



# **Department of Defense Strategic Sustainability Performance Plan**

**FY 2010**

**Public Version  
26 August 2010**



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. This, our first Departmental sustainability plan, lays out our goals and performance expectations for the next decade, establishing the path by which DoD will serve as a model of sustainability for the nation while enhancing our ability to achieve our mission.

The 2010 Quadrennial Defense Review recognizes that a strategic approach to climate change and energy is a high priority for the Department. Our military's heavy reliance on fossil fuels creates significant risks and costs at a tactical as well as a strategic level. We measure these costs in lost dollars, in reduced mission effectiveness, and in U.S. soldiers' lives. Freeing warfighters from the tether of fuel will significantly improve our mission effectiveness, as will reducing our installations' dependence on costly fossil fuels and a potentially fragile power grid. DoD takes its responsibility for sustainability seriously, and anticipates these changes will significantly improve our mission effectiveness while enhancing the environment. Furthermore, to successfully execute the DoD mission, our Military Departments must have the land, air, and water necessary to train and operate, today and into the future, in a world where there is increasing competition for resources. The Department must plan for and act in a sustainable manner now in order to build an enduring future; as such, this Strategic Sustainability Performance Plan is a critical enabler in the performance of our mission.

The Department not only commits to complying with environmental and energy statutes, regulations, and Executive Orders, but to go beyond compliance where it serves our national security needs. It is already DoD policy to address sustainability concepts in our acquisition and procurement processes, and in planning and managing our installations. We are committed to integrated risk management practices that protect the environment and promote sustainability while advancing our mission. We continue to develop and improve methodologies that ensure systematic analysis, informed decision-making, and appropriate budgeting to address these needs. For every DoD program, the Department will identify, assess, manage, and actively seek opportunities to continually improve its activities as well as to monitor its contribution towards the sustainability goals captured in this plan.

In 2010 and 2011 our priorities and significant efforts are to: (1) invest in fixed installations using a three part strategy to reduce energy demand, apply micro-grid technologies, and increase the supply of renewable energy; (2) enhance governance structures to ensure top level commitment and accountability; and (3) ensure that all DoD Components are incorporating the concepts of sustainability into their doctrine, policies, and guidance documents. Our primary path to reaching our sustainability goals will be to reduce the Department's reliance on fossil fuels through energy efficiency and renewable energy. Although we still have much to do, the Department is committed to making bold changes. Successful implementation of the Plan will help DoD continue its culture of excellence in environmental and fiscal stewardship and improve national security, both home and abroad.

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DoD Senior Sustainability Officer  
Under Secretary of Defense for Acquisition,  
Technology, and Logistics (AT&L)

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# Part I: DoD Policy and Strategy

## I.1 Sustainability and the DoD Mission

The Department's vision of sustainability is to maintain the ability to operate into the future without decline – either in the mission or in the natural and manufactured systems that support it. DoD embraces sustainability as a means of improving mission accomplishment. Sustainability is not an individual Departmental program; rather, it is an organizing paradigm that applies to all DoD mission and program areas. DoD personnel are learning to apply this mindset to their practices to improve mission performance and reduce lifecycle costs. The Department has instituted many policies and practices to promote lifecycle thinking and long-term cost savings as a guard against short-term investments that often result in higher long-term operating costs. Applying a systematic framework for improving environmental performance involves a wide range of sustainability practices that span much of the Department's day to day activities and military operations. These include retrofitting and constructing buildings and expeditionary base camps to optimize sustainability, conducting procurement and engineering in the context of sustainability, using and disposing of electronics in ways that minimize energy use and environmental damage, and the use of integrated environmental management systems. The Department recognizes that many key issues facing DoD can be addressed through smart investments that improve sustainability, such as energy efficiency, energy management, renewable energy, water use efficiency, the reduced use of toxic and hazardous chemicals, and solid waste management. The 2010 Quadrennial Defense Review (QDR) specifically recognizes that DoD must address climate change and energy because of their significance to national security and mission readiness.

“Sustainability” and “sustainable” mean to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations of Americans.

— Executive Orders 13423 & 13514

Executive Order (EO) [13514](#) articulates both general and specific requirements to improve federal government efficiency through the development of a green economy and a decreased dependence on fossil fuels. The DoD Strategic Sustainability Performance Plan (the Plan) provides a coherent approach both for complying with multiple federal requirements for sustainability and for assuring the mission. The linkages between sustainability and the DoD mission are strong and direct. There are four key areas of intersection that form priorities for the Department:

- 1) Energy and Reliance on Fossil Fuels
- 2) Chemicals of Environmental Concern
- 3) Water Resources Management
- 4) Maintaining Readiness in the Face of Climate Change

### I.1.A Energy and Reliance on Fossil Fuels

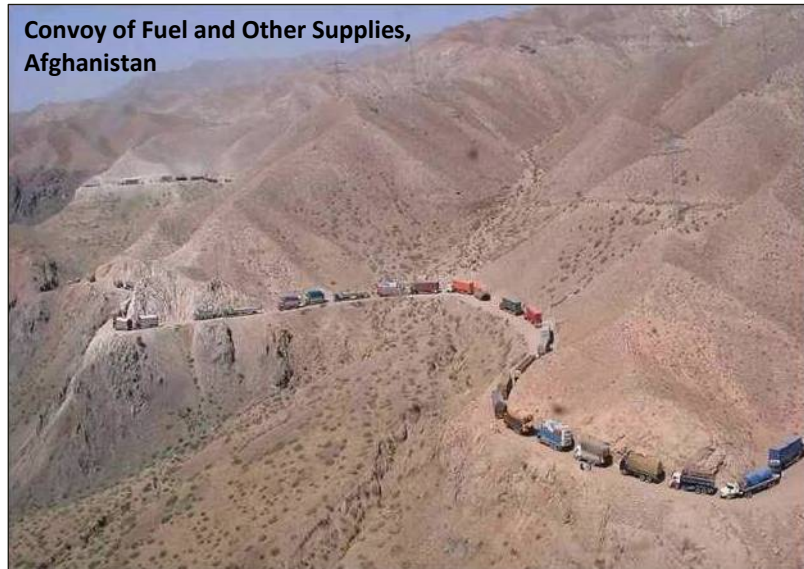
#### Relation to the Mission

The U.S. military's reliance on oil and other fossil fuels poses four broad security challenges:

- The first security challenge is the growing risk to operating forces. Attacks on our delivery mechanisms and fixed energy supplies in Afghanistan and Iraq are resulting in a growing number of casualties and demonstrate that fuel inefficiency endangers our troops and threatens our missions.
- A second challenge is petroleum supply insecurity. Most petroleum products are transported by sea, and much of this trade passes through vulnerable chokepoints such as the Strait of Hormuz and the Straits of Malacca. The free flow of energy through these vital channels may be threatened by piracy,

political instability and military action. Energy supply vulnerability is therefore a strategic as well as a tactical threat.

- A third challenge is oil supply, demand, and price volatility. Tightening global oil supplies and political instability within some oil-producing nations created significant price volatility in recent years, raising our costs and making budget and acquisition decisions more difficult. The challenge will increase as the growing demand for energy – particularly in Asia – outstrips projected oil production and refining capacity.
- A final challenge is grid vulnerability. DoD’s reliance on a fragile commercial grid to deliver electricity to its 500-plus major installations places the continuity of critical missions at risk. In general, our installations lack the ability to manage their demand for and supply of electrical power, making them potentially vulnerable to intermittent or prolonged power disruption caused by natural disasters, cyber attacks, and sheer overload of the grid. 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 our power projection and homeland defense mission capability. For example, the Department operates Predator drones in Afghanistan from a facility in the Western U.S. and analyzes battlefield intelligence at data centers here at home. This means that an energy threat to bases at home can be a threat to operations abroad.



**Convoy of Fuel and Other Supplies, Afghanistan**

Photo: U.S. Army

### **Progress to Date and Key Initiatives Going Forward**

In January 2010, the Department released an aggressive target under EO 13514 for reducing direct greenhouse gas emissions from facilities and non-tactical fleet vehicles. These emissions are overwhelmingly due to direct energy use, especially electricity. Although the Department’s goal of reducing energy risks will require a long and focused campaign, DoD has made meaningful progress. In addition to the office of the Deputy Under Secretary of Defense (DUSD) Installations and Environment (I&E), which has long had a strong focus on energy, DoD created the office of Director for Operational Energy Plans and Programs (DOEP&P) within the Office of the Secretary of Defense (OSD) in October 2009. In the Military Departments, the Military Service Secretaries have made energy a high priority. For example the Air Force Energy Senior Focus Group has established goals of reducing energy demand, increasing supply, and changing energy culture. As a means of achieving these goals, the Air Force will certify all aircraft and systems against a 50/50 alternative fuel blend by 2011, and be prepared to cost competitively acquire 50 percent of its domestic aviation fuel requirements via an alternative fuel blend. This blend’s alternative fuel component must be derived from domestic sources produced in a manner that is greener than fuels produced from conventional petroleum. In October 2009, Navy Secretary Ray Mabus announced a set of ambitious energy goals for the Navy and the Marine Corps. The Secretary’s plans include fielding a carrier strike group of nuclear vessels and ships powered by biofuel – dubbed “the Great Green Fleet” – by 2016, and producing half of the Navy’s installation and operational energy requirements from alternative sources by 2020.

### *Energy Management in Operations*

The FY 2009 National Defense Authorization Act defines "operational energy" as the energy required for training, moving, and sustaining military forces and weapons platforms for military operations; it includes energy used by tactical power systems, generators, and weapons platforms. Operational energy is necessarily exempt from the EO emission reduction targets, as providing immediate support for the

warfighter must remain our highest priority.

Nevertheless, reducing the energy demands of our operational forces is a major focus of the Department's efforts to cut energy consumption, and our combat operations will benefit as a result. The military imperative of reducing our operational energy demand will likely be a major contributor to the Department's greenhouse (GHG) emissions reductions.

#### **DoD Energy Security**

"Energy security for the Department means having assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet operational needs. Energy efficiency can serve as a force multiplier, because it increases the range and endurance of forces in the field and can reduce the number of combat forces diverted to protect energy supply lines, which are vulnerable to both asymmetric and conventional attacks and disruptions."

— *DoD Quadrennial Defense Review, 2010*

To achieve operational energy reductions, the Department has tripled investment in energy security technology over the last four years, from \$400 million to \$1.2 billion. DoD is investing

heavily to improve the efficiency and performance of aircraft engines, which account for a large fraction of all operational energy consumption. One promising project is the Highly Efficient Embedded Turbine Engine, based on a high-pressure ratio and a high-temperature core turbine technology that should reduce fuel consumption by 25 percent. It should also be applicable to commercial aircraft. The Army is developing technology aimed at reducing the fuel consumption of tactical ground vehicles such as the High Mobility Multipurpose Wheeled Vehicle by 30 percent to 40 percent. The Air Force has an ongoing program to qualify aircraft to use alternative fuels. The Defense Advanced Research Projects Agency is spending \$100 million on an 18-month project to develop more affordable, less resource-intensive algae-based synthetic fuels. At many forward operating bases (FOBs), diesel-powered generators are used to provide nearly all power needs, and are a major consumer of operational energy. In 2008, the Department began spraying insulating foam on tents, trailers, and other temporary structures in Iraq, and later Afghanistan, with dramatic energy reduction results. Under one contract, DoD insulated 9 million square feet of temporary structures with the intention of reducing daily fuel demand by more than 77,000 gallons, which could mean 13 fewer trucks convoying fuel each day. Net Zero, a more advanced approach now being tested, would allow a FOB to create all the power it needs within its own perimeter fence, largely through renewable energy.

The Department is exploring how to integrate other sustainable practices into support operations at FOBs. The Strategic Environmental Research and Development Program (SERDP), DoD's environmental science and technology program implemented in partnership with the Department of Energy (DOE) and the Environmental Protection Agency (EPA), is in the process of identifying future research needed to enhance the sustainability of FOBs. The analysis is characterizing FOB design, construction, logistics, and current practices related to the sourcing and use of energy, water, and the disposal of waste.



Photo: U.S. Air Force



### ***Energy Management in Fixed Installations***

The Department continues to pursue an investment strategy designed to reduce energy demand in fixed installations, and to reduce energy from traditional sources while increasing the supply of renewable energy sources. Financing for these investments comes primarily from the Energy Conservation Investment Program and mechanisms such as Energy Savings Performance Contracts, Utility Energy Services Contracts, and Power Purchase Agreements. Efforts to curb demand for energy – through conservation measures and improved energy efficiency – are by far the most cost-effective ways to improve an installation’s energy profile. A large fraction of DoD energy efficiency investments go to retrofit existing buildings. Typical retrofit projects install high efficiency heating, ventilation and cooling (HVAC) systems, energy management control systems, improved lighting, and better insulated and/or reflective roofs.

The Department is taking advantage of the opportunity to incorporate more energy efficient designs, material and equipment into new construction and major renovations, using the Silver performance level of the U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) green building rating system as a guide. The Department’s Unified Facilities Criteria (UFC) system sets standards for DoD projects with regard to planning, design, construction, sustainment, restoration, and modernization. It applies to the Military Departments, Defense Agencies, and DoD Field Activities. [UFC 4-030-01 Sustainable Development](#) – dated December 2007 – reiterates current Military Department policies and instructions which generally require vertical building construction projects (as distinct from horizontal structures such as ranges, roads and airfields) to achieve the LEED Silver performance level for new construction. The UFC identifies key sections of the Energy Policy Act of 2005 ([EPAct](#)) that affect DoD buildings, including Section 109 which requires that buildings be designed to attain 30 percent lower energy consumption than either standard 90.1 of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) or that of the International Energy Code, if lifecycle cost effective. The Department will issue policy in FY 2011 that establishes a schedule for updating UFCs to ensure that the most current industry standards are incorporated. Some state and local governments in the United States and abroad have implemented building code refresh cycles. Regular review of building codes drives improvements in

construction practices and ensures that practices keep pace with advances in technology.

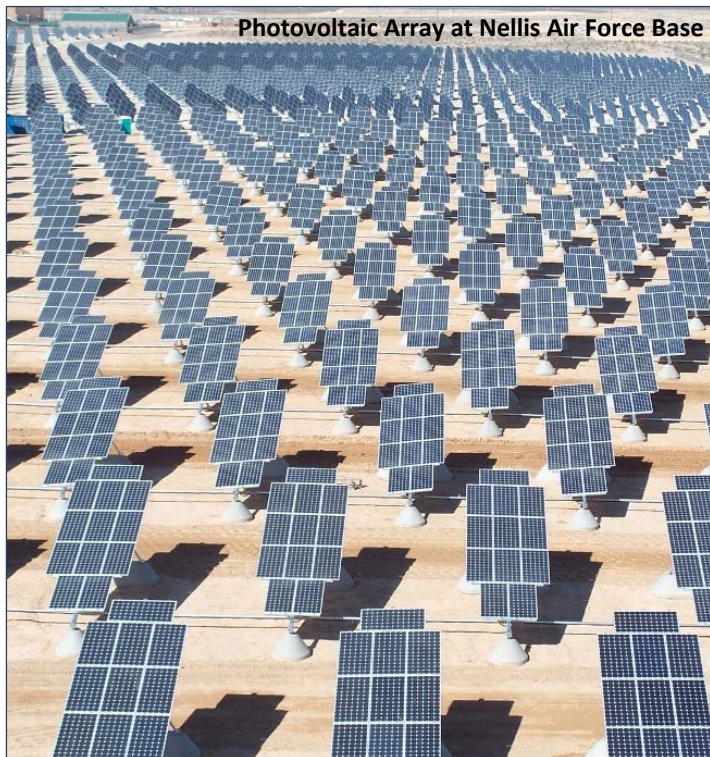


Photo: U.S. Air Force

DoD’s fixed installations offer an ideal test bed for next-generation energy technologies developed by industry, DOE, and university laboratories, filling the gap between research and deployment. DoD’s built infrastructure and lands are unique in their size and variety and encompass a diversity of building types and climates in the United States. DoD facilities afford an exceptional opportunity to assess the technical validity, operating costs, and environmental impact of these advanced, pre-commercial technologies. The Department is able to invest in sustainable projects that may not pay for themselves within the first 20 years, a timeframe that is

usually not viable in the commercial and local government sectors. DoD can help create a market for those technologies that prove effective and reliable by serving as an early adopter, as it did with aircraft, electronics and the internet. This would allow the military to later leverage both cost savings and technology advances from the private sector. Currently DoD is using the energy test bed approach on a small scale and plans to expand it, working closely with DOE among other organizations. The Department has programmed \$30 million for test bed technologies to improve the energy efficiency of buildings, distributed (on-site) energy generation, including renewables, and the control and management of local energy loads. This approach is key to meeting the Department's needs, but it is also an essential element of a national strategy to develop and deploy the next generation of energy technologies needed to support DoD's built infrastructure.

The Department is beginning what will likely be a major effort to address the risk to our installations from potential disruptions to the commercial electric grid, upon which installations are largely dependent. The Department is participating in interagency discussions on the magnitude of the threat and is investigating how to ensure that DoD has the energy needed to maintain mission-critical operations in the face of disruptions to the grid. The National Defense Authorization Act of 2010 requires the Secretary of Defense to submit to Congress a plan for identifying and addressing areas in which electricity needed for carrying out critical military missions on DoD installations is vulnerable to disruption. The on-site development of renewable and alternative energy sources will be one element of this effort. When combined with microgrid technology and energy efficiency investments that significantly reduce demand, distributed renewable energy sources will allow installations to carry out mission-critical activities independent of the grid in the event of disruption.

