energy reduction goals. In the three years since the launch of the Presidential Performance Contracting Challenge in December 2011, DoD awarded more than $1 billion in performance contracts.

Photo: U.S. Army

Performance contracting is helping Fort Buchanan, PR, meet its net zero energy goals

Climate Change Adaptation Planning

In addition to the actions described in the preceding section, in FY 2014 the Department screened the complete set of DoD Issuances (DoD Directives, Instructions and Manuals) to identify those that should be reviewed in depth, to assess which should be updated to include consideration of climate change impacts. Of the 59 documents the Office of the Secretary of Defense (OSD) reviewed in depth, OSD concluded that the content of 29 of them should be updated during the course of the regular review cycle, which for this set of documents will be completed in FY 2018.

I. Sustainability in DoD

I.1 Sustainability and the DoD Mission

The Department of Defense (DoD) vision of sustainability is to maintain the ability to operate into the future without decline—either in the mission or in the natural and man-made systems that support it. The Department embraces sustainability as a critical enabler in the performance of the mission, recognizing that it must plan and act in a sustainable manner now in order to build an enduring future. Just as sustainability directly affects the ability of DoD to perform its mission in the future, so does the Department's ability to be resilient to the impacts of climate change. Sustainability and adaptation to climate change go hand in hand with DoD's efforts at continual improvement to ensure resilience and success.

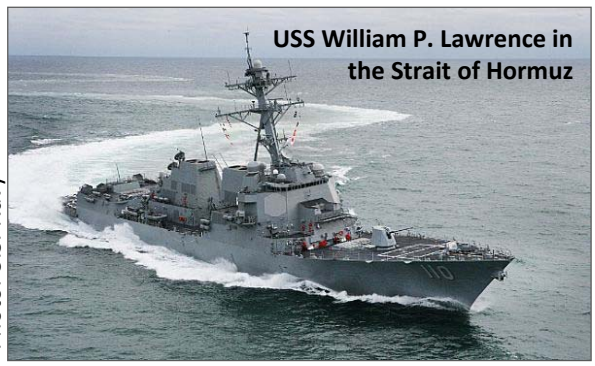
Sustainability is a financial imperative for the Department because one of fundamental premises of sustainability is to conduct business smarter. Operating sustainably necessitates forethought into the consequences of all decisions, from the procurement of everyday goods to the design and construction of facilities. This reduces operating costs in many ways, such as reducing the consumption of energy and water, generating revenue from the reuse and recycling of materials that would otherwise be disposed, and using greener chemicals that avoid liability and remediation costs. The linkage between sustainability and costs is especially strong in the case of energy due to the price volatility of petroleum—a fungible, globally traded commodity. Regardless of the changing domestic energy context here in the United States, global oil markets are subject to significant price volatility, complicating budget and acquisition decisions.

Energy and Water

"DoD invests in energy efficiency, new technologies, and renewable energy sources at our installations and all of our operations because it makes us a stronger fighting force and helps us carry out our security mission."

—Chuck Hagel, Secretary of Defense, February 2013 – February 2015

DoD relies on the commercial electricity grid to deliver electricity to hundreds of installations—a situation that places the continuity of critical missions at risk. Grids are vulnerable to intermittent or prolonged power disruption caused by weather events, attacks, or sheer overload. With the increasing reliance of U.S. combat forces on "reach back" support from installations in the United States, power failures at those installations could adversely affect power projection and homeland defense capability. This means that an energy threat to bases in the United States can be a threat to operations abroad. Beyond electricity, the Department depends on a broad energy supply chain, including petroleum networks and electricity networks, that is increasingly at risk. Most petroleum products move by sea, and much of this trade passes through vulnerable chokepoints such as the Strait of Hormuz. Piracy, political instability, cyber attacks, and military action can threaten the free flow of energy resources through these vital channels.



USS William P. Lawrence in the Strait of Hormuz

Photo: U.S. Navy

At fixed installations, water is also a mission imperative. Water scarcity has led a number of DoD installations in the United States to implement aggressive water conservation and reuse measures. So far, most of these installations have been located in arid portions of the West, but supplies of water are becoming

an issue in other parts of the country as well. DoD also faces potential water risks in its supply chain, should there be insufficient water for suppliers to produce the goods and services sold to DoD. Water supply and distribution, water use, wastewater treatment, and the management of stormwater runoff are interrelated and influence energy and sustainability. For example, the process of extracting, treating, and delivering water to end users is highly energy-intensive. Measures that use and distribute potable water more efficiently and with less leakage also result in significant reductions in energy consumption and, therefore, emissions of carbon dioxide (CO_2). By reducing stormwater runoff from facilities through low impact development (LID) approaches, fewer pollutants flow into water bodies. In the case of collection systems that combine wastewater and stormwater, LID also reduces the volume of stormwater requiring treatment by the wastewater treatment system, and reduces the risks of sewage-containing wastewater overflowing into water bodies during heavy precipitation events.

Photo: U.S. Air Force

Green solution for washing parts replaces hazardous solvent, Altus AFB, OK

Minimizing Chemicals of Concern

Chemicals and materials are essential to the performance of DoD weapon systems and platforms and to the success of military operations. However, the use of hazardous and toxic chemicals and materials poses a number of risks. Toxic chemicals present risks to human health if not managed carefully and the necessary personal protective measures and environmental controls increase the life cycle costs of the Department's systems. In addition, continuing national and international regulatory actions and market pressures are resulting in the non-availability of some chemicals and materials that are needed to meet the demanding performance requirements of modern weapon systems and platforms. The Department has developed a three-tiered process called "scan-watch-action" to identify chemicals and materials with emerging risks, assess the risks to people and the mission, and implement proactive risk management actions. During this process, the Department works closely with academia, regulatory agencies, and industry. The Department also has initiatives to integrate safer, more sustainable chemicals into the industrial base and operations. The Department continues to invest in research, development, and testing of substitute chemicals and materials that present lower risks to human health and the environment, increase performance, and reduce life cycle costs.

Maintaining Readiness in the Face of Climate Change

The *2010 Quadrennial Defense Review* highlighted climate change impacts as an emerging challenge to the Department's installations, roles, and missions. The *2014 Quadrennial Defense Review* continues the emphasis on ensuring the resilience of the Force, and it mandates the use of creative ways to address the continuing impacts of climate change. In the words of the first sentence of the fiscal year (FY) 2014 Climate Change Adaptation Roadmap: "Climate change will affect the Department of Defense's ability to defend the Nation and poses immediate risks to U.S. national

Climate Change and DoD

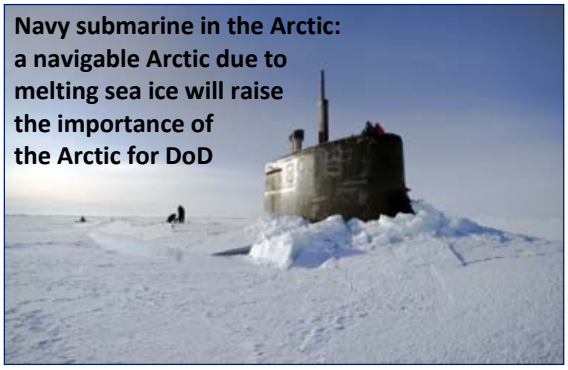
"The Department's operational readiness hinges on unimpeded access to land, air and sea training and testing space. Consequently, we will complete a comprehensive assessment of all installations to assess the potential impacts of climate change on our missions and operational resiliency, and develop and implement plans to adapt as required."

— 2014 Quadrennial Defense Review

security." Climate change creates both needs and opportunities to examine how we operate today and in the future, both in the United States and abroad.

Climate change is predicted to affect the Department in many ways, including direct effects on installations and indirect effects on regional stability, particularly those regions of the world already prone to conflict. Climate change can directly impact military installations and operations by limiting the availability and quality of ranges and lands needed for operations, reducing water supplies, increasing flood and fire hazards, and increasing severe weather risks to the electricity grid. Some of the Department's low-lying coastal installations are threatened by coastal erosion and inundation due to sea level rise, which can damage or destroy infrastructure, reduce availability of land for operational needs, and impact water supply due to seawater intrusion.

The more frequent and extreme heat projected to occur with climate change may limit outdoor training, impair personnel efficiency, and strain electricity supply due to the increased demand on the grid for cooling. Human health could also be impacted due to the connection between heat and air quality: heat accelerates the photochemical process that forms ground-level ozone from vehicle exhaust. Ozone formation and its attendant health problems may worsen with the warmer temperatures projected to result from climate change. Thawing permafrost and a reduction in the sea ice that protects the coast from erosion by storms may impact DoD installations and activities in the Arctic.



Navy submarine in the Arctic: a navigable Arctic due to melting sea ice will raise the importance of the Arctic for DoD

Photo: U.S. Navy

In many areas, warmer temperatures will reduce the amount of snow pack in the mountains, which provides a significant amount of water supply. Water quality and water supply reliability can be further threatened by changes in precipitation patterns, which can cause extended droughts and reduce surface and groundwater supplies in many areas. These trends are expected to continue, increasing the likelihood of water shortages for certain areas. Higher temperatures could increase the risk of wildfire by reducing moisture in soil and plant material and, in some areas, by lengthening the fire season. An increased risk of uncontrolled wildfires can have direct mission consequences. Climate change may also bring an increased frequency of heavy precipitation events in some areas, raising the threat of flooding.

Changing temperature and precipitation regimes accompanying climate change may cause shifts in the composition or geographic range of some species. Among the species shifts anticipated are movement of wildlife to more favorable habitats, expansion of vector-borne diseases into the United States, and expansion of invasive grasses and shrubs. Invasive plants contribute fuel load for wildfires, which in turn increases the likelihood, range, and intensity of wildfires. Threats to federally-protected species may increase and additional species may become endangered, adding to the obligation of species protection for some military installations.

Climate change impacts can directly interfere with an installation's ability to carry out its mission. For example, training may be limited through the occurrence of more red and black flag days (high heat and humidity conditions), by the loss of land to either sea level rise or the need to set aside more land for endangered species, and by more frequent restrictions on live-fire training where heat and reduced rain increase the fire hazard.

Photo: U.S. Air Force

Black flag for high heat and humidity, Keesler AFB, MS

DoD will prepare for a changing climate to make the Department more resilient to climate change and to improve sustainability. For example, by increasing the generation and use of renewable energy, and institutionalizing energy and water efficiency into all DoD activities, the Department can decrease its vulnerability to fluctuations and shortages of these resources.

Fresh water is also a limited and mission-critical resource essential for military operations, drinking, hygiene, sanitation, food preparation, and medical care. During military operations, water poses similar challenges as liquid fuel, requiring the protection of large, vulnerable convoys as it is transported to the troops. Also, the treatment and disposal of wastewater is a human health and environmental issue for Soldiers and the civilian populations being protected during military operations.

I.2 Sustainability is an Integrated Approach Affecting All of DoD

"DoD invests in energy efficiency, new technologies, and renewable energy sources at our installations and all of our operations because it makes us a stronger fighting force and helps us carry out our security mission."

—Chuck Hagel, Secretary of Defense, February 2013 – February 2015

The sustainability principles promulgated in the Strategic Sustainability Performance Plan (SSPP) are the policy of the Department, and should be incorporated into all DoD decisions pertaining to design, investments, and prioritization of activities. Sustainability is not an individual Departmental program. Due to its cross-cutting nature, sustainability is by necessity an organizing paradigm that applies to all DoD mission and program areas. Applying a systematic framework for improving sustainability involves a wide range of practices that span much of DoD's day-to-day activities and military operations, and DoD personnel are applying this mindset to improve mission performance and reduce life cycle costs.

The DoD SSPP provides a coherent approach both for complying with multiple federal requirements for sustainability and for ensuring the mission is accomplished. The Department established the inter-connected objectives and goals for sustainability shown in Figure 1. Along with 20 sub-goals, the objectives and goals form the framework that DoD uses in its SSPP to track progress on continually improving its sustainability. Although more needs to be done, sustainability is already institutionalized in DoD through a large body of existing DoD policies and procedures. Figure 2 lists some recent examples of DoD policies relating to sustainability, including DoD Instructions (DoDIs), Unified Facilities Criteria (UFCs), and policy memoranda. The list illustrates the integrated nature of sustainability, with all policies shown addressing more than one area of sustainability, and some encompassing all areas.

Facilities

The design of facilities, and the evaluation and prioritization of activities, should consider environmental and societal factors in addition to mission, financial, and regulatory considerations. For example, the Department may invest in new renewable energy sources to provide energy security for critical assets and missions. The creation of walkable communities and cluster developments on bases reduces automobile usage, saves military families money, and improves health. Sustainability is also closely tied to the well-being of personnel—DoD's most important

Figure 1. Framework of Objectives, Goals, and Sub-Goals Used for the DoD SSPP

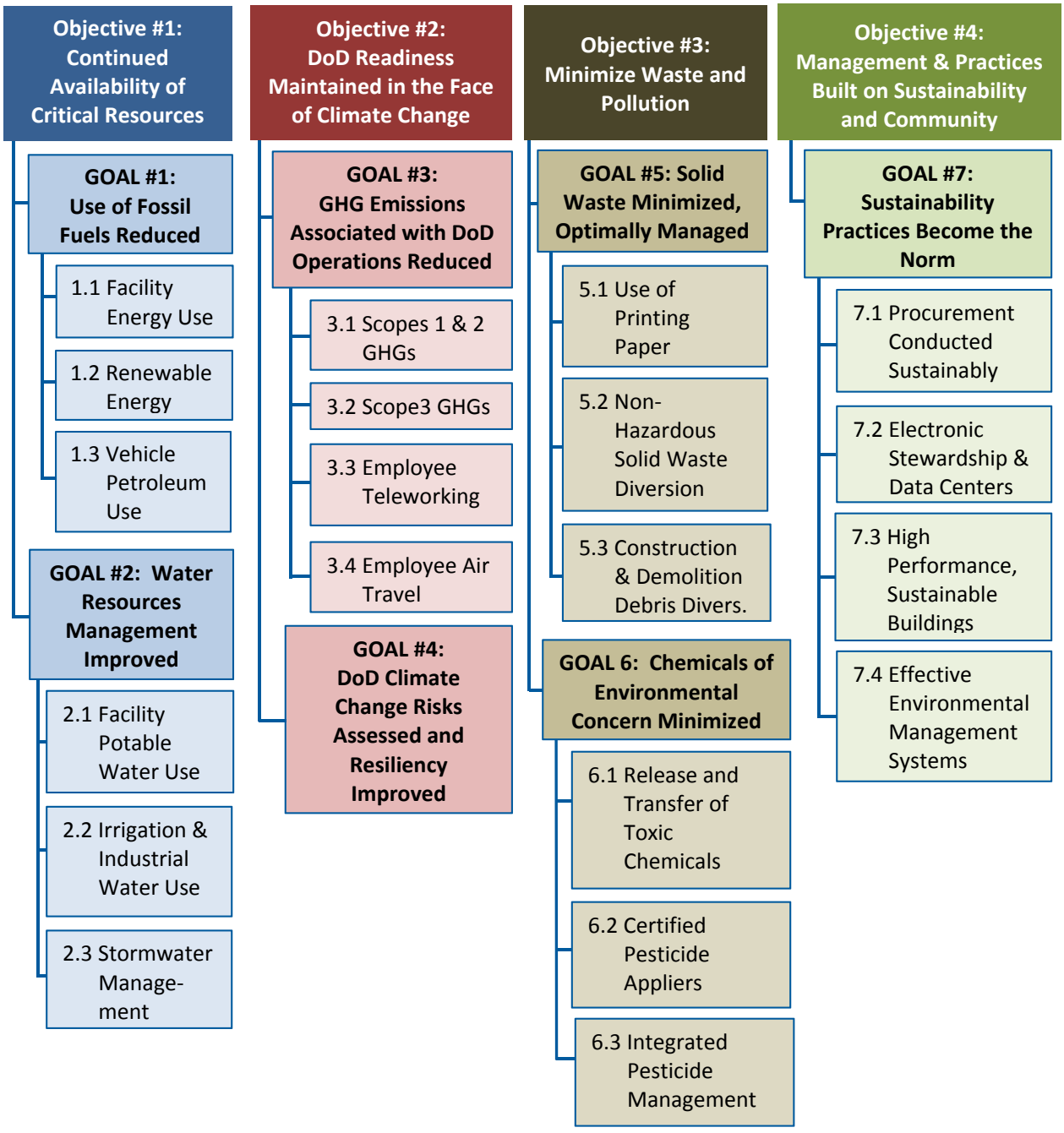
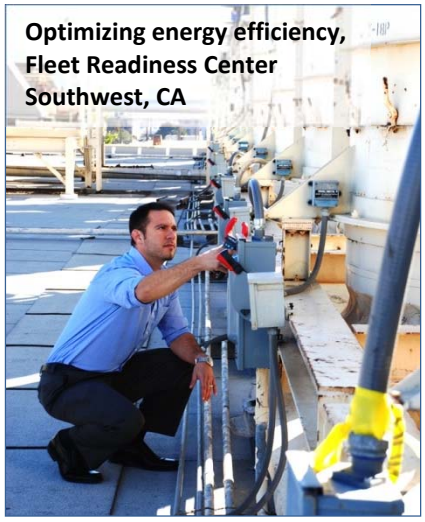


Figure 2. Examples of DoD Sustainability Policies Issued Since FY 2010, Illustrating the Integrated Nature of Sustainability

Next to each policy is a set of numbers corresponding to the sustainability topics shown in the blue box at right.

asset. The ability to recruit, retain, train, educate, and equip the All-Volunteer Force, and to sustain its readiness and morale, is fundamental to the DoD mission. Adopting greener chemicals and materials limits potential exposure and can avoid the need to use hot, uncomfortable hazardous material suits, expediting operations and maintenance activities. In areas where air quality is a concern, an Installation Commander might prioritize investment and design decisions that lower vehicle emissions and reduce the heat island effect on the installation, for example by planting shade trees. Therefore, investment decisions should consider all the costs and benefits of incorporating sustainability. A cost-benefit analysis, including both monetary and non-monetary costs and benefits, should be performed on proposed projects so decision-makers can best evaluate their anticipated effectiveness.

The Department recognizes the importance—and the challenge—of ensuring that sustainability is incorporated into decision-making across the organization. Individual Commands and installations—not a central DoD office—make many of the decisions on budgeting and executing DoD projects. In practice, decisions made at the facility level do not always take into consideration the larger objectives of the Department as a whole, including its sustainability objectives. The challenge of incorporating sustainability into investment decisions is exacerbated by the fact that the benefits of many sustainability considerations are difficult to quantify, whether at the installation or Command level. The Department will find more ways to help Installation Commanders and other decision-makers form an objective basis for making decisions on projects in a way that advances DoD's sustainability objectives, beyond simple, traditional return on investment calculations. Beyond the project level, the Department has a bigger picture view of promoting sustainability by investing in new and emerging technologies. These investments represent a risk at the individual project level, but when viewed across the entire Department they can significantly increase the return on investment.



Optimizing energy efficiency, Fleet Readiness Center Southwest, CA

Photo: U.S. Navy

DoD modified its approach to the Energy Conservation Investment Program (ECIP), making it part of a portfolio approach in which the Services pursue the most financially attractive energy projects, whether through ECIP or third-party financing. As a result, the Department can fund projects having a major impact on energy efficiency and/or security even though they might not otherwise be justified under internal funding strategies. Another change in ECIP to encourage long-term planning is that Services are now required to build a five-year program of projects proposed for ECIP funding. Finally, DoD introduced inter-Service competition for ECIP funding. Although the Department will guarantee each Service a minimum level of funding, it has awarded funds based on competitive merit since FY 2014.

Acquisition

Large military systems and platforms can have a life cycle of 30 years or more. Resources to maintain these systems and platforms are costly and, in some cases, dwindling. In addition, choices in resources such as energy sources and chemicals and materials can have a significant impact on human health and the environment and associated life cycle costs. Without a full understanding of life cycle impacts, significant impacts and costs may be unintentionally inserted during development and design phases of acquisition and later incurred by the logistics, installations, and operational communities. Early sustainable design choices can make a significant difference in these costs. DoD

personnel have developed and are testing a methodology called a Sustainability Analysis that combines Life Cycle Assessment with Life Cycle Costing. A Sustainability Analysis is a method used to compare two or more design alternatives (e.g., energy sources, materials) with the same performance requirements on the basis of resource consumption, emissions, associated life cycle impacts, and the resulting costs. The Analysis can help uncover previously hidden human health and environmental impacts and their associated life cycle costs. Such an analysis can help inform both design decisions when making choices among alternatives and also inform long-term supportability requirements once a design has been chosen. Sustainability Analyses can help to achieve the Department's goal to lower total ownership costs and acquire more sustainable systems—those that use less energy, water, and toxic chemicals, and produce fewer emissions. In 2015, the Department completed three pilot projects to test the methodology in partnership with companies in the defense industry. Lessons learned from the pilot projects are being incorporated into a final version of a guidance manual that describes the steps for completing a Sustainability Analysis.

An essential component of sustainable weapons acquisition is sustainable manufacturing. Sustainable manufacturing is the creation of manufactured products with processes that are economically sound, non-polluting, energy efficient, conserving of natural resources, and safe for warfighters, users, employees, and communities. As a keystone concept that integrates multiple sustainability elements, sustainable manufacturing can make weapons acquisition more affordable by avoiding the costs of environmental, health, and safety liabilities. Every dollar spent on liabilities is one less for warfighter capabilities. Sustainable manufacturing has a place in both the acquisition of systems and in their logistics sustainment.

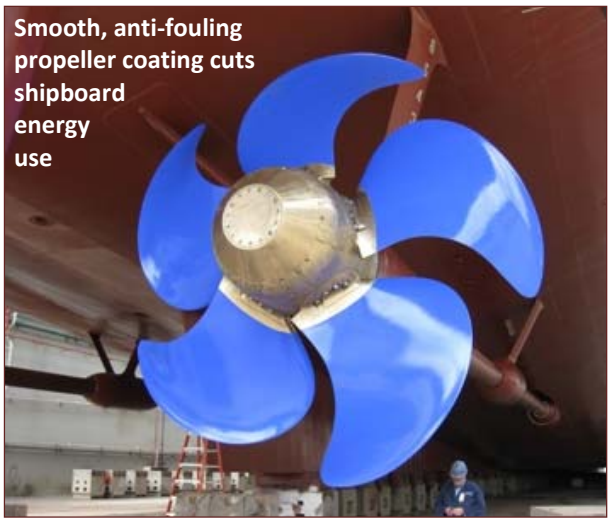


Photo: U.S. Navy

Operations

While a contributor to the Department's sustainability effort, military operations are necessarily exempt from the targets of this Strategic Sustainability Performance Plan (SSPP) and Executive Order (EO) 13693. Although the Plan does not expressly address combat operations or the direct support of combat operations—such as contingency basing, ships, aircraft, and tactical vehicles—the linkages between sustainability and the DoD mission are strong and direct across the board, including for combat operations. For this reason, the Department is working to improve the sustainability of contingency bases as a means of enhancing force effectiveness and mission outcomes. This involves applying the principles of sustainability in policy, doctrine, organizations, training, materiel, leadership, personnel, and facilities. The expected results are improvements in: planning; the efficiency, effectiveness, and interoperability of equipment; and the management and oversight of contingency basing. Improved contingency base sustainability will also enhance mission support by reducing resource consumption and the vulnerability of fuel and water supplies, preserving the health of warfighters, and improving environmental and safety performance. Lastly, to the extent DoD can share sustainable practices with partner nations, international resilience to challenges such as climate change is being built. This resilience can contribute to the Department's goal of conflict prevention as outlined in the *2014 Quadrennial Defense Review*.

I.3 Leadership

The Department designated the Assistant Secretary of Defense for Energy, Installations and Environment as DoD's Chief Sustainability Officer (CSO). The CSO is responsible for ensuring the effective and successful implementation of the SSPP across the Department, and for leading the Senior Sustainability Council (SSC). Table 1 shows the current SSC membership.

Table 1. Senior Sustainability Council Membership

Assistant Secretary of Defense for Energy, Installations and Environment – Chair
Under Secretary of Defense (Comptroller)
Under Secretary of Defense for Policy
Under Secretary of Defense for Personnel and Readiness
Deputy Department of Defense Chief Information Officer
Assistant Secretary of the Army (Installations, Energy and Environment)
Assistant Secretary of the Navy (Energy, Installations and Environment)
Assistant Secretary of the Air Force (Installations, Environment and Energy)
Assistant Secretary of Defense for Research and Engineering
Assistant Secretary of Defense for Logistics and Materiel Readiness
Director, Cost Assessment and Program Evaluation
Director, Defense Procurement and Acquisition Policy
Director of Logistics, Joint Staff
Director, Defense Logistics Agency Installation Support
Deputy Assistant Secretary of Defense for Manufacturing and Industrial Base Policy
Deputy General Counsel (Environment and Installations)
Assistant Secretary of the Army (Civil Works)

The SSC established a Climate Change Adaptation Working Group (CCAWG) in December 2012, to facilitate implementation of the climate change requirements found in EO 13653, *Preparing the United States for the Impacts of Climate Change*. The CCAWG takes direction from and provides advice to the SSC regarding the state of climate science, vulnerability and impact assessment, and adaptation practices, and they led the development of the Department's *2014 Climate Change Adaptation Roadmap*. The CCAWG has membership from all Military Services, Defense Agencies, and Offices across the Department, including Policy, Personnel and Readiness, the Joint Staff, and the Combatant Commands. The SSC and CCAWG will continue to analyze climate change-related policy, guidance, and practice; ensure that the Department has access to the climate-related information necessary to make informed decisions; and engage with internal and external stakeholders to identify and implement actions to maintain mission resilience in the face of a changing climate.

As stipulated in its charter, the four key tasks of the SSC are to:

1. integrate sustainability into policies, plans, budgets, and decisions;
2. make recommendations on processes and procedures to implement the requirements of EO 13693 and other federal sustainability requirements;
3. continuously improve the Department's approach to the SSPP; and

4. review the adequacy of policies, resources, and performance in meeting goals, and make recommendations on changes required.

The SSC is responsible for ensuring integration of the SSPP into the Department's enterprise management structure. It works to ensure that sustainability is reflected in relevant policies, program plans, guidance, and budget development within the Department. Each Military Department (MILDEP) and the Defense Logistics Agency (DLA) has designated a sustainability officer to ensure accountability for the SSPP's implementation, and annually each develops a plan for how they will implement the DoD SSPP. Additionally, the leadership of the Chief Sustainability Officer and SSC, and the Sustainability Implementation Work Group and other relevant committees and work groups, help execute the goals of the SSPP. The Sustainability Implementation Work Group reports to the SSC and is charged with drafting input to the SSPP and facilitating compliance and continual improvement in meeting the SSPP goals. The Department is using its existing structure of committees and work groups to address specific issues and engage subject matter experts where appropriate. The committees and work groups cover a wide range of sustainability topics, including: greenhouse gases (GHGs), energy, transportation and fuels, solid waste and recycling, sustainable procurement, electronic stewardship, and sustainable manufacturing.

The Office of the Secretary of Defense (OSD) employs a number of mechanisms to ensure that sustainability factors are adequately addressed. Departmental planning and programming guidance lays out requirements that DoD Components must use to build their budgets, and environmental and sustainability requirements are part of this guidance. Another key feature of DoD's planning and budgeting process is the Future Year Defense Plan. This provides a six-year resource plan for achieving Department objectives, with major updates occurring every two years and the planning horizon rolling forward during each update cycle.

The SSC conducts annual Performance Management Reviews, and DoD Components are required to submit annual progress reports to OSD. The progress reports and Performance Management Reviews afford the Department the opportunity to alter strategies to better meet sustainability goals. Also, the Environmental Management Systems (EMSs) used by the Military Service installations and DLA facilities provide a valuable framework to guide sustainability improvements and monitor and evaluate performance. The SSPP has a built-in performance monitoring system in the form of a quantitative metric for each of the 20 sub-goals.