### ***Renewable Energy***

The Department is committed to renewable energy not only because it is dedicated to showing leadership in sustainability, but also because it improves resilience and thus mission readiness. Military installations are generally well-situated to support solar, wind, geothermal and other forms of renewable energy, as long as the type of energy facility, its siting, and its physical and operational characteristics are carefully evaluated and mitigated as needed for any possible mission or readiness impacts. For example, Nellis Air Force Base in southern Nevada built a 14.2 megawatt (MW) photovoltaic solar array using a public-private partnership power purchase agreement. More than 72,000 solar panels track the sun to generate 30 million kilowatt-hours of electricity per year – equivalent to a quarter of the total power used at the 12,000-person base. Nellis buys electricity at a lower rate thus saving \$1 million a year in electricity costs and avoiding 22,000 tons of carbon dioxide emissions. The military's interest in renewable energy is not new. Naval Air Weapons Center China Lake in California has operated a 270-MW geothermal plant since 1987. The heat from 166 wells, some of them 12,000 feet deep, is sufficient to light up 180,000 homes. The Navy is now helping the Army tap into geothermal resources at its Weapons Depot in Hawthorne, Nevada, and that project will be capable of producing 30 MW of clean power.



The Department is eager to work with its interagency partners on updating federal renewable energy regulations. For example, the generation and use of renewable energy currently counts towards the targets in EAct only if it is electrical, not thermal. Thermal renewable energy sources are often more

cost effective than electrical sources, and can have a lower carbon footprint. In FY 2009, almost 10 percent of the energy consumed by the Department came from renewable sources when thermal sources were included, such as cogeneration and geothermal (primarily ground source heat pumps). When only electric renewable resources are included, renewables accounted for only 3.6 percent of DoD consumption in FY 2009. For this reason the Department defines renewable energy in the Plan as per United States Code (U.S.C.) Title 10 §2911(e) (or the National Defense Authorization Act §2852) to be either thermal or electrical energy that is produced from renewable sources.

### *Energy Information Systems*

The Department is in the process of addressing its lack of an enterprise-wide energy information management system for its global assets. Large commercial enterprises manage their energy portfolio using such data systems; they are essential to a firm's ability to set goals and incentives for optimal energy efficiency and to monitor subsequent performance. The Department is evaluating various commercial systems and assessing DoD needs, with the goal of having the Department develop and implement a state-of-the-art, secure, enterprise-wide energy information management system. The purpose of the system is to provide the appropriate information on energy consumption at various levels of aggregation, including individual buildings, installations, the geographic region, and the military service as a whole. With accurate management, control, collection, and analysis of energy data, DoD can more effectively monitor, measure, manage and maintain energy systems at their optimal performance levels, collect renewable energy generation and performance data, and compare performance across facilities and across the Military Departments.

### *Energy Efficient Acquisition*

Finally, the Department is pursuing two far-reaching and complementary changes to ensure that design and acquisition of weapons systems takes into account the full cost and logistical burden of the energy required to operate the systems. The first is an Energy Efficiency Key Performance Parameter (KPP). KPPs are a set of mandatory requirements the Department specifies for any new weapons system it sets out to acquire. Although our requirements process has traditionally addressed the range, weight, and payload of any new system, decision makers have implicitly assumed that the fuel logistics available to support our combat forces were adequate and secure. Recognizing that this longstanding assumption is less valid in the future, the Energy Efficiency KPP will require personnel setting requirements for weapons systems to limit the operational burden imposed by the new system's energy needs.

Once the requirements are set, the acquisition process will take into account the financial burden that energy requirements would impose—i.e., the fully burdened cost of fuel. As discussed above, there is a significant cost to providing the logistics and force protection for those systems and platforms that require fuel, and those costs are not currently captured in the weapons acquisition decision process. The Department is developing the methodology to estimate the average cost per gallon of fuel under different scenarios and to incorporate this cost analysis into its evaluation of alternatives.

Together these two decision tools—the Energy Efficiency KPP and the fully burdened cost of fuel analysis—represent a systemic change to the way the Department makes decisions that affect our energy demand. If effectively implemented, they will facilitate a more realistic approach to planning. Availability of fuel will no longer be an unquestioned assumption; fuel requirements will be seen as a strategic and tactical vulnerability as well as an enabler. The Department is encouraged by the initial use of the fully burdened cost of fuel concept by the Army, in its analysis of alternatives for its Ground Combat Vehicle and Joint Light Tactical Vehicle programs to date. Given the long lifecycle of weapons systems, it will take years for this new approach to produce significant results. Over time, however, we believe it will result in a systematically more efficient and effective war-fighting capability.

## I.1.B Chemicals of Environmental Concern

### Relation to the Mission

Chemicals are essential components in DoD weapon systems, but the Department faces long-term risk from its use of hazardous and toxic chemicals and other materials. Hazardous and toxic chemicals and materials can result in cleanup and compliance costs, generate health claims, and increase the lifecycle costs of weapon systems and facilities. Moreover new restrictive laws that aim to reduce exposures to hazardous and toxic materials, such as the European Union's Registration, Evaluation and Authorization of Chemicals (REACH), have implications for DoD's supply chain. These restrictions affect the performance, cost, and schedule of the acquisition of new weapon systems, as well as their maintenance and the availability of chemicals necessary for their operation.

The Department must protect people and readiness by reducing the use of high risk contaminants and hazards, both known and emerging. Current protections include the construction of separate areas for chemical use, requirements for additional personal protective equipment, proper collection and disposal, and reporting requirements. DoD also established its emerging contaminants program as a means to minimize operational disruptions through proactive risk management of chemicals expected to be regulated more strictly in the near future. These activities come with monetary, operational, and time costs. Reducing the use and release of hazardous and toxic chemicals and materials helps avoid the operational disruptions that result from environmental protection restrictions and permitting processes, and reduces handling and disposal costs. It minimizes the degradation of local air and water quality that impairs the health of military and civilian communities. Proper management of hazardous and toxic chemicals and materials also protects the range lands needed for training, and the ecosystems under DoD's care, ensuring continued military access.

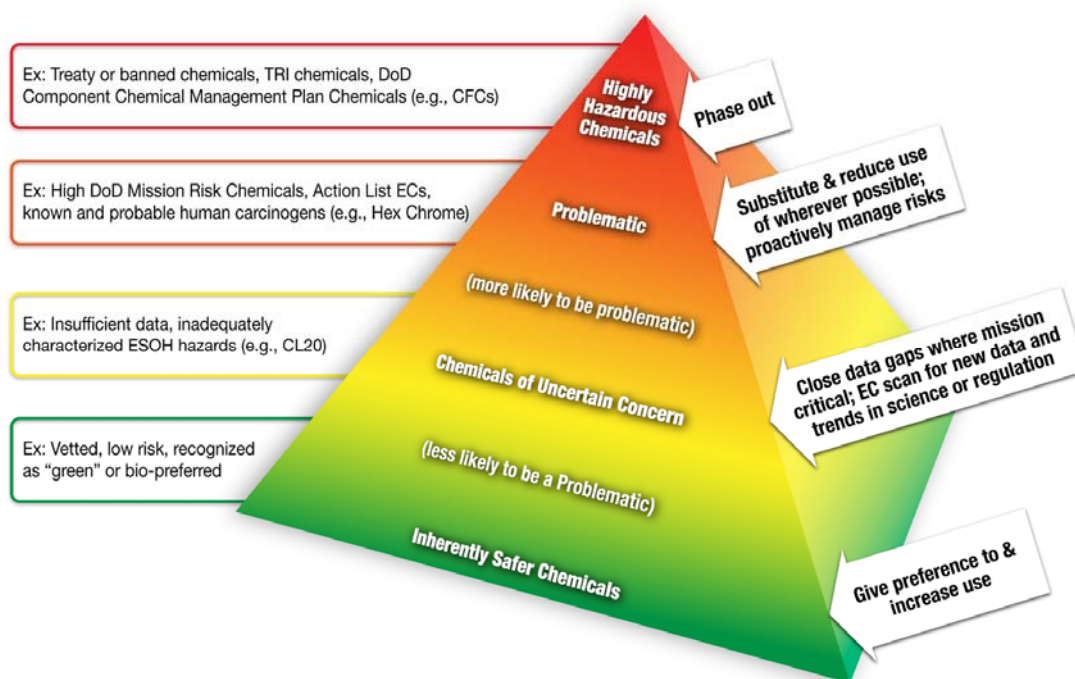
Finally, it is critical to ensure the continued availability of chemicals needed for the DoD mission. Maximizing the use of more benign or "green" chemicals is imperative to the mission in order to protect against the removal of certain substances from the market or significant increases in their cost. For example, sulfur hexafluoride (SF<sub>6</sub>) is critical as a dielectric material in Airborne Warning and Control System radar systems, but it is also the strongest GHG known, remaining in the atmosphere for 3,200 years and having 23,000 times the warming potential over a 100-year period as carbon dioxide. It is anticipated that SF<sub>6</sub> will be regulated in the future, which could threaten its availability and will certainly increase its cost. In response, the Department is researching modifications to reduce SF<sub>6</sub> leakage and searching for alternatives to replace it.

### Progress to Date and Key Initiatives Going Forward

The Department takes a lifecycle approach to the management of hazardous and toxic chemicals and materials in weapon systems and facilities, from acquisition to operations and maintenance, through to disposal. DoD has developed and implemented a three-tiered "scan-watch-action" risk management framework for identifying, assessing, and managing the risks from emerging contaminants. Hundreds of chemicals have been scanned and approximately two dozen chemicals have been evaluated. For example, DoD-wide recently issued a landmark policy to minimize the use of hexavalent chromium. This proactive risk management measure will result in significant reductions in hexavalent chromium releases and potentially save the Department millions of dollars in future liabilities. In some cases conversion to non-hexavalent chromium processes have additional benefits, as plating baths no longer have to be kept at a constant high temperature, reducing energy consumption. The Department's Emerging Contaminants program was selected as a finalist for Harvard University's 2009 "Innovations in American Government" award, ranking in the top 2 percent out of more than 600 nominations. The DoD approach to chemical risk management is illustrated in Figure I.1.

The Department released its *Agency-Level Toxic and Hazardous Chemicals Reduction Plan* in 2008, which describes the DoD programs, initiatives, and actions necessary to reduce the procurement, use, release

and disposal of toxic and hazardous chemicals. The plan represents an important step in continual long-term, DoD-wide improvement in chemical management. For hazardous and toxic chemicals and materials developed for or incorporated into items or systems acquired by DoD through the acquisition process, DoD is increasingly considering the entire lifecycle of these substances, from laboratory synthesis through to disposal. The Department is incorporating pollution prevention and lifecycle assessment language into existing policies, especially with regard to the development of new weapon systems. For example, Environmental, Safety and Occupational Health (ESOH) considerations have been steadily incorporated into the Systems Acquisition process over the last decade, providing reforms to the acquisition process that more fully reflect lifecycle considerations. New guidance and tools are being developed to guide assessment of chemical risks throughout the research, development, testing, evaluation, and acquisition process.



**Figure I.1. DoD Chemical Risk Management Strategy**

DoD’s pollution prevention programs have traditionally focused on solutions that reduce regulatory burdens, in particular those associated with the use of chemicals. DoD’s Joint Service Solvent Substitution effort has led to the development, testing, and demonstration of solutions used by DoD’s chemical depots. A current effort is showing the potential for significant reductions in DoD’s last significant use of the solvent trichloroethylene. The Green Procurement Program is another essential part of the Department’s efforts to move towards more “green” chemicals and products. The program’s foundation is a living Green Procurement Strategy that evolves as needed to accommodate emerging federal requirements on sustainable acquisition. To support its successful implementation, experts developed a program framework that includes green procurement metrics, an online Green Procurement tracking system, a venue for sharing information and best practices, and green procurement education and training.

Among the key challenges in moving towards more benign materials and chemical processes is the need for updated specifications for products used in multiple platforms. Finding the “owners” of specifications, assuring no adverse mission impact, gaining acceptance, and making enterprise-wide changes is a complicated and expensive undertaking. However, DoD has been successful in the past in implementing such changes, such as when international treaties required the phase-out of ozone

depleting substances. Since then, a lack of regulatory drivers to reduce the use of other substances has resulted in less emphasis on the program over the last decade. However, the potential mission impact of the European Union's hazardous substances regulation, REACH, is causing the Department to focus again on these issues, and DoD is developing a strategic plan to better prepare for and manage the impacts from REACH.

## I.1.C Water Resources Management

### Relation to the Mission

Fresh water is a limited and mission critical resource. Water is essential for military operations, drinking, hygiene, sanitation, food preparation, and medical care. In the U.S., water is a mission imperative for military installations, especially for those that need to support large influxes of troops. Water scarcity influences land management practices, such as buffer and agriculture in-leases reliant on irrigation. Such practices can affect dust levels, which in turn can impinge on training. Public concerns over base water use and expansion plans drove the Army to implement aggressive water conservation and reuse at Fort Huachuca in Arizona. Water scarcity is becoming an issue across the country, not just in the arid West.



Overtaken Marine Corps  
water delivery truck in Iraq

Photo: U.S. Marine Corps

In the theater of war, water poses the same challenges as liquid fuel, requiring the protection of large, vulnerable convoys as it is transported to war fighters. In addition, protecting the local water supply is imperative. The growing scarcity of reliable supplies of fresh water is expected to increasingly lead to unrest and conflict, especially in regions of the world already prone to conflict, public discontent and radicalism. The treatment and disposal of sanitary wastewater is a human health and environmental

issue for installations as well as our soldiers and the civilian populations we are protecting in theaters of war. The release of pollutants or other materials by a FOB into a stream or groundwater might contaminate the only water supply to which native civilian populations in areas of conflict have access, making it imperative that DoD consider downstream effects.

Water supply and distribution, water use, wastewater treatment, and storm water management are inter-related and influence energy and sustainability. For example, the extraction, treatment and delivery of water to the end user is a highly energy intensive process. 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. A low impact development approach to storm water management reduces runoff from facilities, which reduces the flow of pollutants into water bodies and reduces the volume of water entering the wastewater treatment system. Reducing the volume of wastewater helps prevent system overload problems such as combined sewer overflows, while also reducing the consumption of energy required to operate the wastewater treatment system.

### Progress to Date and Key Initiatives Going Forward

DoD has committed to meeting the water conservation requirements of [EO 12902](#) (1994), [EO 13423](#) (2007) and [EO 13514](#) (2009). For years, DoD has dominated the DOE Federal Energy Management Program (FEMP) Federal Energy and Water Management Awards for Water Conservation. Award winners include the Marine Corps Air Station Miramar, Tooele Army Depot, Naval Base Ventura County,

Picatinny Arsenal, Marine Corps Base Hawaii, and the Kirtland, Randolph and Fairchild Air Force Bases. These and other installations have been saving water and money – as well as the energy associated with pumping water – through a broad range of approaches that include: proactive leak management, the use of reclaimed water, efficient irrigation systems, metering, automated water distribution controls, water efficient fixtures in buildings such as low-flow toilets, and replacing turf grass with high water requirements with plants requiring little or no irrigation. The extensive 1997 *Military Handbook on Water Conservation* provides guidance to facility managers and project designers on water conservation and efficiency approaches relating to planning, water supply, end use, and wastewater treatment. In FY 2009, DoD reduced the gallons of water consumed per gross square foot of building space by 4.6 percent relative to the FY 2007 baseline, exceeding the EO 13413 target of 4.0 percent.

In January 2010, the Department issued a policy memo titled “[DoD Implementation of Storm Water Requirements under Section 438 of the Energy Independence and Security Act \(EISA\)](#)” that outlines low impact development techniques for maintaining the predevelopment hydrology of project sites, as required by EISA and EO 13514. In April, the UFC [3-210-10 Low Impact Development Manual](#) was issued, indicating that the UFC is under revision to comply with EISA §438 and EO 13514.

### **I.1.D Maintaining Readiness in the Face of Climate Change**

#### **Relation to the Mission**

Climate change is predicted to impact the Department in myriad ways, not only through direct effects on installations, but also by potentially increasing demands on our men and women in uniform. The impacts of climate change may potentially destabilize regions already prone to conflict and increase the need for humanitarian assistance and disaster relief operations.

At the installation level, the more frequent and intense heat extremes projected to occur with climate change may limit outdoor training, strain personnel efficiency, degrade air quality through elevated ozone caused by higher temperatures, and strain electricity supply due to the increased demand on the grid for cooling. In some areas, reduced snow pack caused by higher temperatures and/or changes in precipitation patterns will reduce water supply, increase the frequency and intensity of wildfires, damage local ecosystems, and cause shifts in species composition or geographic range. Among the species shifts anticipated are movement of wildlife to more favorable habitat, shifts in vector-borne diseases into the United States, and expansion of invasive grasses and shrubs. These invasive plants contribute fuel load for wildfires, which in turn increases the likelihood, range, and intensity of wildfire. Because a variety of range activities can start fires, factors that affect the frequency, duration and spread of uncontrolled wildfires have mission consequences.

Department real estate and infrastructure on the coasts may be threatened by sea level rise and the possibility of more intense hurricanes. The resulting impacts can include coastal erosion, inundation, damaged or destroyed infrastructure, reduced availability of land for operational needs, and reduced water supply due to seawater intrusion. A 2008 report by the National Intelligence Council estimated that more than 30 military installations in the continental U.S. are already vulnerable to sea level rise at levels estimated by the Intergovernmental Panel on Climate Change (IPCC) in 2007. A number of scientific research studies published since that time indicate that sea level would likely rise by more than the 2007 IPCC estimates, since the latter did not include contributions from melting in the Greenland and Antarctica ice sheets.

#### **Climate Change, Energy and DoD**

“Climate change and energy will play significant roles in the future security environment. Climate change will shape the operating environment, roles, and missions that we undertake...[and]... DoD will need to adjust to the impacts of climate change on our facilities and military capabilities. The Department is developing policies and plans to manage the effects of climate change on its operating environment, missions, and facilities.”

— *DoD Quadrennial Defense Review, 2010*

These disruptions not only directly impact military operations but undermine the natural resource base upon which military training depends. The combined effects may limit the availability and quality of ranges and other lands needed for operations, while increasing fire hazards and other safety risks. It also can make it more difficult for installations to fulfill their role as stewards of the land. Threats to federally-protected species may increase, and additional species may become endangered. These challenges will be widespread, and extend far beyond DoD's coastal installations.



Photo: U.S. Navy

A key management tool the Department has and will continue to use to help deal with the effects of climate change at the installation level is the Integrated Natural Resources Management Plan (INRMP). INRMPs are planning documents that provide for effective management and multipurpose uses of natural resources, and provide public access necessary and appropriate for those uses without any net loss in the capability of an installation to

support its military mission. They help installations integrate conservation measures with military operations, and balance the management of unique natural resources with mission requirements and other land use activities affecting an installation's natural resources. DoD anticipates that INRMPs will become more valuable as planning tools should the effects of climate change become more pronounced.

### **Progress to Date and Key Initiatives Going Forward**

The Department has started exploring the potential challenges posed by climate change and approaches to improving resiliency. The DoD Legacy Program funded some of the Department's earliest work, an assessment of the impacts of sea level rise on five North Carolina coastal installations. DoD's Natural Resources Conservation Program has partnered with the National Wildlife Federation, the U.S. Fish and Wildlife Service and others to evaluate the effectiveness of various assessment tools relating to the vulnerability of natural resources. The Natural Resources Program also is working with PRBO Conservation Science, a non-profit organization, to identify potential impacts on vulnerable bird populations. Initial work focused on impacts in California, but the work is slated to expand to Arizona and New Mexico this year. The Department is beginning to examine the issue of climate change adaptation for training ranges by supporting a project that is putting information on projected climate change into an existing adaptation model, and evaluating whether the model is suitable for developing a climate change adaptive strategy for ranges. SERDP is supporting research relating to climate change adaptation that includes: developing climate change assessment tools and research into the effects of sea level rise on DoD installation infrastructure; a variety of approaches to ecosystem management in the face of a changing climate and rising seas; and microgrid technologies that will enable installations to operate independently of the electrical grid.

In September 2009, as part of the QDR, the Department conducted a preliminary vulnerability assessment of the impacts of climate change for each installation. The Military Departments were asked to consider the vulnerability of each installation: whether it would be threatened by a rise in sea level of either less than or greater than one meter; whether the risk of a temperature increase or changing precipitation



patterns would be low, medium or high; and whether the impact of 100-year floods becoming 25-year floods would be low, medium or high. This exercise provided an initial look at the potential future vulnerability of military installations, in advance of the comprehensive assessment called for in the QDR. The Department will conduct a comprehensive assessment of all installations to assess the potential impacts of climate change on each installation's mission and natural resources base, and use this analysis to develop climate change adaptation action plans for each installation. These plans are described in more detail in Section I.5 on Climate Change Risk and Vulnerability.

Last year the Navy launched Task Force Climate Change to study how climate change could affect maritime operations. The Task Force is approaching the issue from two perspectives. One is to better assess the changes likely to occur in a warmer world through activities such as air-ocean-ice modeling, cooperative oceanographic surveys, and remote sensing. The Navy is also complementing this effort with research into the best strategies for the Navy to adapt to these changes. To address issues brought to the forefront by a more navigable Arctic, DoD will work with the Coast Guard and the Department of Homeland Security to address gaps in Arctic communications, domain awareness, search and rescue, and environmental observation and forecasting capabilities to support both current and future planning and operations.

Measures that improve sustainability can also make the Department more resilient to climate change. For example, climate change is expected to cause fluctuations and shortages in the supply of water and energy in some areas. Ongoing and future efforts by the Department to increase the generation and use of renewable energy, and to institutionalize energy and water efficiency into all DoD operations, improve the military's resiliency to these vulnerabilities.

## I.2 Greenhouse Gas Reduction Goals

In January, the Department set a target to reduce Scope 1 and Scope 2 GHG emissions from facilities by 34 percent from FY 2008 to FY 2020. Recognizing DoD's potential leadership role within the federal government as well as DoD's ability to be a test bed for new technology, the Department chose an aggressive goal that exceeds the federal government's target of 28 percent by 21%. To develop the target, the Department convened a GHG Accounting Group with representation from the Military Departments and the Defense Logistics Agency (DLA). As a starting point, the group used the modeling tool specifically developed by the White House Council on Environmental Quality (CEQ) for this exercise. The calculation was based on energy consumption data that the agencies already report to FEMP.

Meeting the reduction goal will require extensive planning and capital investment, increasing short run costs in order to reduce longer run outlays for energy purchases. Investments will also be necessary in areas such as reductions in emissions from refrigerants, landfills, employee commuting, and business travel.

The Department's Scope 1 and Scope 2 target will mainly be achieved through: energy efficiency in facilities, reduced fossil fuel use by non-tactical vehicle fleets, and the use of renewable energy, including the capture and use of methane from landfills. The Plan includes the following sub-goals relating to these areas:

### GHG Emission Sources by Scope

**Scope 1** - Direct emissions from sources that are owned or controlled by DoD, including fossil fuel combustion from stationary and mobile sources, processes that emit GHGs, and fugitive emissions (such as leaks).

**Scope 2** - Emissions resulting from the generation of electricity, heat, or steam purchased by DoD.

**Scope 3** - Emissions that result from DoD activities but are from sources not owned or directly controlled by DoD.

- Energy Efficiency: The Department will reduce facility energy intensity by 3% each year from FY 2006 through 2015, and by 1.5% per year from FY 2016 through 2020.
- Renewable Energy: DoD will produce or procure 18.3% of all energy consumed within its facilities during FY 2020 from renewable energy sources (thermal as well as electrical).
- Vehicle Fleets: DoD will reduce the use of petroleum products by non-tactical vehicle fleets by 2% annually, relative to FY 2005, for a total 30% reduction by FY 2020.
- Landfill Gas: Ten landfill gas capture facilities will become operational by FY 2020 for the production, capture and use of methane from landfills (both those owned by DoD as well as through arrangements with landfills owned by other parties).

The GHG reduction strategies used by DoD are embedded in management approaches and best practices that form the foundation for DoD's commitment to sustainability: sustainable procurement, environmental management systems, high performance sustainable buildings, and coordination with regional and local planning.

The Department made a commitment to reduce its Scope 3 GHG emissions by the end of FY 2020 by 13.5%, relative to a FY 2008 baseline. Recognizing the lack of available data and the difficulty in establishing Scope 3 targets, the Federal Environmental Executive (FEE) limited the Scope 3 target for this year to three sources: transmission and delivery losses from purchased electricity; contracted waste disposal; and employee travel. To establish these targets, DoE and the FEE provided a calculation tool. Using the tool, DoD calculated separate scopes for the three subcategories. As employee travel is responsible for more than 75% of all emissions over the three sources, it is key to driving the overall goal.

For air travel, the Department established a 7% reduction goal by the end of FY 2020, relative to FY 2011, based on planned improvements in aircraft engine technology, flight routing, and a reduction in employee trips through an increased reliance on telecommunications such as video teleconferencing, and improved conference locations. Business ground travel is expected to supply an 11% decrease in emissions over the period, primarily through improved efficiency of various travel modes. Most important to this category is employee commuting. Here, the calculations set a 7% reduction target by FY 2020, based upon improvements in automobile mileage (based on increasing Corporate Average Fuel Economy standards) and increased use of telecommuting.

Losses during the transmission and delivery of electricity are calculated based on a factor of 6.5% (supplied by the FEE), applied to the reduction in electricity consumption calculated into DoD's previously supplied Scope 2 emissions target. The Department's solid waste goal was calculated based on a 16.7% reduction in solid waste emissions from contracted sources off-installation by FY 2020, and ties directly to Departmental goals for waste diversion for recycling. For this goal setting exercise, the Department assumed no reduction in wastewater treatment emissions, because the FEE model only permitted reductions from cuts to staff. There are no current plans to cut staff, especially as military forces are likely to come back to the U.S. from overseas duty during the target planning period. For FY 2011, the definition of contracted waste disposal is confined to non-hazardous solid waste sent off-site for disposal in landfills not owned by DoD, and does not include construction and demolition debris.

Excluded from GHG emission reduction targets are expeditionary base camps, tactical vehicles<sup>1</sup> and equipment owned or operated by DoD that are used for combat operations and support, or training for such operations. However, the Department recognizes that significant reductions can be achieved in these systems and we are committed to taking advantage of these opportunities. For example, the

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<sup>1</sup> A military tactical vehicle is any motor vehicle designed to military specifications or a commercially designed motor vehicle modified to military specification to meet direct transportation support of combat, tactical or relief operations, or for training of personnel for such purposes.

Department developed the Net Zero Plus Joint Concept Technology Demonstration at Fort Irwin to test a fully operational replica of a FOB. The goal of the project is to demonstrate a self-contained system that uses less energy than it generates within its own perimeter fence. Another approach the Department is taking to reduce operational energy is to change the acquisition process to ensure that the fully burdened cost of fuel is considered in the acquisition decisions made for all weapons systems and platforms requiring fuel. Beyond energy, the Department is exploring how to integrate sustainable practices into support operations at FOBs. The Strategic Environmental Research and Development Program (SERDP), DoD's environmental science and technology program implemented in partnership with the Department of Energy (DOE) and the Environmental Protection Agency (EPA), is in the process of identifying future research needed to enhance the sustainability of FOBs. The analysis is characterizing FOB design, construction, logistics, and current practices related to the sourcing and use of energy, water, and the disposal of waste.

The Department currently has a number of broader initiatives under way that will help develop the strategic way ahead to ensure sustainable expeditionary base camps for future contingencies. In December 2009, the Army completed a collaborative study of strategic guidance, current doctrine, and lessons learned. The study identifies the capabilities required to support base camp lifecycle management during the 2015-2024 timeframe, and serves as a reference guide for future analysis and combat development efforts. DoD is focusing the study on the planning, design, construction, deconstruction, operation, and management of base camps. DoD also has a growing interest in waste stream reduction and the development of new technologies, such as waste-to-energy systems, conducive to military operations, which will also benefit GHG reductions.



The Department has started to address its emissions of GHGs that have very high global warming potentials. In October 2009, DoD's Emerging Contaminant Governance Council endorsed pursuit of several risk management measures to address SF<sub>6</sub>, a highly potent GHG with unique military and national security uses. As a result of the Council's recommendations, DoD will: develop a mandatory leak detection, capture, and reuse policy for all DoD uses of SF<sub>6</sub>; expand research and development efforts for SF<sub>6</sub> substitutes for unique military applications; and follow and leverage research being conducted by the Electric Power Research Institute regarding SF<sub>6</sub> substitutes for electrical transmission and distribution equipment in DoD infrastructure. DoD will initiate an assessment of mission risks associated with the continued use of hydrofluorocarbons – a class of potent GHGs used by the Department for air conditioning, refrigeration, fire suppression and explosion protection – and propose proactive risk management measures.

## I.3 Plan Implementation

### I.3.A Leadership and Accountability

The Deputy Secretary of Defense designated the Under Secretary of Defense for Acquisition, Technology and Logistics as the Department's Senior Sustainability Officer (SSO) to ensure the effective and successful implementation of the Plan across the Department. Each Military Department and DLA has designated a sustainability officer to ensure accountability for the Plan's implementation. Additionally, the Department established the governance structure, shown in Figure I.2, to ensure the accountability and

coordination necessary to meet the Department’s goals. Under the leadership of the SSO, the structure consists of the Senior Sustainability Council (SSC), the Sustainability Implementation Work Group, and a set of relevant committees and work groups to execute the goals of the Plan. The committees and work groups cover a wide range of sustainability topics, including: greenhouse gases; energy; transportation and fuels; solid waste and recycling; green procurement; electronic stewardship; and sustainable manufacturing. A DoD policy memorandum on DoD Infrastructure Sustainability Policy will be issued soon establishing a DoD Infrastructure Sustainability Panel that will report to the SSC and be co-chaired by the Directors of Environmental Management and Facility Investment and Management.



**Figure I.2. DoD Sustainability Governance Structure**

DUSD(I&E) and DOEP&P lead the SSC and report directly to the SSO. The current membership of the Committee, which may be modified at the direction of the SSO to ensure appropriate representation and participation by DoD Components, includes those identified in Table I.1. As stipulated in its charter, the SSC is responsible for ensuring that this Plan is coordinated and communicated internally within DoD. The SSC is likewise responsible for ensuring a systematic, interdisciplinary approach to meeting the Plan’s goals to advance sustainability while assuring mission accomplishment. The key tasks of the SSC are to: integrate sustainability into policies, planning, budgeting and decision-making; make recommendations on processes and procedures to implement the requirements of EO 13514 and other federal sustainability requirements; and continuously improve the Department’s approach to the Plan. The SSC also reviews the adequacy of policies, resources, and performance in meeting goals, and makes recommendations on changes required. The Sustainability Implementation Work Group reports to the SSC. It is charged with drafting input to the Plan and facilitating compliance and continual improvement in meeting the Plan goals. The Department is using its existing structure of committees and work groups to address specific issues and engage subject matter experts where appropriate.

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 a part of this guidance.

**Table I.1. Senior Sustainability Council Membership**

Deputy Under Secretary of Defense (Installations & Environment) - Co-Chair
Director, Operational Energy Plans and Programs <sup>2</sup> - Co-Chair
Under Secretary of Defense (Policy)
Under Secretary of the Army
Under Secretary of the Navy
Under Secretary of the Air Force
Director, Defense Research and Engineering
Deputy Under Secretary of Defense (Logistics & Material Readiness)
Deputy General Counsel
Deputy Under Secretary of Defense, Readiness
Assistant Secretary of Defense for Networks and Information Integration/Deputy Department of Defense Chief Information Officer
Under Secretary of Defense (Comptroller) – Deputy Comptroller – Planning and Budget
Director, Defense Procurement and Acquisition Policy
Director, Defense Logistics Agency (Enterprise Support)
Director, Industrial Policy
Joint Staff (J8)

OSD is proposing specific language in these documents for the requirements in EO 13514 and related requirements. Another key feature of DoD’s planning and budgeting process is the Future Year Defense Plan (FYDP). It 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. All Department Components already incorporate performance on DoD energy-related goals in their employee performance evaluation processes for relevant energy professionals.

### **I.3.B DoD Policy, Planning and Budget Integration**

DoD has a robust and well-functioning process for planning, programming, and budgeting. The SSC is responsible for ensuring that the Plan becomes integrated into the Department’s enterprise management structure, an ongoing way of conducting business DoD-wide that is continually maintained, evaluated, and refined for optimal performance in all aspects of the DoD mission, including sustainability. The SSC will explore optimal means to codify this Plan to ensure that relevant policies, program plans, guidance, and budget development in the Department reflect the Plan. The SSC is responsible for identifying any gaps in existing policies and plans that prevent implementation of the Plan, and drafting new policies and directives to fill those gaps. The status of incorporating sustainability into critical DoD reports and plans is summarized in Table I.2.

Almost two decades ago, DoD realized the need to plan and budget specifically for environmental protection and established the Environmental Security budgeting structure within the existing DoD planning, programming, and budgeting system. The functional categories established for environmental budgeting include: recurring and non-recurring environmental compliance, pollution prevention,

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<sup>2</sup> Until such time as the Director of Operational Energy Plans and Programs (DOEP&P) position is confirmed, the Principal Deputy Director, Defense Research and Engineering, is acting as the Co-Chair. The DOEP&P will assume the role of Co-Chair upon confirmation.

cleanup, natural and cultural resources conservation, and research. More recently, DoD added a special category to capture resources budgeted for operational range sustainment. A similar process is being considered to capture facilities energy investments.

As a result of this integration into the existing DoD planning, programming, and budgeting system, environmental protection, pollution prevention, and sustainability have become commonplace but less visible in the budget as separate line items. For example, sustainable building design is part of the budget for a Military Construction project and not broken out separately. While the Environmental Security budget categories still exist today, OSD has emphasized the need for DoD Components to fully integrate environmental protection, pollution prevention, and sustainability into all DoD functions. Likewise, many pollution prevention efforts are integrated into procurement for equipment and the operations and maintenance budgets for installations. Pollution prevention equipment is also designed into new Navy vessels. OSD reviews the proposed FYDPs for the DoD Components to ensure requirements have been programmed, and holds program reviews to evaluate progress. These reviews are an effective method to ensure that appropriate resources are being applied to environmental and sustainability efforts, even if they are not shown as distinct items in the budget. In addition, the Department will prepare guidance to help explain how to plan, program and budget for FY 2012 and beyond to satisfy requirements of this Plan.

The purpose of the newly created Infrastructure Sustainability Panel is to establish guidance on sustainable infrastructure, to report progress on it, and to establish guidance on how to integrate strategic planning for sustainable infrastructure with the DoD budget process. Infrastructure in this context refers to natural infrastructure (air, land, water) as well as built infrastructure found on all DoD installations.

### **I.3.C Methods for Evaluating Progress**

The Department will develop a Performance Management Review process and scorecard to monitor compliance with federal requirements relating to sustainability, and to monitor DoD activities and progress toward sustainability goals. The scorecard will employ a rating system to convey progress in achieving the Plan's objectives, goals, and sub-goals. The draft scorecard being considered for use in FY 2011 is found in Appendix C. The review process and rating system will allow the Department to continuously improve its sustainability efforts. The SSC will conduct biannual Performance Management Reviews designed to provide senior leadership with visibility on performance and the opportunity to make decisions on program direction as appropriate.