I.4 Outreach and Communication

The Department is continually working to increase awareness of the SSPP among personnel, using normal internal channels of communication such as websites, newsletters, and announcements throughout the Department and within each individual DoD Component. DoD uses annual updates of the SSPP as opportunities to remind civilian, military, and contractor staff of the Department's expectations regarding sustainability. Each year, the Office of the Assistant Secretary of Defense for Energy, Installations and Environment presents the SSPP to senior officials within each DoD Component at the Deputy Assistant Secretary level and higher. Presentations stress the integration of sustainability activities within overall DoD strategic planning and budgeting.

The Department has long had two platforms on the Internet for communicating to both DoD employees and the public on sustainability performance:

- DENIX (DoD Environment, Safety and Occupational Health Network and Information Exchange, http://www.denix.osd.mil/sustainability/); and

- the DoD Sustainability website, http://www.defense.gov/home/features/2010/1010_energy/.

DENIX offers a wealth of information on sustainability, including DoD and federal policy and guidance, useful technical information, and examples of DoD's sustainability activities. Topics covered include: alternative fuel vehicles, environmental, safety, and occupational health in acquisition, the Toxics Release Inventory, Environmental Management Systems, Solid Waste and Recycling, and Sustainability. The DoD Sustainability site is focused entirely on energy: energy efficiency, renewable energy, and fuels from sources other than petroleum. In addition, the Whole Building Design Guide website, www.wbdg.org, hosts a significant number of DoD documents pertaining to green buildings, including facility and construction criteria.

Making DoD more sustainable requires the broad participation of personnel across the Department. While OSD can accomplish a certain amount of outreach and raise awareness, most employee engagement occurs at the Component level. In general, across DoD, Components engage and reach out to their personnel on sustainability issues through internal newsletters, websites, and social media. The Services participate in award programs pertaining to sustainability, such as the Secretary of Defense Environmental Awards, and comparable federal agency programs such as the annual Federal Energy and Water Management Awards of the Department of Energy (DOE) Federal Energy Management Program, and their own award programs. The Departments of the Army and Navy also have their own award programs to recognize excellence in promoting sustainability. The Army has two related Secretary of the Army award programs: Environmental Awards and Energy and Water Management Awards. The Secretary of the Navy annually recognizes outstanding performance by Navy and Marine Corps installations, ships, and squadrons with Energy and Water Management Awards.

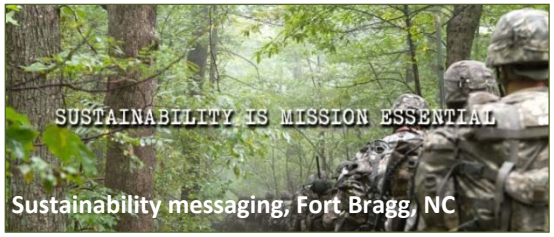
The Navy makes extensive use of social media platforms, including Facebook and Twitter pages for Task Force Energy and *Currents* magazine, the Stewards of the Sea Facebook page, the *Currents* Flickr page, and the Navy Energy and Environment YouTube channel. These online tools have allowed the Navy to expand its reach to a diverse audience and to effectively communicate recent news and developments on sustainability. The Navy is also leveraging milSuite (https://www.milsuite.mil) as a social business tool and developing multimedia campaigns on mobile platforms to engage, inform, and facilitate dialogue about sustainability issues among internal audiences. The interactive framework allows the Navy to embrace the conversational tone of the Internet and provide real-time updates and responses to questions. In FY 2013, the Department of the Navy (DON)[2] completed a comprehensive revision of its environmental policy, Environmental Readiness Program Manual (Chief of Naval Operations Instruction [OPNAV] 5090.1D), which was released in FY 2014. The update specifically addresses sustainability and the SSPP. In addition to DON activities, Headquarters (HQ) Marine Corps distributes quarterly newsletters across the various environmental programs, highlighting success stories, best practices, performance updates, and future training opportunities.

While the Air Force's commitment to the long-term sustainability of its installations is not new—the first policy to apply sustainable development concepts to facilities and infrastructure projects dates back to 2001—in 2014 the Air Force reiterated for its personnel the strong linkage between sustainability and ready and resilient installations with the publication of *Air Force Civil Engineer* magazine, Vol. 22, No. 1. The issue was titled "Building Sustainable Installations" and featured

[2]In this document, the Navy is used to refer to the U.S. Navy (USN), and DON is used to refer to the Department of the Navy (which includes the U.S. Marine Corps as well as the U.S. Navy).

articles on management tools to help reach sustainability and facility energy goals, and a web-based sustainability management tool called the Installations Sustainability Management System. The system is being developed and demonstrated by the Air Force Civil Engineer Center, which also developed a strategic sustainability messaging toolkit to assist installations in communicating the importance of sustainability. The toolkit included Air Force Civil Engineering Commander's Call Talking Points to help drive home the message that sustainability makes the Air Force better able to "fly, fight, and win" now and in the future. The toolkit is available at http://www.afcec.af.mil/news/earthday/.

The Army's Senior Energy and Sustainability Council, co-chaired by the Under Secretary of the Army and Vice Chief of Staff of the Army, continued to oversee and integrate sustainability and energy efforts across the Army enterprise. Secretary of the Army John McHugh renewed the Council's charter on 10 December 2013. The Council is supported by a General Officer Steering Committee and a Council of Colonels—which meet quarterly and monthly, respectively—to track and report Army progress implementing the DoD SSPP and other sustainability-related actions. The Army also routinely addresses sustainability in its Services and Infrastructure Core Enterprise Board, a three- and four-star level board chaired by the Assistant Secretary of the Army for Installations, Energy and Environment. Priorities in FY 2014 included energy and water security, energy and fuel efficiencies, reducing the use of fossil fuels, climate change, water optimization, waste minimization, and high-performance sustainable buildings. The Army Campaign Plan, which provides guidance and direction to the entire Army enterprise, includes Army-wide objectives and metrics for energy security and sustainability. FY 2014 was the third year it included enterprise-level objectives and associated metrics for installation and operational energy, non-tactical vehicle fuels, and water security. The Army continues its outreach on sustainability and energy through public websites (http://www.army.mil/news/energy/ and http://www.army.mil/news/environment/), social media, and via *STAND TO!* (http://www.army.mil/standto/), the Army's daily compendium of news and information.



Sustainability messaging, Fort Bragg, NC

The newly developed DLA Sustainability Program is leading the development of a Senior Sustainability Council, which will be instrumental in developing strategy, recommending policy and ensuring coordination on sustainability initiatives across DLA. In FY 2015, DLA will be establishing a Sustainability Communication Plan to highlight the purpose of the Sustainability Program, specific sustainability concepts, and lay out objectives for the program's success.

In the National Security Agency (NSA)/Central Security Service (CSS), engaging and communicating with employees in sustainability is handled by the agency's Sustainability Team. The Team maintains both an internal and external webpage where it posts information on NSA sustainability actions, and staffs kiosks at various NSA events to communicate the agency's sustainability efforts. In cases where broad-based employee participation is required, such as when the agency moved to single stream recycling, the agency also uses signs, posters, and e-mails for outreach. Quarterly, the Sustainability Team holds Green Team meetings with representatives from across the agency, providing the opportunity to offer suggestions on sustainability projects and policy. The agency routinely offers training to NSA employees on a wide variety of topics such as the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) rating system, energy management, and sustainable procurement.

The Defense Intelligence Agency (DIA) has an active program to communicate sustainability. The primary means is through DIA's internal website, featuring daily articles, photos, announcements, and other items of interest on topics ranging from energy saving tips to buying green products. In FY 2014, DIA developed a Sustainability SharePoint site on its classified computer system, which serves as the unofficial repository for many sustainability products and services, including the DoD SSPP. Also in FY 2014, DIA sustainability and training personnel prepared a Microsoft PowerPoint presentation titled "Sustainability and Environmental Management System (EMS) Awareness" to provide self-paced training to all DIA employees on the DoD SSPP and EMS requirements; the presentation is located on the Microsoft SharePoint site. In FY 2015, DIA plans to utilize current flat screen monitors located in several common areas in DIA HQ to educate employees on the DIA energy program and other sustainability topics.

The Missile Defense Agency (MDA) promotes the participation of its employees in sustainability by requiring all new employees (military, civilian, and contractors) to complete an environmental awareness training course that explains the importance of MDA's environmental compliance and sustainability program. All employees are required to complete refresher training every year. MDA's Environmental Directorate maintains a website accessible to all employees, containing current information to ensure that all employees in each organizational element are aware and have a working knowledge of the goals and requirements of the SSPP. The agency also publishes articles on current MDA sustainability issues, events, and success stories at least quarterly. MDA's Sustainability Integration Product Team meets quarterly to discuss the agency's sustainability progress and target new initiatives to undertake. The team has six sub-working groups that from FY 2014 through FY 2016 will continue to develop and execute focused action plans for pursuing opportunities for improvement. The sub-working groups are: Green Procurement, Teleworking, Sustainable Operations (energy, water, and solid waste), Vehicle Fleet Management, Electronics Stewardship, and Environmental Management System.

In the Washington Headquarters Services (WHS), DoD sustainability goals are communicated by the Environmental, Sustainability and Energy Branch through the WHS Sustainability and Energy Management Task Force, and by briefings on various sustainability topics, reviewing design submittals for construction and minor renovation projects, and meeting with the groups managing these projects on sustainability matters. Some of the smaller Components, such as the Defense Contract Management Agency (DCMA) and Defense Commissary Agency (DeCA), are predominantly tenants in DoD and other federally managed space. These Components generally achieve outreach by sharing the sustainability policy and programs of their hosts with their employees.

DoD welcomes input on its SSPP. Please submit comments and questions through DENIX at https://www.denix.osd.mil/cmrmd/ by clicking on the "Contact Chemical Material Risks Management Program" link on the left.

II. Strategic Overviews for the Military Services and DLA

II.1 Army

A resilient Army reduces mission risk, financial risk, and reputational risk. The increasing complexity of its operating environment requires us to anticipate, prepare for, withstand, and adapt to a range of natural or man-made disruptions and to recover rapidly across the entire Army spectrum. The Army's energy and sustainability efforts are preserving its military capabilities and increasing the resilience of its installations at home and abroad. They will also enhance the Army's future capabilities, readiness, and performance. The Army's overarching sustainability efforts include policies, initiatives, projects, technologies, and collaboration. These efforts include the Net Zero Initiative, Office of Energy Initiatives, and deployment of advanced energy and water technologies. During FY 2014, the Army continued its efforts to update its sustainability strategy, through the development of an overarching Energy Security and Sustainability Strategy. The Strategy is built upon the principle of resiliency, and includes goals that aim to: fully consider resource implications in Army planning and decision-making processes, improve resource efficiency, expand alternative and renewable energy, incorporate science and technology, and accomplish networked energy security and installation resiliency. On May 1, 2015, the strategy was signed by the Under Secretary of the Army (the Army's Senior Sustainability Official) and the Vice Chief of Staff of the Army. Implementation of the strategy will be overseen by the Army's Senior Energy and Sustainability Council.

II.2 Navy

From the Navy's perspective, sustainability encompasses policies, technology, best practices, smart planning, and an appropriate level of fiscal investment to ensure effective mission performance now and for the foreseeable future, while respecting the natural environment and recognizing resource constraints. If Navy ships, aircraft, and tactical equipment can travel farther on a gallon of fuel, the Navy can reduce vulnerabilities associated with refueling, remain on station longer, and/or increase the intensity of operations when needed. Reducing energy consumption and integrating affordable renewable energy sources at shore facilities makes the Navy more resilient and allows resources to be focused on training and operational requirements, which is especially vital in times of fiscal constraint. Responsibly managing Navy impacts to the land, water, and in the air meets the spirit and intent of applicable environmental regulations while maintaining trust with the public and other key stakeholders. Interfacing with industry and outside federal agencies ensures that urban development and other uses near Navy installations and training areas do not degrade the ability to train and operate naval forces. Finally, evaluating and addressing the potential effects of climate change on shore infrastructure allows for continued support of Navy operational assets.

II.3 Air Force

To the Air Force, sustainability is not a stand-alone program, nor is it simply an environmental initiative; rather it is a holistic philosophy and integrated management approach. By connecting Air Force activities today to those of the future through sound business, environmental, energy, and material management practices, sustainability helps create and maintain conditions that allow the Air Force to reduce compliance burdens and operating costs. In times of shrinking budgets and constrained resources, sustainability helps the Air Force maintain efficiently operated, ready, and resilient installations, and frees up funding for other mission areas.

II.4 Marine Corps

The U.S. Marine Corps (USMC) embraces sustainability as a means of improving mission accomplishment. The essence of sustainability is using mission-critical resources—energy, fuel, water, equipment, and facilities—with greater efficiency, while enhancing warfighting capabilities and mission. Operating more efficiently is a universal concept that can be achieved by better integrating sustainable practices across every facet of the USMC mission and capabilities, from bases to battlefield, acquisition to fielding, concept to application.

II.5 Defense Logistics Agency

DLA is an integral part of DoD's vision of sustainability, and it recognizes that it must plan for and act in a sustainable manner now in order to build an enduring future. Therefore, DLA embraces sustainability as a critical enabler in the performance of its mission through three principal goals: Warfighter Support, Stewardship Excellence, and Workforce Development. DLA views these goals through the lens of sustainability, embedding sustainability concepts and requirements into high-level strategies and policies. Over the past year, DLA has set in motion the process to formalize and manage an official DLA Sustainability Program. The program will continue efforts to implement a standardized process for reporting to DoD while enhancing DLA operations and providing management engagement, accountability, and a forum for resolving sustainability issues. Successful implementation of the Sustainability Program will help DLA continue its culture of excellence in environmental stewardship while addressing sustainability as an integrated agency-wide concept.

III. Goal and Sub-Goal Summaries

III.1 Progress Update

Figure 3 displays the status of DoD's progress on its sub-goals in scorecard form. A green score is assigned when the result is equal to the target or greater. A result scores red when it is below the amount needed for yellow. The scoring system for assigning yellow is shown in Table 2. Sub-goals that match those of the U.S. Government use the same system used for the Sustainability/Energy Scorecard of the Office of Management and Budget. Sub-goal results for FY 2010 through FY 2014, and targets from FY 2015 through FY 2020, are compiled in Table 3. Appendix A provides the metrics for each sub-goal and the results and targets from FY 2011 through FY 2020.

Cross-Cutting Initiatives

This section highlights Department activities that do not fit neatly under a single sub-goal. One example is the Army's Net Zero Installations initiative, which spans energy, water, and waste, fostering changes in behavior that strive to maximize efficiency, maximize reuse, and reduce demand. The Army's Net Zero Installations initiative continued to highlight progress made at its 17 pilot installations during FY 2014. Through a Net Zero Installations directive signed on 28 January 2014 by Secretary of the Army, John McHugh, the Army transitioned Net Zero from a pilot initiative to an Army-wide approach to sustainability based on knowledge developed during the first two years of the pilot. Distributed throughout the Army, the directive is publically available online. The Army also uses annual Command-level briefings in which various Commands, the Army National Guard, and the U.S. Army Corps of Engineers brief the Assistant Secretary of the Army for Installations, Energy and Environment on energy and sustainability.

Other examples of progress that cuts across multiple areas are the annual Federal Energy and Water Management awards, conferred by the DOE Federal Energy Management Program. In FY 2014, the Military Services received 13 out of 26 of these awards. A selected set of these are showcased in Section IV. Finally, all of the MILDEPs operate under important policies and plans that reflect the integrated nature of sustainability. Examples are:

- DON cross-cutting environmental policy, *Environmental Readiness Program Manual* (OPNAVINST 5090.1D); and
- the *U.S. Air Force Energy Strategic Plan*, which also places a strong emphasis on water.

Table 2. Basis for Yellow Scores in the Sub-Goal Scorecard for FY 2014 Results

Sub-Goal		Yellow if < Target but:
#	Topic	
1.1	Energy	≥24%
1.2	Renewables [§2911(e)]	≥ last year's target
1.3	Vehicle Fuel	≥ last year's target
2.1	Potable Water	≥ last year's target
2.2	ILA Water	≥ last year's target
2.3	Stormwater	≥90%
3.1	GHGs - Scopes 1 & 2	≥ half of FY 2020 goal
3.2	GHGs - Scope 3	≥ half of FY 2020 goal
3.3	Teleworking	≥ last year's target
3.4	Business Air Travel	≥ last year's target
5.1	Printing Paper	≥ last year's target
5.2	Solid Waste - Non-Hazardous	≥46%
5.3	Solid Waste - C&D Debris	≥56%
6.1	Toxic Chemicals	≥12%
6.2	Pesticides - Certification	≥99%
6.3	Pesticides - Plans	≥95%
7.1	Sustainable Procurement	≥92%
7.2	Electronic Stewardship	no metric is <90% of the target
7.3	Sustainable Buildings	≥ last year's target
7.4	EMSs	≤ 10% red EMSs

Figure 3. DoD SSPP Scorecard for FY 2014 Results

Objective #1: The Continued Availability of Resources Critical to the DoD Mission is Ensured	
GOAL #1: The Use of Fossil Fuels Reduced	
	**1.1** - Reduction in Facility Energy Intensity
	**1.2** - Use of Renewable Energy [Title 10, U.S.C. §2911(e)(2)]
	**1.3** - Reduction in Fleet Petroleum Use (non-tactical)
GOAL #2: Water Resources Management Improved	
	**2.1** - Reduction in Facility Potable Water Intensity
incom-plete	**2.2** - Reduction in Facility Industrial and Irrigation Water
	**2.3** - Stormwater Runoff Managed to Maintain Pre-Development Hydrology
Objective #2: DoD Readiness Maintained in the Face of Climate Change	
GOAL #3: Greenhouse Gas Emissions Associated with DoD Operations Reduced	
	**3.1** - Reduction in Scope 1&2 GHG Emissions
	**3.2** - Reduction in Scope 3 GHG Emissions
	**3.3** - Increase in Teleworking by Eligible Employees
	**3.4** - Reduced Scope 3 GHG Emissions from Employee Air Travel
GOAL #4: DoD Climate Change Risks Assessed and Resiliency Improved	
Objective #3: The Ongoing Performance of DoD Assets Ensured by Minimizing Waste and Pollution	
GOAL #5: Solid Waste Minimized and Optimally Managed	
	**5.1** - Increase in DoD Employees Covered by Policies to Reduce the Use of Printing Paper
	**5.2** - Increase in Non-Hazardous Solid Waste Diverted from the Waste Stream
	**5.3** - Increase in Construction and Demolition Debris Diverted from the Waste Stream
GOAL #6: The Use and Release of Chemicals of Environmental Concern Minimized	
	**6.1** - Reduction in On-Site Releases and Off-Site Transfers of Toxic Chemicals
	**6.2** - DoD Personnel and Contractors Who Apply Pesticides Are Properly Certified
	**6.3** - Integrated Pest Management Plans Prepared, Reviewed, and Updated Annually
Objective #4: Continuous Improvement in the DoD Mission Achieved through Management and Practices Built on Sustainability and Community	
GOAL #7: Sustainability Practices Become the Norm	
	**7.1** - 95% of Procurement Conducted Sustainably
	**7.2** - Electronic Stewardship and the Efficient Use of Data Centers
	**7.3** - Sustainable Buildings (Conforming to the Guiding Principles)
	**7.4** - Environmental Management Systems Effectively Implemented and Maintained

Table 3. Summary of the DoD Objectives, Goals, and Sub-Goals Comprising the DoD SSPP, and Results for FY 2010 Through 2014

#	Sub-Goal	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Objective #1: The Continued Availability of Resources Critical to the DoD Mission is Ensured												
GOAL #1: The Use of Fossil Fuels Reduced												
1.1	**Energy Intensity of Facilities Reduced 30% from FY 2003 Levels by FY 2015 and 37.5% by FY 2020**	11.4%	13.3%	17.7%	17.2%	17.6%	30%	31.5%	33%	34.5%	36%	37.5%
1.2	**By FY 2020, Produce or Procure Energy from Renewable Sources in an Amount that Represents at Least 18% of Electricity Consumed by Facilities**	9.6%	8.5%	9.6%	11.8%	12.3%	12%	13%	14%	15%	16%	18%
1.3	**Use of Petroleum Products by Vehicle Fleets Reduced 30% from FY 2005 Levels by FY 2020**	3.7%	8.6%	20.4%	26.1%	30.2%	20%	22%	24%	26%	28%	30%
GOAL #2: Water Resources Management Improved												
2.1	**Potable Water Consumption Intensity by Facilities Reduced 26% from FY 2007 Levels by FY 2020**	12.6%	10.8%	18.6%	19.8%	21.5%	16%	18%	20%	22%	24%	26%
2.2	**Potable Industrial and Irrigation Water Consumption Reduced 20% from FY 2010 Levels by FY 2020**	not applic	incom -plete	incom -plete	incom -plete	incom -plete	10%	12%	14%	16%	18%	20%
2.3	**All Development and Redevelopment Projects of ≥5,000 Sq. Ft. Maintain Pre-Development Hydrology to the Maximum Extent Technically Feasible**	not avail.	not avail.	98%	98.9%	79.4%	100 %	100%	100%	100%	100%	100%
Objective #2: DoD Readiness Maintained in the Face of Climate Change												
GOAL #3: Greenhouse Gas Emissions Associated with DoD Operations Reduced												
3.1	**Greenhouse Gas Emissions from Scope 1 and 2 Sources Reduced 34% from FY08 Levels by FY20**	3.6%	4.4%	9.2%	10.3%	11.3%	16%	19%	22%	28%	30%	34%
3.2	**Greenhouse Gas Emissions from Scope 3 Sources Reduced 13.5% from FY 2008 Levels by FY 2020** (with hosted renewable energy credit)	4.8%	(0.1%)	9.1%	18.5%	19.5%	4%	5%	7%	9%	11%	13.5%
3.3	**30% of Eligible Employees Teleworking at Least Once Per Bi-Weekly Pay Period, on a Regular, Recurring Basis, by FY 2020**	not avail.	not avail.	8%	13.4%	14.5%	20%	23%	25%	27%	29%	30%
3.4	**Greenhouse Gas Emissions from Employee Air Travel Reduced 7% from FY 2011 Levels by FY 2020**	not applic	not applic	9.0%	27.5%	29.0%	2%	3%	4%	5%	6%	7%
GOAL #4: DoD Climate Change Vulnerability Assessed and Resiliency Improved												

#	Sub-Goal	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Objective #3: The Ongoing Performance of DoD Assets Ensured by Minimizing Waste and Pollution												
GOAL #5: Solid Waste Minimized and Optimally Managed												
5.1	**By FY 2015, at Least 95% of DoD Employees Covered by Policies to Reduce the Use of Printing Paper**	43%	43%	57%	58%	63.6%	95%	95%	95%	95%	95%	95%
5.2	**50% of Non-Hazardous Solid Waste Diverted from the Waste Stream by FY 2015 and Thereafter Through FY 2020**	39%	40%	49%	46%	46%	50%	50%	50%	50%	50%	50%
5.3	**60% of Construction and Demolition Debris Diverted from the Waste Stream by FY 2015, and Thereafter Through FY 2020**	73%	77%	74%	73%	82%	60%	60%	60%	60%	60%	60%
GOAL #6: The Use and Release of Chemicals of Environmental Concern Minimized												
6.1	**On-Site Releases and Off-Site Transfers of Toxic Chemicals Reduced 15% from CY06 Levels by FY20**	2.8%	2.5%	(6.6%)	23.4%	15.5%	5%			10%		15%
6.2	**100% of DoD Personnel and Contractors Who Apply Pesticides Are Properly Certified**	99.4%	99.2%	99.0%	99.6%	99.6%	100%	100%	100%	100%	100%	100%
6.3	**All DoD Installations Have Integrated Pest Management Plans Prepared, Reviewed, Updated Annually by Pest Management Professionals**	84.6%	90.2%	96.7%	90.9%	95.6%	100%	100%	100%	100%	100%	100%
Objective #4: Continuous Improvement in the DoD Mission Achieved through Management and Practices Built on Sustainability and Community												
GOAL #7: Sustainability Practices Become the Norm												
7.1	**95% of Procurement Conducted Sustainably**	not avail.	82.6%	95.0%	98.0%	97.5%	95%	95%	95%	95%	95%	95%
7.2	**Electronic Stewardship and Data Centers**	***See table for sub-goal 7.2 in Appendix A***										
7.3	**15% of Existing Buildings Conform to the Guiding Principles on High Performance and Sustainable Buildings By FY 2015, and Thereafter Through FY 2020**	0.89%	0.89%	0.97%	1.09%	1.11%	15%	15%	15%	15%	15%	15%
7.4	**All Environmental Management Systems Effectively Implemented and Maintained by FY 2020**	red	red	red	red	**yellow**	green	green	green	green	green	green

Objective #1: The Continued Availability of Resources Critical to the DoD Mission is Ensured

GOAL #1: The Use of Fossil Fuels Reduced

Sub-Goal 1.1 – Facility Energy Intensity

As shown in Figure 4, the decline in the Department's facility energy consumption has slowed in the past two years, reaching 17.6% below the FY 2003 baseline in FY 2014, falling short of the 27% target. One factor working against a reduction in facility energy consumption—although a favorable development—is the return of warfighters from their deployments. This increases demand for facility energy, countering ongoing advances in efficiency. However, the Department's continuing commitment to performance contracting will accelerate improvements in efficiency in the future. During calendar year (CY) 2014, DoD awarded 20 energy savings performance contracts (ESPCs) worth $260 million, and 16 utility energy service contracts (UESCs) worth $43 million.

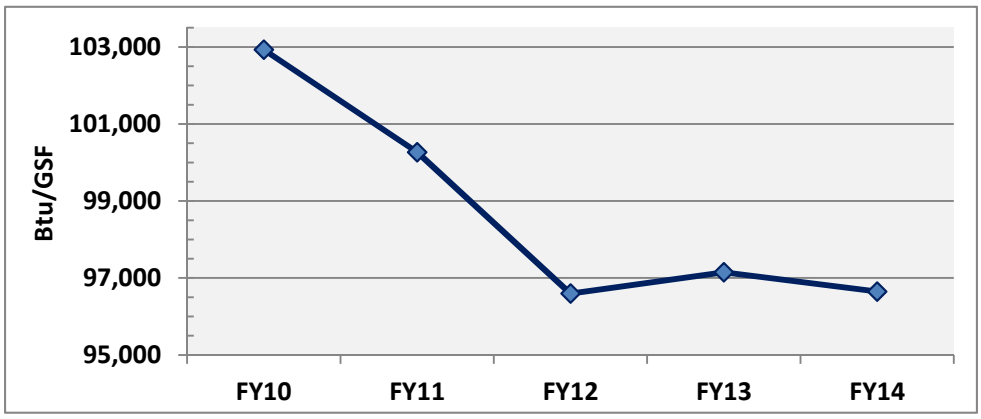


Figure 4. DoD Energy Intensity from FY 2010 to FY 2014

The Air Force achieved the largest reduction in facility energy intensity in FY 2014 among the Services, with intensity 22.3% below the baseline. Air Force energy consumption dropped in FY 2014 due to retro-commissioning facility heating, ventilation, and air conditioning (HVAC) systems, continued use of ESPCs and UESCs, and energy awareness programs across installations. Also, investments made in earlier years have started yielding results. Unlike in prior years, Energy Focus Funds were not available in FY 2014. Funding for energy saving projects is now determined each year by the Air Force Civil Engineer Council as part of the overall Integrated Priority List for Facility Sustainment Restoration and Modernization funding. This determination is based on total funding available and the relative value to the Air Force in terms of life cycle financial savings and reduced energy consumption of the proposed energy projects.