### **I.3.D Internal Coordination and Dissemination**

A communication plan is being drafted to assure coordinated outreach on the plan:

- When the Plan is approved by the Office of Management and Budget (OMB), the Department will ensure that its personnel are aware of the Plan, its purpose within the DoD mission, and performance on it, using all of the usual internal channels of communication within the Department and within each individual DoD Component, such as web sites, newsletters, and announcements. The June 2010 Environment, Energy Security, and Sustainability Symposium, which is widely attended by DoD civilian and military personnel as well as Defense contractors, provides a perfect opportunity to reach out to DoD staff regarding the plan. Annual updates of the Plan will be used as opportunities to remind civilian, military, and contractor staff of the Plan's goals and the Department's expectations.
- DUSD(I&E) and DOEP&P will present the Plan to senior managers within each DoD Component at the Deputy Assistant Secretary level and higher. Possible venues are the Range Commander's Council, Sustainable Ranges Overarching Integrated Product Team, and Defense Energy Working Group. Presentations will stress the integration of sustainability activities within overall DoD strategic planning and budgeting.

**Table I.2. Critical Planning Coordination**

Originating Report / Plan	DoD Strategic Sustainability Performance Plan Goals							
	Scope 1 & 2 GHG Reduction	Scope 3 GHG Reduction	Reduce the Use of Fossil Fuels	Improve Potable Water Efficiency	Minimize and Optimally Manage Solid Waste	Minimize the Use and Release of Chemicals of Environmental Concern	Sustainability Practices Become the Norm	Sustainability Built into Management Systems
FY 2010 Quadrennial Defense Review (Serves as DoD's Government Performance and Results Act Strategic Plan)	Yes	No	Yes	No	No	No	No	No
DoD Future Years Defense Plan	No	No	No	No	No	No	No	No
Circular A-11 Exhibit 300s (Capital Asset Plan and Business Case Summary)	n/a	n/a	n/a	n/a	n/a	n/a	Y	n/a
EISA Section 432 Facility Evaluations Reporting	Yes	No	Yes	Yes	n/a	n/a	No	n/a
DoD FY 2010 Budget	No	n/a	Yes	Yes	No	Yes	Yes	Yes
Defense Installations Strategic Plan (the DoD Asset Management Plan) / 3 Year Timeline	No	No	Yes	No	Yes	Yes	Yes	Yes
Circular A-11 Exhibit 53 Agency IT Investment Portfolio	No	n/a	No	n/a	n/a	No	No	n/a
OMB Scorecards on Energy, Environmental Stewardship and Transportation	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Defense Environmental Programs Annual Report to Congress	No	No	n/a	n/a	Yes	Yes	Yes	Yes
DoD Toxic and Hazardous Chemicals Reduction Plan (Jan 2009)	n/a	No	n/a	n/a	n/a	Yes	No	Yes
DOE Federal Fleet Compliance Report, 2007	No	No	Yes	n/a	n/a	No	No	n/a
Data Center Consolidation Plan (Defense Information Services Agency)	No	n/a	Yes	n/a	n/a	No	No	n/a
DoD Sustainable Building Implementation Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
DoD Green Procurement Plan (2008)	n/a	Yes	n/a	n/a	No	No	Yes	n/a
Sustainable Ranges – 2009 Report to Congress	No	n/a	n/a	No	No	No	n/a	Yes
Readiness and Environmental Protection Initiative (REPI) – 3 <sup>rd</sup> Annual Report to Congress	n/a	n/a	n/a	n/a	n/a	No	No	Yes
Unified Facilities Criteria (Dec 2007)	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
OMB Sustainable Practices Report	n/a	No	n/a	n/a	Yes	Yes	Yes	Yes
Environmental Management Systems	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Annual DoD Energy Management Report	Yes	No	Yes	n/a	n/a	n/a	Yes	n/a

"Yes" indicates that the Plan goal is relevant and incorporated into the report or plan; "No" indicates relevance but that it has not yet been incorporated; and "n/a" means the goal is not relevant to the report or plan.

- The Department will provide targeted training to reach personnel with specific responsibilities for implementing the Plan. OSD will work with the Defense Acquisition University and other organizations, such as the Naval Civil Engineers Corps Officer School, to develop topical training modules for use by the DoD Components. The training modules will be developed around the following DoD sustainability goals:
  - The Use of Fossil Fuels Reduced
  - Potable Water Efficiency Improve
  - Solid Waste Minimized and Optimally Managed
  - The Use and Release of Chemicals of Environmental Concern Minimized
  - Sustainability Practices Become the Norm
  - Sustainability Built into DoD Management Systems

Some relevant training courses that have already been developed, such as the Navy's DoD Sustainability Awareness Training offered by the Civil Engineer Corps Officers School, which provides practical training on high performance buildings, green procurement and electronic waste management, energy efficiency and alternative energy, innovations in pollution prevention and storm water, and best practices in sustainability. Training on Chemical Risk Management Systems is under development.

- The Department will build on its successful environmental and installation awards programs. New competitions among commands and Military Departments will be encouraged to more rapidly recognize early adopters and encourage broader adoption of new processes or technologies.
- The Department's outreach efforts will emphasize the behavioral changes required in order to achieve DoD's sustainability goals, such as shifting habits to use electronic documents instead of print versions wherever possible, setting printers and copiers to a default of double-sided printing, turning off lights and computers, practicing sustainable procurement, and conserving water. The Department will also use these general educational opportunities to give personnel hints on how to save money and become more sustainable at home.
- DoD will periodically issue policy memoranda to ensure these basic measures become ingrained in the Department's day-to-day conduct of business. For example, the Department will encourage the use of webinars and videoconferencing for training and meetings in lieu of travel, as well as providing procedures and locations for accessing these options. DUSD(I&E) will take the lead in developing a simple, brief "What You Can Do" training module for use with all DoD personnel. The training module will be posted on the DoD Environment, Safety and Occupational Health Network and Information Exchange (DENIX) web site and DUSD(I&E) will encourage each DoD Component to require the training annually.

As the Department begins implementing the Plan, we envision that we will encounter barriers to progress on sustainability in unanticipated ways, and that these will often occur at the operational level, far down in the chain of command. To effectively address these unanticipated issues, the Department will foster the communication of suggestions from all levels throughout the Department by setting up an e-mail address dedicated to this purpose.

## **I.4 Evaluating and Prioritizing the Use of Resources**

While the objectives in the Plan are driven from the "top-down", budgeting and execution of the plan is from the "bottom-up". Programs are executed by a wide variety of commands and offices across the Department rather than through a central DoD office that reviews, prioritizes, and approves sustainability investments. Decisions on the best use of financial and human resources are made at the discretion of each command within the framework of advancing the mission, and based on



considerations specific to their geographic area. Beyond that, decisions are influenced by the goal of reducing overall costs – informed by return on investment (ROI) and lifecycle cost analysis – and by environmental, social, and community considerations. For example, the mission benefits of having an off-grid source of electricity can outweigh the higher cost of renewable energy.

### 1.4.A Evaluating Return on Investment

The Department, spearheaded by the Tri-Service Collaborative Group, is building sustainability into the O&M of military installations. The Tri-Service Collaborative Group is creating a streamlined, holistic approach to sustainability at installations, with a more efficient reporting methodology. Optimizing O&M can lead to significant improvements in energy and water efficiency, offering some of the most cost-effective opportunities for maximizing return on investment, while at the same time placing less strain on energy, water and financial resources and reducing GHG emissions.



Photo: Air National Guard

DoD calculates ROI for O&M projects when there are quantitative factors that can be weighed against one another, such as initial purchase cost versus the energy or water costs associated with operating the equipment, and differing maintenance requirements and equipment lifetimes. For example, when evaluating the purchase of a pump the Department does not base its decision on purchase price alone, but on the energy efficiency of the pump (and therefore the cost of powering it over its lifetime) and its maintenance requirements. Driven largely by ROI calculations, the Department has already harvested some of the lower cost opportunities offered by O&M improvements. However, the Department recognizes that there is much more to be done, and that its maintenance backlog threatens the ability of the Department to meet its sustainability and GHG reduction goals. In order to address its maintenance backlog, the Department must have a better understanding of the energy and water savings that will result if the backlog is remedied. Therefore, the Department will survey the backlog to estimate the potential savings that can be unleashed, and gain a better understanding of the underlying reasons for the backlog. Two likely and closely related causes behind large deferred maintenance backlogs are a lack of O&M funds for facility maintenance and an insufficient availability of staff time dedicated to O&M. As part of the study, the Department will determine whether building maintenance operations in DoD are underfunded and insufficiently staffed, and if so to what extent.

Based on the results of the study, the Department will take action to ensure that the underlying problems are corrected. Addressing the underlying issues will require long-term initiatives. These initiatives are distinct from major renovation projects with Sustainment, Restoration, and Modernization funds. The Military Construction appropriation already funds the Energy Conservation Investment Program, which supports specific energy projects, but these measures are not meant to address underlying problems. These long-term initiatives will include specialized training on topics such as the highly technical systems used in high performance sustainable buildings. This training will provide staff with the skills needed to properly optimize and maintain these complex building systems, to ensure that the benefits of high performance buildings are realized.

The Department sees little impact on its GHG reduction targets from unneeded facilities. During the time when DoD is holding such assets, they use little or no energy and therefore have no appreciable impact on GHG emissions. For example, it is not uncommon for installations with unneeded facilities to fence them off and turn off their utilities, with the possible exception for minimal exterior lighting for security. It should be noted that reducing the Department's square footage, be it through the demolition of facilities or consolidation, increases DoD's overall energy intensity (energy consumption per gross square foot).

#### **1.4.B Factors in Acquisition and Procurement Decisions**

Decisions made in the acquisition of weapon systems and the procurement of goods and services unquestionably and directly impact sustainability. The Department's choices of goods and weapons have a resource and environmental impact, during the useful life of the goods and weapons and beyond. Acquisition and procurement decisions cascade into a profound range of downstream impacts, from energy and water consumption, to the use and release of toxic and hazardous materials, to the amount of solid waste generated. Program managers develop, design, and buy major systems and weapons platforms that can last thirty years or longer and have significant impacts on human health and the environment during their lifecycle.

The Department has undertaken a number of measures to ensure that sustainability and lifecycle costs are better estimated and considered in the acquisition process. The new Energy Efficiency Key Performance Parameter will require that personnel setting requirements for weapons systems limit the operational burden imposed by the new system's energy needs. DoD is also in the process of developing sustainability criteria to guide researchers, developers, and program managers to make more environmentally sustainable decisions from an array of alternatives that meet performance requirements. The products being developed are: a set of sustainability factors to be considered at key milestones in the acquisition process; guidance on the types of lifecycle costs to be considered when analyzing alternatives, making tradeoffs, and developing designs; and guidance on how to weigh or score various non-cost factors. The first phase of the project, which began in FY 2010, is benchmarking the best practices in industry and other government agencies. OSD's Chemical and Material Risk Management office plans to develop the criteria and perform some pilot testing.

The Programmatic Environment, Safety, and Occupational Health Evaluation (PESHE) also helps program managers select more sustainable weapon systems. The PESHE is a document prepared by the program manager that lays out the strategy for integrating ESOH considerations into the systems engineering process, the approach for identifying ESOH risks and reducing or eliminating them, and managing those risks where the program cannot avoid them. It is a living document that is continually updated and maintained throughout the acquisition process. It also includes a National Environmental Policy Act (NEPA) compliance schedule. The purpose of NEPA is to identify environmental issues early in the planning process for actions by federal agencies, and evaluate alternatives and possible mitigation measures before proceeding. With EPA's finding in December 2009 that GHGs threaten the public health and welfare of current and future generations, CEQ is proposing that federal agencies consider GHG emissions in their NEPA analyses.

#### **1.4.C Environmental, Social and Community Considerations**

The Department recognizes that a number of factors influence the evaluation and prioritization of DoD activities apart from monetary and regulatory elements, notably environmental and social considerations and issues affecting local communities and regions. One example of the intersection of mission and environmental considerations is the need for DoD to protect the natural resources base of its installations, both to sustain military testing and training and to be an effective steward of protected natural and

cultural resources. It is essential to work closely inside and outside the Department to ensure that development pressures and resource competition around our installations, ranges and facilities does not compromise current or future readiness and mission capabilities.

OSD's Sustainable Ranges program coordinates with regional and local planning to ensure the availability of military training and testing ranges now and into the future while protecting the environment. It supports education and engagement of key stakeholders—such as federal agencies, state and local governments, academia and nongovernmental organizations—and strengthens regional partnerships to effect landscape-level planning. OSD partners with these stakeholders to develop solutions to shared challenges—such as land use, energy, pollution and population growth—at the national, regional and local levels. Regional partnerships convene stakeholders from federal and state governments to address natural resource management, water quantity and quality, land use, and other emerging issues like climate change in a common, collaborative framework. One of the key components of the Sustainable Ranges program is the Readiness and Environmental Protection Initiative (REPI). REPI works to ensure the long-term accessibility and capability of military training areas by collaborating with stakeholders to develop a framework of compatible land use efforts. REPI forms coordinated regional planning and community partnerships that share the costs of protecting land, for the purpose of providing continued military access to the resources necessary for training and testing while remaining excellent stewards of the environment and good neighbors to communities across America. Military Departments use REPI funding to implement partnerships and projects according to their own processes.



Partnership to protect Waianae Mountains watershed and cultural values

Photo: U.S. Army

The Department's Office of Economic Adjustment, through the Defense Economic Adjustment Program, helps state and local governments adjust community planning in response to the needs of nearby military installations, for example for military ranges, training routes, and growing military missions. The office provides technical assistance to installation and range officials, and technical and financial assistance to neighboring states, communities and interest groups to support cooperative planning efforts.

The Department's many installations work closely with local, regional, and state governments in making sustainability investment decisions. Over a decade ago, the Department established Regional Environmental Coordinators (RECs) in each of the ten federal regions on the U.S. The RECs maintain regular communication with both government and non-government entities on all environmental and sustainability matters. In many cases, the RECs provide representatives to planning boards and sustainability organizations.

Sustainability is closely tied to the well-being of personnel, DoD's most important asset. Our ability to recruit, retain, train, educate, and equip the All-Volunteer Force, and to sustain its readiness and morale is fundamental to the mission. Especially given the continuing need for sustained deployments in conflict zones, the Department must do all it can to take care of our people—physically and

psychologically. One example of how sustainability is related to human health, and how DoD can prioritize its investments in response, is the connection between heat and air quality. Ground-level ozone, which irritates and inflames the lining of the respiratory system, is one of the primary components of smog. Heat accelerates the photochemical process that forms ozone from vehicle exhaust, which is why dangerous levels of ozone in urban areas always occur during summer. In areas prone to air pollution, as levels of ozone increase in warmer weather, forces cannot train outdoors as frequently and both military personnel and their families suffer increasing medical problems. Ozone formation and its attendant health problems will worsen with the warmer temperatures resulting from climate change. In areas where air quality is a concern, then, this consideration might be given greater weight by an Installation Commander making investment decisions, leading he or she to focus more resources on reducing the heat island effect on the installation (for example by planting shade trees) or lowering vehicle emissions.

## **I.5 Climate Change Risk and Vulnerability**

In its latest QDR, DoD highlighted the importance of climate change, citing energy security and climate change as one of four specific issues for which it is imperative that the Department reform how it operates. Section I.1.D, “Maintaining Readiness in the Face of Climate Change”, discusses the primary impacts of climate change on the DoD mission and outlines the Department’s initial efforts at assessing potential vulnerabilities and risks. This section describes how the Department intends to strategically address the risks posed by climate change to its fixed military installations, ranges, and facilities. DoD’s ability to sustain operations at its installations and facilities is critical for maintaining military readiness. DoD plans to follow a three-phase approach to ensure that over time its installations and facilities are resilient to the potential impacts of climate change. To accomplish these phases, DoD will take advantage of the science, models, and tools developed by other federal agencies, as well as leveraging the work of its own SERDP and the efforts of the individual Military Departments.

For Phase One, the Department will develop decision frameworks to outline the types of risks to the DoD mission and installations that may occur under climate change, the types of decisions DoD may need to make regarding these risks, and the spatial and temporal nature of these risks and decisions. During Phase Two, the Department will develop and apply a tool kit of impact assessment methods and models that can be used to identify vulnerabilities and risks to the mission accomplishment at the installation, regional, and DoD-wide scales. In Phase Three, DoD will build upon the learning generated during execution of the first two phases and develop guidelines for adaptation planning, again for different temporal and spatial scales. Work and product development under all three phases is intended to be adaptive; as a result, periodic checkpoints will be established to assess the current state of knowledge and to make any adjustments relative to impact assessment and adaptation planning.

### **Development of a Decision Framework**

Global climate change projections are generated from a set of General Circulation Models (GCMs) that do not have the requisite spatial or temporal resolution to enable robust decision making at the scales needed by DoD decision-makers. Moreover, GCMs are better at predicting mean climate conditions, in particular temperature, than climate extremes or variability. Impact assessment and adaptation decisions may be particularly sensitive to extreme events or increases in climate variability.