The Army reduced its facility energy intensity by 15.2% in FY 2014 from the base year. It is challenging for the Army to continue to achieve significant reductions in facility energy intensity because of two competing factors: the numerator in the calculation increased in FY 2014 due to the use of training simulation facilities and other energy-intensive buildings and functions related to the Afghanistan equipment reset, while the denominator of the intensity calculation continues to fall, with a reduction in building area of 3.3 million square feet in FY 2014. However, the Army's energy intensity is already lower than the DoD average: 82,500 British thermal units (Btu) per gross square foot (GSF), compared to 96,647 Btu/GSF.

The Army invested significantly in efficiency improvements in FY 2014. Eleven projects were funded under ECIP, totaling more than $43.5 million, with a projected annual savings of $3.0 million and 137 billion Btu. The Army enlisted support from DOE's Idaho National Laboratory and the U.S. Army Corps of Engineers to validate each ECIP project, resulting in better defined scopes, more accurate cost estimates, and more detailed life cycle cost analyses. The Army also executed over $332.5 million in appropriated funds toward energy and water efficiency projects, which are expected to achieve energy savings of 980 billion Btu annually. The Army continued to emphasize performance contracting in FY 2014, awarding 18 ESPC task orders with $311 million in investments, and awarding 10 utility energy services contracts (UESCs) with $15.1 million in investments. These projects have a projected annual savings of 1.2 trillion Btu and almost $32 million. The Army has invested more than $2.2 billion in total EPSCs and UESCs since the programs began.


Photo: U.S. Army

Energy efficient hydraulic system at Scranton Army Ammunition Plant, PA

The Navy's FY 2014 energy intensity was 20.6% lower than the FY 2003 baseline. The Navy expects the savings from projects awarded late in FY 2012 and FY 2013 to begin to yield substantial savings in FY 2015. In FY 2013 and FY 2014 combined, the Navy invested over $500 million into energy efficiency projects, which will help the Navy continue its downward trend in energy intensity.

The FY 2014 energy intensity for the Marine Corps was 18.7% below the base year. The Marine Corps invested aggressively in energy efficiency in FY 2013 and FY 2014, with a combined $190 million targeted at building-level energy efficiency measures such as upgrades to lighting, heating, and cooling systems. The Commandant of the Marine Corps continues to focus on energy efficiency as the core strategy for reaching energy independence. Installation Commands are required to complete and submit annual reports on their energy and water management programs, which evaluate the overall programs, discuss current status and achievements, and lay out future plans and funding requirements.

DLA facilities have a very low energy intensity, 49,500 Btu/GSF on average, compared to the DoD average of 96,647 Btu/GSF. However, although DLA reduced its energy consumption by 13% in FY 2014, a large decrease in square footage during this period resulted in an *increase* in energy intensity of 6.4%. For example, DLA returned Sharpe Army Depot to the Army in FY 2014, and those buildings had a very low average intensity of 22,000 Btu/GSF. DLA's continued aggressive efforts to reduce aging building inventory will make continued reductions in energy intensity a challenge.

WHS completed the second phase of the Pentagon recommissioning program in FY 2014, yielding an estimated 78 billion Btu in savings so far. A total savings of 120 billion Btu is anticipated once the recommissioning project is finalized. DIA's energy intensity improved in FY 2014, primarily as a result of a comprehensive effort to better control excess after-hours lighting, heating, and cooling in the HQ building. DIA awarded an ESPC for HQ in FY 2014, which it anticipates will yield $996,000 per year in energy savings beginning late in FY 2015. The National Reconnaissance Office (NRO) has been replacing fluorescent and high-pressure sodium lighting with more efficient fluorescent or light-emitting diode fixtures. Also, with ECIP funding, NRO installed a waterside economizer and

water source heat pump energy recovery system. In spite of efforts to improve energy efficiency, DeCA has only been able to reduce energy intensity by 10% since the baseline. The commissaries are energy intensive facilities with a fixed refrigeration load of approximately 50% of total energy.

Sub-Goal 1.2 – Renewable Energy

As a percentage of electricity consumed by DoD facilities in FY 2014, DoD produced or procured 12.3% from renewable sources (electric and non-electric), exceeding the target of 11%.

Photo: U.S. Marine Corps

The Navy continued its outstanding progress on renewable energy in FY 2014, producing and procuring 26.5% of renewable energy relative to total facility electricity consumption. This marks the second time the Navy has achieved the 25% target of Title 10 U.S.C. §2911 well ahead of the FY 2025 deadline. One of the main contributors to Navy progress is the Naval Air Weapons Station geothermal plant at China Lake, CA. The plant is owned by and generates electricity for the utility company. The Navy does not sell electricity to the utility company. The plant produced over 1.2 million megawatt hours of electricity in FY 2014, a decrease of more than 5% from the previous year's output. This decrease is not unexpected, as the plant's electricity production has been declining each year with the incremental depletion of the geothermal resource.

The electricity generated by the municipal solid waste plant at Norfolk Navy Shipyard in Portsmouth, VA—another major contributor to the Navy's renewable energy portfolio—is sold to the utility, although the base does use the steam generated by the plant. In FY 2014, 5.2% of USMC facility electricity consumption was produced from renewable energy.

The Army met the 11% target for FY 2014 by more than doubling the amount of renewable energy it produced or procured, from 5.4% in FY 2013 to 11.3% in FY 2014. The Army's renewable energy portfolio will continue to include both large- and small-scale projects. Its large-scale renewable energy development efforts are led by its Office of Energy Initiatives (OEI), which transitioned from the Army's Energy Initiatives Task Force in October 2014. The mission of OEI is to secure a resilient energy supply for mission requirements on Army installations by developing renewable and alternative energy production projects greater than 10 megawatts (MW). OEI projects leverage private financing in lieu of Congressionally appropriated funding to provide access to secure on-site energy generation at costs that are equal to or less than current or projected installation utility rates. When reviewing potential renewable energy opportunities, OEI weighs a set of identified risk factors, which influence the likelihood of success against the potential contribution of the project to the Army's energy portfolio. In November 2014, OEI published a guide titled Developing Renewable Energy Projects by Leveraging the Private Sector, detailing processes, tools, and policies regarding the development of renewable energy projects leveraging the private sector. It includes the strategies and tactics employed by OEI to streamline processes and address lessons learned from internal and external stakeholders.

In FY 2014, OEI signed contracts for an 18 MW photovoltaic (PV) array at Fort Huachuca, AZ, and a 28 MW biomass plant at Fort Drum, NY. Another 5.4 MW will come from FY 2014 investments made through ESPCs, UESCs, and other utility agreements, and an additional 3.8 MW of renewable electric generation was awarded through the ECIP program. To increase installation-level renewable energy projects funded by ECIP, in FY 2014 the Army and DOE's National Renewable Energy Laboratory developed a guide to serve as a desk reference for Army installation energy managers who are preparing ECIP project applications. It provides practical information on six renewable energy technologies and walks the energy manager through the process of creating a technically- and financially-sound renewable energy ECIP application.

The Air Force produced or procured 6.7% of total electricity consumed by facilities from renewable energy sources in FY 2014. Several renewable energy projects originally projected to be on line in FY 2014 have been delayed or significantly reduced in scope, primarily due to poor market economics. Also, the Air Force limited the purchase of unbundled renewable energy certificates in FY 2014. However, on-base electricity capacity increased by over 20% in just one year, from FY 2013 to FY 2014, for a total of 103 MW, while on-base electricity production jumped by more than 50% to 189,845 megawatt-hours (MWh). While well short of the FY 2014 interim target, the Air Force expects to meet the FY 2025 goal of 25%, with 287 renewable energy projects on 97 sites either currently operating or under construction, and more to be developed.


Solar water heater, DLA installation in Tracy, CA

Photo: DLA

DLA is in the process of installing two large-scale solar thermal walls at its installation in Tracy, CA, and it is performing a wind resource availability and feasibility study with DOE and the National Renewable Energy Laboratory. DIA included a 500-kilowatt (kW) PV array in the ESPC it awarded in FY 2014. Under the terms of the ESPC, DIA will purchase power from the contractor through a power purchase agreement at a price competitive with grid electricity. NSA added two small rooftop photovoltaic installations in FY 2014, on two buildings where new green roofs also reside.

Sub-Goal 1.3 – Vehicle Fleets

The use of petroleum by the Department's non-tactical fleet of motor vehicles was 30.2% lower in FY 2014 than the FY 2005 baseline, while the vehicle fleet used 156% more alternative fuel than in FY 2005. Both of these achievements easily surpass the FY 2014 Federal Government targets of 18% and 136%, respectively.

The Army's reduction in the petroleum fuel used by its non-tactical vehicle fleet reached nearly 37% in FY 2014, from the FY 2005 baseline. This success has been achieved by an aggressive three-part strategy to downsize the fleet, right-size the mix of vehicles to match the mission, and acquire alternative fuel and high fuel efficiency models. The Army continues to use the General Services Administration (GSA) vehicle replacement cycle as an opportunity to downsize and right-size the fleet, transitioning from large Class IV and III vehicles to hybrid, plug-in hybrids, and all-electric vehicles (EVs) where they are not required by mission (e.g., fire and emergency services). Just under half of the Army's non-tactical fleet now consists of alternative fuel and/or high-efficiency vehicles. The Army emphasizes three requirements for its vehicles leased through GSA: vehicles will have the highest rating for GHG emission reductions; vehicles capable of using E-85 fuel (a blend of 85%

Photo: U.S. Air Force

ethanol and 15% gasoline) will only be located where E-85 fuel is available and all E-85 vehicles will utilize the fuel exclusively; and vehicles will be the most efficient (highest miles per gallon) available on the market. The Army eliminated 2,072 non-tactical vehicles in FY 2014, and since FY 2011 it has reduced the size of its fleet by 15,051 vehicles.

The Air Force fleet, the fourth largest in the Federal Government, is managed by the Air Force Element, Vehicle and Equipment Management Support Office (VEMSO). In 2014, VEMSO was ranked by the Government Green Fleet Award as number 20 of the top fleets competing in a pool of 38,000 North American Government Vehicle Fleets, placing VEMSO in the top 0.05% of the best managed government vehicle fleets in the nation. This achievement was possible due to a suite of approaches used by VEMSO, for procuring, managing, and sustaining vehicles for the Air Force. The Air Force vehicle validation process reviewed 29,000 vehicle authorizations and identified 3,202 vehicles no longer required to support changing mission needs, subsequently removing their authorizations. The process also identified another 1,460 for exchange to more fuel-efficient models ("right sizing"). The tool the Air Force uses for its validation process is the Fleet Management Decision Support System, which has enabled VEMSO to reduce funding requirements by over $210 million over the Future Year Defense Program. Since 2011, the Air Force has eliminated 9,023 vehicles from the inventory. Air Force policy also targets efficient operation of vehicles, including a vehicle idling policy and radio frequency technology called AIM2 to monitor automated fuel consumption, idle time, maximum vehicle speed, and engine diagnostic code reporting.

The Navy fleet consumed 20% less petroleum fuel in FY 2014 than in FY 2005. The Navy has been implementing a suite of innovative measures to continue the transition to a cleaner fleet. A pilot project is still underway, in partnership with GSA, to determine the life cycle costs and payback of plug-in electric vehicle technology, both all-electric and gasoline-assisted EVs. For heavy-duty trucks, the Navy had demonstrated fuel economy benefits in excess of 25% for hybrid electric vehicles that cannot be plugged in. In FY 2014, the Navy completed a pilot project of a plug-in hybrid electric bucket-truck at Joint Base Pearl Harbor Hickam, HI. In addition to fuel economy, the project team monitored noise level, brake wear, unscheduled maintenance issues, vehicle reliability, and drivability, and compared the data to a conventional diesel model. Success criteria for the plug-in truck include a 40% relative increase in fuel economy and no major operational or safety issues. The final results are currently being documented. The Navy is also moving towards car-sharing, automated fleet management systems, and the use of Global Positioning System technology to improve data quality. The installation of solar carport EV charging stations—begun in FY 2013—continued in FY 2014 at Navy installations, with the set of 20 stations to be complete by the end of CY 2015.

The Marine Corps achieved excellent results in FY 2014 reducing fleet petroleum fuel consumption, by almost 36% compared to FY 2005. The success can be attributed to a broad array of measures:

- Reducing the number of miles traveled (by 45 million miles since 2008).
- Increasing the use of alternative fuels, now at 19% of total fuel consumption. An E-85 fuel site was installed at Marine Corps Air Station (MCAS) Miramar and another is planned at MCAS Yuma.

- Increasing the number of alternative fuel vehicles (AFVs) in use, now accounting for almost half of the total inventory.
- Replacing conventional fueled vehicles with low speed EVs where possible; they now number 887.
- Reducing vehicles in the inventory (by 1,717 since 2011).

Photo: U.S. Marine Corps

The Marine Corps is also partnering with GSA to add 20 compressed natural gas (CNG) pickup trucks, and in 2015 will work with GSA to add 272 hybrid electric vehicles to the fleet.

DLA continues its aggressive efforts to use the vehicle replacement cycle to acquire smaller, more fuel-efficient models. In FY 2014, DLA added 90 low speed vehicles as part of its ongoing effort to optimize fleet utilization, create efficiencies, and reduce petroleum consumption. AFVs now account for 56% of the fleet, and these vehicles are located where they can benefit from the availability of alternative fuel. DCMA continues to reduce vehicle allocations, improve gas mileage with smaller vehicles and engine sizes, and implement efficiency strategies, while the focus of NSA is on acquiring hybrid and alternative fuel vehicles. DIA routinely evaluates the number of fleet vehicles required by the agency, and uses the GSA replacement cycle to acquire hybrid-electric vehicles where possible. NRO has been replacing vehicles fueled entirely with fossil fuels to electric "buggies", flex-fuel, and hybrid-electric vehicles.

GOAL #2: Water Resources Management Improved

Sub-Goals 2.1 and 2.2 – Reducing the Use of Facility Water

The Department continued driving down the potable water intensity of its facilities, with intensity 21.5% lower in FY 2014 than the FY 2007 baseline level (Figure 5). This far exceeds the FY 2014 reduction target of 14%. To ensure accurate reporting on the use of industrial, landscaping and agricultural (ILA) water, in FY 2014 DoD began developing supplemental guidance for Components to accurately establish an ILA baseline and measure and estimate consumption.

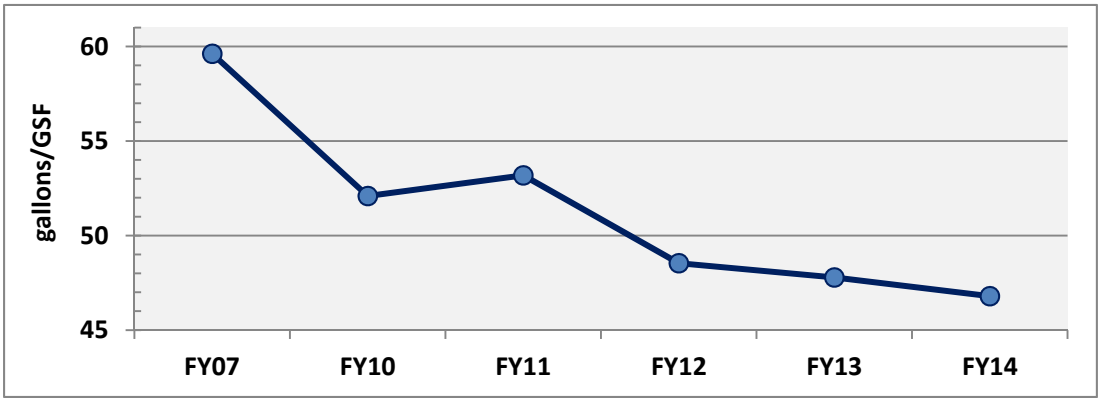


Figure 5. DoD Water Intensity Continues to Fall

The Army continues to exceed the targets for sub-goal 2.1, reaching a reduction in potable water intensity of more than 27% from the FY 2007 base year. The emphasis of the Army commands on

water efficiency is reflected in the numerous projects implemented at Army installations, including: active leak detection programs to identify and repair water leaks (one of the largest contributors); reducing make-up cooling tower water; installing high-efficiency fixtures (e.g., toilets/urinals, faucets, aerators, shower heads); replacing or upgrading aging water distribution systems, mostly through utility privatization; improving water distribution flushing programs; using drought-tolerant landscaping and xeriscaping where appropriate; and awareness programs that include public outreach briefings, presentations, displays, and publicity to promote water conservation.

From a policy perspective, the Army views water as a critical resource to be conserved and used as efficiently as possible to insure mission readiness. This is reflected in the FY 2014 Army Campaign Plans, the December 2013 update to the sustainable design and development (SDD) policy, and the Army's Net Zero Water philosophy. To reduce the amount of potable water used for ILA purposes, the SDD policy requires projects to evaluate options for reusing water and landscaping with native plant species and/or dry-scape alternatives. In FY 2014, the eight Net Zero Water pilot installations continued to make progress and the Army published a report summarizing the results of the Net Zero water balance assessments and water roadmaps conducted at each pilot. The report, titled *Net Zero Water Balance & Roadmap Programmatic Summary*, included water conservation measures specific to the pilot installations, but applicable Army-wide, consistent with the Army's directive to implement Net Zero Army-wide. The Army continued collaborating with the U.S. Environmental Protection Agency (EPA) on the Net Zero Water initiative.

Photo: U.S. Marine Corps

Irrigation with reclaimed water, MCAS Miramar, CA

The Marine Corps continued to excel in improving water intensity, exceeding even the FY 2020 target during FY 2014, with the potable water intensity of its buildings 27.7% lower than FY 2007. The key approach used by USMC is to install low flow bathroom fixtures, such as sink aerators, showerheads, toilets, and urinals. The Navy's reduction for FY 2014 was 10.5% below baseline. Performance contracts awarded by the Navy in FY 2014 are expected to yield savings of 24 million gallons of water annually once implemented. Awards were made at Naval Air Station Lemoore, Naval Weapon Station (NAVWPNSTA) Seal Beach, Naval Base Ventura County, and Naval Air Station Patuxent River.

The Air Force easily surpassed the 14% FY 2014 target for sub-goal 2.1, achieving a reduction of 21.9% from the FY 2007 baseline. This success was the result of water system improvements and efficiency measures including leak detection and infrastructure repair, fixture replacement and upgrade, irrigation system disconnection, separately metering privatized systems, and using non-potable water sources for ILA uses. Approaches the Air Force used in FY 2014 to reduce ILA water included: (1) xeriscaping to reduce ILA water consumption, (2) policies promoting more efficient irrigation or prohibiting new irrigation systems, and (3) implementing water recycling projects to service remaining landscaping applications.

DLA continued to reduce its potable water intensity, by more than 14% from FY 2013 to FY 2014. This was largely the result of the facility in Tracy, CA—the largest water consuming DLA site—which in FY 2014 improved water efficiency by completing hydraulic modeling, water system evaluations, and leak detection. NSA reduced its potable water consumption by increasing the quantity of reclaimed water used in its cooling towers, by partnering with a municipality to build

the infrastructure needed to transport the water. The agency also continues to install low-flow fixtures in all new restrooms and to retrofit existing restrooms as the building refresh schedule allows.

DCMA decreased water consumption intensity by 14% in FY 2014 from the FY 2007 baseline, and it expects efficiency to accelerate due to two new performance contracts that include water efficiency. Assessments under the contracts were performed in FY 2014 and task orders will commence in FY 2015. WHS experienced a sharp decline in potable intensity of 22% in FY 2014, relative to the FY 2007 base year, due in part to the inclusion of the Mark Center in the inventory during FY 2013 and 2014, since it is a LEED Gold facility. However, WHS does not expect to pinpoint other reasons until the installation of water meters throughout the Pentagon Reservation is completed in FY 2016. For landscaping irrigation, WHS offsets some of its use of potable water by drawing water from the Pentagon Lagoon.

DIA engineers worked with Joint Base Anacostia Bolling staff in FY 2014 to improve the frequency and accuracy of water meter readings, and repair the supply line water meters feeding HQ. NRO replaced humidification steam generators with point-of-use humidifiers in data centers. DeCA Design Criteria require electronic sensor control valves on lavatory sinks, xeriscaping, drip irrigation systems rather than sprinklers, and—for new and renovated commissaries—low-flow toilets and urinals with electronic flush sensors. The National Geospatial-Intelligence Agency (NGA) has reduced its potable water intensity by 23% since the base year, possible due to metering, controlling algae in the backup water pond so it never needs to be drained and refilled, and irrigating with runoff captured by the backup pond. The pond provides an emergency water source for cooling towers and fire protection and control, and is part of the NGA Campus East LEED Gold certification, with an interconnected system of surface and subsurface drainage feeding all stormwater runoff to it, from both point and non-point sources.

Sub-Goal 2.3 – Stormwater Runoff

Of DoD development and redevelopment projects in FY 2014 with 5,000 square feet or greater, 79.4% of them complied with the requirement to maintain pre-development hydrology to the maximum extent technically feasible. The Navy and Air Force achieved 100% compliance, while the Army and Marine Corps achieved 72% and 73% compliance, respectively. In August 2014, the Air Force published Engineering Technical Letter 14-1, *Construction, Operation, and Maintenance Guidance for Storm Water Systems*, providing specific operations and maintenance guidance for procedures and practices that minimize stormwater pollution by effectively managing permanently constructed LID features.

To improve compliance with this goal, the Army has issued several LID guidance documents and tools, including: 'Army Stormwater Management Using Low Impact Development', an automated LID design application planning tool, and the 'Army Low Impact Development Technical User Guide' which is a guide for use by installation Departments of Public Works, especially Master Planners and LID project designers. In FY 2014, the Army trained 50 master planners, engineers, and stormwater program managers on the Army's LID initiatives, including table-top exercises where teams designed LID best management practices for stormwater management.

Objective 2: DoD Readiness Maintained in the Face of Climate Change

GOAL #3: Greenhouse Gas Emissions Associated with DoD Operations Reduced

The Department has been steadily reducing its target subject GHG emissions every year since the FY 2008 baseline, with FY 2014 emissions 13.1% below the baseline, as shown in Table 4. Total DoD GHG emissions for FY 2014, for all categories subject to the reduction target, were under 30 million metric tons of CO_2-equivalent emissions, when third-party operated renewable energy generation is included.[3] The inventory is dominated by just four sources, which account for 87% of all subject GHG emissions: purchased electricity (56%), stationary combustion (23%), employee commuting (14%), and employee business air travel (6%).

Sub-Goal 3.1 – Scopes 1 and 2 Greenhouse Gas Emissions

The downwards trend in the Department's Scopes 1 and 2 GHG emissions continued in FY 2014, with emissions 11.3% lower than the FY 2008 baseline, although this was short of the 13% target.

Sub-Goal 3.2 – Scope 3 Greenhouse Gas Emissions

The Department's Scope 3 GHG emissions also continued to decline, reaching 19.5% lower than the FY 2008 base year in FY 2014, driven by a continued increase in credit for hosting renewable energy facilities. The FY 2014 result surpassed DoD's 13.5% target for FY 2020.

Sub-Goal 3.3 – Telework

Of those DoD employees eligible for regularly recurring telework in FY 2014, 14.5% teleworked at least one day per two-week pay period, falling short of the 17% target. Participation across the MILDEPs and other DoD Components varied greatly, with teleworking in the MILDEPs generally less common than in many of the smaller Components. Two Components topped 50% participation: DLA with 56% and DFAS with 53%. Three others had more than 40% of eligible employees regularly teleworking: the Defense Security Cooperation Agency at 47%, Defense Information Systems Agency (DISA) at 45%, and WHS with 42%. The Components were split evenly into two distinct groups: those with high participation between 26% and 56%, and those whose participation failed to meet the 17% target, with participation of 15% or less. Figure 6 shows the percent participation for DoD as a whole, the MILDEPs, and the seven Components with more than 2,000 eligible employees.

The Air Force has a set of policies to promote the use of flexible work arrangements, including compressed work schedules, flexible work schedules with credit hours, and telework for eligible civilian employees. These policies include: Air Force Policy Directive 36-8, *Employee Benefits and Entitlements and Work/Life Programs*; Air Force Instruction 36-807, *Weekly and Daily Scheduling of Work and Holiday Observances*; and Air Force Instruction 36-816, *Civilian Telework Program*. Installation Commanders, Tenant Commanders, and Heads of Activities are encouraged to attempt to overcome artificial barriers and permit flexible work arrangements that allow employees to better balance their work and family responsibilities on a daily basis, consistent with workload and mission requirements, and to incorporate telework arrangements into Continuity of Operations plans.

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[3]This amount reflects the inclusion of Scope 3 credit DoD receives for renewable energy generation hosted on DoD land but operated by third parties, for which DoD does not retain the renewable energy certificates. Without this credit, target subject emissions totaled 31.0 million metric tons of **CO_2-**equivalent.

Table 4. Change in DoD GHG Emissions (Subject to Target) From FY 2008 to FY 2014

Scope and Category		DoD GHG Emissions Subject to Target, million MT $CO2_{(e)}$						% Decrease (FY 2008 - 2014)
		FY 2008	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	
Scope 1	Stationary Combustion	6.73	6.68	6.40	6.08	6.06	6.1	
	Non-highway Vehicles, Aircraft, Ships, Equipment	1.74	0.99	1.56	1.46	1.44	1.3	
	Passenger Fleet Vehicles	0.73	0.68	0.64	0.62	0.53	0.5	
	Fugitive, Fluorinated Gases, Other	0.22	0.30	0.23	0.20	0.28	0.3	
	Fugitive, On-site Wastewater Treatment	0.01	0.01	0.01	0.01	0.01	0.0	
	Fugitive, On-site Landfills	0.22	1.10	0.26	0.25	0.24	0.3	
	Industrial Process Emissions	0.00	0.00	0.00	0.00	0.00	0.0	
Scope 2	Purchased Electricity	16.35	15.91	15.74	15.05	14.56	14.6	
	Purchased Biomass Energy	0.00	0.01	0.01	0.01	0.01	0.0	
	Purchased Steam and Hot Water	0.86	1.76	1.02	0.95	1.26	0.8	
	Purchased Chilled Water	0.00	0.00	0.00	0.00	0.00	0.0	
	Purchased CHP Electricity, Steam and Hot Water	0.00	0.00	0.03	0.00	0.00	0.0	
	Reductions for Renewable Energy Use	0.00	-0.42	-0.21	-0.23	-0.29	-0.1	
Scopes 1 and 2		**26.86**	**27.01**	**25.68**	**24.39**	**24.10**	**23.82**	**11.3%**
Scope 3	Transmission and Distribution (T&D) Losses	1.05	1.04	1.01	0.98	0.96	0.96	
	T&D Losses REC Adjustment	n/a	n/a	n/a	0.0	-0.02	-0.01	
	Employee Business Air Travel	2.30	1.89	2.39	2.09	1.67	1.69	
	Employee Business Ground Travel	0.24	0.33	0.24	0.26	0.21	0.22	
	Employee Commuting	3.40	3.47	3.84	3.82	3.74	3.66	
	Off-site Wastewater Treatment	0.01	0.01	0.01	0.01	0.01	0.01	
	Contracted Municipal Solid Waste Disposal	0.64	0.62	0.59	0.46	0.57	0.65	
	Credit for Hosting Renewable Energy Facilities	n/a	-0.75	-0.66	-0.67	-0.91	-1.03	
Scope 3		**7.63**	**6.61**	**7.42**	**6.94**	**6.22**	**6.14**	**19.5%**
Total Emissions		**34.49**	**33.62**	**33.10**	**31.33**	**30.32**	**29.96**	**13.1%**

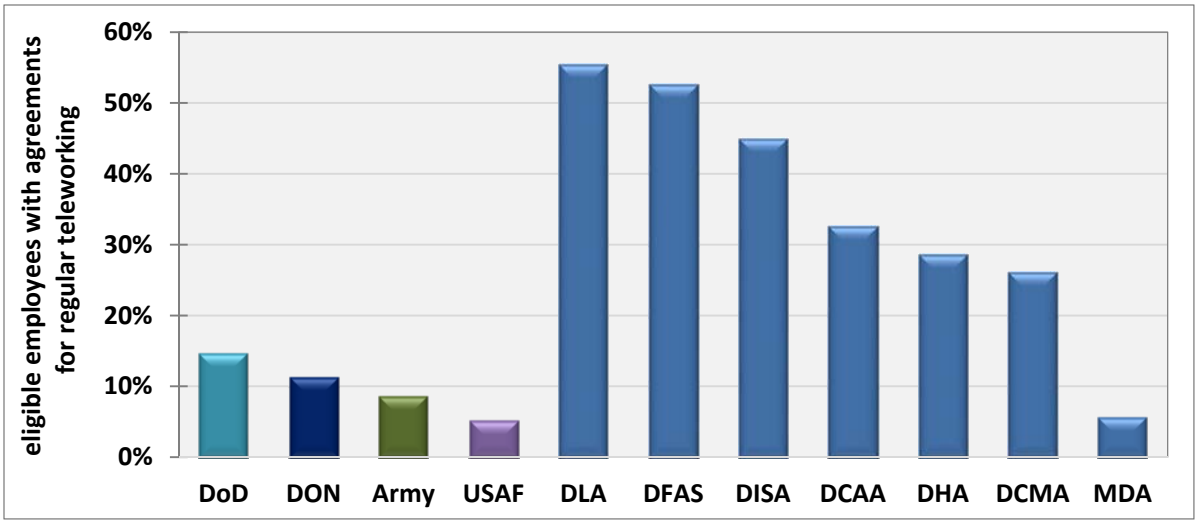


Figure 6. Teleworking Participation in DoD, Shown for the MILDEPs and Components with at Least 2,000 Eligible Employees

To increase awareness and use among eligible employees, DON employees are required to complete training before initiating telework, while supervisors of interested employees are required to complete training prior to approving telework agreements. DON's new enterprise-wide Department of the Navy Civilian Employee Assistance Program offers educational sessions on successful teleworking and managing teleworkers, useful to support the transition to teleworking for both employees and supervisors. The USMC developed a formal telework plan and continues to train managers and supervisors on how to determine telework eligibility, developing employee telework agreements, and the benefits of telework.

The Army worked to increase telework participation in FY 2014 by highlighting the benefits of telework, including improved continuity of operations and increased employee satisfaction. The Army issued a Telework Week memorandum in February 2014 highlighting the benefits of telework, encouraging eligible employees to participate in telework options, and reiterating the need for employees to appropriately code telework time in their organization's time and attendance system.

Sub-Goal 3.4 – Employee Air Travel

The FY 2014 GHG emissions associated with business air travel by DoD employees were 29% lower than the FY 2011 base year, and essentially flat from the prior year. DoD Components continue to follow the 2011 Secretary of Defense Track Four Initiative Decisions, requiring that travelers justify why travel is needed to accomplish the objective, and DoD employees are increasingly making use of electronic communication systems such as Defense Connect Online in lieu of travel.

GOAL 4 – DoD Climate Change Vulnerability Assessed and Resiliency Improved

In FY 2014, DoD actions to improve resiliency to climate change largely fell into three categories: policy, vulnerability assessments, and planning. On the policy side, the Department screened the complete set of DoD Issuances (DoD Directives, Instructions, and Manuals) to identify those that should be reviewed in depth, to assess which should be updated to include consideration of climate change impacts. Of the 59 documents OSD identified in depth, OSD concluded that the content of 29 of them should be updated during the course of the regular review cycle, which for this set of documents will be completed in FY 2018. The Department also issued important policy relating to

climate change in FY 2014:

- a new Floodplain Management policy memorandum, issued February 2014; and
- a new policy memorandum on water rights and water resources management on DoD installations and ranges in the United States, issued May 2014.

DoD initiated screening-level surveys to assess the vulnerability of DoD installations from severe weather and projected changes in climate, conducted in two phases. Phase 1, initiated in March 2014, directed the MILDEPs to focus on DoD sites located within 2 kilometers of a coast or tidal area. Phase 2, initiated in September 2014, encompasses the remaining sites worldwide. In December 2014, DoD initiated a pilot test of a tool to assess water needs, designed to help installations identify how much water they actually need to satisfy mission requirements.

On the planning side, the Department initiated Regional Climate Change Adaptation Planning Pilot efforts for three areas: Hampton Roads, VA (led by the Navy), Michigan (led by the Army National Guard), and Mountain Home, ID (led by the Air Force). At the Pentagon, DoD launched a Geographic Combatant Commanders Climate Change Information Exchange, with the first meeting convened for two days in September 2014. DoD also participated in the Initial Climate Change Adaptation Planning Workshop in May 2014, part of the Climate Change Preparedness and Resilience Exercise Series led by the Federal Emergency Management Agency.

Army FY 2014 Climate Change Adaptation Efforts

The Army issued its Army-wide High-Level Climate Change Vulnerability Assessment in January 2014, identifying potential regional vulnerabilities to mission activities, infrastructure, and training lands and ranges, based on the draft National Climate Assessment. The Army continued developing a framework in FY 2014 to incorporate climate change considerations into existing Army plans and planning processes, rather than creating a separate climate change adaptation plan. The Army also began developing detailed guidance to integrate climate change considerations into Army Integrated Natural Resource Management Plans.

In FY 2014, the Army began evaluating many of its processes to better integrate climate change considerations: 'military value' analysis factors used for stationing decisions, the implications of climate change on acquisition and supply activities, the use of water in selected classes of Army supply, and deep futures war gaming in Army future force planning. The Army also initiated a water footprint analysis of the Army supply chain, and the National Guard also began to evaluate the resiliency of its readiness centers to support anticipated increased demand for disaster response. Finally, the Army Science Board released its study *Planning for Climate Change: Actions for the Army to Better Adapt to the Effects of Climate Change in 2030* in November 2013.

Objective #3: The Ongoing Performance of DoD Assets Ensured by Minimizing Waste and Pollution

GOAL #5: Solid Waste Minimized and Optimally Managed

Sub-Goal 5.1 – The Use of Paper

As of the end of FY 2014, DON and the Air Force had issued and are implementing policy to reduce the use of printing paper, along with ten other DoD Components: DCMA, DeCA, DFAS, DLA, MDA, NGA, NRO, NSA/CSS, the Defense Health Agency (formerly the Tricare Management Activity), and WHS. These Components comprise more than 63.6% of all DoD employees, exceeding the 60% target for FY 2014.

Photo: U.S. Air Force

While the Army does not have an Army-wide printing policy, its Net Zero directive issued in FY 2014 includes minimization of waste generation. Through the Net Zero efforts, some Army installations have issued printing policies. Additionally, digital staff action systems and electronic filing systems have been implemented across the Army to improve records control and reduce the use of paper, and most Army organizations have replaced their older printers with newer energy-efficient models capable of being set to default to duplex printing.

DLA Document Services plays a major role in reducing the amount of printing paper used by the Department as a whole, since it assists the Services and other DoD Components with many of their document needs. As shown in Figure 7, DLA Document Services has continued to drive down the number of hard copy impressions it has made, with those made in FY 2014 more than 51% fewer than in FY 2010, and 15.5% fewer than FY 2013.

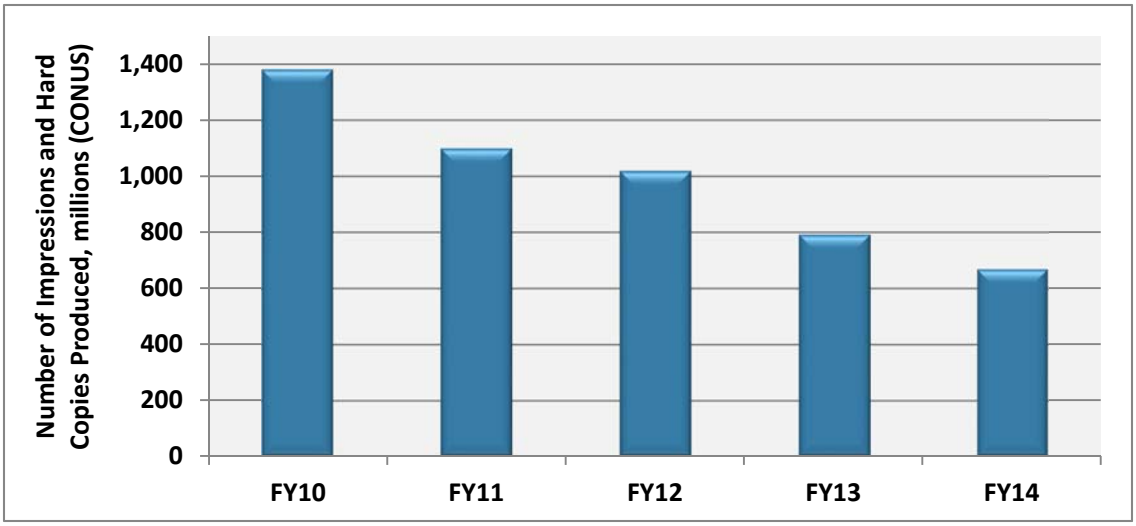


Figure 7. Number of Hard Copies and Impressions Produced by DLA Document Services since FY 2010 (millions, contiguous United States CONUS])

This ongoing shift away from printing is accomplished through the following services:

1. **Duplex Printing.** DLA Document Services increased the number of multi-functional devices it

maintains in FY 2014 by 1,500 over FY 2013, for a total of 37,586. All devices are set to default to duplex printing, which DLA estimates saves approximately 1 billion sheets of paper annually across DoD.

2. **Print on Demand.** Print on Demand is "print what you need, as you need it" output, avoiding overprinting. Print on Demand output totaled 640 million pages in FY 2014, 154 million fewer pages than in FY 2013. The approach also saves warehousing costs.
3. **Scanning and Conversion.** DLA Document Services converted an additional 26.4 million of hard copy images to digital form in FY 2014, for a total of almost 140 million over the last five years, greatly reducing storage requirements.
4. **Electronic Document Management.** DLA Document Services provides digital storage of original digital documents and the storage of documents scanned and converted at its field locations. In FY 2014, the service added 13 million pages to digital storage, bringing the total number of stored digital pages to 443 million. Assuming all pages would have been printed double-sided, this prevented 221 million sheets of paper from being printed and stored.
5. **Distribute and Print.** The Distribute and Print approach prints exactly what is required at a given time by distributing document files electronically and printing to the DLA Document Services at locations closest to the end user, which virtually eliminates the historical pattern of ordering an estimated 10% more publications than needed. This approach saves DoD shipping costs, warehousing costs, millions of sheets of paper, and waste expenses, since unneeded publications originally ordered to ensure sufficient quantities are no longer printed.

Sub-Goals 5.2 and 5.3 – Solid Waste Diversion

The Department diverted 46% of its non-hazardous solid waste from disposal in FY 2014, falling short of the 48% target. For construction and demolition (C&D) debris, the 82% diversion from disposal far exceeded the 58% target, with all Military Services surpassing the target by between 21 and 30 percentage points. The extent to which the Military Services and DLA diverted solid waste from disposal is compiled in Table 5.

Table 5. Percent Solid Waste Diverted from Disposal in FY 2014

Component	Non-Hazardous Municipal	C&D Debris
Army	49%	88%
USN	45%	79%
USAF	48%	80%
USMC	36%	80%
DLA	47%	61%
DoD-wide	**46%**	**82%**
FY 14 Target	48%	58%
FY15 Target	50%	60%

The Army continued to focus on food and organic waste in FY 2014. It significantly increased its diversion of organic waste in FY 2014, and continued the Net Zero Waste implementation efforts. Material flow analyses at Net Zero Waste pilot installations determined that at least one-quarter of the solid waste generated on Army installations is food and other organic waste, which could be composted or segregated for other treatment and disposal. Based on the success of the Defense Commissary Agency with food waste dehydration systems in their Commissaries, the Army is also piloting a dehydration system at two locations representative of dining facilities and field (training area) kitchens across the Army. The Army will analyze the pilot project results to determine whether food dehydration is advantageous at other Army installations. In July 2014, the Army issued guidance on procedures for donating excess food to authorized food recovery and distribution organizations.

The waste and materials management requirements in the updated SDD policy the Army issued in

December 2013 exceed those in UFC 1-200-02, *High-Performance and Sustainable Building Requirements*, issued March 2013. The Army policy requires each new construction and major renovation project to plan for and encourage occupant recycling by providing building occupants with conveniently located and appropriately sized space for reuse and recycling. In April 2014, the Installation Management Command (IMCOM) issued operational order 14-067, *Integrated Solid Waste Management*. The order addresses waste minimization, reuse, and diversion, including composting and food recovery. IMCOM also issued a solid waste contracting template that incentivizes diversion over disposal, and establishes a rate structure based on the weight of material. In November 2013, the Army Public Health Command issued Technical Guide 197, *Guide for Developing Integrated Solid Waste Management Plans at Army Installations*.

The Air Force met the target for non-hazardous solid waste in FY 2014 while generating positive economic benefit, showing that efforts to focus on training, improving cost awareness, and providing enhanced guidance are proving successful. However, from FY 2015 onwards, the Air Force will be challenged to sustain a diversion rate of 50%.

Photo: U.S. Navy

In FY 2014, the Navy released OPNAV M-5090.1, *Environmental Program Readiness Manual*, which contains a comprehensive revision of DON's policies on solid waste management designed to encourage diversion. The Navy completed a study of potential diversion methods for food wastes, which it is disseminating to integrated solid waste managers to reduce the disposal of food waste.

The FY 2014 diversion rate for WHS fell short of the 47% target, with 42%, but improvements WHS made to the recycling operation at the Mark Center increased diversion from 32% to 70%. The NSA recycling program continued to evolve into a single stream operation in FY 2014 (changes began in FY 2013), maximizing participation by making office recycling easier for employees. NSA marketed the program through signs, posters, emails, and webpage articles to make sure the workforce was aware of the enhanced program.

GOAL #6: The Use and Release of Chemicals of Environmental Concern Minimized

Sub-Goal 6.1 – Chemical Use, Release, and Transfer

For the CY 2013 reporting year under the Toxics Release Inventory (TRI), DoD reduced the quantity of toxic chemicals released into the environment and transferred off-site by 15.5% relative to the CY 2006 base year. The Department worked with GSA and other agencies to develop a new Federal Acquisition Regulation in FY 2014 titled "High Global Warming Potential Hydrofluorocarbons", designed to reduce the use and release of these chemicals into the atmosphere. DoD's participation was critical, since hydrofluorocarbons are used in virtually all existing and new weapon systems. DoD continually strives to ramp down its use of those hydrofluorocarbons that are potent warmers of the atmosphere, by shifting to existing alternatives and continuing to research new ones. The Federal Acquisition Regulation is currently undergoing review by the U.S. Government Office of Information and Regulatory Affairs.

The Air Force on-site releases and off-site transfers of toxic chemicals increased slightly in the CY 2013 TRI reporting period, but the Air Force is still on track to exceed the DoD SSPP target reduction goal for CY 2014. Part of the increase was due to a CY 2013 replacement of nitric acid that occurs periodically in plating tanks at the F-16 manufacturing plant. Most of the reported TRI releases,

however, were from two sources: aircraft depot 23 maintenance activities (29%) and two coal–fired heat plants (27%). Once the on-going project to replace the boiler in the Wright-Patterson Air Force Base (AFB) heating plant utility is completed, the coal-based emissions should be significantly reduced.


Non-toxic pre-paint treatment better than traditional toxic product, Robins AFB, GA

Photo: U.S. Air Force

Culminating in FY 2014, the Army succeeded in all but eliminating two chemicals that made a significant contribution to its reported TRI releases: trichloroethylene and methylene chloride. Anniston Army Depot historically accounted for the vast majority of these substances, but their use at the Depot has been reduced by 91.3% and 99.6%, respectively.

In FY 2014, the Navy initiated an in-depth study on the sources of chemical releases and the materials and processes that generate them, and plans to identify potential technology solutions that can be implemented to further reduce these releases. Nitrate compounds remain the largest single source of Navy releases—approximately 45% of the annual total in CY 2013. The nitrates are by-products of secondary wastewater treatment plants, and the Navy is continuing to upgrade its plants to meet increasingly stringent National Pollutant Discharge Elimination System permit requirements nationwide. The Marine Corps continued to drive down its on-site releases and off-site transfers of toxic chemicals at non-range facilities. The FY 2014 reductions were due in large part to infrastructure improvements that resulted in decreased releases from non-range facilities, but reductions in training levels and the number of personnel on base also contributed.

Photo: U.S. Navy


Naval Air Warfare Center Aircraft Division, MD, developed a water nozzle to replace halon for fighting fires

The DLA Ozone-Depleting Substance (ODS) Reserve Program at Defense Supply Center Richmond serves as DoD's central manager for the return, storage, reclamation, and issuance of ODS for all of the Military Services and the Coast Guard. The Reserve gives DoD the capability to recover and centrally receive, reclaim, store and issue ODSs. Defense Supply Center Richmond implements a monthly leak monitoring program to identify and resolve leaking cylinders and/or drums associated with the ODS Reserve Program.

Sub-Goals 6.2 and 6.3 – Pesticides

To help ensure that individuals apply pesticides only when necessary and do so safely and effectively, DoD requires individuals applying pesticides on its installations to be appropriately certified. The overall rate for certification of DoD applicators and its contract personnel in FY 2014 was 99.6%. Due to constant turnover in personnel, the Department is unlikely to achieve an exact 100.0% rate. Installation Integrated Pest Management Plans (IPMPs) describe how the installation will prevent, manage, and control animal and plant pests while following the principles of integrated pest management and complying with DoD and Component policy and federal, state, and local laws. The percentage of installations having these plans approved and updated was 95.6% in FY 2014.

Objective #4: Continuous Improvement in the DoD Mission Achieved through Management and Practices Built on Sustainability and Community

GOAL #7: Sustainability Practices Become the Norm

Sub-Goal 7.1 – Procuring Sustainable Goods and Services

OSD, DLA, GSA and other federal agencies have been working together to recommend changes to the Federal Procurement Data System to enable it to track all sustainable procurement data categories in the future. Until sufficient automated systems are in place to enable DoD to accurately report the extent of sustainable procurement, the Department manually reviewed 2,150 contract actions from FY 2014 with values over $3,000 for their compliance with sustainable procurement requirements, finding 97.5% of them to be in compliance. The review process included contracts from the Military Services, DLA, MDA, DeCA, DCMA, DFAS, NGA, NSA, Defense Health Agency, and WHS. The nearly 100% compliance reflects the fact that sustainability has successfully become woven into the everyday fabric of procurement in the Military Services, DLA, and other DoD Components. The Department has been steadily increasing the incorporation of sustainable procurement language into contracts, project criteria, and standard operating procedures.

The Department launched the DoD Sustainable Products Center in March 2014 on https://www.denix.osd.mil/spc/. The website is a repository of information on sustainable products and their performance, and serves as a forum for DoD personnel to submit questions regarding sustainable procurement and to share success stories.

In the Navy, the Weapon Systems Support field activity of the Naval Supply Systems Command (NAVSUP) worked with DLA and GSA to identify green alternatives for high-demand consumable items the Navy uses daily. The more sustainable alternatives are now being provided to acquisition professions via electronic tools and catalogs, increasing the use of green products without changing existing requisitioning processes or adding additional workload. In FY 2014, the Navy focused on publicizing its *Buy it Green* guide (for Navy Purchase Card Holders) and the *Contract It Green* guide (for Contracting Specialists), which it developed last year. They are available at https://www.navsup.navy.mil/ccpmd/purchase_card/buy_green. *Buy it Green* contains sustainable procurement requirements, customized ordering instructions for DLA and GSA purchasing websites, and a consolidated list of sustainable products. *Contract It Green* provides information on the relevant sections of the Federal Acquisition Regulation, a list of types of contracts with green opportunities, sample statement of work language, links to specific green programs, and an overview of GSA's new interactive Sustainable Facilities Tool. The Navy marketed the guides through articles and the Internet, and by providing soft copies to Navy Heads of Contracting Activities, and hard copies to requesters.

Training on sustainable procurement, Natick Soldier Systems Center, MA

Photo: U.S. Army

During FY 2014, the Army updated its two-page *Quick Guides* for use by the requirements generator as well as the purchasing/contracting officers. The guides summarize the applicable sustainable procurement requirements for a number of common installation-level activities, such as food service, motor pools, building operation and maintenance, and administrative offices. They also provide sources for corresponding sustainable products (e.g., EMALL, GSA Advantage). To increase awareness of sustainable

procurement requirements, the Army provided three-hour training sessions for requirements generators and contracting/procurement personnel at the Army National Guard Bureau and the U.S. Army Reserve Command. Additionally, the Army's updated SDD policy, issued in December 2013, contains a new paragraph requiring all new construction and major renovation contracts to include clauses requiring compliance with applicable sustainable procurement requirements (e.g., bio-based, energy efficient, water-efficient, and recycled content). The paragraph also requires contracting officers to report these clauses in the Federal Procurement Data System.

DIA upgraded its Contract Management System in FY 2014, to more accurately enforce the selection of sustainable procurement Contract Line Item Numbers by making these fields mandatory, and by providing a drop-down field for each Contract Line Item Number to specify the reason why the procurement is sustainable. The new version is scheduled for release in FY 2015. DeCA's 2013 Sustainability policy, Director's Policy 500-30, provides guidance concerning the purchase of sustainable products, domestic and local food products, and recyclable materials for resale in commissary stores.

Sub-Goal 7.2 – Electronic Stewardship and the Efficient Use of Data Centers

The Department estimates that 96% of its acquisitions of desktops, laptops, and monitors in FY 2014 were registered with the Electronic Product Environmental Assessment Tool (EPEAT), and that an estimated 77% of desktops, laptops and monitors had power management features enabled. The portion of DoD excess or surplus electronic products whose end of life disposition was handled in an environmentally sound manner is estimated to be 87% in FY 2014. The FY 2014 performance was lower than expected because a larger volume of electronic products was turned in for disposal than forecasted. DLA is developing a solicitation for award in the fourth quarter of FY 2015 that will expand its recycling capacity and require all buyers of DoD electronic scrap in the United States to comply with Responsible Recycling© practices or e-Stewards®. To deal with sensitive material, some Components need to destroy electronics. For example, MDA degaussed and crushed more than 5,000 hard drives in FY 2014, and sent the material off-site for precious metals recovery. MDA also extended its proper handling of excess electronics to employees in FY 2014, holding two electronics recycling events for employees' home electronics.

Efforts continue across the Department to consolidate data centers and make the remaining ones more efficient. Since FY 2010, DoD has closed 488 data centers, eliminating almost 513,000 square feet of space. Through a pilot effort, the Army is installing meters at a sample set of data centers that are representative in terms of factors such as size and location. Data from the pilot will be used to evaluate the cost-effectiveness of metering, and will inform the roll-out of meters at the Army's remaining data centers. NRO implemented measures that nearly halved energy costs for the air handling units in four data centers, and at several sites it replaced existing computer room air conditioning units with much more efficient units using electronically commutated motors. Across the enterprise, NRO purchases equipment that more is energy efficient whenever it is time to replace data center equipment such as load centers, uninterrupted power supply units, and power distribution units. In FY 2014, DIA continued to transition from older equipment to more efficient servers and storage equipment. NGA evaluated its Campus East data center and found that its computer room air conditioning units were overutilized. It removed 18 out of 49 units and implemented a variety of other energy saving measures, generating annual savings of more than 1 GWh and $73,000.

Sub-Goal 7.3 – High Performance, Sustainable Buildings

Of the 48,480 applicable buildings with areas greater than 5,000 GSF in the DoD inventory, 394 of them (or 0.8%) met all of the criteria of the *Guiding Principles of Federal Leadership in High Performance and Sustainable Buildings* (hereafter referred to as the Guiding Principles) as of FY 2014. In terms of building area, 1.1% of total area conformed to all of the Guiding Principles, up by more than one-third since FY 2010, as shown in Figure 8. The current structure of the Guiding Principles is an "all or none" approach that fails to give credit for progress made. Although only a small percentage of DoD facilities meet all of the criteria of the Guiding Principles, many facilities meet many of the criteria, and many are LEED-certified. The Department anticipates that the revision to the Guiding Principles currently underway will better reflect the progress that DoD has been making. Section IV provides many success stories on high performing, sustainable buildings.

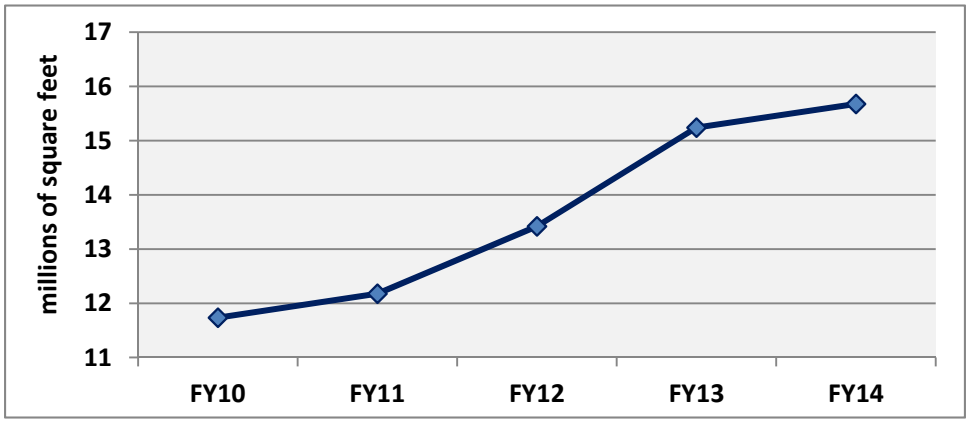


Figure 8. Rise in DoD Building Area that Conforms to the Guiding Principles

There was a flurry of activity in FY 2012 and 2013 to drive improvements in the inventory of DoD's buildings, with the November 2013 policy memorandum *Department of Defense Sustainable Buildings Policy*, the March 2013 UFC 1-200-02 *High Performance and Sustainable Building Requirements*, and the May 2012 UFC 2-100-01 *Installation Master Planning*.

In the Army, the updated SDD policy issued in December 2013 captures the requirements contained in these recent issuances, as well as integrating Net Zero energy, water, and waste concepts. The updated policy establishes a comprehensive process that makes energy and sustainability considerations a fundamental part of every new facility design. Among other things, it requires a minimum LEED Silver certification, as well as total building commissioning to capture the high-performance milestones realized from capital investments. To ensure that designs for new construction and major renovations comply with the updated Army policy, Army project design teams will use a project scorecard developed by the U.S. Army Corps of Engineers to track each element of the policy. After the updated policy was issued, the Army worked with DOE's Lawrence Berkeley National Laboratory to integrate proven new technologies into the Army's standard designs and

Photo: U.S. Marine Corps

LEED Gold Intelligence Operations Center, Camp Pendleton, CA

specifications. A total of 40 Uniform Facilities Guide Specification sections were reviewed, and 29 were selected for revision to incorporate the applicable technologies. The revisions were drafted by Lawrence Berkeley National Laboratory and the U.S. Army Corps of Engineers and submitted to the DoD Discipline Working Groups. To date, 21 of the 29 revisions have been approved.

Sub-Goal 7.4 – Environmental Management Systems

The overall EMS rating for DoD was yellow for FY 2014, with 61% of the 354 EMSs across the Department earning a green rating, 32% yellow, and 7% red. The portion of green scores was up from 49% in FY 2010 and 57% in FY 2013, while the portion of red EMSs has almost been halved since FY 2010. Since this EMS metric is no longer in active use within the Federal Government, DoD is in the process of considering options for revisions that might be more effective.