It is not DoD’s mission or role to make projections of future climate change; however, given the significant potential consequences of climate change, the Department must be able to make robust decisions in the face of uncertainty to ensure the long-term sustainability of its mission. DoD planners and managers require actionable information about potential future climate change scenarios, in the form of the best available synthesis of what the future might hold in terms of variables such as extreme heat events, sea level rise, and reduced river flow or snow pack (important for fresh water supplies). Such

climate change scenarios offer plausible though often simplified representations of future climate and changes to the environment that result, which can be used as input to climate change impact assessments. Such scenarios are indirectly tied to GHG emission scenarios but are not directly linked to a specific climate projection. DoD plans to adopt regional climate change scenarios to ensure consistent assessments across DoD installations. The Department will assess the risks to the mission, the types of decisions to be made, and their temporal and spatial nature. The decision framework will be used by installations for impact assessment and adaptation planning, based on a robust set of regional climate scenarios. The Department will avoid a “one size fits all” approach when developing decision frameworks, enabling them to be applied flexibly by individual installations, but it will provide DoD-level standards and guidelines to ensure that an appropriate degree of consistency is applied.

DoD does not intend to make assessment and adaptation decisions in a vacuum. The Department is actively engaged with the activities of the Interagency Assessments Task Force, which is involved in planning the next National Climate Assessment, and the Interagency Climate Change Adaptation Task Force. The Department will identify its needs in coordination with other federal entities faced with similar challenges regarding the appropriate use of climate change scenarios.

### Climate Change Impact Assessments

DoD’s operational readiness hinges on continued access to land, air, and sea for training and test space. Consequently, the Department must complete a comprehensive assessment of all its installations and facilities to assess the potential impacts of climate change on its mission. A comprehensive assessment is also a prerequisite for developing, prioritizing, and resourcing robust adaptation strategies.

“The Department must complete a comprehensive assessment of all installations to assess the potential impacts of climate change on its missions and adapt as required.”

— *DoD Quadrennial Defense Review, 2010*

To this end, DoD will continue to make use of existing impact assessment methods and models, and develop new ones as necessary. Some of these tools, associated with sea level rise and storm surge impacts, are currently under development through SERDP-funded research. The climate change scenarios upon which impact assessments are based depend on how climate as a forcing variable eventually affects changes in sea level, soil moisture, and so on. Changes in climate can lead to a cascading of physical and biological effects that have to be considered for both impact assessment and adaptation planning, in combination with the effects of other environmental stressors that also may be occurring. The Department needs models and other tools to understand how changes in physical and biological processes relate to infrastructure impacts, both natural and built. Therefore, as part of Phase Two, DoD will evaluate the availability and current utility of existing impact assessment tools and identify any gaps for which tools need to be developed. This evaluation, when appropriate, can be accomplished in coordination with other federal agencies. The Department will address gaps directly through additional research and development activities, and in coordination with other federal agencies.

With this information in hand, DoD will develop guidance consisting of an analytical methodology and associated tools for its installations to use when conducting risk-based, climate change assessments. DoD will develop a plan to conduct initial vulnerability and risk assessments at each of its installations and facilities, using the assessment guidance it develops. The plan will include processes and responsibilities to complete all impact assessments by a set deadline, and prioritize the order in which installations and facilities are assessed based in part on the decision frameworks developed during Phase One. Depending on the uniformity of the physical drivers to be considered, the types of infrastructure that may be impacted, and the decisions to be made, DoD may choose to conduct and aggregate some of the assessments across multiple installations. As the nature of the impacts and their likelihoods are better understood and tool development advances, the Department will update each of its assessments. DoD will review the assessments for their continued accuracy and relevance, and update them as needed.

The Department will emphasize to all installations and facilities the value of these self-assessments and that the results of the assessments should be incorporated into current and ongoing processes. These include the DoD Readiness Reporting System and other processes as necessary to ensure appropriate responses to the assessment findings. The Department also will develop, in conjunction with the Military Departments, a cross-DoD system for collecting assessment information, evaluating its completeness, and assisting with assessment-based resourcing decisions.

### **Climate Change Adaptation Planning**

Adaptation planning and response relies heavily on answering the question: what are we adapting to? Moreover, it is important to know over what period of time a potential impact will manifest itself to decide if adaptation is even necessary for certain infrastructure decisions. As a result, robust adaptation planning will be dependent on the decision framework developed during Phase One and the subsequent risk-based assessments conducted as part of Phase Two. The Department is an active participant on a number of the working groups associated with the Interagency Climate Change Adaptation Task Force, which is charged with developing recommendations on the development of a national strategy on climate change adaptation. As part of Phase Three, DoD will leverage the work of the Task Force in developing its own Department-wide strategy for climate change adaptation. This strategy will be provided as guidance for use by the Military Departments and individual installations and facilities. As part of its adaptation strategy, DoD will note the state of adaptation science and identify key information gaps. Strategies that are robust across a range of potential climate change scenarios will be flagged for adoption as no-regrets strategies.

## **I.6 Transparency**

The Department is committed to clearly communicating progress on the Plan because DoD's mission is advanced by doing so. Ongoing communication about the Plan and progress on it serves two purposes. First, the set of performance metrics in the Plan is a tool for evaluating performance to ensure that programs are on track, and for deciding how to take corrective action as needed. Second, the Plan enables the Department to continually instill into our personnel, the public, and the international community DoD's commitment to sustainability, and the fundamental principle that DoD's mission and sustainability are tightly coupled.

The Department looks forward to communicating performance on the Plan externally as an important opportunity to convey to Congress, the American public, and countries around the world that DoD is part of the solution to create a more sustainable future. DoD's proactive pursuit of sustainability is generally underappreciated and the DoD Strategic Sustainability Performance Plan provides a vehicle for communicating the sum and breadth of DoD's sustainability efforts as an integrated, cohesive story.

### **Internal**

Each DoD Component's Sustainability Official will provide semi-annual progress reporting through the Senior Sustainability Council to the Department SSO. The annual progress report on the Plan will consist of: 1) a report on the metrics for each sub-goal in the Plan for the entire fiscal year; 2) narrative descriptions of the best success stories for the fiscal year; and 3) a brief analysis for each sub-goal on the suitability of the annual targets and any issues inhibiting performance. The mid-year review will report the metrics for each sub-goal for the period from October through March, and any explanations of problems with meeting the sub-goals. Semi-annual monitoring will bring to light any problems in achieving the sub-goals, allowing more time for corrective action to be taken. Reporting on the Plan's progress will provide OSD, as well as the senior management of each DoD Component, with the information needed to analyze Department progress for that year on its sustainability objectives, goals and sub-goals, and alter strategies and sub-goals as needed for subsequent years. The annual report will also provide the information needed for OSD to prepare Part II of the Plan each year. Although success

stories will only be required from the DoD Components annually, their submittal is encouraged on an ongoing basis throughout the year so the Department can use them in communicating with the public (as described below). DoD and Military award programs will consider outstanding achievements every year for individuals and teams for the Plan's goals. For more information on how the Department plans to engage agency staff regarding its progress and performance on the Plan, refer to Section I.3.D on "Internal Coordination and Dissemination".

### **External**

External communication will take three forms: the media, the internet, and venues such as conferences. The Department will take full advantage of the media to disseminate messages on sustainability performance to the public. OSD will craft press releases for distribution through regular public relations channels, and will also distribute them to the Military Departments for distribution as appropriate through their local media outlets. The Department will issue a press release annually each time the Plan is submitted, and will continue to seek opportunities throughout the year to provide examples of DoD progress on its sustainability efforts.

The Department already has two platforms on the internet for communicating to the public on sustainability performance:

- DENIX (<http://www.denix.osd.mil>); and
- the "DoD Goes Green" website at [www.defense.gov/home/features/2009/0809\\_green/](http://www.defense.gov/home/features/2009/0809_green/).

In addition to posting stories and articles to these web sites on an ongoing basis, the Department will post summary results on the Plan's performance metrics annually. All Department external communication will comply with the DoD Open Government Plan (<http://open.dodlive.mil/open-government-plan/>).

The Department is already using, and will do so with greater frequency moving forward, venues such as conferences, seminars, workshops and external forums to raise awareness of the Plan, report on progress towards its goals, and discuss updates to it.

## Part II: Performance Review and Annual Update

### II.1 Summary of FY 2009 and 2010 Accomplishments

The Department was active in FY 2009 and the first part of FY 2010 in numerous areas that have advanced sustainability and reduced greenhouse gas emissions. Many examples have been described in other sections of this Plan: in the sub-sections titled "Progress to Date and Key Initiatives Going Forward" in Section I.1, and for each Goal in the "Status" sub-sections of Section II.2. Rather than repeat these, the current section provides examples of recent DoD accomplishments and lessons learned in two areas critical to forging a path to sustainability: energy and chemicals.

A paradigm shift occurred within the Department during 2009 and 2010 with regard to energy. In February of 2010, the Department issued the Quadrennial Defense Review (QDR). The QDR was the first high-level DoD strategic document to give thorough treatment to the subjects of energy and climate change. The 2010 QDR serves as a foundational document for the incorporation of energy and climate change considerations into future strategic planning documents. DoD created the office of Director for Operational Energy Plans and Programs in the Office of the Secretary of Defense (OSD), and the Military Departments have made energy a high priority. For example, the Secretary of the Navy, Ray Mabus, announced a set of ambitious goals to boost the energy efficiency of the Navy and the Marine Corps, both at sea and on land. Secretary Mabus directed that half of the energy used by installations will come from alternative sources by 2020, and by 2016 he plans to field a carrier strike group powered only by biofuel and nuclear energy.

The Department has developed an initiative that will address Expeditionary Camp Operations Sustainability by specifically focusing on base camp sustainability issues of solid waste, water, and power. The intent of the initiative is to institutionalize sustainability in order to enhance mission effectiveness for the war fighter while reducing resource demands and logistics vulnerabilities. The initiative will draw on various ongoing sustainability efforts across DoD, such as the Power Surety Task Force, the Marine Corps' Experimental Forward Operating Base, the Air Force's drive to significantly increase the use of biofuels in aircraft, and the Army's Net Zero efforts at the National Training Center, Green Warrior Project, and Base Camp Integrated Concept Development Team. Many of these efforts will identify existing commercial equipment that can be made available to our forces today, or will find gaps that need further research and development. Likewise, they will identify new environmental, health, and expeditionary sustainability skill sets required for our uniformed and civilian personnel and contracted partners.

The Department as a whole will benefit from lessons learned in energy management at the installation level. Some DoD installations have struck out ahead of the pack, setting the Department apart in the federal government as a leader in reducing the use of fossil fuels for energy. This is illustrated by the Department's continued dominance of the Department of Energy (DOE) Federal Energy Management Program (FEMP) Awards for Energy Efficiency and Energy Program Management. Award results are not yet available for 2010, but in 2009 DoD garnered nine out of 13 of these awards, and in 2008 all but one of the nine awards went to DoD. For the Department overall, in spite of increased military operations, the energy used per square foot of DoD building space declined by 10 percent in FY 2009



Photo: U.S. Air Force



relative to FY 2003. The Department is also on track to meet the Energy Policy Act of 2005 (EPAct) goal of having all eligible buildings metered for electricity by FY 2012: as of the end of FY 2009, DoD had metered 63 percent of buildings, and based on current contract commitments to continue meter installations, 86 percent of all eligible DoD building will be metered by the end of FY 2010.

The Department has made progress in increasing its use of renewable energy, producing or procuring almost 7 percent of its electricity from renewable sources in FY 2009, including geothermal (primarily ground source heat pumps), solar, wind, and biomass. DoD benefits through a power purchase agreement with the largest solar panel array in North America: a 14.2 MW installation at Nellis Air Force Base, Nevada. The array of over 72,000 solar panels provides one quarter of the necessary power for Nellis AFB and saves the Air Force about \$1 million every year in electricity costs. In the near future, the Nellis installation will be dwarfed by a new solar project currently under development: a massive solar energy venture planned for Fort Irwin, California. A combination of solar thermal and solar photovoltaic, the installed capacity of the project will be between 500 and 1,000 MW. It is being financed using enhanced use leasing, requiring no investment from DoD. The Department has learned the importance of ensuring that at least some of the installed renewable energy capacity be available to the host military installations independent of the community electrical grid. Moving forward, for purposes of mission readiness, the Department will place an increased emphasis on the ability of on-site or nearby renewable energy to ensure a supply of electricity to installations even when electricity from the grid is disrupted.

The Department's goals for reducing the environmental and mission risks associated with chemicals are to achieve better visibility into "what, where, why and how much" of chemicals of environmental concern are used by DoD, and to develop lifecycle-based chemical management policies that lead to better informed, risk-based decisions for chemical selection and usage. Notable progress was made towards this end during FY 2009 and 2010. One example is a memorandum signed in April 2009 to minimize the use of hexavalent chromium. Hexavalent



Photo: U.S. Army

chromium is found in a number of products used to perform a range of DoD functions, in particular corrosion protection, and it is also a known carcinogen. This policy directs the DoD Components to seek safer, more environmental responsible alternatives wherever feasible and in keeping with the DoD Mission. It is an important step forward to improve the safety of the warfighter and defense maintenance personnel, based on sound science. In October 2009 the Deputy Under Secretary of Defense for Installations and the Environment, DUSD(I&E), agreed to a voluntary arrangement with the National Institute for Safety and Occupational Health to measure the potential exposure of nanomaterials to DoD research personnel. While the science of nanotechnology offers very real benefits to the warfighter for protection and armament, a strategic approach is needed to mitigate the risks of this promising new science. Even where uncertainty of risk is very high, the greatest risk to DoD is to do nothing.

In 2010, the Department coordinated on a strategic plan to prepare DoD for the potential impacts of the European Union Registration, Evaluation, Authorisation, and Restriction of Chemical Substances (REACH) regulation. The plan for REACH promotes military readiness by developing goals and objectives necessary to address global defense supply chain concerns as a result of REACH implementation, as well as identifying lead DoD and support offices. Chief among the plan's goals are to protect the availability of substances with significance to the mission, guard against disruptions to the supply chain, and ensure the performance and reliability of substitutes. Some of REACH's effects are expected to exert a positive influence on DoD's efforts in green procurement.

## II.2 FY 2010 Goal Performance Review

### Introduction

The DoD Strategic Sustainability Performance Plan consists of four high-level Departmental strategic Objectives, each of which has two Goals. Under the set of eight Goals are 21 sub-goals, as summarized in Table II.1. The hierarchy of Objectives and Goals is as follows:

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

Goal #1: The Use of Fossil Fuels Reduced

Goal #2: Water Resources Management Improved

Objective #2: DoD is a U.S. Government Leader in Reducing Greenhouse Gas Emissions

Goal #3: Greenhouse Gas Emissions from Scope 1 and 2 Sources Reduced 34% by FY 2020, Relative to FY 2008

Goal #4: Greenhouse Gas Emissions from Scope 3 Sources Reduced 13.5% by FY 2020, Relative to FY 2008

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

Goal #5: Solid Waste Minimized and Optimally Managed

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

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

Goal #8: Sustainability Built into DoD Management Systems



Photo: U.S. Marine Corps

Solar Power at 29 Palms Marine Corps Air Ground Combat Center, for Use On-Site

The goals and sub-goals in the Plan are designed to be based on performance to allow flexibility in the methods used to achieve them. The sub-goals are quantitative and carefully defined by a performance metric that provides an objective, rigorous means of reporting and tracking progress against the sub-goal. The full definition of each sub-goal is provided by the combination of the sub-goal title and its defining performance metric.

Table II.1. Summary of the DoD Objectives, Goals and Sub-Goals Comprising the Strategic Sustainability Performance Plan

#	Sub-Goal	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Objective #1: The Continued Availability of Resources Critical to the DoD Mission is Ensured</b>											
<b>GOAL #1: The Use of Fossil Fuels Reduced</b>											
1.1	Energy Intensity of Facilities Reduced by 30% of FY 2003 Levels by FY 2015 and 37.5% by FY 2020	18%	21%	24%	27%	30%	31.5%	33%	34.5%	36%	37.5%
1.2	18.3% of Energy Consumed by Facilities is Produced or Procured from Renewable Sources by FY 2020	6.5%	7.5%	8.8%	10.2%	11.5%	12.9%	14.2%	15.6%	16.9%	18.3%
1.3	Use of Petroleum Products by Vehicle Fleets Reduced 30% by FY 2020 Relative to FY 2005	12%	14%	16%	18%	20%	22%	24%	26%	28%	30%
<b>GOAL #2: Water Resources Management Improved</b>											
2.1	Potable Water Consumption Intensity by Facilities Reduced by 26% of FY 2007 Levels by FY 2020	8%	10%	12%	14%	16%	18%	20%	22%	24%	26%
2.2	Industrial and Irrigation Water Consumption Reduced by 20% of FY 2010 Levels by FY 2020	2%	4%	6%	8%	10%	12%	14%	16%	18%	20%
2.3	All Development and Redevelopment Projects of 5,000 Square Feet or Greater Maintain Pre-Development Hydrology to the Maximum Extent Technically Feasible	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Objective #2: DoD is a U.S. Government Leader in Reducing Greenhouse Gas Emissions</b>											
<b>GOAL #3: Greenhouse Gas Emissions from Scope 1 and 2 Sources Reduced 34% by FY 2020, Relative to FY 2008</b>											
3			10%			19%			28%		34%
<b>GOAL #4: Greenhouse Gas Emissions from Scope 3 Sources Reduced 13.5% by FY 2020, Relative to FY 2008</b>											
4		0%	1%								13.5%

#	Sub-Goal	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
4.1	Greenhouse Gas Emissions from Employee Air Travel Reduced 7% by FY 2020 Relative to FY 2011	0%	0%	1%	2%	2%	3%	4%	5%	6%	7%
4.2	30% of Eligible Employees Teleworking at Least Once a Week, on a Regular, Recurring Basis, by FY 2020	10%	15%	17%	19%	21%	23%	25%	27%	29%	30%
4.3	50% of Non-Hazardous Solid Waste Diverted from Disposal in Landfills Not Owned by DoD by FY 2015 and Thereafter Through FY 2020	42%	44%	46%	48%	50%	50%	50%	50%	50%	50%
<b>Objective #3: The Ongoing Performance of DoD Assets Ensured by Minimizing Waste and Pollution</b>											
<b>GOAL #5: Solid Waste Minimized and Optimally Managed</b>											
5.1	All DoD Organizations Implementing Policies by FY 2014 to Reduce the Use of Printing Paper	1	6	24	31	31	31	31	31	31	31
5.2	50% of Non-Hazardous Solid Waste Diverted from the Waste Stream by FY 2015 and Thereafter Through FY 2020	42%	44%	46%	48%	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	52%	54%	56%	58%	60%	60%	60%	60%	60%	60%
5.4	Ten Landfills Recovering Landfill Gas for Use by DoD by FY 2020	0	2	3	4	5	6	7	8	9	10
<b>GOAL #6: The Use and Release of Chemicals of Environmental Concern Minimized</b>											
6.1	On-Site Releases and Off-Site Transfers of Toxic Chemicals Reduced 15% by FY 2020, Relative to FY 2007					5%			10%		15%
6.2	100% of Excess or Surplus Electronic Products Disposed of in Environmentally Sound Manner	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
6.3	100% of DoD Personnel and Contractors Who Apply Pesticides Are Properly Certified Through FY 2020	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

#	Sub-Goal	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Objective #4: Continuous Improvement in the DoD Mission Achieved through Management and Practices Built on Sustainability and Community</b>											
<b>GOAL #7: Sustainability Practices Become the Norm</b>											
7.1	95% of Procurement Conducted Sustainably	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
7.2	15% of Existing Buildings Conform to the Guiding Principles on High Performance and Sustainable Buildings By FY 2015, Holding Through FY 2020	7%	9%	11%	13%	15%	15%	15%	15%	15%	15%
<b>GOAL #8: Sustainability Built into DoD Management Systems</b>											
8.1	All Environmental Management Systems Effectively Implemented and Maintained	green	green	green	green	green	green	green	green	green	green
8.2	The Sustainability of Transportation and Energy Choices in Surrounding Areas Optimized by Coordinating with Related Regional and Local Planning	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
8.3	All DoD Installations Have Integrated Pest Management Plans Prepared, Reviewed, and Updated Annually by Pest Management Professionals	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

The set of sub-goals tracks closely with the sustainability requirements of Executive Order (EO) 13514, EO 13423, the Energy Independence and Security Act of 2007 (EISA), and EPAct. Appendix D summarizes these federal requirements by subject area, while Appendix E provides the federal requirements relating to each sub-goal.