The Navy and the Air Force excelled in implementing EMSs in FY 2014, achieving 80% and 74% green ratings, respectively, and no red scores. The Navy success was the result of continued efforts to re-declare conformance with 14001 EMS standard of the International Organization for Standardization, and to resolve any major findings of external audits on a sustainable three-year cycle. The Navy also issued updated environmental readiness policy, drafted standardized procedures for integrated EMS and Environmental Compliance audits, and realigned and restructured two regional and four facility-level EMSs for more effective management and oversight.

The Air Force achievement came from the consistent application of the "appropriate facility" designation, Joint Basing activities and alignments, and effectively combining range facilities that are contiguous to a main supporting base with that supporting base. Another key reason was the Air Force use of a single, web-based Microsoft SharePoint EMS communication system—eDASH—that effectively enables the tracking and execution of requirements through performance indicators (dashboards) and collaboration tools. eDASH provides real-time access to current regulatory and policy information, as well as ongoing standardization efforts, workspaces and/or installation level sites for all Air Force EMSs, visible by all Air Force stakeholders.

The Marine Corps developed a comprehensive environmental management data repository collection portal online in FY 2014. USMC installations now have access to current and historical environmental management metric data, which will assist in identifying trends and tracking progress towards environmental management goals and requirements. Headquarters Marine Corps continued to conduct EMS Lead Auditing Training courses across their installation commands.

Environmental management program at MCAGCC 29 Palms, CA, helps maintain sustainable habitats

Photo: U.S. Marine Corps

III.2 The Way Forward

Objective #1: The Continued Availability of Resources Critical to the DoD Mission is Ensured

GOAL #1: The Use of Fossil Fuels Reduced

Sub-Goal 1.1 – Facility Energy Intensity

The Navy plans to reduce shore energy consumption through a phased approach that first dedicates funds towards proven energy efficiency technologies that lower total energy demand, increasing the energy efficiency of current facilities and utility systems, and implementing a culture of conservation through data transparency. The next focus is on renewable energy initiatives, to decrease greenhouse gases and increase energy security. This approach enables the Navy to reduce energy consumption and increase renewable energy generation in the most cost-effective way possible, while protecting critical assets.

The Navy is driving down demand on a number of fronts. One is to continue tracking consumption at the facility-level, by investing in facility energy management systems, audits, and personnel. This will provide leaders with greater visibility into energy consumption and improve Navy consumption practices by directly linking consumption to behavior awareness and accountability at the installation and regional command levels. The Navy will also engage with its tenants to drive further reductions by incentivizing positive changes in energy usage. Navy Smart Energy will be accomplished through the ongoing installation of advanced metering infrastructure to capture 95% of overall consumption at installations. The metering involves data transport to generate actionable information, using the Centralized and Integrated Reporting for the Comprehensive Utilities Information Tracking System, and the Navy's Public Safety Network. This effort will be followed by integrating the advanced metering infrastructure with other industrial control systems, including direct digital controls and supervisory control and data acquisition systems.

HVAC in hangar shuts off automatically when doors are open, Naval Air Weapons Station China Lake, CA

Photo: U.S. Navy

Another Navy initiative is a pilot project of a split system variable refrigerant flow technology in three buildings, to assess the approach's ability to improve energy efficiency and indoor air quality. The technology uses an inverter compressor in the outdoor air-cooled condensing unit to vary the speed of the compressor based on actual cooling demand, resulting in lower energy consumption. The split system allows multiple indoor fan coil units to be served by one air-cooled condensing unit, which reduces maintenance. If results from the pilot project are favorable, the Navy will consider expanding this new system in other facilities.

From FY 2017 to FY 2020, the Navy is planning to invest $743 million in directly funded programs: the Energy Sustainment, Restoration and Modernization Program of Commander, Navy Installations Command, the Major Maintenance and Repair Program, and Military Construction (MILCON). Another $550 million is slated for third-party financing with performance contracts (UESCs and ESPCs). The Navy expects these investments, coupled with the more near-term improvements described, to cut overall energy consumption in half from the FY 2003 baseline by FY 2020.

The Marine Corps is providing increased energy security with reduced energy costs to better support the Marine Corps mission. It is doing so by making smart efficiency improvements to existing facilities, investing in energy efficient new construction, partnering with private industry for the development of renewable resources, and leveraging the power of individual Marines. The Marine Corps considers it the responsibility of everyone who manages, works, and lives onboard USMC installations to address the concerns caused by the volatility in energy costs and supplies, and potential vulnerabilities to manmade and natural disasters. These instabilities in both price and supply place USMC installations and training areas at risk.

To promote the shared USMC vision that the efficient use of energy resources is a critical component of mission readiness, on 9 March 2015 USMC issued a Marine administrative message for the Energy Ethos Campaign and Unit Energy Manager Program. The programs will create a culture of energy and water efficiency throughout bases and stations. The Energy Ethos Campaign will:

Advanced electricity meter, MCB Camp Pendleton, CA

Photo: U.S. Marine Corps

- provide tenant commands with greater visibility of installation energy resources;
- emphasize end-user-controlled reductions; and
- sustain commitment to the efficient use of energy resources.

The Unit Energy Manager, appointed by each tenant command, will be vital in supporting and promoting the Energy Ethos. Along the East Coast, the 2015 Marine Corps Installations East Energy and Water Strategy emphasizes both the technical and the behavioral, promoting an Energy Ethos campaign that encourages Marines to take ownership over their energy consumption.

The Marine Corps is also generating significant energy savings by eliminating thousands of individual power supplies from the installation IT architecture. It is doing so by shifting from a system of individual communications and network owners to a common optical Installation Communication Distribution Systems platform and Installation Data Center hosting platform. Another related improvement is to adopt passive optical network technology standards within each of the facilities and training areas. The Marine Corps strives for a concerted effort by all Marines and civilians to achieve congressional energy mandates by the end of CY 2015.

The Army will continue to program and budget for projects that reduce energy demand and improve installation energy security, including aggressive pursuit of performance contracting. For FY 2017 – FY 2021, the Army has programmed $1.232 billion in Army Energy and Utility Restoration and Modernization Program. It also anticipates executing $250 million in planned ECIP projects, and over $200 million in ESPC/UESC projects. The Army's enterprise-wide utility metering program will continue in FY 2015, with the installation of advanced meters to be completed at all Phase 1 facilities by the end of FY 2015. The meters will report energy utility use data to an enterprise Meter Data Management System to support integrated facility and data management capabilities for Enterprise Energy Information Management business processes, operational capabilities, and business systems. When fully functional, the system will help installations pinpoint energy savings and opportunities for avoiding utility costs, as well as improve cost accounting for large tenants that reimburse for installation utilities services.

In FY 2014, the Army Materiel Command conducted energy assessments at its industrial bases—which are among the Army's largest energy users—to identify opportunities to improve productivity, reduce waste, and save energy. It will continue working with these bases in FY 2015 to improve energy efficiency, implementing recommendations from the assessments as funding becomes available. Army IMCOM is also focusing significant effort on improving energy efficiency, with Operations Order 15-013 requiring installations to implement Energy Action Plans that include: trained full-time energy managers, building energy monitors, quarterly energy steering committee meetings, comprehensive energy and water audits, energy security plans, review of construction and repair project plans for energy efficiency opportunities, and review of new designs to ensure they meet or exceed standard 90.1-2010 of the American Society of Heating, Refrigerating and Air-Conditioning Engineers. The Order also requires installations to evaluate a list of 31 low cost/no cost energy conservation measures and implement all that are appropriate as resources become available.


Solar dish concentrators, Tooele Army Depot, UT

Photo: U.S. Army

The Air Force will begin implementing its Meter Development Management Plan in FY 2015, scheduled to run through FY 2018. The plan lays out a comprehensive strategy to install advanced meters adequate to capture 60% of energy consumed by the Air Force, and to deploy advanced meter reading systems to the approximately 35 bases that consume the most energy. At that point, the Air Force will pause the metering initiative to conduct a business case analysis of the meters and advanced meter reading systems, to determine if the approach yields a favorable savings to investment ratio. The Air Force estimates that the goal of capturing 60% of total energy will require $42 million from FY 2015 to FY 2018, but the metering initiative is currently below the funding line due to the fiscally constrained environment. However, the Air Force is working diligently to find sufficient resources to implement the plan. In addition to metering, in FY 2015 the Air Force will proactively advocate for ECIP projects that provide large energy savings, aggressively pursue the use of performance contracts, and adjust its investment strategy to achieve the greatest synergy between these two funding approaches. Another important component of the Air Force facility energy management program is to foster energy awareness at all levels of professional development and technical training. The Air Force will continue its drive to provide energy leadership, promote the importance of energy to the Air Force mission, and incorporate energy considerations in the acquisition process.

DIA's primary approach to improving energy efficiency in FY 2015 is to execute ESPC projects in its HQ, and ensure that the expected energy savings specified in the contract are achieved. DIA also plans to identify projects that qualify for ECIP Military Construction funding, as well as projects that can be funded internally.

Sub-Goal 1.2 – Renewable Energy

The Army's renewable energy efforts will continue on two fronts in FY 2015: (1) large-scale projects (>10 MW) developed by the Army's OEI, and (2) smaller-scale projects initiated at installations, often funded through performance contracting or incorporated into MILCON projects where cost-effective. OEI is scheduled to execute contracts and agreements for over 100 MW of renewable

energy projects in FY 2015. The Army will continue to pursue combined heat and power technologies in FY 2015, with projects planned or underway for Redstone Arsenal (AL), Radford Army Ammunition Plant (VA), and Fort Wainwright (AK). The Army's use of ESPC and UESC financing mechanisms will also be used to fund small-scale renewable energy projects (e.g., a 3 MW solar carport at Fort Hunter Liggett), which will help the Army achieve its goal of having one gigawatt of renewable energy by 2025. The 2014 update to the Army SDD requires that each project evaluate the feasibility of including renewable energy, and maximize the use of solar hot water heating where life cycle cost-effective. An increase in renewables is also driven by the Army's Net Zero Energy strategy. The nine Net Zero Energy pilot installations are implementing renewable energy projects, using strategies broadly applicable to all Army installations.

Secretary of the Navy Ray Mabus set a goal in May 2014 for the DON to produce or procure one gigawatt of renewable energy by the end of 2015. As per the Navy Shore Energy Strategy, the Navy is committed to integrating renewable energy technology where and when the investment and development of the technology is directly advantageous to achieve Navy goals, and the use of alternative energy technologies is cost effective and achievable. The Navy plans to leverage all funding opportunities to support the Navy's renewable efforts, including ECIP, third-party financing, power purchase agreements, and enhanced use leasing.

Photo: U.S. Navy

Rooftop solar, Naval Air Warfare Center Training Systems Division, FL

The Marine Corps is committed to taking a leadership position in on-site renewable power development, with assistance from private sector financing and development expertise. The primary route by which USMC will accomplish its renewable energy goals is through both direct funded construction and alternative financing, such as energy saving performance contracts, power purchase agreements, and enhanced use leases. Marine Corps Base Camp Lejeune signed an agreement with the local utility, Duke Energy Progress, for a new 13 MW solar facility expected go online in CY 2015. Electricity from the facility will connect to the grid through a Duke Energy Progress substation, and be available to utility customers.

The Air Force renewable energy plan focuses on developing cost-effective, on-base renewable projects—both electric and non-electric. The Air Force Renewable Energy Project Development Subpanel will continue to provide leadership for and coordination of renewable energy projects by providing a forum, process, and tools for evaluating potential projects. One key approach the Air Force is using to incorporate renewable energy on installations is the power purchase agreement with third parties under either a utility purchase contract or extended use lease. With this approach, the Air Force leases to the private sector developer a parcel of non-excess and underutilized land for the project, at a fair market rent, and commits to a long-term purchase of all or most of the energy generated by a renewable power source. Also, the Renewable Energy Project Development Subpanel will continue to explore the role of the ECIP in augmenting the MILCON funds available for new building renewable energy development, where a project is cost effective and best suited for the location and need.

The DLA site in Susquehanna, PA, will be installing an additional seven solar thermal walls, as well as solar water heating. The agency is also evaluating the feasibility of a large-scale 13 MW

photovoltaic system for the installation in Tracy, CA, possibly under a power purchase agreement. Under its HQ ESPC, DIA will install a 500 kW rooftop PV array in FY 2015, which will begin producing electricity in FY 2016. In FY 2017, DIA is planning to install a 200 kW PV system over a new DIA HQ parking garage. NSA is planning to conduct a feasibility study to explore renewable energy possibilities for its cryptologic center in Hawaii.

Sub-Goal 1.3 – Vehicle Fleets

The Air Force remains committed to reducing the consumption of petroleum products across the entire vehicle fleet, not just the Air Force non-tactical vehicle fleet, through a diverse portfolio of acquisition strategies, alternative fuel use, vehicle management best practices, and by exploring new and emerging technologies that are a good fit for a given purpose. In FY 2015, the Air Force will continue to implement its Vehicle Fleet Management Plan, which maps out a systematic approach to vehicle acquisition, use, maintenance, refueling, and replacement. The plan calculates changes in vehicle demand due to anticipated changes in the mission or organization, and establishes a strategy to achieve full compliance with mandates to reduce petroleum consumption, acquire AFVs and vehicles that emit the fewest GHG emissions, and utilize alternative fuels. A key strategy is to procure the most fuel-efficient and cost-effective vehicle that meets mission requirements. Also tied to a verifiable mission are Air Force vehicle authorizations, which are geared to minimizing the number of vehicles needed to accomplish the mission, and maximizing the utilization of all vehicles. In FY 2015, the Air Force will continue this strategy, conducting additional vehicle validations, both virtually and via site visits, to identify and reduce vehicle authorizations that are no longer required to support changing mission needs, and to "right-size" the remaining vehicle authorizations.


Electric low-speed vehicle, Hancock Field Air National Guard Base, NY

Photo: U.S. Air Force

DON is conducting a study that will provide specific recommendations on whether DON should lease or purchase vehicles for its non-tactical fleet. The resulting Acquisition Decision Model will consist of a validated and verified methodology, based on a multitude of factors, for determining the optimum sources for vehicle acquisitions. The methodology will be designed so that it can be modified over time as market and technology situations change. When comparing life cycle costs of owned AFVs to those leased through GSA, separate USMC and Navy studies suggest that procurement may be more cost-effective than leasing in some cases.

In the Marine Corps, the Non-Tactical Vehicle Transportation Services of Headquarters Marine Corps focuses on several strategies to reduce vehicle petroleum use: using smaller and more fuel-efficient vehicles, replacing petroleum-dedicated vehicles with AFVs, replacing standard sized vehicles with low-speed EVs wherever possible, and annually reviewing vehicle assignments in order to reduce the size of the overall fleet.

In partnership with GSA, the Marine Corps will participate in three pilot programs—two focused on petroleum reduction and one on vehicle safety:

1. 25 CNG vehicles from GSA will be placed where existing fueling infrastructure is in place and manufacturers are capable of maintaining the vehicles;

2. 272 hybrid-electric vehicles will be placed at recruiting stations, where high mileage driving is typical and E-85 fuel is not available; and
3. the Marine Corps will test and evaluate 50 vehicles with front collision avoidance protection to see if this technology can play a role in the safe operation of the fleet.

The USMC will also pursue existing alternative vehicle technologies and fuels such as hydrogen fuel cell or battery electric vehicles.

The Navy is well on its way to meeting the 30% petroleum reduction by FY 2020. The Navy plans to continue to purchase more fuel-efficient vehicles and AFVs, placing AFVs where fueling infrastructure exists or is planned. The Navy will also seek to acquire EVs in cases where their use justifies the higher cost, continue testing new petroleum-reducing technologies through pilot programs, and further explore the use of telematics to help improve efficiency through driver behavior. Fleet right-sizing will continue as the Navy works to obtain its optimum fleet size through the Vehicle Allocation Module.

Photo: U.S. Navy

In FY 2015, the Army will continue to emphasize the relocation of its E-85 vehicles to areas where E-85 fuel is available, and will continue to pursue opportunities to install E-85 and biodiesel fuel pumps on installations that dispense over 100,000 gallons of fuel annually. Additional FY 2015 efforts will be focused on replacing the Army's conventional bus fleet with buses fueled by CNG, and conducting a fleet cost-benefit analysis to help the Army evaluate its options for CNG vehicle and infrastructure investments. The Army is in the process of conducting a pilot demonstration of vehicle-to-grid technology for 55 plug-in EVs at Fort Hood, TX. The charging stations are configured to allow bidirectional flow of electricity between the vehicles and the grid, providing up to 100 kW of power to the grid during periods of high demand, supporting the stability of the electric distribution system. The system is one of the first participants in a new ancillary services market set up by the Electric Reliability Council of Texas, in which participants are paid for helping the utility manage electrical demand. Also in FY 2015, the Army is installing DoD's first compressed natural gas fueling station, at Fort Benning, GA.

DLA will closely track and report the extent to which vehicles capable of operating on alternative fuel do so in FY 2015, and will explore making it mandatory for government-owned AFVs to use alternative fuels if they are available near garaged locations within established time and distance standards, or if they can be accessed during official government travel. DIA will continue to replace less efficient vehicles with fuel-efficient hybrids and electric vehicles, and to seek opportunities to remove vehicles from the fleet when no longer required.

GOAL #2: Water Resources Management Improved

Sub-Goals 2.1 and 2.2 – Reducing the Use of Facility Water

As explained in Section III.1, the Army has strong water use and water security objectives, embodied in the FY 2015 Army Campaign Plan, the October 2013 *Net Zero Water Balance and Roadmap Programmatic Summary*, and the SDD policy updated to be consistent with the Army's Net Zero Water philosophy. In FY 2015, the Army's Net Zero Water pilot installations will continue to focus on improving water efficiency and conservation measures to reduce water demand. The eight Net

Zero Water pilot installations are beginning to implement projects from their installation-specific Net Zero Water roadmaps. Several are pursuing the use of ESPCs to finance water efficiency and alternative water use measures. The Army is evaluating lessons learned from measures implemented by installations in California in response to the drought there, to assess their suitability for adoption across the enterprise. The Army will continue its Net Zero Water collaboration with EPA in FY 2015, including a water reuse project underway at Fort Riley, KS, that is testing a membrane bioreactor to reclaim water from the base's wastewater. A potential water reuse project is also being developed for Aberdeen Proving Ground, MD.

Water conservation projects remain an important part of the Air Force utilities portfolio, particularly for bases in arid or seriously water-constrained locations. In FY 2015, the Air Force will continue to invest in proven approaches that generate high returns in water and financial savings. Examples of FY 2015 actions that are expected to lead to continued success at reducing potable water consumption include: leak detection and repair; replacing plumbing fixtures with low-flow models; disconnecting irrigation systems; efficient irrigation systems, including the use of non-potable reclaimed water and harvested rainwater; extensive use of xeriscaping and native plants in landscaping; incorporating water conservation design principles into new MILCON projects; and housing privatization that incorporates separate metering. The Air Force will continue to collaborate in FY 2015 with DoD leadership and the other Services to identify steps that can be taken to protect Air Force water rights while identifying ways to reduce or conserve ILA water consumption.

Navy efforts to reduce potable water consumption will focus in FY 2015 on potable water reduction at installations, by installing water-efficient appliances and low-flow bathroom fixtures and using less potable water for landscape irrigation. The Navy conducts energy and water evaluations for its "covered facilities" every four years, and determines the measures to be taken by evaluating return on investment, legal requirements, and impact to critical infrastructure. To gain a better understanding of the effectiveness of different smart irrigation approaches, the Navy will measure the water saved from these projects and calculate their payback periods.

Water-efficient landscaping, Enlisted Dining Facility, Camp Pendleton, CA

Photo: U.S. Navy

The Marine Corps continues its longstanding commitment to improving water efficiency, due to its positive impact on the training mission. Moving forward, USMC will reduce the water intensity of existing facilities by installing advanced meters, procuring products that use water efficiently, and using xeriscaping in arid areas—fixing problems and promoting innovation throughout. One example of these improvements is Marine Corps Logistics Base Albany, where an old water piping system will be replaced beginning in CY 2015. The Marine Corps completes a comprehensive water evaluation of its facilities every four years, and will ensure that new construction is water-efficient.

The WHS Facilities Support Directorate is in the process of designing a project that will implement a new automatic boiler blowdown system and heat exchanger at the heating and refrigeration plant. The new system is expected to save up to 5 million gallons of water annually. WHS will continue its process of installing water meters for the domestic water lines for all five wedges, as well as the

ancillary facilities and other major uses of water throughout the Pentagon Reservation. This will allow WHS to accurately track overall water use at the Pentagon Reservation and identify high water use areas to investigate. The project includes a meter for the non-potable irrigation water line. Also in FY 2015, the WHS Facilities Support Directorate plans to conduct a water assessment for the Pentagon Reservation and Mark Center to identify potential water saving opportunities.

DIA's HQ ESPC includes the installation of low-flow fixtures, and the permitting of an on-site non-potable well. Once the projects are completed in FY 2016, they are anticipated to save DIA over 14 million gallons per year of potable water.

Sub-Goal 2.3 – Stormwater Runoff

The Navy is developing implementation guidance on best practices for funding the construction and maintenance of LID features, to assist Navy installations in effectively preventing stormwater runoff pollution. Both the Navy and Marine Corps monitor not only this sub-goal but related measures, such as implementation of LID best management practices and features for achieving Chesapeake Bay Total Maximum Daily Load goals, and best management practices to reduce runoff in municipal separate storm sewer systems. The Marine Corps will continue to work on implementing DON and DoD LID policy, along with compliance with EISA requirements.


Stormwater catchment, Cape Canaveral Air Force Station, FL

Photo: U.S. Air Force

In FY 2015, the Air Force will continue to evaluate the effectiveness of alternative engineering and low impact design options, such as permeable pavers, to manage storm water flow at Air Force locations and facilitate infiltration of stormwater into the ground. The Air Force expects to achieve 100% compliance with sub-goal 2.3 in FY 2015 and beyond, by virtue of Air Force policy, UFC 3-210-10 on Low Impact Development, and enhanced outreach to Air Force construction and water managers.

The Army will issue guidance in FY 2015 on the new LID provisions of the updated SDD policy. The policy requires all master planning, project development, and project site planning to: (1) follow the guidance of ASHRAE Standard 189.1 Section 5, (2) incorporate LID criteria, (3) maximize use of the existing topography (including slope, hydrology, flora and soils), and (4) minimize site clearing and soil grubbing activities to the greatest extent possible.

Objective 2: DoD Readiness Maintained in the Face of Climate Change

GOAL #3: Greenhouse Gas Emissions Associated with DoD Operations Reduced

Sub-Goal 3.1 – Scopes 1 and 2 Greenhouse Gas Emissions

The main path by which the Department intends to achieve its goal for Scopes 1 and 2 GHG emission reductions is through Goal 1: a reduced consumption of fossil fuels by facilities and vehicles, and an increased use of renewable energy. Some reductions will also come from fuel switching. For example, the Navy plans to shutter its last three coal-fired boilers in late FY 2015. Built in 1954 and located at the Goddard Steam Plant at Navy Support Facility Indian Head, MD, the central heating plant will be replaced by a nodal steam generation plant fueled by natural gas.

Sub-Goal 3.2 – Scope 3 Greenhouse Gas Emissions

The Department's main approach to reducing Scope 3 GHG emissions is through reduced emissions from employee air travel (Sub-Goal 3.4) and the continued recognition of third-party renewable energy projects on DoD managed lands providing hosted renewable energy credits.

The Navy's last coal-fired power plant is being replaced with natural gas, Navy Support Facility Indian Head, MD

Photo: U.S. Navy

Sub-Goal 3.3 – Telework

The Army continues its work to increase telework participation across the Army by highlighting the benefits of telework, including increased continuity of operations and employee satisfaction. In FY 2015, the Army issued guidance to align local telework policies and procedures relating to teleworking in inclement weather with DoD and Office of Personnel Management guidance. The Army Chief Information Officer/G-6 will continue to improve the Army's information technology infrastructure to better support telework.

The Air Force is committed to maximizing employee participation in telework to the extent that mission is not disrupted or jeopardized. In FY 2015, the Air Force will encourage Installation Commanders, Tenant Commanders, and Heads of Activities to incorporate plans for telework arrangements into their Continuity of Operations plans, and continue urging them to overcome artificial barriers and permit flexible work arrangements that provide better balance for employees, consistent with workload and mission requirements. The Air Force will continue to assess telework requests against eligibility criteria, and expects the number of personnel deemed eligible to telework on a regular, recurring basis to continue to increase.

Reflecting a commitment to expand telework opportunities wherever possible, DON recently issued its first comprehensive DON-wide telework policy. The policy outlines responsibilities of management to overcome obstacles and directs consistent implementation of telework programs throughout the Component, including reporting requirements. The policy will have a cascading effect on subordinate commands to issue or update their policies, increasing all types of telework arrangements.

Video teleconferencing, Joint Enabling Capabilities Command, Norfolk, VA

Photo: U.S. Transportation Command

In FY 2015 and FY 2016, MDA will continue to increase awareness regarding telework opportunities and strive to increase the number of eligible civilians routinely teleworking to 21% and 23%, respectively. During this period, the MDA will continue to monitor and audit telework performance (the number of executed agreements and personnel actually teleworking) to determine if additional measures are necessary to increase teleworking participation. MDA will also publish educational materials to more fully explain and promote the benefits of scheduling non-classified work activities to a standard day of the week in an effort to increase participation in teleworking. DIA has seen a significant increase in the telework agreements from FY 2013 to FY 2014 and expects that number to grow in FY 2015.

Sub-Goal 3.4 – Employee Air Travel

Air travel will continue to receive scrutiny across the Department, with all employees required to justify that travel is necessary to meet objectives, as per the 2011 DoD Track Four Initiatives Decision. The Military Services and other DoD Components reinforce this requirement, and continue to improve the technological capability to support virtual meetings with geographically dispersed participants, such as video teleconferencing. DIA, for example, has been highly successful reducing employee air travel through the widespread availability of secure desktop video teleconference monitors. Components are also advancing this sub-goal through administrative procedures. For example, all DeCA travel orders must contain the following statement: "SVTC or Other web-based communications are not sufficient to accomplish travel objectives." MDA will continue auditing travel authorization forms and analyzing business travel data to determine if its initiatives are effective. It plans to update its General Environmental Awareness Training to more fully promote the use of video-teleconferencing technologies.

GOAL 4 – DoD Climate Change Vulnerability Assessed and Resiliency Improved

In FY 2015, the Department will issue a DoD Directive on Climate Change Adaptation and Resilience that will codify the roles and responsibilities for action across the Department. By the end of FY 2015, DoD will complete its worldwide screening-level surveys to assess the vulnerability of DoD installations from severe weather and projected changes in climate. The Department will complete the three regional climate change adaptation planning pilots in FY 2016, and begin developing guidance for installations on developing adaptation plans. Some details on one of the planning pilot projects are provided in the text box.

Regional Climate Change Adaptation Planning Pilot: Michigan Army National Guard

The Michigan Army National Guard is collaborating with state and federal agencies and neighboring cities on planning to improve resilience to climate change. The collaboration is focused on its training lands at Camp Grayling and Fort Custer, and includes participation by the Michigan Departments of Natural Resources, Environmental Quality, and Transportation; the State Police; Michigan State University; and surrounding communities. Planning charrettes have been held at both training areas, and a regional adaption plan will be developed by September 2015 and made available to the public.

The Army will continue to develop its planning framework in FY 2015 to integrate climate change considerations into existing installation-level plans, with this year's focus on Emergency Contingency Planning and Potable Water System Master Plans. The Army will release in late FY 2015 the more detailed guidance on integrating climate change considerations into Integrated Natural Resources Management Plans that it is currently developing and has piloted at three Army installations. An effort is also underway to conduct a high-level vulnerability assessment for the Army's overseas installations, to supplement the CONUS high-level vulnerability assessment released in 2014. The Army is also supporting several research projects on climate change by the DoD Strategic Environmental Research and Development Program.

Objective #3: The Ongoing Performance of DoD Assets Ensured by Minimizing Waste and Pollution

GOAL #5: Solid Waste Minimized and Optimally Managed

Sub-Goal 5.1 – The Use of Paper

The Air Force has a broad array of measures it uses, and will continue to use, to minimize the use of printing paper. These include: requiring all new copying and printing devices to have duplexing

capability, conducting staff workflow and coordination processes electronically, using electronic communications as the primary means of maintaining information on policies and procedures, and printing documents double-sided. The successful Air Force electronic flight bag initiative will continue, with a number of Government Off-the-Shelf applications currently being developed expected for release in FY 2015.

Covered by the January 2013 department-wide DON Print Management Initiative, both the Navy and Marine Corps continue implementing the policy to improve the management and use of all types of printing and imaging devices to reduce the use of printing paper. As of December 2014, the DON Print Initiative had reduced paper usage across the DON by approximately 25% since its inception, amounting to a reduction of more than 350 million sheets of paper per year. By the end of 2015, paper usage will be reduced by approximately 33% and 500 million sheets. Additionally, the initiatives' assessment process has resulted in considerable energy savings, by reducing the total device count by over 30% without reducing capability, and in some cases correcting or improving print configuration. As of Oct 2014, the DON Print Initiative had saved over $25 million. The Navy has a strong relationship with DLA Document Services, and is using a phase approach spanning FY 2013 to FY 2017 to transition all Navy multi-functional devices to DLA Document Services. DON is establishing an enterprise-wide task management and records management system. Once in place, it will reduce the complexity and manual labor involved with managing paper documents.

Photo: U.S. Army

Mechanic using a digital manual, Picatinny Arsenal, NJ

Army organizations and installations will continue to pursue sub-goal 5.1 strategies, including use of digital staff action and electronic filing systems and GSA's Print Wise guidelines. Under the Army's Net Zero Waste efforts, installations are implementing 'go paperless' campaigns to reduce the volume of paper waste generated. Additionally, printer defaults have been set Army-wide to duplex printing where feasible.

MDA already issued policy in 2010, in the form of MDA Directive 8400.1, *Sustainable Electronics Management Program*, and MDA will continue implementing these policies and procedures moving forward. MDA set a goal to reduce annual printing paper consumption by 2% each year, and plans to achieve this through the following measures: (1) continue to promote electronic business practices, such as the use of electronic forms and MDA's E-Tasker system to track staff actions; (2) configure a default setting in Microsoft Outlook to print only the first page of a multi-page email; and (3) configure a default setting in Microsoft Word to preview a document before printing. DFAS will convert to all-in-one copiers during FY 2015, to further reduce the number of desktop printers and local area network printers. DIA plans to implement a paper reduction policy in FY 2016.

Sub-Goals 5.2 and 5.3 – Solid Waste Diversion

The DoDI on integrated solid waste management (ISWM) developed in 2013 and 2014, titled *Recycling of Materials and Integrated Solid Waste Management*, is currently undergoing formal DoD Component coordination and is expected to be issued by the end of CY 2015. The document contains policy, responsibilities, and procedures for implementing a solid waste diversion program.

The Army will update its guidance on solid waste management and Qualified Recycling Programs once the new ISWM DoDI is published. The Army will continue to focus on food and organic waste

in FY 2015, since it accounts for more than a quarter of installation solid waste. The Army is piloting dehydration systems at two locations representative of dining facilities and field kitchens across the Army. Based on the positive results to date, dehydration systems are being installed at Fort Jackson, SC, and are planned for an additional five installations by the end of CY 2015. The Army will also pursue food donations as means of reducing food waste. The Army is in the process of preparing an Engineering Construction Bulletin on deconstruction and diversion of C&D materials to help installations meet the requirements of the updated SDD policy. Army Commands will continue to focus on solid waste minimization and diversion in FY 2015, including conducting Staff Assistance Visits at its installations. IMCOM is launching a new Net Zero Waste training course and will offer the course at three IMCOM Regions in FY 2015. The course will bring together staff from the highest performing installations to assist installations that are struggling to meet their solid waste diversion goals. The Army Reserve will issue a Solid Waste Strategy in FY 2015, under which each Regional Support Command and installation will focus on source reduction (through sustainable procurement and material reuse) and recycling.

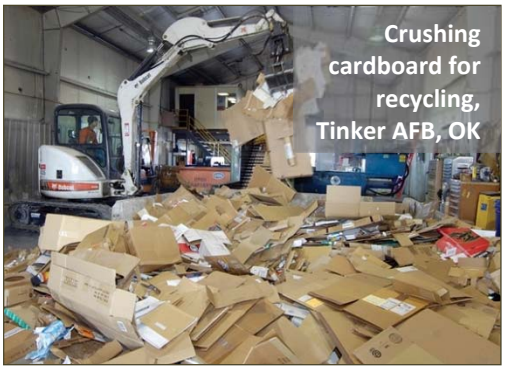


Photo: U.S. Air Force

The Air Force will continue to implement an Asset Management Program in FY 2015 that includes waste management as one of its five primary mission lines. The Air Force will continue to develop Waste Activity Management Plans to guide the investment strategy and approach for achieving program goals in solid waste management. Applying ISWM principles helps solid waste managers understand waste stream composition, available options for diversion or disposal, and associated costs and cost avoidances. The new DoDI will provide further guidance and direction, and is expected to further enhance the ability of the Air Force to cost-effectively manage non-hazardous solid waste. Continued, focused efforts will be required, however, to achieve the Air Force's more aggressive 65% FY 2020 diversion target, but the Air Force remains committed to finding innovative and cost effective ways to achieve established solid waste reduction goals. For C&D debris, the Air Force is committed to maximizing diversion of its waste stream in the most cost-effective manner possible. Year-to-year diversion rates can vary significantly based on the type of C&D projects executed each year, but it is expected that runway construction and refurbishment activities in FY 2015 will present significant C&D recycling opportunities. The Air Force will need to continue its emphasis on maximizing the diversion of C&D debris away from disposal in order to consistently achieve its 65% target diversion rate.

In FY 2015, the Navy will continue to leverage its ISWM working group to disseminate best practices and focus on areas where diversion can be increased. The group is considering pilot projects to implement findings from the FY 2014 study of alternatives for handling galley food waste, which has the potential to significantly increase the amount of food waste diverted from disposal in galleys and food service operations. The Navy will also continue it revisions of the Navy Qualified Recycling Program guide, which will help these programs operate more effectively. Finally, the Navy will begin an update of policy manual OPNAV M-5090.1, *Environmental*

Photo: U.S. Navy

Readiness Program Manual, to include the most recent solid waste policies intended to increase diversion rates.

The Marine Corps has a number of plans moving forward to support installation efforts to divert more solid waste away from the waste stream:

- Review installation solid waste management plans to identify areas for improvement, as well as successful initiatives that can be shared across USMC installations.
- Survey a representative set of installations to identify areas where Headquarters Marine Corps can provide support by issuing policy or guidance to help improve solid waste diversion, focusing first on the largest generators of waste.
- Periodically publish a newsletter to engage the installation pollution prevention community in discussions to increase awareness of diversion goals, current and future initiatives, and installation success stories.

GOAL #6: The Use and Release of Chemicals of Environmental Concern Minimized

Sub-Goal 6.1 – Chemical Use, Release, and Transfer

The Navy is conducting an in-depth study in FY 2015 of its top ten TRI chemical releases during the last five reporting years—the sources of chemical releases, the materials and processes that generate them, and potential technology solutions that can be implemented—to gain insights to help further reduce these releases. Nitrate compounds are being investigated as part of this study, which in both the Navy and Marine Corps remain the largest single source of TRI releases, due to the by-products of secondary treatment processes at wastewater treatment plants. Findings from the study may provide specific measures for reducing nitrate releases. Also, the Navy is contacting other federal agencies and commercial companies for ideas on the best approaches for addressing nitrate releases from wastewater treatment plants.

In FY 2015, the Army Materiel Command will continue to evaluate chemical use at its installations to identify the best options for chemical substitutions or production process changes that will reduce the use of toxic and hazardous chemicals. The Army Materiel Command will also continue evaluating opportunities for by-product synergies, including a project at Iowa Army Ammunition Plant that is evaluating the feasibility to use waste energetics from the Plant's production processes as a fuel source in a fuel cell.

Photo: U.S. Army

Pesticide-free zone for the Monarch butterfly, Army Garrison Forest Glen, MD

The Air Force will implement a number of initiatives during FY 2015 to reduce or eliminate the use, production, release, and transfer of toxic chemicals, and increase the accuracy and consistency of reported release data. Consistent with 2012 Air Force policy on Achieving Efficiencies Through Pollution Prevention and Waste Elimination, in FY 2015 Commanders will continue to utilize the Air Force EMS framework to identify and manage daily operations that generate waste and pollution. The framework uses a hierarchy that gives preference to first eliminating or reducing pollution at its source, by adopting less hazardous alternatives and reengineering processes, packages, systems, and facilities. Managing EMS-generated information via the electronic dashboard site (eDASH) of the Air Force Civil Engineer Center will allow the Air Force to more easily understand pollution prevention opportunities, target high-valued opportunities across the life cycle, and allow lessons learned and best practices to be shared with users across the Air Force. The Air Force shift to newer

weapon system platforms allows processes heavily dependent on nitric acid and other chemicals to be engineered out. This is an example of how the Air Force and its industry partners have incorporated environmentally preferable materials and manufacturing processes into Air Force weapon system acquisition, production, and maintenance. In FY 2015, the Air Force will continue its project at Wright-Patterson AFB to replace coal-fired boilers with natural gas boilers, which will reduce the release of approximately 45 tons of toxic materials annually. The combination of these two efforts, and on-going efforts to phase out additional toxic materials in weapon system components, is expected to keep the Air Force on track to exceed the DoD SSPP target reduction goal.

Sub-Goals 6.2 and 6.3 – Pesticides

DoD's pest management programs are essential to prevent pest and disease vectors from adversely affecting the Department's operations. On an ongoing basis, the Military Services evaluate opportunities to minimize the use of pesticides while maintaining mission support requirements. The Air Force will continue in FY 2015 to ensure that pest management personnel receive appropriate training, certified individuals are used to apply pesticides in a manner consistent with their intended use, and IPMPs are updated and implemented. The Air Force will continue to collaborate as needed with federal, state, and local officials to support pest management initiatives impacting Air Force installations and surrounding communities.

The Army anticipates that 100% of its pesticide applicators will be certified and/or recertified again in FY 2015, and it will continue to comply with Army Regulation 200-1 and DoDI 4150.7, which require Army installations to maintain current IPMPs.

The re-write of installation IPMPs must occur every five years, and in DON this is done by the NAVFAC Applied Biology Center at the expense of the installations. Therefore, the occasional failure of an installation to fund an IPMP re-write harms the ability of the Navy and Marine Corps to have 100% of their IPMPs comply. The best way to avoid this situation is for installations to make the re-write a high priority and plan for it in the Program Objective Memorandum process well in advance of the IPMP's expiration date.

Objective #4: Continuous Improvement in the DoD Mission Achieved through Management and Practices Built on Sustainability and Community

GOAL #7: Sustainability Practices Become the Norm

Sub-Goal 7.1 – Procuring Sustainable Goods and Services

The DoDI titled *Procurement of Sustainable Goods and Services* is currently undergoing formal coordination, and is planned for issuance by the end of CY 2015. The DoDI establishes policy, assigns responsibility, and provides compliance goals and direction for the sustainable procurement of goods and services. The Instruction also outlines procurement preferences, new contract requirements, training procedures, and program evaluation processes for sustainable procurement. Due to the fact that procurement is executed within DoD at many levels and by many organizational entities—spanning government purchase cards to major contracts—the Department expects the DoDI to have a significant impact in ensuring that procurement is conducted sustainably across DoD.

In FY 2015, the Army will launch short, web-based training modules to provide on-demand training for requirements generators and purchasing and contracting staff. The modules will focus on

common installation-level activities such as food service, motor pools, building operation and maintenance, and administrative offices. They will augment the activity-specific two-page Quick Guides that summarize the applicable sustainable procurement requirements for common installation-level activities, and will include sources for corresponding sustainable products, such as DoD EMALL and GSA Advantage. The Army will continue to require Commands to brief on sub-goal 7.1 performance as part of their quarterly and annual energy and sustainability briefs to the Assistant Secretary of the Army for Installations, Energy and Environment.

Army Contracting Command is also working to improve their sustainable procurement performance. The Command issued ACC Contracting Note #15-05 to raise awareness of and compliance with sub-goal 7.1 requirements. In the third quarter of FY 2015, the Command will issue a contracting checklist to help ensure that all applicable provisions and clauses are included in solicitations and resultant contracts. The Army National Guard will continue to develop and implement Sustainable Procurement Plans in FY 2015; to date, 32 states and territories have implementation plans. The Guard will also continue providing semiannual sustainable procurement training to Construction Facilities Management Offices, to raise awareness of this key group of requirements generators.

The NAVSUP Weapon Systems Support, in partnership with the Defense Packaging Policy Group, completed the Sustainable Military Packaging Roadmap in FY 2014. Once issued, the Roadmap will be used to identify and prioritize future efforts to reduce the environmental impact of military packaging across the DoD. The Marine Corps will continue to work with GSA and DLA to procure sustainable products at all installations, while educating contract writers, vendors, and product purchasers about sustainability requirements and mandates.

Demonstration of biobased penetrating lubricant

Photo: OSD

The Air Force will emphasize outreach and education in FY 2015, on using sustainable procurement practices and their life cycle benefits, and sustainable procurement requirements in contracting. It also plans to continue working with GSA to make environmentally preferable products more visible and accessible through GSA procurement tools. Once the new DoDI is released, the Air Force will review and update Air Force policies and instructions accordingly.

DLA will continue to research the possibility of adding the ability to track compliance with environmental regulations to DLA's EProcurement contract writing system. DIA plans to issue a new version of its Contract Management System in August 2015, which has been revised to accurately report sustainable procurement actions. After a brief beta testing period of the new version, DIA will make the sustainable procurement revisions mandatory for all users beginning in FY 2016. MDA has in place a Sustainable Acquisition Instruction that states MDA policy on sustainable procurement and identifies roles and responsibilities for implementing the program. In FY 2015, MDA will continue working to make its process for contract auditing more streamlined. MDA is currently in the process of updating its Green Procurement Training class, including incorporating changes pertinent to EO 13653.

Sub-Goal 7.2 – Electronic Stewardship and the Efficient Use of Data Centers

To ensure that all excess automated data processing equipment in the contiguous United States is disposed in an environmentally sound manner, in the fourth quarter of FY 2015, DLA plans to award a CONUS-wide sales solicitation for all its electronic scrap, requiring buyer facilities to comply with Responsible Recycling© practices or e-Stewards®. The Army has power management settings enabled on all Army workstation monitors, and is currently working to develop and implement a similar enterprise-level power management solution that can be applied to all Army workstation computers (Active Army, Guard, and Reserve).

Navy Enterprise Data Center, Space and Naval Warfare Systems Command Systems Center

Photo: U.S. Navy

To make the most efficient use of its data centers, the Department has committed to closing 251 more data centers by the end of FY 2015, eliminating almost 408,000 square feet from its inventory. In addition to closures, DoD Components continue improving the energy efficiency of the remaining data centers. The Services will continue their long-term alignment with the Joint Information Environment, which is implementing a hierarchy of data centers across the department focused not only on minimizing the number of required data centers, but on improving efficiency through the extensive use of server virtualization and application rationalization. Another example is DIA, which plans to implement an infrastructure modernization in FY 2015 to update its main data center with a high efficiency ducted hot aisle containment system configuration.

NRO is in the process of reducing the number of computer room air conditioners continually running in its data centers by using an energy monitoring and control system. It is also ensuring that all new computer room air handlers come equipped with variable speed drives, and as resources become available it is retrofitting existing handlers with variable speed drives. MDA plans to continue upgrading the electronic switchgear and backup generators used in its data centers with more energy efficient equipment. NGA is in the process of migrating its remaining dedicated data storage platforms, which result in a larger data center footprint using more power for less storage, to shared storage space.

Sub-Goal 7.3 – High Performance, Sustainable Buildings

As per the September 2014 NAVFAC Engineering Construction Bulletin 2014-02, *NAVFAC Sustainability and Energy Requirements*, both USN and USMC ensure that all repairs and alterations of existing buildings comply with the Guiding Principles, and that building repair projects exceeding $2.5 million are developed to reduce maintenance costs and the consumption of energy, water, and materials. In FY 2015, the Navy will continue with the certification of 17 facilities to either Silver or Gold LEED ratings.

LEED Gold Missile Procedures Training Operations Facility, Minot AFB, ND

Photo: U.S. Air Force

Based on UFC 1-200-02 and the November 2013 *DoD Sustainable Buildings Policy*, the Air Force expects

all new construction and major renovations to comply with the Guiding Principles. For existing buildings, the Air Force will base its decisions to invest in projects that improve the performance and sustainability of buildings based on the projects' life cycle return on investment. The Air Force success in improving the performance of its buildings is directly linked to the ability of building improvement projects to favorably compete with all projects and requirements through the Air Force Integrated Priority List process.

The updated SDD policy the Army issued in FY 2014 establishes a comprehensive process that makes energy and sustainability considerations a fundamental part of every new facility design, and incorporates new UFCs as well as Net Zero energy, water, and waste concepts. In FY 2015, the Army will issue additional Engineering Construction Bulletins to implement the requirements of the updated SDD policy, and it will update the Engineering Regulation. To improve reporting on this sub-goal, the Army will provide training in FY 2015 on how to use the updated coding guidance for the Real Property Asset Database.

Sub-Goal 7.4 – Environmental Management Systems

Air Force Commanders will use the Air Force EMS framework in FY 2015 to manage daily operations that generate waste and pollution. The framework directs the first preference to be the elimination or reduction of pollution at its source by adopting less hazardous alternatives and reengineering processes, packages, systems, and facilities. On an enterprise level, the Air Force will continue to manage EMS-generated information via the eDASH website. This will enable the Air Force to more easily understand the enterprise-wide implications of pollution prevention opportunities, target high-value opportunities for risk reduction and efficiencies across the life cycle, and facilitate the sharing of lessons learned and best practices with users from across the Air Force.

Photo: U.S. Marine Corps

During FY 2015, the Navy will implement a performance-based audit strategy plan for scoping integrated EMS and compliance audits enterprise-wide, and prepare the next three-year external audit cycle schedule. The Navy will further streamline audit procedures with guidance and criteria for more consistent EMS conformance determinations, standard documentation processes, shareable reporting templates, action plans, and proven corrective actions. A root cause analysis algorithm has been proposed and will be further tested for broader application. Standardizing the EMS framework across the enterprise will improve communication, enhance environmental performance oversight, and facilitate resource planning for future changes in program requirements. The Navy will also update its EMS training program to include more online tools, with additional short courses suited to a process owner audience and those with an EMS role related to aspects of their specific mission. The Marine Corps will continue to implement and appropriately maintain EMSs at all appropriate organizational levels.

The Army is developing an improved module in the Army's enterprise environmental data management and reporting system, the Headquarters Army Environmental System, for conducting external and internal EMS audits. The improvement will provide greater visibility into installation-level audit results (both internal and external), enabling the Commands and HQ Army to better address systemic issues, implement enterprise-level corrective actions where appropriate, and

identify opportunities for improvement. Deployment of the EMS module is planned for late FY 2015.

In FY 2015, DLA will issue an enterprise-wide EMS that will serve both as an umbrella policy over DLA environmental policies, and provide EMS procedures for all levels of the agency. It will provide policy and implementing guidance to define DLA's HQ and field activities' roles, responsibilities, and requirements within a DLA Organizational EMS in addition to existing facility EMSs. This, combined with continued assistance for those DLA organizations with EMSs that have not achieved a green score, is expected to improve DLA's EMS performance in FY 2015.

IV. Sustainability Highlights for Military Installations and DLA

IV.1 Department of the Army

Fort Carson

Fort Carson, CO, has been driving down energy and water consumption and solid waste disposal through a broad range of actions. Energy efficiency improvements at Evans Army Community Hospital on-base are saving $88,000 every year through the following:

- a comprehensive retrofit of service-level lighting to high efficiency lighting yielded a savings of more than $69,000 per year in electricity costs;
- lighting occupancy sensors save $2,787;
- replacing hot water tanks with instantaneous, or on-demand, water heaters netted $16,165 per year in costs for natural gas, while also reducing water consumption.

Additional efficiencies are resulting from the installation of variable-frequency drives on the HVAC system.

Photo: U.S. Army

The installation's new Echelons Above Brigade Company Operations Facility earned a LEED Platinum rating in November 2013. The building has a high-performance building envelope; occupancy, vacancy, and day-lighting sensors; efficient lighting systems; and automated programming controls. Temperature control in the building is accomplished with efficient geothermal heating and cooling. All told, energy usage by the facility is 54.6% below the standard 90.1-2004 of the American Society of Heating, Refrigerating and Air-Conditioning Engineers. The roof top PV panels generate approximately 87,000 kW-hours (kWh) of electricity annually, reducing annual energy costs by nearly 11%. Water efficiency features of the building have made annual water consumption almost 59% lower than the baseline, and earned additional LEED points for Innovation in Design and Innovative Waste Water Technologies. C&D diversion during construction of the facility was 91%.

Finally, across the installation, Fort Carson reached a solid waste diversion rate of more than 49% in FY 2014 by expanding its single stream recycling operations to motor pools. The base replaced its old segregated-stream bins with single-stream recycling totes in each motor pool. On an ongoing basis the new totes collect aluminum and steel cans, glass, plastic, cardboard, and all types of paper. When full, Soldiers empty the totes into single-stream dumpsters. Fort Carson also held its inaugural Paper Shredding event in FY 2014, generating 13,500 pounds of shredded paper for recycling, and it operates a collection point for household waste. Wood waste from the installation is sent to the local woody biomass energy plant at Colorado Springs Utilities.

Photo: U.S. Army

Fort Buchanan

Fort Buchanan in Puerto Rico, has been aggressively pursuing Net Zero Energy, Water, and Waste activities, aided by their Sustainability and Environmental Management System and a wide-ranging ESPC. The initiatives yielded annual savings of 6,800 kWh and 36.6 million gallons of water, and at peak production the

solar PV panels cover at least 60% of the installation electricity demand. The ESPC covered: three wind turbines, 11 PV arrays totaling 5.5 MW, 11 rainwater harvesting systems collecting 14 million gallons per year, a cooking oil recycling program involving seven facilities, the installation of high-efficiency water fixtures (faucets, showerheads, toilets, and urinals), and the detection and repair of eight water leaks. The installation also switched from potable water to well water for some irrigation and designed and installed a water harvesting system at nine buildings, covering 330,000 square feet. The Sustainability and Environmental Management System is divided into eight Environmental Management Action Plans covering various topics ranging from the management of hazardous materials to the management of Endangered Species habitat. Each plan has a working group that reports quarterly to the Environmental Quality Control Committee.

Minnesota Army National Guard

Rooftop PV on the LEED Gold Field Maintenance Shop, Minnesota Army National Guard

Photo: Minnesota Army National Guard

The Minnesota Army National Guard set an example in FY 2013 and FY 2014 in the management of non-hazardous solid waste and hazardous waste, the use of non-potable water for irrigation and vehicle washing, and sustainable buildings, all of which lowered operating costs while reducing the installation's environmental footprint. The installation operates a Hazardous Material Exchange that in one year redirected 9,000 pounds of hazardous materials that would otherwise have been disposed as hazardous waste, avoiding approximately $20,000 in purchasing and disposal. The team began by identifying opportunities for sharing hazardous material among facilities. In finding sufficient demand, the team set up a hazardous material exchange program where viable hazardous materials not needed by one facility are re-routed to another facility that can use them. Meanwhile, the Qualified Recycling Program at Camp Riley recycled more than 61% of the solid waste generated in FY 2014. The installation is currently developing a sustainable procurement program to guide the purchase of materials and reduce the generation of solid waste.

Also in FY 2014, the new Field Maintenance Shop on the Arden Hills Army Training Site received a LEED Gold rating. The facility incorporates a 40 kW PV array, daylight harvesting, and a water collection system. Rainwater collected from one-half of the building is stored in a 25,000-gallon underground cistern for irrigation, while that collected on the other half of the building is stored in a 20,000-gallon underground concrete cistern and filtered for use in the vehicle wash bays.

Joint Base Lewis-McChord

Joint Base Lewis-McChord (JBLM), an Army Net Zero Waste pilot installation, is an ongoing DoD leader in solid waste management, especially organic waste and C&D debris. For non-hazardous, municipal-type solid waste, the base is now in its second year with a new performance-based contract for solid waste disposal. The contractor weighs each container as it is emptied and logs the information by building number, enabling the installation to identify those buildings needing targeted occupant engagement to improve recycling. The base also has a robust composting program, using organic material from landscaping and other plant-based material around the base, food waste, manure, and biosolids from the wastewater treatment plant. In addition to generating revenue by selling the compost on the market, the compost is used to maintain an 8-acre habitat for the Taylor's Checkerspot butterfly. The base also used 903 tons of biosolids as landfill cover on 35 acres of land. In FY 2014, the installation increased its diversion of non-hazardous solid waste to 62%, up from 5.3% in FY 2013. The base also recycled 162 tons of lead acid batteries, generating

Brendalyn Carpenter, Northwest Guardian

$97,000 in revenue for the installation's Qualified Recycling Program.

JBLM operates the Army's most successful C&D diversion program, called Earthworks. JBLM diverted 98% of its C&D debris from disposal in FY 2014, by collecting the waste concrete and asphalt generated from in-house projects, then reclaiming the material to provide high-quality aggregate to the specifications of the Washington Department of Transportation for use in other on-post projects. This practice eliminates the cost of off-site transportation and disposal, and reduces the need for new crushed rock and aggregate. The cost of using reclaimed material depends on the volume of material processed, but generally is less than 50% of the cost of virgin material.

JBLM is also a Net Zero Water pilot installation, and applies its forward thinking to avoid using potable water for non-potable purposes. At the Madigan Army Medical Center, JBLM captures non-potable water discharged from an on-site groundwater pump-and-treat system operated by the base, and uses it in the Medical Center's cooling towers. Water from the towers is later reused to irrigate the hospital grounds.

Fort Hunter Liggett

Photo: U.S. Army Corps of Engineers

Fort Hunter Liggett, CA, is located in a rural area at the end of the area transmission lines, making renewable energy a wise investment for energy security reasons. The installation has set its sights on becoming net zero for energy by FY 2020, which is projected to save approximately $25 million over 25 years. Fort Hunter Liggett recently installed carports covered with solar PV panels, which are currently on track to generate 6 MW of electricity while providing shade for tactical vehicles. The post is working to install a microgrid with a battery storage system to provide electricity during grid outages.

Fort Hunter Liggett also has a successful recycling program, which not only serves the installation but is recognized as a Certified Community Service Program by the State of California, providing the community with a designated drop-off site. The certification allows the installation to get cash redemption on California Refund Value commodities such as soda cans and bottles, in addition to the scrap value paid by vendors. The base established sales agreements with vendors for scrap metals and paper goods (such as mixed office paper, cardboard, and white paper), with flexible pick-up cycles that increase during training periods and decrease when no training is scheduled. This is important due to the transient nature of the installation population, which can change from 10,000 to 100 Soldiers overnight.