### Scorecard for Tracking Progress

Each year, beginning with FY 2011 results, performance on the objectives, goals and sub-goals will be summarized using a DoD sustainability scoring system. The Department’s current vision for the system is provided in Appendix C. Although only the DoD-wide scoring summary will be reported in the Plan each year, separate scoring summaries will also be used for each Military Department and the Defense Logistics Agency (DLA) to foster competition. Every year the Department will use this performance monitoring system to evaluate the efficacy of its approaches to each goal and sub-goal, and revise its Plan and the approaches to achieving it as needed.

## OBJECTIVE 1

### Ensure the Continued Availability of Resources Critical to the DoD Mission

#### GOAL 1 The Use of Fossil Fuels Reduced

##### Goal 1 Sub-Goals

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

###### Metric

The percent reduction relative to FY 2003 in the total fossil fuel-generated energy consumed by DoD facilities per gross square foot of total DoD building space. A facility is defined as per the Energy Independence and Security Act of 2007 (EISA) §432(1)(C) to be 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 DoD.

###### Annual Targets

Fiscal Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 1.1 Targets	18%	21%	24%	27%	30%	31.5%	33%	34.5%	36%	37.5%

##### **SUB-GOAL 1.2 18.3% of Energy Consumed by Facilities is Produced or Procured from Renewable Sources by FY 2020**

###### Metric

The percent of total energy consumed by DoD facilities that is produced or procured from renewable energy sources. The energy is produced by DoD, produced from a DoD controlled location, or procured from another source. Renewable energy is defined as per 10 U.S.C. §2911(e) to be 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. A facility is defined as per EISA §432(1)(C).

**Annual Targets**

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 1.3 Targets	6.5%	7.5%	8.8%	10.2%	11.5%	12.9%	14.2%	15.6%	16.9%	18.3%

**SUB-GOAL 1.3 Use of Petroleum Products by Vehicle Fleets Reduced 30% by FY 2020 Relative to 2005**

**Metric**

The percent reduction in petroleum product consumption by DoD non-tactical motor vehicle fleets relative to FY 2005. Only fleets numbering 20 motor vehicles or more are covered.

**Annual Targets**

Fiscal Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 1.1 Targets	12%	14%	16%	18%	20%	22%	24%	26%	28%	30%

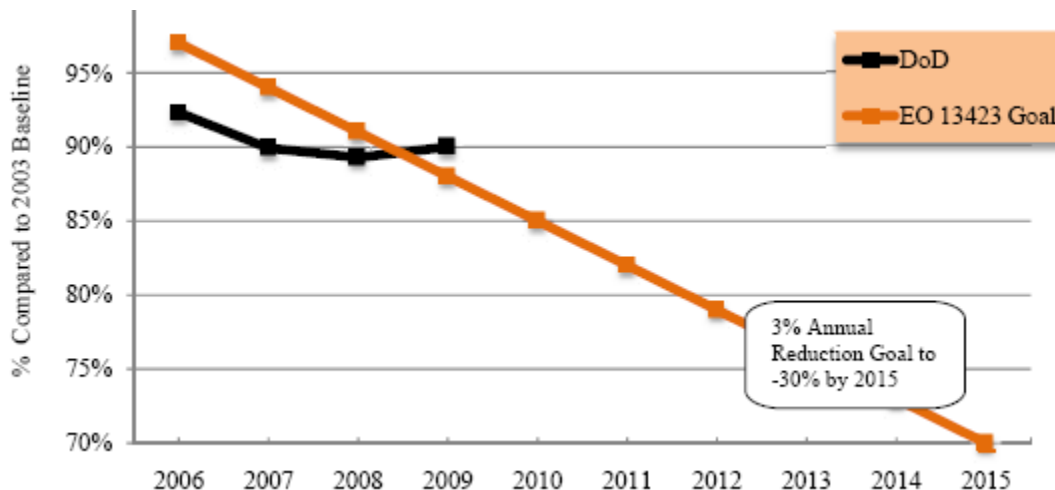
**Goal 1 Responsible OSD Office**

AT&L/I&E

**Goal 1 Status**

**Facility Energy Intensity**

DoD reduced the energy intensity of its buildings by 10 percent in FY 2009 relative to FY 2003 (measured in Btu per gross square foot), 20 percent shy of its FY 2009 goal of a 12 percent reduction (Figure II.1). As shown in Figure II.2, DoD facility energy consumption is dominated by the Military Departments, which accounted for 94 percent of consumption in FY 2009. The 2009 increase shown in Figure II.1 is due to an overall increase in energy intensity compared to last year, driven by increased energy consumption due to realignment and increased troop strength in FY 2009.



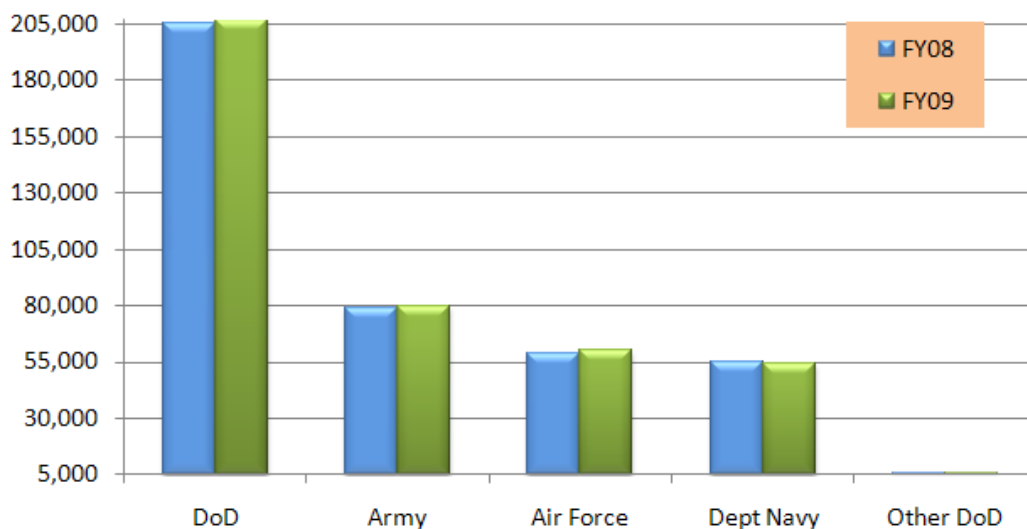
**Figure II.1. DoD Energy Intensity Compared to the EO 13423 Goal, Relative to FY 2003**

One of the fundamental approaches for improving energy efficiency is through the metering of end use. As of the end of FY 2009, DoD had metered 63 percent of those buildings eligible for standard and

advanced metering. Eligible buildings are those for which the DoD Component has determined that metering will be cost effective and practical as a management enhancement tool to identify energy cost savings.

With regard to electronic stewardship, the DoD Deputy Chief Information Officer (CIO) issued a policy memo in October 2009 to all DoD Component CIO offices, calling for the implementation of personal computer power management and Energy Star features on all eligible DoD desktops, laptops, and monitors, and encouraged all DoD Components to extend the useful life of electronics equipments to four years or more.

Another critical energy efficiency tool is performance contracting, where the energy savings from a project are used to pay for the costs of the project. DoD makes extensive use of this financing mechanism, and set a FY 2009 goal for investments using performance contracting to equal 10 percent of total utility costs. Investments in FY 2009 using performance contracting totaled \$113.4 million, or 9.1 percent of utility costs, made by the Army in the form of Energy Savings Performance Contracts and Utility Energy Services Contracting.



**Figure II.2. DoD Facility Energy Consumption (in total energy delivered, billion Btu)**

While much remains to be done to reduce overall energy consumption by the Department, notable achievements have been made by some installations. As mentioned in Section II.I, DoD was awarded nine out of 13 of the FEMP Awards for Energy Efficiency and Energy Program Management in 2009, and in 2008 all but one of the nine awards went to DoD. Details on the innovative and cost-effective measures taken by these installations can be found at the [FEMP award web site](#). One example is the Dyess Air Force Base in Texas, which through a series of energy efficiency measures reduced energy consumption in FY 2008 by 16.5 percent relative to FY 2007, producing annual savings of more than \$1 million in energy costs in the process.

### Renewable Energy

In FY 2009 DoD produced or procured 6.8 percent of its electric energy from renewable sources, including cogeneration, geothermal (primarily ground source heat pumps), solar, wind, and biomass. The requirements of 10 U.S.C. 2911(e) for DoD are to produce or procure 25 percent of its electric energy consumption from renewable resources by the end of FY 2025. The 2010 National Defense Authorization Act, however, changes the metric starting in 2010, requiring the measurement of all types of renewable



energy rather than only electricity. The new metric will dramatically reduce DoD's reported progress because including all energy consumed rather than only electricity will nearly double the percentage denominator. A recalibration of the baseline is necessary to adjust for the new metric.

DoD earned two of the DOE FEMP Awards for renewable energy in 2009. The winners were building-integrated solar photovoltaic projects at Naval Air Weapons Station China Lake and Marine Corps Base Hawaii.

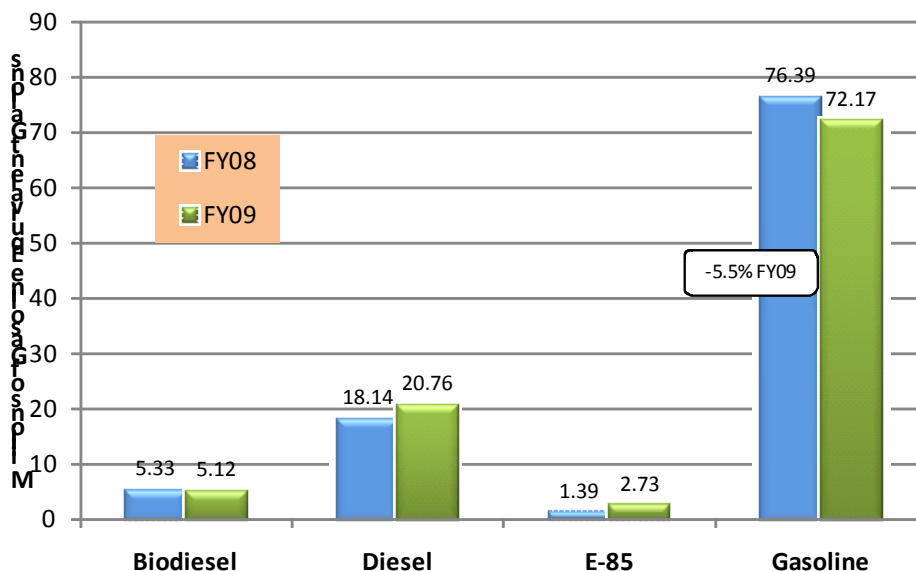


Figure II.3. DoD Vehicle Fleet Use By Fuel Type, FY 2008 and 2009

### Vehicle Fleets

DoD continued efforts in FY 2009 to acquire high efficiency vehicles and those with the ability to use alternative fuels. FY 2009 additions to the fleet consisted of 105 neighborhood electric vehicles, 863 low-speed or mini-utility vehicles, 150 hybrid electric vehicles, and 1,485 E85 vehicles (capable of using a blend of 85 percent ethanol and 15 percent gasoline); 800 low-speed electric vehicles were ordered. The Department's use of alternative fuels was 4.9 percent in FY 2009, an increase of 72 percent from the FY 2005 baseline. DoD fleet vehicle fuel consumption in FY 2009 shifted gasoline use to E85 and diesel compared to FY 2008 (Figure II.3). These measures reduced overall petroleum use by non-tactical vehicles by 9 percent compared to FY 2005.



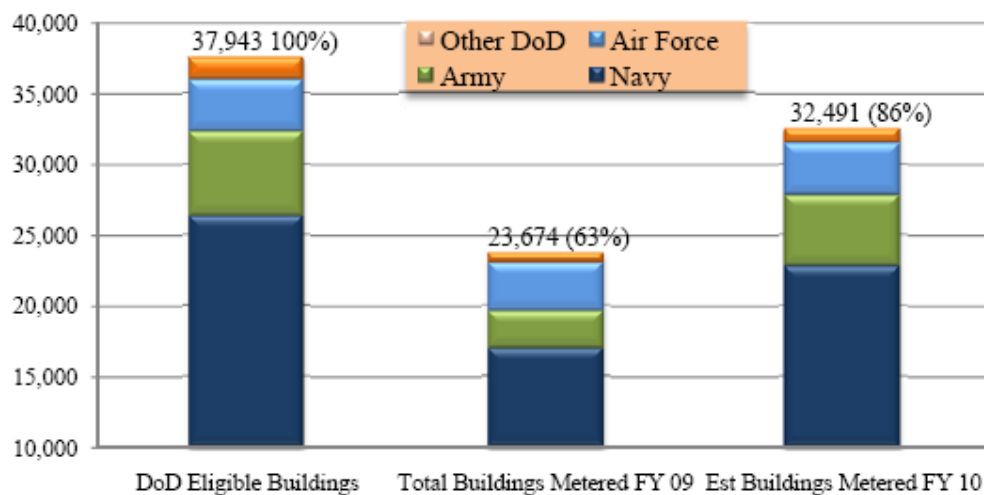
Photo: U.S. Navy

To provide the necessary supporting infrastructure for alternative fuels, the Department completed the infrastructure for 16 alternative fueling stations to dispense E85 and B20 (a blend of 20 percent biodiesel and 80 percent petroleum diesel). It also installed a solar photovoltaic charging station and upgraded a compressed natural gas station. By way of new alternative fueling infrastructure, the Department initiated construction of three E85 stations, permitted two, and placed contracts for one E85 station and one hydrogen reformer. EISA §246 requires that fuel sites dispensing 100,000 gallons or more per year be

modified to support alternative fuel infrastructure. DoD has identified 137 sites over this threshold, and completed the necessary modifications to 83 of them (63 percent). Of the remaining 51 sites, 34 are in the planning phase to install new fuel infrastructure in the near future.

### Goal 1 Implementation Methods

**Metering.** The Department will continue on its path to have all eligible buildings metered for electricity by FY 2012 (where eligible buildings are those for which the DoD Component has determined that metering will be cost effective and practical as a management enhancement tool to identify energy cost savings). Based on current contract commitments to continue meter installations, the forecast for FY 2010 is to have 86 percent of all eligible DoD building metered (Figure II.4).



**Figure II.4. Number of Eligible DoD Buildings Metered for Electricity Use**

**Sustainable Building Design and High Performance Buildings.** See the Implementation Methods for Goal 7 for information on how the Department plans to make its building inventory more sustainable.

**Leased Buildings.** A significant portion of the energy consumed by DoD facilities occurs in leased buildings. The Department will place an increased emphasis on incorporating energy efficiency and sustainable design into lease provisions. Efforts to reduce energy consumption in leased facilities have already begun. The Army, for example, emphasizes that energy and water conservation be included in all facility leases and requires that these leased facilities meet energy and water goals. The intent is to have the landlord make appropriate investments in energy efficiency and amortize them in the lease, as long as the new total cost (energy costs plus lease cost) does not exceed total costs without improvements. In July 2009, the General Services Administration signed a lease on behalf of the Defense Advanced Research Projects Agency for a new headquarters building being constructed to meet LEED Silver specifications.