Fort Huachuca

Fort Huachuca, AZ, is now home to the largest solar energy project in the DoD. Becoming fully

operational in December 2014, the array of more than 57,000 panels was made possible through a partnership of the U.S. Army Office of Energy Initiatives, Fort Huachuca, GSA, and the local utility, Tucson Electric Power. The utility funded, owns, and operates the project, with a 30-year easement arranged with the Army, while the installation purchases electricity through an existing GSA contract at rates approved by the Arizona Corporation Commission. The utility connects to the main grid through its Fort Huachuca substation, which reduced interconnection costs and improves system reliability. The 18 MW system provides about 25% of Fort Huachuca's electricity requirements.

57,000 panel PV array, Fort Huachuca, AZ

Arizona Daily Star

Scranton Army Ammunition Plant

Scranton Army Ammunition Plant used 67% less water in FY 2014 than in the FY 2007 base year, an achievement possible due to several projects relating to their manufacturing processes. The plant replaced three old, leaking cooling towers, repaired the water supply and condensate return systems, and implemented more water-efficient management practices in the manufacturing areas. A system to capture and store rainwater from the roof provided the plant with nearly 1.4 million gallons of water for use as cooling water in production operations, reducing the discharge of stormwater from the site and lowering operational costs. Further water savings come from a membrane ultra-filtration system that recycles all of the oily wastewater from the forging operation—about 320,000 gallons per year—and reuses it in the plant's noncontact cooling water system. The wastewater reclamation has enabled the plant to eliminate the discharge of effluent from this treatment system into the Scranton sewer system. The plant also recently installed a new ultra-filtration/reverse osmosis system to treat the wastewater from the zinc-phosphate coating operation that pre-treats metal parts prior to painting. The treated water will be used for the zinc-phosphate process and the boiler.

Rainwater captured in tanks (left) **used in cooling towers** (right), **Scranton Army Ammunition Plant, PA**

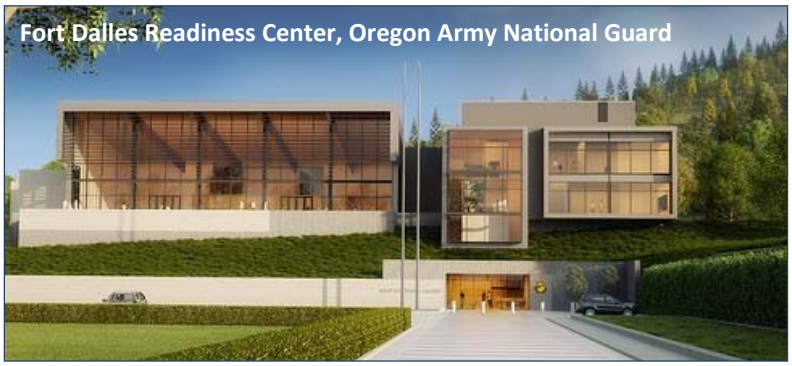
Photo: U.S. Army

Sierra Army Depot

Drought conditions in California prompted the Governor to declare a State of Emergency, and the President to direct federal facilities to immediately reduce their water use. Sierra Army Depot took the necessary steps to reduce their total water consumption by 51%. The Depot recently replaced its outdated water towers with a 1.1 million gallon subsurface reservoir. Within the Depot's industrial, administrative, and residential areas, preventive maintenance crews frequently check the hydrants, faucets, and other plumbing fixtures for leaks. For dust suppression on its roads and grounds, the Depot replaced the conventional, water-intensive system with hydroseeding to prevent blowing

dust. For its unpaved roads, the Depot is using DuraSoil, a non-hazardous, synthetic dust suppression fluid, to minimize dust and eliminate water usage. All employees living in Depot housing were issued a water conservation plan that strictly limits the watering of gardens and lawns, and prohibits washing privately owned vehicles in driveways.

Oregon Army National Guard



Rendering by Columbia Gorge Community College

The new Dalles Readiness Center at Oregon Army National Guard was designed to be nearly net zero, and a LEED Gold rating is pending. The nearly zero energy needs of the building were achieved through a wide range of measures. The building boasts many passive energy designs that capture solar heat in the winter and reject it during the summer: building orientation, natural ventilation, daylighting, architectural shading, window glazing with high U-value (high resistance to heat flow), and thermal breaks and sealed openings throughout the building envelope. Other energy efficiency features are an airtight structure, energy-efficient lighting, high-performance insulation, lighting and building controls, a cool roof design, and green roof. All electronic motors, pumps, and other equipment are high efficiency. HVAC is accomplished with a ground-source heat pump, and renewable energy is supplied from both a 90 kW PV system and a cutting edge concentrating PV system that provides approximately 30 kW.

IV.2 Department of the Navy

MCAS Cherry Point

For MCAS Cherry Point, NC, FY 2014 was a notable year for recycling, both paper and used oil. The air station generates a significant quantity of documents containing personally identifiable information. The Environmental Affairs Department contracted with a paper shredding service provider to perform on-site document destruction. There are 177 tamper-proof containers located throughout the air station that are emptied bi-weekly into a specially equipped truck that instantly shreds the paper as the container is emptied of its contents. During FY 2014, the program shredded 87 tons of sensitive material, all of which was recycled. In addition to saving the air station more than $13,000 in disposal costs, the program avoided the use of 262 cubic yards of landfill space.

MCAS Cherry Point also recycled almost 149,000 gallons of used oil in FY 2014, saving the Central Heating Plant $335,325 and sending almost $149,000 in proceeds to the Qualified Recycling Program.

Naval Facilities Engineering Command Mid-Atlantic

The Navy Exchange Service Command and Naval Facilities Engineering Command Mid-Atlantic equipped vending machines with motion sensors that minimize energy usage when the machines are not being used by customers. The controls save approximately $130 worth of electricity per machine annually in the Norfolk area, and even more in parts of the region that have higher electricity costs. The measure is estimated to save nearly 1900 kWh per year.

MCAGCC Twentynine Palms

Marine Corps Air Ground Combat Center (MCAGCC) 29 Palms, CA, continues its ongoing drive to improve its mission by advancing its sustainability. In FY 2014, its potable water intensity was 45% lower than in the FY 2007 base year, and non-potable water intensity was reduced by 71%. The base optimized its use of recycled water from its wastewater treatment plant, reducing the use of potable water for irrigation by approximately 120,000 gallons per day, or about 44 million gallons per year. In addition to efficiency and wastewater reclamation, 29 Palms also reduces water intensity through conservation: converting green space areas to desert areas, installing shade structures, using plants with low water requirements for all new construction landscaping, and installing synthetic turf at numerous common areas and family parks.

Boiler room of cogeneration plant, 29 Palms, CA

Photo: Richard Lui, The Desert Sun

The antifreeze recycling program at MCAGCC 29 Palms recycled approximately 3,740 gallons (68 drums) of ethylene glycol antifreeze during CY 2013, avoiding $456,000 in hazardous waste disposal fees and the need to purchase about $70,000 in new antifreeze. In FY 2014, the base completed the installation of a new twin turbine high-efficiency cogeneration facility with two 4.6 MW gas-fired turbines and a heat recovery system designed to feed the current high temperature loop heat transfer device. The cogeneration plant, along with other facility infrastructure improvements, save MCAGCC 29 Palms more than $600,000 every year, and have driven energy intensity down to 32% below the FY 2003 baseline. The base also continues to grow its solar PV capacity, adding 0.75 MW in FY 2014 to bring the total up to 5.2 MW, achieving an annual costs savings of more than $550,000.

MCB Quantico

Marine Corps Base (MCB) Quantico, VA, made notable progress in FY 2014 avoiding the disposal of scrap metal and hazardous waste. The base established a scrap metal collection and recycling program that collected approximately 300,000 pounds of metal, reducing landfill disposal fees for scrap metal from over $19,000 in FY 2013 to just $600 in FY 2014.

The base also developed a program that stores serviceable hazardous materials in a location where other organizations and agencies can use them, saving money for new purchases and reducing waste and disposal. The program is saving MCB Quantico over $6,800 in disposal costs annually. The base recently expanded the program to provide dedicated spaces for incompatible hazardous materials, a paint room, holding area for drums, a receiving area, and dedicated office space for hazardous material personnel and hazardous material management system terminals.

Naval Weapons Station Seal Beach

NAVWPNSTA Seal Beach exemplifies the role that an EMS program, together with leadership support, can play in achieving outstanding performance. The command's EMS provides a framework to engage the entire organization in achieving sustainability, including pollution prevention. Key to the success of the EMS Internal Assessment Program is the SMART Shop Process, managed by the EMS Coordinator. The process creates an effective face-to-face dialog between supervisors and

the Environmental Office, engages practice owners, and conducts a building-specific inventory of all "Environmental Points". Instead of a focus on frequently conducting routine inspections of equipment and process compliance, the Installation Environmental Program Director shifted staff time to developing improved compliance system tools and deploying a comprehensive training program. Through the SMART Shop Process, environmental staff worked with tenant and shop supervisors to develop simple, easy-to-use compliance tools, such as the SMART Binder, training materials, and practice owner self-checklists. The SMART Binders provide supervisors with a simple, one-stop guide to effectively using the EMS to support achieving sustainability goals. They were developed by environmental staff, the supervisors, and EMS Coordinator, who jointly reviewed shops processes, compliance requirements, and training needs.

The results are impressive. NAVWPNSTA Seal Beach has reduced facility energy intensity by 3% annually since FY 2003, and is on track to achieve a 30% reduction by FY 2015, reducing total base-wide energy consumption by 58% in FY 2013 from the FY 2003 baseline. The Station cut annual natural gas costs by more than 70% since FY 2003, reducing annual costs from $35,000 to $10,000. Fossil fuel use is being offset by renewable energy, which provides 7.5% of total energy base-wide. NAVWPNSTA Seal Beach has tackled water intensity as well, steadily improving efficiency such that FY 2013 water intensity was 19% lower than the FY 2007 baseline. The improvements have reduced potable water usage by 22.5 million gallons per year, saving $62,600 every year. The station is on track to increase its diversion of solid waste from disposal to 50% by FY 2015, and diversion in its C&D program was 97%, diverting 4,491 tons from disposal in FY 2013, saving almost $290,000.

To minimize stormwater runoff, NAVWPNSTA Seal Beach designed and installed LID features wherever feasible, including permeable surfaces, bioretention, filter/buffer strips, swales, infiltration trenches, and native plant landscaping. The Command also takes seriously its role as natural and cultural resource stewards across its three installations (Seal Beach, Fallbrook, and Norco), with stewardship goals integrated into the overall EMS. As part of an on-going partnership with the local community and U.S. Fish and Wildlife Service to protect the Seal Beach National Wildlife Refuge, volunteers conduct annual native planting events that have restored approximately 21 acres of important wetland transition habitat since 2004.

MCAS Miramar

MCAS Miramar, CA, received three Federal Green Challenge Awards from EPA in August 2014, for excellence in energy efficiency and renewable energy. Energy efficiency improvements over the past two years consisted of $30 million in investments in HVAC systems, lighting, automated controls, and boiler retrofits. The amount of renewable energy generated on post jumped by 250% from FY 2012 to FY 2013, and now covers about half of the air station's electricity needs and one-third of its total energy needs. The renewable energy comes from a variety of sources, including: extensive use of rooftop systems on buildings and carports, PV parking lot lights, concentrating solar photovoltaic panels, solar thermal panels that pre-heat water going to the boiler, a solar hot water system for the

Photo: U.S. Marine Corps

laundry, and methane from the on-site landfill. At 25,000 MW, the landfill provides half of the energy used by the entire installation. Given the large portion of the air station's total energy supplied by renewable energy, the installation is developing a microgrid that will enable it to continue operating in the event of a disruption to the San Diego electrical grid.

MCAS Miramar is also an installation to emulate on oil recycling: it negotiated sales of used oil for revenue ranging from $0.30 to $1.25 per gallon, which is saving the air station up to $494,000 annually in disposal costs.

Photos: U.S. Marine Corps

Pearl Harbor Naval Shipyard

Pearl Harbor Naval Shipyard, HI, generated $880,663 and 11,730 million Btu in annual energy savings by implementing one of the most promising solutions recommended by an energy audit. In February 2014, the Navy awarded a $7.4 million contract to construct a new low-pressure air compressor plant and install new low-pressure air compressors. The project provides the lowest total ownership cost and highest payback period by utilizing new, smaller, and more efficient variable speed air compressors.

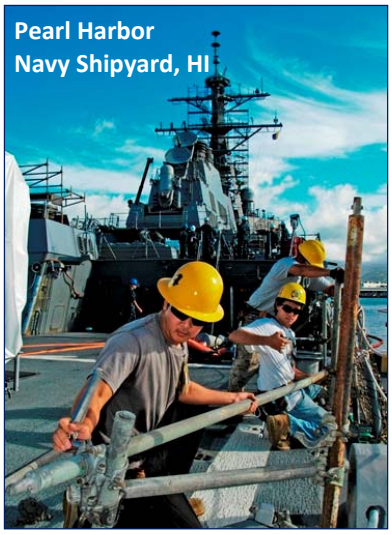


Photo: U.S. Navy

MCB Hawaii

MCB Hawaii saved more than $6,100 in CY 2013 by recycling antifreeze, while preventing 1,134 pounds of antifreeze (142 gallons) from being disposed and eight 55-gallon drums (440 gallons) of new antifreeze from being ordered. The program began in January 2010. The base is able to recycle 11% of waste antifreeze turned in to the Base Hazardous Waste Site.

Car Sharing at Multiple Naval Bases

The Navy completed pilot studies of two types of car-sharing systems, testing technologies with the potential to optimize fleet size and streamline vehicle dispatching. The participating installations were Naval Station Norfolk (VA), Naval Base Kitsap Bangor (WA), and Naval Station Great Lakes (IL). Systems tested in the car-sharing pilot study included automated, web-based reservations, geographic tracking equipment, secure key management systems, and keyless vehicle entry systems. Analysis of results found that simple payback can occur in three years, depending on the configuration of the fleet at a specific site. At Naval Station Norfolk, the technology enabled cost

reductions exceeding 60%. If the technologies are implemented within DoD on a large scale, the costs savings can be reinvested in more advanced technology vehicles that reduce the consumption of fossil fuels. Naval Base Kitsap Bangor and Naval Station Great Lakes continue to use the fleet type car-sharing systems (Naval Station Norfolk is not because the equipment had to be removed during facility renovations).

IV.3 Department of the Air Force

Davis-Monthan AFB

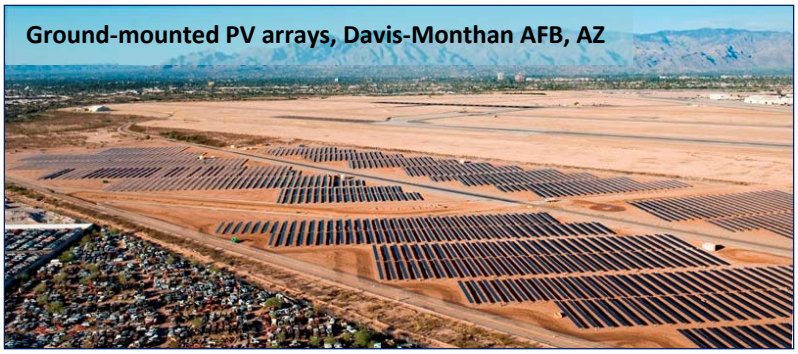

Ground-mounted PV arrays, Davis-Monthan AFB, AZ

Photo: U.S. Air Force

As of FY 2014, Davis-Monthan AFB, AZ, is home to the largest photovoltaic solar electric system in the Air Force. The 57,000 panels cover 170 acres of underutilized land on the base and have a capacity of 16.4 MW, enough to provide approximately 35% of the base's electricity requirements. The array is projected to save the base $500,000 every year in reduced electricity costs. Sun Edison installed the system and is operating and maintaining it under a 25-year lease with the Air Force. The array brings the base's total solar energy production capacity to 20.5 MW.

Davis-Monthan AFB is also reducing its fossil fuel intensity through energy efficiency, saving 11.6 billion Btu and $235,000 from the prior year. In terms of HVAC, the base made critical improvements to the central plant, installing energy-efficient chillers with a chilled water distribution loop, and a plate and frame heat exchanger to cool both new and older facilities. In FY 2013, the base completed a project to upgrade all large facility boilers across the base. For lighting, the 675 high-pressure sodium lighting fixtures on the base were replaced with T-5 high output fluorescent lights. All 580 taxiway lights were switched to light-emitting diodes, a measure so cost-effective the expense will be recovered in just one year, while also resulting in significant reductions in maintenance. The base finished retro-commissioning more than 200,000 square feet of facility space, including two high security facilities. On an ongoing basis, the Base Energy Team saves the installation money by maximizing rebate surcharges, accruing more than $50,000 received to date with a total of $160,000 forecasted through 2015. Davis-Monthan AFB received a 2014 Federal Energy and Water Management Award for this work.

Los Angeles AFB


Bank of EV charging stations, Los Angeles AFB, CA

Photo: U.S. Air Force

Los Angeles AFB, CA, operates the Air Force's first non-tactical fleet of plug-in EVs testing vehicle-to-grid technology. Vehicle-to-grid technology allows plug-in EVs to supplement major electrical grids during peak hours and then recharges vehicle batteries during off-peak hours when rates are cheaper. The 42-vehicle fleet, consisting of all electric vehicles and hybrid electric vehicles, is capable of providing more than 700 kW to the grid. The plug-in fleet consists of sedans, 21 trucks, and a 12-passenger van. Funding and testing of the vehicle-to-grid system was shared with energy providers and regulators because it enhances the energy security and reliability of both the installation and the electrical grid.

The Air Force plans to expand vehicle-to-grid capability to Joint Base Andrews and Joint Base McGuire-Dix-Lakehurst, and it will continue to look for additional ways to evolve the capability, such as utilizing batteries as a form of on-base energy storage for contingency and bare-base operations.

Hurlburt Field

In FY 2013, Hurlburt Field, FL, invested nearly $4.7 million to expand its system to reuse water generated by its advanced wastewater treatment plant. Previously, the system reuse capacity was limited to only 10,000 gallons per day, with 98% of the effluent from the wastewater treatment plant discharged to permitted wetlands after being treated and de-chlorinated. The installation added 40,000 linear feet of piping and a 500,000-gallon storage tank to the existing "purple pipe" reclaimed water distribution system. The expanded Reclaimed Water System was put into operation in June 2013. The first four months of the project saved 13 million gallons of water, with a total of 24.6 million gallons of reuse water produced in FY 2014 as a whole. As of March 2015, 12.7 million gallons reclaimed water had been produced, with 9.4 million gallons used on Hurlburt Field and 3.3 million gallons used by the City of Fort Walton Beach. The installation can now provide up to 200,000 gallons per day of excess water to the local community for their use. Hurlburt Field uses the treated reuse water for irrigation, aircraft and vehicle wash racks, fire training, and cooling towers. The system expansion has dropped the installation's water intensity almost 20% below the FY 2007 baseline.


Part of system to distribute reclaimed wastewater, Hurlburt Field, FL

Photo: U.S. Air Force

Cape Cod Air Force Station

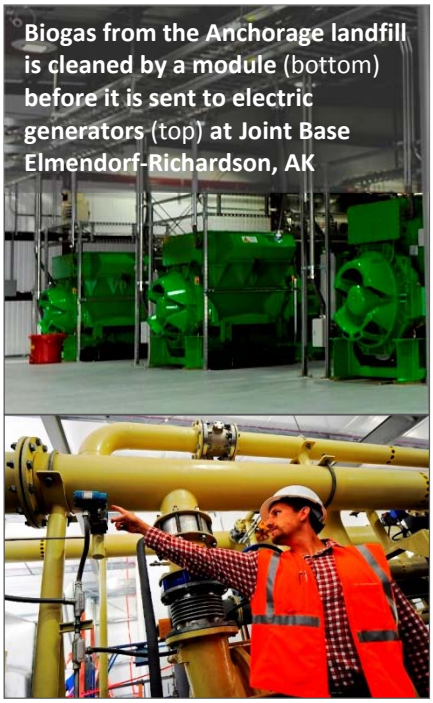

Wind turbine installation, Cape Cod Air Force Station, MA

Photo: U.S. Air Force

In FY 2014, the Air Force completed installing two 1.68 MW wind turbines at Cape Cod Air Force Station, MA. The new capacity has slashed the air station's electricity bill while helping to power the Phased Array Warning System radar system of the Air Force PAVE program. The radar system requires massive amounts of energy, previously costing $1.6 million per year in electricity, in order to fulfil its mission to detect submarine-launched ballistic missiles and track satellites in low-Earth orbit. The $8.5 million project has a payback period of eight to ten years, and the wind turbines have a life expectancy of at least 20 years. The turbines not only reduce the installation's operating costs by offsetting electricity costs, but the turbines at times produce more electricity than the station consumes, generating revenue from the local utility company which purchases the excess. In the first six months of operation, the project generated more than $668,000 in revenue from the utility, more than halving electricity costs.

The United States Air Forces in Europe

In 2014, the United States Air Forces in Europe received a Fleet Masters Award from the Association of Equipment Management Professionals for their exceptional skill in meeting the challenges of cost-effectively fielding a large fleet of mixed equipment. The Command Vehicles Branch of the United States Air Forces in Europe at Ramstein Air Base in Germany manages 7,500 vehicles at 42 locations in 35 countries on two continents, with an equipment replacement value estimated at $700 million. The team has increased the fuel efficiency of the average sedan to 26 miles per gallon, while 608 subcompacts average 67 miles per gallon, saving $143,000 annually and halving fossil fuel dependency. This was possible in large part by working with local fleet managers and vehicle operators to convert 283 vehicle authorizations from pickup trucks and large sedans to subcompact sedans. Identifying the biggest "gas guzzlers" in the fleet was helped by installing Fuel Master AIM2 radio frequency fuel-management devices on over 1,000 vehicles, blending onboard diagnostics and wireless technology to track vehicles and their fuel use. The award also highlighted efficient management in the face of significant reductions in funding, the use of web-enabled tools and databases, closely tracking maintenance and life cycle costs, and effective training of uniformed and civilian employees.



Biogas from the Anchorage landfill is cleaned by a module (bottom) **before it is sent to electric generators** (top) **at Joint Base Elmendorf-Richardson, AK**

Photos: U.S. Air Force

Joint Base Elmendorf-Richardson

In FY 2013, Joint Base Elmendorf-Richardson, AK, finished the first phase of construction of a facility to convert biogas from the adjacent Anchorage Municipal Solid Waste Landfill into electricity. The plant generates 54,498 MWh of electricity annually with five electric generators (totaling 7MW), and is slated to add a sixth generator by FY 2016. The base saves almost $1.8 million per year in energy costs, and is projected to save a total of $70 million over the 46-year life of the plant, generating a total of 3 million MWh of clean electricity. The partner utility operates and maintains the plant through a utility energy services contract with the base.

Cannon AFB

Water is a precious resource in New Mexico, and Cannon AFB, NM, has made water efficiency a top priority. Despite the base's industrial footprint increasing by nearly 96,000 square feet and the addition of nearly 1,000 new Air Commandos, the amount of groundwater pumped from the stressed Ogallala Aquifer declined by almost 100 million gallons compared to the previous year. A number of steps contributed to this success, including building more water-efficient facilities, constructing infrastructure specifically for reclaimed wastewater, identifying and fixing water leaks, metering infrastructure to monitor usage and identify potential pipe leaks, and xeriscaping the base to mirror the landscape of eastern New Mexico. The base conducted a 127-mile leak detection study, and identified and repaired 35 leaks in-house that are expected to save an additional 23 million gallons annually.

Photo: U.S. Air Force

Cannon AFB recently built a wastewater storage basin capable of holding nine million gallons of treated wastewater, which prevents 55—60 million gallons of groundwater from being extracted each year to irrigate the golf course and driving range.

Construction began on a fill stand adjacent to the nine million gallon basin to supply contractors with reclaimed wastewater for construction activities, such as dust control and soil compaction. The base has also designed an additional project to expand wastewater reuse that is awaiting construction funding. This project will connect ball fields and a dog park in the northwest corner of the main base to the existing golf course irrigation system. The golf course and driving range currently use reclaimed wastewater for a portion of the irrigation needs. The new projects are projected to save an additional 12 million gallons annually.

Idle Reduction Technology at Multiple Air Force Bases

The Air Force has idle reduction technology in many of its fire trucks, water tankers, structural pumpers, and rescue trucks. The technology automatically turns off the truck engine and starts the energy efficient on-board auxiliary power unit, or generator, after the truck has been idling for two minutes. The auxiliary generator provides just enough electricity to power vehicle components such as lights, communication, and environmental controls. The resulting reduction in fuel use is dramatic, causing an idling diesel truck to use about 80% less fuel. The system also reduces wear and tear on the vehicle's main engine.

Air Force fire trucks with idle reduction technology; inset: control panel inside the cab

Photos: U.S. Air Force

Massachusetts Air National Guard

The 104th Fighter Wing of the Massachusetts Air National Guard received the New England Federal Green Challenge Award from EPA in 2014, for excellence in managing electronics. The base increased the amount of electronics recycled on-base by 98%, recycling a total of 1.17 tons of electronics. The success of the e-waste recycling program was based on a three-pronged approach: (1) increasing awareness across the facility through base-wide emails, posters, and articles in the monthly newsletter; (2) expanding the types of items accepted, from computers and keyboards to copiers, printers, and fax machines; and (3) establishing a central recycling location that stays open five days a week. The installation is now utilizing DLA Disposition Services for electronic waste recycling and reutilization.


Using an Electronic Technical Order for a mission at Korat Royal Thai Air Base

Photo: U.S. Air Force

Hawaii Air National Guard


Photo: U.S. Air Force

Hangar Bay of the new LEED Platinum squadron operations and aircraft maintenance hangar of the Hawaii Air National Guard

The new F-22 squadron operations and aircraft maintenance hangar of the Hawaii Air National Guard at Joint Base Pearl Harbor-Hickam was certified by LEED at the Platinum level. The 77,000-square-foot facility was completed in January 2014 on schedule and under budget. Efficiency features of the building are projected to make energy consumption 72% below a building designed to ASHRAE 90.1-2004 standards. These features include using lānai (roofed, open-sided space) around the perimeter of the building, providing shading, and having daylight accessible to 75% of the occupied spaces. Electricity purchased from the grid will be further reduced by PV arrays on the roofs of the building and parking structure, projected to account for 60% of the facility's annual consumption. Also mounted on the hangar roof are solar thermal panels to heat water, projected to offset 54% of the energy needed to supply hot water. The consumption of water is anticipated to be 47% lower than a building built to code, due to extensive use of low-flow plumbing fixtures. During construction of the facility, 94% of all demolition and construction materials were salvaged or recycled.

IV.4 Defense Logistics Agency

Reducing the Use of Printing Paper

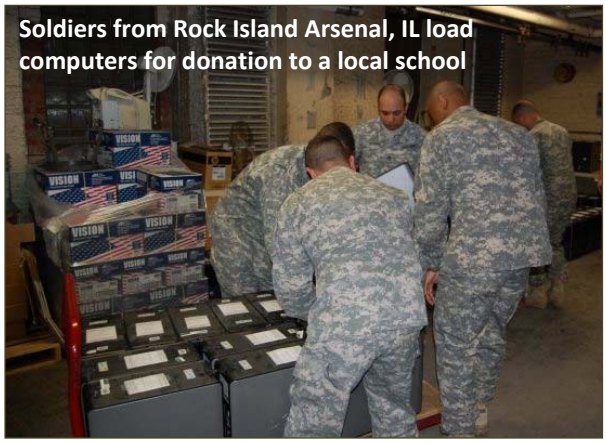
During FY 2014, DLA Document Service continued to provide electronic distribution and printing of digital documents to many DoD customers. The largest of these programs is for the Technical Orders of the Air Force Material Command. DLA Document Services developed and continues to maintain and operate the Technical Order Distribute and Print Gateway system, which through FY 2014 has reduced printed documents by 72% since the system's introduction in FY 2010. This is an average of more than 26% each year. The DLA system uses automated logic to digitally distribute mission critical Technical Order documents to the DLA Document Service production site closest to the end receiver. The system was specifically designed to go hand-in-hand with the Air Force Enhanced Technical Information Management System, to facilitate the replacement of paper manuals with Electronic Technical Orders. By centralizing, standardizing, and simplifying the paper reproduction and distribution process, DLA Document Service allowed the Air Force Material Command to focus on transitioning to electronic Technical Orders.

DLA Document Services also assisted the Army with the planning to use scanning to convert 11.5 million pages of hardcopy detainee records to digital documents. The conversion of these records in FY 2014 saved the Army millions of square feet of warehouse space while streamlining record keeping and saving thousands of person hours per year performing search and retrieval.

Electronic Stewardship Puts Computers in Schools

DLA assists the Military Services with donating excess computer equipment to local schools through the U.S. Government Computers for Learning program. In FY 2014, DLA assisted Vance Air Force Base, OK with its donation of excess equipment to public schools in nearby Drummond, OK. The

Air Force donated 114 desktop machines, along with software and many extra parts, and gave the students hands-on experience with setting up the computers. The grade school in Drummond got a brand new computer laboratory as a result, and two existing laboratories at other area schools had their antiquated machines replaced.



Soldiers from Rock Island Arsenal, IL load computers for donation to a local school

Photo: U.S. Army

Another example is Fort Polk, LA, where a soldier took the initiative to arrange for the base to donate its old computers and related equipment to Rosepine Elementary School. The school in west central Louisiana now has a new supply of computers.

Appendix A. DoD Sustainability Plan Sub-Goals

SUB-GOAL 1.1 Energy Intensity of Facilities Reduced 30% from FY 2003 Levels by FY 2015 and 37.5% by FY 2020

Metric: The percent reduction relative to FY 2003 in the total energy (British thermal units, Btu) consumed by DoD facilities per gross square foot (GSF) of total DoD building space. A facility is defined by the Energy Independence and Security Act of 2007 (EISA) §432(1)(C) as any building, installation, structure, or other property (including any applicable fixtures) owned or operated by, or constructed or manufactured and leased to, DoD. The term "facility" includes a group of facilities at a single location, or multiple locations managed as an integrated operation, and contractor-operated facilities owned by DoD. It does not include any land or site for which the cost of utilities is not paid by the Federal Government.

Annual Planning Targets and Results

FY	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	15%	18%	21%	24%	27%	30%	31.5%	33%	34.5%	36%	37.5%
RESULTS	11.4%	13.3%	17.7%	17.2%	**17.6%**						
Btu/GSF	102,929	100,268	96,593	97,149	96,647						
billion Btu	210,691	197,212	187,397	182,576	181,463						
million GSF	1,949.7	1,896.4	1,896.1	1,879.3	1,877,577						
FY 2003 Baseline for each FY											
Btu/GSF	116,134	115,647	117,344	117,334							

including renewable energy and source credits

SUB-GOAL 1.2 By FY 2020, Produce or Procure Energy from Renewable Sources in an Amount that Represents at Least 18% of Electricity Consumed by Facilities

Metric: The numerator is the sum of renewable energy that DoD produced, a DoD-controlled location produced, or a DoD component procured from another source. The denominator is the total electric consumption of facilities as published in the DoD Annual Energy Management Report. Renewable energy is defined in 10 United States Code (U.S.C.) §2924(7) as either thermal or electrical energy that is produced from renewable sources, including solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal (including electricity and heat pumps), municipal solid waste, and new hydroelectric generation capacity if achieved from increased efficiency or additions of new capacity at existing hydroelectric projects.

Annual Planning Targets and Results*

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	10%	11%	12%	10%	11%	12%	13%	14%	15%	16%	18%
RESULTS	9.6%	8.5%	9.6%	11.8%	**12.3%**						

**Title 10, U.S.C. §2911(e) (2) requires DoD to establish an interim renewable energy goal in FY 2018, adjusting future DoD renewable energy planning factors.*

SUB-GOAL 1.3 Use of Petroleum Products by Vehicle Fleets Reduced 30% from FY 2005 Levels by FY 2020

Metric: The percent reduction in petroleum product consumption by DoD non-tactical motor vehicle fleets relative to FY 2005.

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	10%	12%	14%	16%	18%	20%	22%	24%	26%	28%	30%
RESULTS	6.6%	13.4%	20.7%	26.9%	**30.2%**						
000 GGE	74,648	69,180	63,347	58,423	55,801						
FY 2005 Baseline		79,898	thousand GGE (gallon[s] of gasoline equivalent)								

SUB-GOAL 2.1 Potable Water Consumption Intensity by Facilities Reduced 26% from FY 2007 Levels by FY 2020

Metric: The percent reduction relative to FY 2007 in potable water consumed by DoD facilities per GSF of total building space. Consumption includes the loss of water after it is delivered (e.g., though leaking or malfunctioning fixtures, such as toilets). A facility is defined as per EISA §432(1)(C).

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	6%	8%	10%	12%	14%	16%	18%	20%	22%	24%	26%
RESULTS	12.6%	10.8%	18.6%	19.8%	**21.5%**						

SUB-GOAL 2.2 Industrial and Irrigation Water Consumption Reduced 20% from FY 2010 Levels by FY 2020

Metric: The percent reduction relative to FY 2010 in the amount of water consumed by DoD for agricultural, landscaping, and industrial purposes, which is either potable water or is non-potable water used for space cooling. Sub-goal 2.2 does not track non-potable water used for these purposes (except for space cooling) or water tracked under sub-goal 2.1.

Annual Planning Targets and Results

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	2%	4%	6%	8%	10%	12%	14%	16%	18%	20%
RESULTS	n/a	n/a	n/a	**n/a**						
million gallons	10,722	13,821	15,723	n/a						

SUB-GOAL 2.3 All Development and Redevelopment Projects of 5,000 Square Feet or Greater Maintain Pre-Development Hydrology to the Maximum Extent Technically Feasible

Metric: The percent of covered projects (those development and redevelopment projects of 5,000 square feet or greater) that can demonstrate with documentation that stormwater design objectives were met through practices that infiltrate, evapotranspire, and/or harvest and use the rainfall to the maximum extent technically feasible. The criterion for maximum extent technically feasible is the full employment of accepted and reasonable stormwater infiltration and reuse technologies subject to site and applicable regulatory constraints.

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
RESULTS	n/a	n/a	98%	98.9%	**79.4%**						

SUB-GOAL 3.1 Greenhouse Gas Emissions from Scope 1 and 2 Sources Reduced 34% from FY 2008 Levels by FY 2020

Metric: The percent reduction of GHG emissions from combined Scopes 1 and 2 sources from the FY 2008 baseline (subject to DoD emissions reduction target, reported in units of million metric tons of carbon dioxide equivalent, MMT CO_2(e)).

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	3%	5%	7%	10%	13%	16%	19%	22%	28%	30%	34%
Results	3.6%	4.4%	9.2%	10.3%	**11.3%**						
MMT CO_2(e)	27.012	25.681	24.387	24.099	23.820						

Baseline for FY 2011 – FY 2014	26.855
Baseline for FY 2010	28.021

SUB-GOAL 3.2 Greenhouse Gas Emissions from Scope 3 Sources Reduced from FY 2008 Levels by FY 2020

Metric: The percent reduction of GHG emissions (subject to DoD emissions reduction target) from Scope 3 sources from the FY 2008 baseline.

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	0%	0%	1%	2%	3%	4%	5%	7%	9%	11%	13.5%
Results w/Hosted RE*	4.8%	(0.1%)	9.1%	18.5%	**19.5%**						
Results without Hosted RE**	(6.0%)	(9.0%)	0.4%	6.6%	6.0%						
MMT CO_2(e)*	6.607	7.424	6.939	6.224	6.144						
MMT CO_2(e)**	7.355	8.082	7.605	7.132	7.175						

Baseline for FY 2012, FY 2013	7.634
Baseline for FY 2011	7.413
Baseline for FY 2010	6.940

without Hosted RE Credit

**Including credit for renewable energy (RE) generation operated by third-parties.*
*** Without including the RE credits.*

SUB-GOAL 3.3 30% of Eligible Employees Teleworking at Least Once Per Bi-Weekly Pay Period, on a Regular, Recurring Basis by FY 2020

Metric: The percent of DoD employees eligible to telework who are doing so at least once per bi-weekly pay period on a regular, recurring basis. Telework can be at any approved location: home, a telework center, and/or a secure telework site meeting the additional requirements for facility construction, network security, and access control for employees needing access to classified networks. An employee's day off during a compressed work schedule cycle does not count as a telework day.

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	-	-	10%	15%	17%	20%	23%	25%	27%	29%	30%
RESULTS	n/a	n/a	8%	13.4%	**14.5%**						

SUB-GOAL 3.4 Greenhouse Gas Emissions from Employee Air Travel Reduced 7% from FY 2011 Levels by FY 2020

Metric: The percent reduction of GHG emissions from air travel by DoD employees on DoD business, relative to FY 2011, as calculated from travel data captured by the Defense Travel Management Office.

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	-	0%	0%	1%	2%	2%	3%	4%	5%	6%	7%
RESULTS	n/a	n/a	12.2%	30.0%	**29.0%**						
MMT CO_2(e)	n/a	2.39*	2.09	1.67	1.69						

**The Air Travel number in the FY 2011 data submission will not match this value, as this is an improved estimate developed after the FY 2011 data were submitted.*

SUB-GOAL 5.1 By FY 2015, at Least 95% of DoD Employees Covered by Policies to Reduce the Use of Printing Paper

Metric: The percent of total DoD employees (active military and civilian) in DoD Components that have issued policy to reduce the use of printing paper.

Annual Planning Targets and Results

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	35%	45%	55%	60%	95%	95%	95%	95%	95%	95%
RESULTS	34.3%	57.2%	57.2%	**63.6%**						

SUB-GOAL 5.2 50% of Non-Hazardous Solid Waste Diverted from the Waste Stream by FY 2015 and Thereafter Through FY 2020

Metric: The percent of the total non-hazardous solid waste stream generated and collected by DoD facilities (by weight), without construction and demolition debris, that is directed away from the waste stream, for example by reuse, recycling, and/or composting.

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	40%	42%	44%	46%	48%	50%	50%	50%	50%	50%	50%
RESULTS	39%	40%	49%	46%	**46%**						
Generated*	2.014	2.245	2.144	1.901	1.889						
Diverted*	0.777	0.909	1.048	0.872	0.875						

**million tons*

SUB-GOAL 5.3 60% of Construction and Demolition Debris Diverted from the Waste Stream by FY 2015, and Thereafter Through FY 2020

Metric

The percent of construction and demolition materials and debris generated and collected by DoD facilities (by weight) that is directed away from the waste stream, for example by reuse, recycling, and/or mulching.

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	50%	52%	54%	56%	58%	60%	60%	60%	60%	60%	60%
RESULTS	73%	77%	74%	73%	**82%**						
Generated*	4.108	4.140	4.922	3.145	5.697						
Diverted*	2.984	3.195	3.645	2.293	4.658						

**million tons*

SUB-GOAL 6.1 On-site Releases and Off-Site Transfers of Toxic Chemicals Reduced 15% from CY 2006 Levels by FY 2020

Metric: The toxic chemicals released into the environment and transferred off-site (in total pounds), as a percentage of the calendar year (CY) 2006 baseline. The chemicals reported are the sum of releases reported on Environmental Protection Agency Form R Part II from: (1) Section 5 (Quantity of the Toxic Chemical Entering Each Environmental Medium On-Site), (2) Section 6.1 (Discharges to Publicly Owned Treatment Works, and (3) Section 6.2 (Transfers to Other Off-Site Locations) for disposal and treatment. This sub-goal does not include releases and off-site transfers from operational range activities. DoD toxic chemical reporting to the Environmental Protection Agency is done by calendar year, so fiscal year reporting on this sub-goal corresponds to data for the previous calendar year (e.g., FY 2012 reporting is CY 2011 data).

Annual Planning Targets and Results

FY	2010	2011	2012	2013	2014	2015	2018	2020
Targets	-	-	-	-	-	5%	10%	15%
RESULTS	2.8%	2.5%	(6.6%)	23.4%	**15.5%**			
pounds	20,126,484	20,198,710	22,073,843	15,869,588	17,506,428			
CY 2006 Baseline: 20,710,301								

(a negative number corresponds to an increase from baseline)

SUB-GOAL 6.2 100% of DoD Personnel and Contractors Who Apply Pesticides Are Properly Certified

Metric: Percent of personnel who applied pesticides on DoD installations during the fiscal year who were properly certified. Direct hire employees, certified in accordance with DoD 4150.07-M, Volume 1, have a maximum of two years to become certified after initial employment. Contracted employees shall have appropriate State or host-nation certification in the appropriate categories at the time the contract is effective. These certifications are in accordance with EPA rules and regulations and are accepted as valid certifications.

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
RESULTS	99.4%	99.2%	99.0%	99.6%	**99.6%**						

SUB-GOAL 6.3 All DoD Installations Have Integrated Pest Management Plans Prepared, Reviewed, and Updated Annually by Pest Management Professionals

Metric: The percent of DoD installations that maintained integrated pest management plans that a DoD-certified pest management consultant and/or the installation pest management coordinator prepared, reviewed, and updated annually. These plans describe how the installation will prevent, manage, and control animal and plant pests while following the principles of integrated pest management and federal, state, and local laws. The plans are generated by the installation, are updated annually, and are reviewed and approved by the respective Military Department senior pest management professional(s).

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	-	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
RESULTS	84.6%	90.2%	96.7%	90.9%	**95.6%**						

SUB-GOAL 7.1 95% of Procurement Conducted Sustainably

Metric: The percent of contract actions (new contracts and modifications) that adhere to the principles of sustainability by containing requirements for (as relevant and where such products and services meet DoD performance requirements): energy-efficient (ENERGY STAR or Federal Energy Management Program [FEMP] designated), water-efficient, biobased, environmentally preferable, non-ozone depleting, containing recycled content, and/or are non-toxic or less-toxic alternatives. The sub-goal applies to products and services, including task and delivery orders, but excluding the acquisition of weapon systems and their components and spare parts. The results shown are from DoD's annual review of a subset of contract actions, as explained in Part III.1.

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	-	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
RESULTS	n/a	82.6%	95.0%	98.0%	**97.5%**						

SUB-GOAL 7.2 Electronic Stewardship and Data Centers

Metrics: This sub-goal consists of three metrics pertaining to agency progress toward EPEAT and end of life goals.

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
% of Monitors and PCs/laptops purchased agency-wide in compliance with EPEAT											
Targets	-	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
RESULTS	-	98%	99%	99.9%	**96%**	*estimate*					

% of Electronics at end-of-life disposed through GSA Xcess®, CFL, Unicor, or Certified Recycler (Responsible Recycling©, E-Stewards)											
Targets	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
RESULTS	100%	100%	100%	100%	**87%**						

% of Electronics at end-of-life disposed through non-Certified Recyclers											
Targets	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
RESULTS	0%	0%	0%	0%	**13%**						

SUB-GOAL 7.3 15% of Existing Buildings Conform to the Guiding Principles on High Performance and Sustainable Buildings By FY 2015, and Thereafter Through FY 2020

Metric: The percent of building area in applicable buildings over 5,000 GSF (owned and leased) that meet the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (Guiding Principles), as per the December 2008 implementation guidance developed by the Interagency Sustainability Work Group.

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	…	2020
Targets	-	7%	9%	11%	13%	15%	15%	15%	…	15%
RESULTS (% of GSF)	0.89%	0.89%	0.97%	1.09%	**1.11%**					
GSF conforming to Principles (million)	11.734	12.176	13.418	15.241	15.676					
Total applicable GSF (million)	1316.85	1361.20	1382.69	1397.31	1408.18					
# applicable buildings	46,229	47,195	47,792	48,235	48,480					
# conforming	310	328	345	382	394					

SUB-GOAL 7.4 All Environmental Management Systems Effectively Implemented and Maintained

Metric: Overall DoD status using the DoD EMS Scorecard Metrics. The overall DoD status is a color rating (green, yellow, or red) for all DoD facilities and organizations for which an EMS is appropriate. Status is based on the color ratings for individual facilities determined using the federal EMS Metrics. An overall green rating requires at least 80% of all EMS-appropriate facilities and organizations to have green EMSs, with no more than 5% total red EMSs. An overall yellow requires no more than 10% red EMSs. An overall red is assigned when the status is neither green nor yellow.

Annual Planning Targets and Results

Fiscal year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Targets	-	green	green	green	green	green	green	green	green	green	green
RESULTS	red	red	red	red	**yellow**						

Appendix B. Lists of Figures and Tables

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Appendix C: DoD Multimodal Access Plan for Commuters

The purpose of this plan is to describe the Department's plan for giving its employees more options for commuting. However, the main DoD strategy for commuting is to increase teleworking, which reduces all commuting miles travelled, by any mode of transportation. DoD established a goal for 30% of employees eligible for teleworking to be doing so on a regular basis by FY 2020, at least once per biweekly pay period. In 2012, the Department issued a revised version of DoD Instruction 1035.01, Telework Policy, to ensure that DoD meets the requirements of the Federal Telework Enhancement Act of 2010. The Instruction creates the conditions for successfully implementing enhancements to the DoD telework program.

Many DoD personnel (civilian and active military) are located on military installations where walking and biking are already common, and will become more common due to UFC 2-100-01, *Installation Master Planning*, which calls for installation designs that facilitate walking and biking. Therefore—apart from teleworking, which is broadly applicable across the Department—DoD's first Multimodal Access Plan for Commuters focuses on the Washington, D.C. metropolitan area, where almost 30,000 employees are located at the Pentagon and the DoD Mark Center.

Commuting via means other than solo driving is already common at these facilities due to a combination of public transit options (especially at the Pentagon) and chronic traffic congestion during rush hour periods. All DoD employees in the DC area who regularly commute by means other than solo driving have access to the Guaranteed Ride Home program. This service, administered by the Metropolitan Washington Council of Governments, gives these commuters a free ride home in the event of a personal emergency or if they work late at a supervisor's request.

In spite of the heavy reliance on alternative commuting methods in the DC area, DoD's Washington Headquarters Services (WHS) is looking for ways to further reduce commuting by single occupancy driving. To inform strategic planning, WHS deployed an extensive commuter survey in May 2015 of government employees and full-time contractors who commute to and from the Mark Center and the Pentagon. The survey was highly comprehensive, including questions on typical commuting schedule, modes of transportation, extent of teleworking, the closest Metrorail station for those using the system, bus routes taken to the Mark Center, and awareness of the Mass Transit Subsidy Program and Commuter Connection Guaranteed Ride Home program. For the shuttle service, there were questions on how and why the shuttle service is used, and satisfaction with the schedules and performance of the various shuttle routes. The survey also had questions designed to inform strategies for shifting those who drive alone to other modes of transportation, asking respondents why they do not telework, bike, or use public transit or ride sharing, and whether they would consider using various other modes of transportation if they were more convenient and less costly. The survey did not, however, address commuting via electric vehicle. WHS will use the results of the survey to inform strategies to reduce commuting by driving alone.

Mass Transit

Both the Pentagon and Mark Center offer many public transit options for commuting, although these are not as convenient for the Mark Center, since it is not directly served by a Metro station as is the Pentagon. For employees located at the Mark Center, there are bus and shuttle options connecting the facility to four different Metro stations. The bus options are as follows:

- DASH Buses – there are two DASH routes to the Mark Center, from the Braddock and King Street Metro stations.

- MetroBuses – The Washington Metropolitan Area Transit Authority has two MetroBus routes to the Mark Center, one serving the West Falls Church Metro Station and another the Pentagon Metro Station. The Pentagon route is free with a valid badge.

There is also currently free DoD shuttle service for Mark Center personnel (with Common Access Card or Alternate Logon Token Card) that provides connection from key Metrorail stations such as the Pentagon, King Street, and Franconia-Springfield Metrorail stations to the Mark Center.

Bicycling

The Mark Center is accessible to bicycles from the unpaved Holmes Run and Four Mile Run Trails, several paved bike routes, and surrounding residential neighborhoods. Conveniently located and covered bicycle racks are located in the North Parking Garage, and there is a designated bicycle shower room with 36 showers. The Pentagon also has bicycle parking racks, although uncovered, and some showers, but as indicated in the January 2015 Pentagon Reservation Master Plan Update (in draft form), WHS has identified plans for improvements to increase bicycle commuting.

Electric Vehicle Charging Infrastructure

WHS will assess the feasibility of the use of electric vehicle charging infrastructure at the Pentagon and Mark Center to determine the appropriate approach in accordance with the Pentagon Master Plan and Mark Center Transportation Management Plan to develop a framework for formulating a policy and plan to provide electric vehicle charging infrastructure for use by employees driving to work in electric vehicles.

Appendix D: Planned FY 2015-2016 Actions for Developing the FY 2017 DoD Procurement Plan to Reduce Supply Chain Emissions

The Department embraces greening its supply chain, as a logical progression that builds upon DoD's success ensuring that environmental attributes are an integral part of its procurement. In FY 2014, the Department achieved a 97.5% compliance with sustainable procurement requirements, as determined by a manual review of 2,150 contract actions with values over $3,000. The review process included contracts from the Military Services, Defense Logistics Agency (DLA), and eight other Components, which collectively account for the vast majority of DoD contract value. The nearly 100% compliance reflects the fact that sustainability is becoming more integrated into everyday procurement throughout the Department. However, DoD is striving for continued improvement, through the DoD Instruction (DoDI) titled *Procurement of Sustainable Goods and Services*. Currently undergoing formal coordination, the Department expects to issue the DoDI by the end of calendar year (CY) 2015. The DoDI will further institutionalize sustainability into procurement, at all levels, from government purchase cards to major contracts. The DoDI establishes policy, assigns responsibility, and provides compliance goals and direction for the sustainable procurement of goods and services. It also outlines procurement preferences, new contract requirements, training procedures, and program evaluation processes for sustainable procurement.

With the General Services Administration (GSA), DoD is co-chairing the interagency Supply Chain GHG Emissions Working Group (WG), launched on 17 June 2015. The purpose of the WG is to identify the most appropriate procurement mechanisms to incentivize vendors of goods and services to manage and reduce GHGs emissions. In mid-October 2015, the WG will issue a report describing the findings of their deliberations.

Together with the WG, the Department will evaluate which of various approaches will be most effective for FY 2017. One strategy to be explored is the inclusion of clauses in contracts requiring vendors to demonstrate the management and reduction of GHG emissions, such as requiring vendors to annually conduct an inventory of their GHG emissions according to an accepted standard such as the GHG Protocol *Corporate Accounting and Reporting Standard*[4] developed by the World Resources Institute and World Business Council for Sustainable Development. Evaluation criteria are another lever, for example including among the evaluation criteria the completion of a GHG inventory for the previous year or a plan for reducing GHGs. DoD plans to take a measured approach to the requirements imposed on suppliers. For example, over time, after suppliers have had time to become adept at GHG management and planning, requirements can move to reductions, by including demonstrated emissions reductions as an evaluation criterion. Another option is to require vendors to reduce GHG emissions by a certain annual percentage over the contract's period of performance. DoD and the WG will explore various strategies such as these, being mindful of the potential cost burden for suppliers. The WG will also develop sample language for contract clauses, along with other aids for agencies. GSA already has three procurement pilots underway, which will provide the WG with valuable insights and lessons learned.

[4] http://www.ghgprotocol.org/files/ghgp/public/ghg-protocol-revised.pdf, and the 2013 Amendment adding nitrogen trifluoride to the Protocol (http://www.ghgprotocol.org/files/ghgp/NF3-Amendment_052213.pdf).

Although the Department is a large consumer, its spending is dwarfed by that of the private sector and consumers. Therefore, another key strategy for DoD to green its supply chain is to partner with industry. Private sectors firms such as Walmart have already blazed the trail on effective supply chain management, including requiring its suppliers to report through the Carbon Disclosure Project. These industry leaders provide valuable, proven strategies for DoD to consider. Another aspect of partnering with industry is to work side by side on supply chain management with firms in large procuring industries, such as automotive and aerospace. For its own supply chain, the Department does not intend to work directly with second or third tier suppliers, but will work with its first tier suppliers on their supply chain. DoD will explore ways to do this during FY 2015 and FY 2016, such as asking these suppliers to describe mechanisms they have in place for selecting vendors based on GHG emissions reporting.

In FY 2016, the Office of the Secretary of Defense will work with the Military Services and DLA, having each develop a contract that can be used to pilot the various strategies developed by DoD and the WG. All of the efforts described here will provide DoD with the insights it needs to identify at least five new procurements to be implemented during FY 2017 that encourage DoD vendors to reduce their GHGs emissions.

Appendix E. Acronyms and Units

AFB	Air Force Base
AFV	alternative fuel vehicle
Btu	British thermal unit(s)
C&D	construction and demolition
CCAWG	Climate Change Adaptation Working Group
CNG	compressed natural gas
CO_2	carbon dioxide
CONUS	contiguous United States
CSO	DoD Chief Sustainability Officer
CSS	Central Security Service
CY	calendar year
DCMA	Defense Contract Management Agency
DeCA	Defense Commissary Agency
DCAA	Defense Contract Audit Agency
DENIX	DoD Environment, Safety and Occupational Health Network and Information Exchange
DFAS	Defense Finance and Accounting Services
DHA	Defense Health Agency
DIA	Defense Intelligence Agency
DISA	Defense Information Systems Agency
DLA	Defense Logistics Agency
DoD	Department of Defense
DOE	Department of Energy
DoDI	Department of Defense Instruction
DON	Department of the Navy
ECIP	Energy Conservation Investment Program
EISA	Energy Independence and Security Act of 2007
EMS	Environmental Management System
EO	Executive Order
EPA	Environmental Protection Agency
EPEAT	Electronic Product Environmental Assessment Tool
ESPC	Energy Savings Performance Contract
EV	electric vehicle
FY	fiscal year
GGE	gallon(s) of gasoline equivalent
GHG	greenhouse gas
GSA	General Services Administration
GSF	gross square foot/feet

HQ	headquarters
HVAC	heating, ventilation, and cooling
ILA	industrial, landscaping, and agricultural
IMCOM	Installation Management Command
IPMP	Integrated Pest Management Plan
ISWM	integrated solid waste management
JBLM	Joint Base Lewis-McChord
kW	kilowatt(s)
kWh	kilowatt-hour(s)
LEED	Leadership in Energy and Environmental Design
LID	low impact development
MCAGCC	Marine Corps Air Ground Combat Center
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MDA	Missile Defense Agency
MILDEP	Military Department
MMT CO_2(e)	million metric tons of carbon dioxide equivalent
MW	megawatt(s)
MWh	megawatt-hour(s)
NAVFAC	Naval Facilities Engineering Command
NAVSUP	Naval Supply Systems Command
NGA	National Geospatial-Intelligence Agency
NRO	National Reconnaissance Office
NSA	National Security Agency
NAVWPNSTA	Naval Weapon Station
OEI	Office of Energy Initiatives
OPNAV	Chief of Naval Operations Instruction
OSD	Office of the Secretary of Defense
PV	photovoltaic
RE	renewable energy
SDD	sustainable design and development
SSC	Senior Sustainability Council
SSPP	Strategic Sustainability Performance Plan
TRI	Toxics Release Inventory
UESC	Utility Energy Services Contract
UFC	Unified Facilities Criteria
U.S.C.	United States Code
USMC	U.S. Marine Corps
USN	U.S. Navy
VEMSO	Vehicle and Equipment Management Support Office
WHS	Washington Headquarters Services