**Facility Energy Audits.** The Department will continue to use facility energy audits to identify energy efficiency opportunities. For example, in FY 2009 energy audits were performed by the Tricare Management Agency's Navy Bureau of Medicine and Surgery at three Naval Medical Centers: Portsmouth, Jacksonville, and San Diego. The audits resulted in 47 recommendations with an estimated savings of \$5.4 million. Several of the recommendations will be used in the submission of FY 2011 projects under the Energy Conservation Investment Program. When conducting facility efficiency improvements, the Department will ensure that no changes are made to humidity, temperature, air exchange and lighting that are known to harm health, safety and productivity. It will do so by evaluating

all proposed modifications against the relevant guidelines of ASHRAE, IESNA, and other recognized, authoritative sources.

**Electronic Stewardship and Data Centers.** Under the Federal Data Center Consolidation Initiative, the Department will strive to reduce the overall energy and real estate footprint of its data centers, consistent with the guidance provided by the Office of Management and Budget. The Department will use the data center metrics shown in Table II.2 to drive the Department’s Data Center consolidation effort, improve energy efficiency, and reduce energy demand. Targets for the metrics will be determined after further analysis, and in coordination with the new DoD Data Center Consolidation Plan completed in late August 2010.

**Table II.2. Metrics to Drive the DoD Data Center Consolidation Effort**

	FY11	FY12	FY13
% of cloud activity hosted in a data center	TBD	TBD	TBD
% of agency data centers independently metered or advanced metered and monitored on a weekly basis	TBD	100%	hold
Reduction in the number of agency data centers	TBD	TBD	TBD
% of agency, eligible electronic products with power management and other energy-environmentally preferable features (duplexing) actively implemented and in use	95%	100%	hold
% of agency data centers operating with an average CPU utilization of 60-70%	TBD	TBD	TBD
% of agency data centers operating at a power usage effectiveness range of 1.3 to 1.6	TBD	TBD	TBD
% of agency data center activity implemented via virtualization	TBD	TBD	TBD

Other aspects of electronic stewardship are handled under the following separate sub-goals:

- ✓ sub-goal 5.1: “All DoD Organizations Implementing Policies by FY 2014 to Reduce the Use of Printing Paper”;
- ✓ sub-goal 6.2: “100% of DoD Excess or Surplus Electronic Products Disposed of in Environmentally Sound Manner”; and
- ✓ sub-goal 7.1: “95% of Procurement Conducted Sustainably”, which covers the procurement of Energy Star and EPEAT-registered electronics.

Last October, DoD’s Deputy Chief Information Officer issued a policy memo to all DoD Component CIO offices calling for the implementation of power management and Energy Star features, and encouraging all DoD Components to extend the useful life of electronics equipments to at least four years. To follow up on that memo, during FY 2010 the OSD CIO office will be reviewing the plan of each DoD Component to enable power management features on its eligible electronics equipment. The Department has partnered with the Environmental Protection Agency (EPA) and the Office of the Federal Environmental Executive to satisfy the electronics stewardship goals of EO 13423 and EO 13514 in all three phases of the electronics lifecycle: acquisition, use, and end of life. In addition, DoD will shift information technology investments to more efficient computing platforms and technologies such as desktops, laptops, and monitors that have the Energy Star label and/or are registered with the Electronic Product Environmental Assessment Tool (EPEAT).

**Vehicle Fleets.** The Department will reduce the amount of petroleum used by its non-tactical vehicle fleet through four approaches. It will:

- 1) Increase the use of alternative fuels not based on petroleum by 159% by the end of FY 2015, relative to 2005 levels, as required by EO 13423 §2(g). The Department will do so by continuing to expand the number of alternative fuel vehicles in the fleet and the supporting infrastructure

for alternative fuels (through the modification of fueling stations to dispense alternative fuels and the construction of new fueling facilities).

- 2) Continue to grow the number of low emission and high fuel efficiency vehicles, and encourage personnel to use the most efficient vehicle possible for a given purpose.
- 3) Downsize (“right-size”) the fleet by eliminating unnecessary vehicles.
- 4) Optimize the operational efficiency of vehicles, by keeping vehicles properly maintained (including tire pressure) and encouraging efficient driving techniques.

By the first quarter of FY 2011, the Department will launch a study of approaches that will accelerate its progress in reducing petroleum use by its vehicles, including incorporating the transportation elements of EO 13423 into relevant position descriptions and performance evaluations.

**Renewable Energy.** For reasons of mission readiness and national security, the Department is committed to increasing the amount of renewable energy generated on DoD property that can be consumed by installations independent of the local electrical grid. By the third quarter of FY 2011, the Department will conduct an analysis of the potential for renewable energy generation on different properties in the U.S. Each location will be evaluated based on the availability of renewable energy resources, energy-related risk assessments, and the possibility of any mission or readiness impacts of the energy facility. In addition to increasing on-site generation that can be accessed independently of the grid, the Department will continue to support the development of large renewable energy projects that benefit the nation as a whole. For example, a massive solar energy venture is planned for Fort Irwin. With a combination of solar thermal and solar photovoltaic, the installed capacity of the project will be between 500 and 1,000 MW. It is being financed using enhanced use leasing, requiring no investment from DoD.

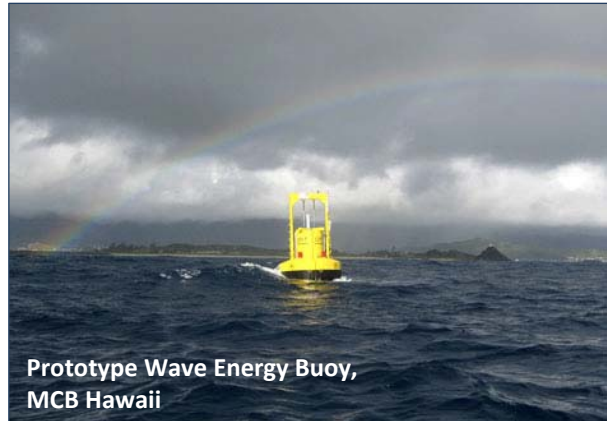


Photo: U.S. Navy

Prototype Wave Energy Buoy,  
MCB Hawaii



Photo: U.S. Navy

On-Site Solar Power at Naval Base San Diego

**Installation Energy Test Bed Initiative.** DoD’s fixed installations offer an ideal test bed that could help fill a gap between research and development, and the deployment of next-generation energy technologies developed by industry, DOE, and university laboratories. DoD’s built infrastructure and land are unique

in their size and variety, and encompass the diversity of building types and climates in the United States. The Department has programmed \$30 million to explore test bed technologies (included in the FY 2011 leveraged investments in the Resources Planning Table), working on a small scale now with plans to expand. The program uses DoD installations to test advanced, pre-commercial technologies aiming to improve the energy efficiency of buildings and distributed (on-site) energy generation, including renewables, and to improve the control and management of local energy loads. The test bed approach accelerates the deployment of innovative energy technologies across DoD installations. It provides the real life scenarios for testing technologies in the final development stage (alpha versions) and the performance of emerging commercial technologies (beta versions), while providing direct benefits to the host installation.

The test bed process for a given technology begins with a competitive selection by the Department in partnership with DOE and the private sector. DoD creates partnerships with the developer and end user to test the technology at DoD facilities. The performance of the technologies is evaluated and the associated operating costs and environmental impacts assessed, using independent testing and evaluation. The Department transfers the lessons learned in design and procurement across all Military Departments and installations to identify DoD market opportunities. For those technologies that prove effective and reliable, DoD can help create a market by serving as an early adopter, as it did with aircraft, electronics and the internet. This would allow the military to later leverage both cost savings and technology advances from the private sector.

## GOAL 2 Water Resources Management Improved

### Goal 2 Sub-Goals

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

##### Metric

The percent reduction relative to FY 2007 in total water consumed by DoD facilities per gross square foot of total building space. Consumption includes the loss of water after it is delivered (for example through leaking or malfunctioning fixtures such as toilets). A facility is defined as per EISA §432(1)(C).

##### Annual Targets

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 2.1 Targets	8%	10%	12%	14%	16%	18%	20%	22%	24%	26%

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

##### Metric

The percent reduction relative to FY 2010 in total water consumed by DoD for irrigation (agricultural and/or landscaping) and industrial purposes.

##### Annual Targets

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 2.2 Targets	2%	4%	6%	8%	10%	12%	14%	16%	18%	20%

**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 storm water 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 storm water infiltration and reuse technologies subject to site and applicable regulatory constraints.

**Annual Targets**

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 2.3 Targets	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

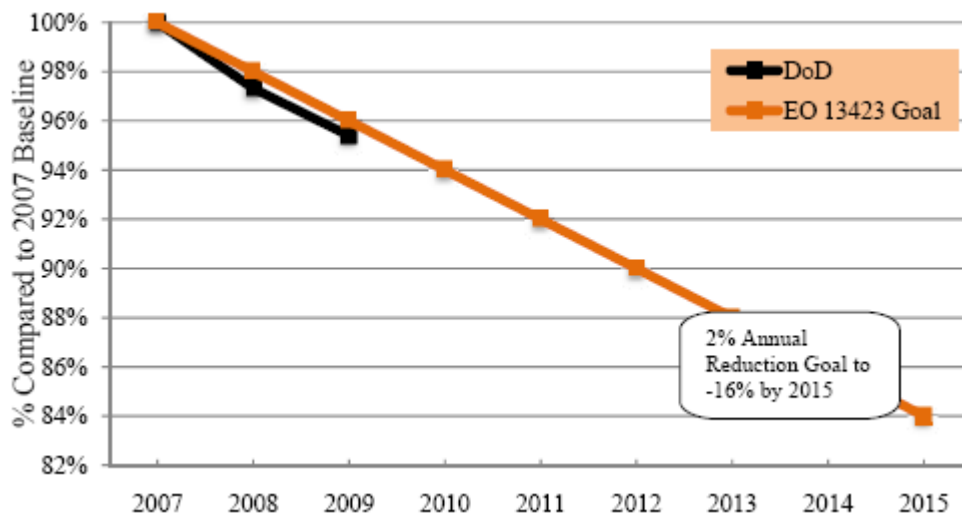
**Goal 2 Responsible OSD Office**

AT&L/I&E

**Goal 2 Status**

**Water Consumption**

Potable water consumption intensity by DoD facilities declined by 1.1 percent from FY 2008 to 2009 (in gallons per gross square foot), for a 4.6 percent decrease in water intensity relative to FY 2007, exceeding the EO 13423 goal of 4.0 percent (Figure II.5). For industrial and irrigation uses of water, FY 2010 is the first year the Military Departments will be asked to collect this data.



**Figure II.5. DoD Water Consumption Intensity Compared to the EO 13423 Goal, Relative to 2007**

All of the Military Departments are implementing water efficiency programs on an ongoing basis, installing water efficient toilets and urinals, and low-flow faucets and showerheads. Some installations have instituted aggressive leak detection surveys, and followed up with repair programs of leaky valves and damaged pipelines, significantly reducing water consumption. These water efficiency measures have the added benefit of helping these buildings comply with the “Guiding Principles for Federal

Leadership in High Performance and Sustainable Buildings Memorandum of Understanding” ([Guiding Principles](#)).

Good examples of recent DoD accomplishments in water efficiency can be found in the FEMP Federal Awards for Water Conservation. The results of the 2010 awards are not yet available, but more than half of these awards went to DoD in 2009. One of the awardees was Marine Corps Air Station Miramar, which in FY 2008 reduced water consumption by 18 percent compared to the prior year, greatly exceeding the 2 percent reduction target. The savings of 22 million gallons of water and \$371,000 was achieved by installing a dual piping system to use reclaimed water for toilets, urinals and large landscaped areas, and by installing a central irrigation control system. Another California awardee was Naval Base Ventura County, which repaired leaking pools and water lines and installed evapotranspiration controlled irrigation systems, waterless urinals, and low-flow showerheads. Savings in 2008 totaled \$337,000 and 225 million gallons, a 36 percent reduction in water use compared to 2007. The Tooele Army Depot in Utah located and repaired leaks in 12 water lines, saving 12 million gallons of water in just six months with a payback period of about two and a half years.

The fourth award went to Picatinny Arsenal in New Jersey, which operates its own water supply plant. When the plant reached capacity, rather than building another plant, the facility manager instituted an aggressive leak detection and repair program combined with automation and sub-metering that reduced water use 14 percent below 2007 levels and saved \$127,000. The decline is significant because over the same period the population of the installation increased 30 percent. These water efficiency awards are just some of the projects demonstrating DoD’s leadership in water efficiency. Naval Base Kitsap Bangor, for example, is saving 53 million gallons and more than \$80,000 every year from an investment of only \$12,500. The installation reduced water consumption by installing freeze protection devices, which reduced the water flow rate needed to protect critical equipment. These successes provide case studies to inspire and guide other installations to take advantage of the wealth of untapped opportunities in water efficiency.

### **Storm Water Runoff**

EO 13514 §2(d) calls on federal agencies to implement and achieve the metrics identified in the storm water management guidance issued by EPA, as per EISA §438. Sub-goal 2.3 was written to align with the Department’s new policy memo on storm water management, “[DoD Implementation of Storm Water Requirements under Section 438 of the Energy Independence and Security Act \(EISA\)](#)”, which was issued by DUSD(I&E) in January 2010. The memo incorporates the storm water management requirements under EISA §438 for development and redevelopment construction projects, and is based on the technical guidance issued in December 2009 by EPA.

Military installations have already been incorporating low impact development features, including bioretention swales (or bioswales) to treat parking lot runoff, biofiltration planters for rooftop runoff, vegetated filter strips, infiltration basins, permeable pavers for roads, permeable paver strips and patios underlain with gravel chips, disconnected downspouts to allow roof runoff to infiltrate, and rain gardens (including some that collect runoff from old copper downspouts on historic

#### ***DoD Unified Facilities Criteria for Sustainable Development on Managing Storm Water Runoff***

“When precipitation rate exceeds infiltration rate or when soil is saturated, water begins to move down slope on ground surface, carrying with it soaps, detergents, oil, antifreeze, fertilizers, pesticides, animal bacteria, and other pollutants. Most of the surface runoff enters streams and rivers and eventually flows back into oceans, contaminating the waterways along the way. Use low impact development (LID) technologies (e.g., bio-retention cells, permeable paving) and natural or man-made site features (e.g., roofs of buildings, parking lots, and other horizontal surfaces) to infiltrate, treat/filter, store, evaporate, and detain runoff close to its source to the maximum extent feasible.”

— UFC 4-030-01, December 2007, excerpt from §C-2.5

buildings).

In December 2007, the Department of the Navy announced a new policy on low impact development (LID) to reduce storm water runoff at all Navy and Marine installations in the U.S. starting in FY 2011. The policy applies to all new construction projects exceeding \$750,000 and renovation projects over \$5 million, and calls for all such projects to retain their pre-development hydrology such that no additional storm water flows from the site. The Naval Facilities Engineering Command Engineering Service Center developed the [Storm Water Best Management Practices Decision Support Tool](#) to evaluate different best management practices for reducing storm water runoff and the resulting pollution from it.

## **Goal 2 Implementation Methods**

### **Water Consumption**

An important part of DoD's approach to reducing potable water use by facilities will be through the high performance building requirements of EO 13514, including:

- complying with the Guiding Principles for all new construction and major renovation of DoD buildings;
- ensuring that at least 15 percent of DoD's existing buildings and building leases over 5,000 ft<sup>2</sup> meet the Guiding Principles by FY 2015;
- demonstrating annual progress toward 100 percent conformance with the Guiding Principles for the entire building inventory; and
- operating, maintaining and managing installations and facilities to reduce water consumption.

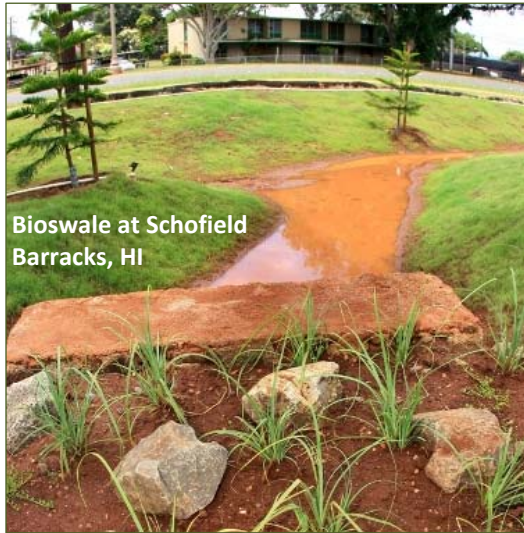
One of the main avenues through which the Department envisions meeting Goal 2 is through improved leak management on its military installations. Leak management for DoD facilities involves proactively finding and repairing leaks on an ongoing basis in the water distribution systems, starting at the point(s) where water is received from the community water provider into the installation.

Another path to achieving Goal 2 is to substitute non-potable, reclaimed water for needs currently being met with potable water, especially landscaping and industrial uses. Reclaimed water is defined as previously used water that has been processed with at least a secondary level of wastewater treatment to produce water that has a high quality but is not meant for drinking. The Department will evaluate opportunities for water reuse in wastewater treatment systems it operates during FY 2011, and will participate with community-sponsored water reclamation projects in cases where lifecycle cost-benefit analyses are favorable. For new construction of DoD-owned wastewater treatment plants, the Department will incorporate wastewater reclamation when lifecycle cost-effective.

### **Storm Water Runoff**

The Department plans to develop and distribute storm water general awareness training, and require specialized storm water construction training for inspectors, contract managers, and related personnel. Using this training, Military Departments will develop or update their storm water management policies. DoD will revise the 2004 Unified Facilities Criteria (UFC) 3-210-10 on LID to reflect recent DoD storm water policy and incorporate design requirements for the use of LID to manage storm water. DoD is working with federal agencies to incorporate storm water management requirements on federal lands into the Federal Coordinated Strategy required under EO 13508, "Chesapeake Bay Protection and Restoration" (2009).





Bioswale at Schofield Barracks, HI

Photo: U.S. Army



Bioswale to Capture Parking Lot Runoff, Little Creek Amphibious Base, Norfolk, VA

Photo: U.S. Navy

## OBJECTIVE 2

### DoD is a U.S. Government Leader in Reducing Greenhouse Gas Emissions

In letters to the White House Council on Environmental Quality (CEQ) and the Office of Management and Budget (OMB) dated January 7, 2010, the Department committed to reducing greenhouse gas (GHG) emissions from Scope 1 and Scope 2 sources by 34 percent by FY 2020, relative to levels in FY 2008. The target of 34 percent applies to each Military Department.

As per Section 19(h) of EO 13514, emissions from any vehicle, vessel, aircraft, or non-road equipment owned or operated by DoD that is used in combat support, combat service support, tactical or relief operations, or training for such operations are excluded from Department reduction targets. However, the Department recognizes that significant reductions can be achieved in these systems and it is committed to taking advantage of these opportunities.

This first Plan does not specifically address reductions associated with gases having very high global warming potentials, such as sulfur hexafluoride, due to the lack of a comprehensive GHG inventory at this time, but emission from these compounds are included in the GHG inventory and the Scopes 1 and 2 reduction target of 34%. The Department will evaluate the best approach to these gases once the inventory provides the information needed for analysis.

The Department's FY 2020 target for Scope 3 GHG emissions was being developed in parallel with this Plan, and submitted at the same time as the Plan but separately. A comprehensive GHG inventory is needed to evaluate the best approach to making reductions to Scope 3 emissions. Since FY 2010 will be the first comprehensive GHG inventory for DoD, and it cannot be completed until after the fiscal year ends, details on how the Department will address Scope 3 emissions will not be available until the FY 2011 Plan. However, the Department's approach to Scope 3 emissions in FY 2011 and 2012 are described below under Goal #4.

#### Development and Management of the GHG Inventory

The Department is committed to conducting a comprehensive GHG inventory, starting with FY 2010.

The inventory is a valuable planning tool to enable the Department to understand the highest priority areas to be targeted for emissions reductions. It is anticipated that the Department will want to revisit its set of sub-goals next year once it has a more accurate understanding of its GHG profile. Also, once the FY 2010 inventory has been conducted, DoD will have the experience needed to refine its procedures for collecting data and estimating emissions, particularly for the Scope 3 emissions with which the Department has little experience at this stage.

### **GOAL 3 Greenhouse Gas Emissions from Scope 1 and 2 Sources Reduced 34% by FY 2020, Relative to FY 2008**

#### **Annual Planning Targets**

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Goal 3		10%			19%			28%		34%

#### **Goal 3 Responsible OSD Office**

AT&L/I&E

#### **Goal 3 Status**

The Department does not yet have the FY 2009 or 2010 data needed to quantify the change in its Scopes 1 and 2 GHG emissions in FY 2009 or 2010 relative to FY 2008.

#### **Goal 3 Implementation Methods**

The lion's share of Scope 1 and 2 GHG emission reductions will come from Goal #1, the reduced use of fossil fuels. The three Goal 1 sub-goals reduce fossil fuel consumption by DoD facilities and vehicle fleets, and increase energy consumed from renewable sources:

Sub-Goal 1.1: Energy Intensity of Facilities Reduced by 30% of FY 2003 Levels by FY 2015 and 37.5% by FY 2020

Sub-Goal 1.2: 18.3% of Energy Consumed by Facilities is Produced or Procured from Renewable Sources by 2020

Sub-Goal 1.3: Use of Petroleum Products by Vehicle Fleets Reduced 30% by 2020 Relative to 2005

In addition, sub-goal 5.4 aims to increase the amount of landfill gas used by the Department:

Sub-Goal 5.4: Ten Landfills Recovering Landfill Gas for Use by DoD by 2020

Many of the other sub-goals will also reduce GHG emissions, such as: reducing water consumption, the use of printing paper, and the amount of solid waste going to landfills; retrofitting and constructing buildings for sustainability; and the procurement and use of energy-efficient electronic equipment.

### **GOAL 4 Greenhouse Gas Emissions from Scope 3 Sources Reduced 13.5% by FY 2020, Relative to FY 2008**

#### **Annual Planning Targets**

Fiscal year	2011	2012
Goal 4	0%	1%

#### **SUB-GOAL 4.1 Greenhouse Gas Emissions from Employee Air Travel Reduced 7% by FY 2020**

## Relative to FY 2011

### 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 Targets

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 4.1 Targets	0%	0%	1%	2%	2%	3%	4%	5%	6%	7%

## SUB-GOAL 4.2 30% of Eligible Employees Teleworking at Least Once a Week, on a Regular, Recurring Basis, by FY 2020

### Metric

The percent of DoD employees eligible to telework who are doing so at least once a week on a regular, recurring basis. Telework can be at any approved location: home, a regular General Services Administration 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 Targets

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 4.2 Targets	10%	15%	17%	19%	21%	23%	25%	27%	29%	30%

## SUB-GOAL 4.3 50% of Non-Hazardous Solid Waste Diverted from Disposal in Landfills Not Owned by DoD by FY 2015 and Thereafter Through FY 2020

### Metric

The percent of the non-hazardous solid waste stream generated and collected by DoD facilities (by weight), without construction and demolition debris, that by reuse, recycling, and/or composting is directed away from disposal in landfills not owned by DoD.

### Annual Targets

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 4.3 Targets	42%	44%	46%	48%	50%	50%	50%	50%	50%	50%

## Goal 4 Responsible OSD Office

Sub-Goals 4.1 and 4.2: AT&L/Personnel and Readiness (P&R)

Sub-Goal 4.3: AT&L/I&E

## Goal 4 Status

### Employee Air Travel

The Department has not been tracking the miles travelled by employees flying on DoD business, but it does capture the information needed to track this sub-goal in the future. The General Services Administration is developing a tool in order to calculate emissions from airline travel, based upon such factors as length of the flight and eventually type of aircraft and load factors. The Defense Travel System already includes a rail travel option for booking travel between cities on major rail corridors. Rental car

miles driven could be calculated based upon already captured information on gasoline purchased, with a price per gallon assumed.

### **Teleworking**

Of those eligible, 4.8 percent of DoD employees teleworked in FY 2009, up from 3.0 percent in FY 2008. In FY 2009, 19 percent of employees who were teleworking were doing so three or more days per week, 35 percent were teleworking one or two days per week, 20 percent were teleworking at least once a month, and the remainder (26 percent) were doing so on an ad hoc or situational basis. The Department is committed to increasing participation, and as of June 2009 it assigned a staff member dedicated to teleworking. DoD is also in the process of reissuing Department of Defense Instruction (DoDI) 1035.01 on Telework Policy to update the version issued in April 2007. The aim of the draft DoDI is to ensure that teleworking is actively promoted and implemented throughout DoD, in recognition that teleworking benefits workforce efficiency, emergency preparedness, and quality of life. DoD also recognizes that teleworking is an effective means of continuing operations in the event of a crisis or national emergency, such as a pandemic influenza. The Department plans to include in the new DoDI enhanced guidance on implementation and a standardized telework agreement form that includes checklists for safety and technology/equipment.

### **Contracted Solid Waste Disposal**

The current status of the Department's reduction in solid waste disposal is covered under Goal 5.

## **Goal 4 Implementation Methods**

### **Employee Air Travel**

The Department will reduce GHG emissions from employee air travel through a variety of approaches. One is to include evaluation criteria in the City Pair contracts negotiated by the General Services Administration to provide vendors with a higher evaluation result when they provide more efficient routes and equipment. DoD will also alter its automated travel tools, such as the Defense Travel System, to flag the most "green" travel options. The Department will issue a policy memo that highlights the importance of being as efficient as possible with travel and avoiding it where possible, and that calls on employees to incorporate the goal of reduced GHG emissions from travel into their everyday course of business. The memo will cite specific changes employees can embrace toward this end, such as considering the minimization of participant miles travelled in the decision on where to site a conference, using rail for travel between cities on major rail corridors, and the increased use of virtual telecommunications tools. The Department will implement an education and communication campaign to help DoD employees understand how they can help reduce emissions. To reduce the need for travel, DoD will conduct a cost-benefit analysis to inform a program to increase the availability of high quality virtual tools and facilities in DoD, such as videoconferencing, teleconferencing, web conferencing, webinars, and internet broadcasting (webcasting). The Department also plans to post on-line training for employees on the effective use of these tools and facilities.

### **Teleworking**

The Department's goal is to increase the visibility and usage of the telework program and to integrate and embed its use in our mainstream operations where appropriate. The current DoD teleworking rate is not commensurate with the U.S. Government average and Administration priorities, and sub-goal 4.2 is an important step to overcoming the barriers that have limited participation. The latest Strategic Plan of P&R – the OSD office responsible for telework – set targets to increase the percentage of employees who are teleworking by 5 percent per year from FY 2010 through FY 2012, relative to the FY 2009 baseline, for a rate of 15 percent by the end of FY 2012. This goal does not restrict telework frequency to at least once a week on a regular and recurring basis, so the Plan sub-goal represents a stretch beyond the P&R goal.

The Department has identified the main barriers to teleworking and is in the process of remedying them. It has a plan in place to develop a long-term solution of a web-based electronic telework tracking system to facilitate accurate and consistent reporting of telework data and a coding system that will clearly define the positions eligible for teleworking. The Department is also developing a targeted marketing campaign and revised telework policy that requires telework training to educate leaders, managers and employees on telework benefits, performance in a telework environment, and the value of integrating telework into continuity of operations activities. Finally, the inclusion of sub-goal 4.2 in the Plan will contribute significantly to addressing one of the main barriers to teleworking: cultural resistance.

**Contracted Solid Waste Disposal**

The Department’s planned methods for reducing solid waste disposal into landfills (not including construction and demolition debris) are covered under the solid waste diversion sub-goal 5.2. There are no plans at this time to emphasize reductions in waste streams based on whether they are sent to DoD landfills or off-site landfills not owned by DoD. The purpose of sub-goal 4.3 is to document that waste going to off-site landfills not owned by DoD, for purposes of tracking Scope 3 GHG emissions, and the Department will modify its record keeping methods to track solid waste sent to off-site landfills not owned by DoD.

**OBJECTIVE 3**  
**The Ongoing Performance of DoD Assets Ensured**  
**by Minimizing Waste and Pollution**

**GOAL 5     Solid Waste Minimized and Optimally Managed**

**Goal 5 Sub-Goals**

**SUB-GOAL 5.1     All DoD Organizations Implementing Policies by FY 2014 to Reduce the Use of Printing Paper**

**Metric**

The number of DoD organizations that: 1) have issued a policy that establishes a program for reducing the use of printing paper, where the program consists of two or more initiatives that drive the transition to a culture of reduced paper; and 2) are actively implementing that program. Organizations counted are the Departments of the Army, Navy and Air Force, the 17 National Agencies, and the 11 DoD Field Activities.

**Annual Targets**

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 5.1 Targets	1	6	24	31	31	31	31	31	31	31

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

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 5.2 Targets	42%	44%	46%	48%	50%	50%	50%	50%	50%	50%

### **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 Targets**

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 5.3 Targets	52%	54%	56%	58%	60%	60%	60%	60%	60%	60%

### **SUB-GOAL 5.4 Ten Landfills Recovering Landfill Gas for Use by DoD by FY 2020**

#### **Metric**

Cumulative number of qualifying landfills (starting in FY 2011):

- a) landfills owned by DoD that became operational for the production, capture and use of methane from landfill gas; and
- b) landfills owned by other parties, with which DoD has entered agreements to buy landfill gas (or energy from it), that became operational for the production and capture of methane from landfill gas for use by DoD.

Landfill projects will only be counted towards the sub-goal when it results in the collection of at least 50,000 standard cubic feet per day of landfill gas, on average.

#### **Annual Targets**

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 5.4 Targets	0	2	3	4	5	6	7	8	9	10

## **Goal 5 Responsible OSD Office**

Sub-Goal 5.1: OSD Director of Administration

Sub-Goal 5.2 to 5.4: AT&L/I&E

## **Goal 5 Status**

### **Increasing Solid Waste Diversion**

In FY 2008, DoD released the "[DoD Integrated \(Non-Hazardous\) Solid Waste Management](#)" (ISWM) Policy Memorandum and established corresponding DoD ISWM Guidelines. The ISWM policy set a diversion goal for non-hazardous solid waste of 40 percent by 2010, excluding construction and demolition (C&D) waste. DoD achieved a diversion rate of 39 percent for non hazardous solid waste (excluding C&D) in FY 2009 (Figure II.6). Development of a DoD Instruction (DoDI) on ISWM is underway. DoD has developed a Qualified Recycling Program Managers training course approved by the Interservice Environmental Education Review Board that includes guidance for C&D diversion. All Military Departments and DLA have recently updated their ISWM program policy, including for C&D diversion.

The current goal for C&D diversion is 50 percent by FY 2010 and DoD achieved a 65 percent diversion rate in FY 2009. However, it should be noted that C&D diversion can be highly variable from year to year since it depends on construction schedules. Individual Military Department diversion rates ranged from 42 to 73 percent in FY 2009.

### Recovery of Landfill Gas

DoD currently has three landfill methane-to-energy projects. One of these landfills, the West Miramar Sanitary Landfill, is owned by DoD and operated by the City of San Diego. The Miramar landfill gas (LFG) collection system is in place and operational, collecting 6.4 million standard cubic feet per day (mmscfd) of LFG that generates 9 MW of electricity.

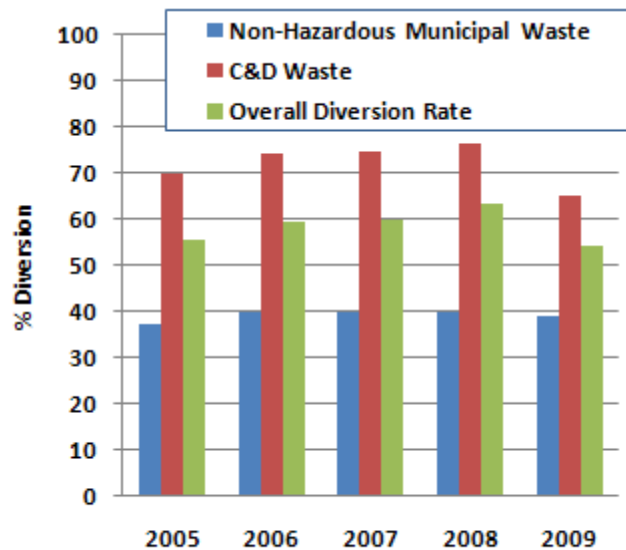


Figure II.6. DoD Solid Waste Diversion Rates, 2005 - 2009

The other two LFG-to-energy projects are contractual arrangements where DoD buys the gas, or energy made from it, from nearby landfills. One of these is with the Hill Air Force Base (Utah), which buys LFG from the Davis County Landfill adjacent to the base. The landfill is owned and operated by the Wasatch Waste Management District, but the LFG-to-energy project was developed and is operated by Ameresco. The other is with the Marine Corps Logistics Base Albany (Georgia), which will buy a minimum of 153,640 million Btu per year from a facility that will be online by 2011, under a 20-year contract between the Navy and the Dougherty County Commission. The gas is expected to provide 22 percent of the base's energy needs. Camp Lejeune has an LFG collection in place but not yet operational. Other DoD landfills already identified as candidates for LFG recovery are Fort Lewis landfill #5 and the landfills at Vandenberg Air Force Base and Fort Bragg.

## Goal 5 Implementation Methods

### Reducing the Use of Paper

No solid waste reduction effort can be successful without addressing paper, which on average accounts for more than 60 percent of office waste. By the end of FY 2011, the Department will issue a policy stating that reducing the use of printing paper is a priority for DoD, and directing the DoD organizations specified in the sub-goal 5.1 performance metric to issue and implement a policy for minimizing the use of paper. Also by this time, the Department will develop and issue DoD-wide guidance on effective strategies for reducing the use of paper, for example by encouraging the use of digital documents in lieu of paper, requiring printers with automatic duplexing capability to default to this setting, and modifying routine office tasks to reduce paper use. The Military Departments and DLA are expected to meet the requirements of sub-goal 5.1 by no later than the end of FY 2012.

### Increasing Solid Waste Diversion

The Department will evaluate the effectiveness of procuring waste disposal contracts that use a weight ticket-based payment system rather than one based on volume. Weight is a much more accurate representation of actual waste totals than volume, thus a weight-based system is critical to accomplishing solid waste reduction goals. The Department will also investigate the development of technologies or strategies that support more composting options, such as facilitating community and/or installation composting infrastructure or increasing the purchase of biodegradable products and packaging materials. The guidance would draw attention to the fact that many natural and manufactured materials do degrade, and to the connection between purchasing decisions and disposal options such as

composting. In support of sub-goal 5.2, DoD will begin tracking landscape and food waste composting operations.

The Department will evaluate the feasibility of requiring solid waste recycling and diversion contracts to conduct programs that support DoD's solid waste diversion goals, and to routinely report to DoD installations. This would align solid waste management contracts with DoD's solid waste goals, and should resolve the problem at some installations where solid waste data is not reported for privatized housing even though the waste is disposed in installation landfills. The Department will also evaluate the need for environmental assessment protocols to be revised to ensure that EO 13514 requirements and DoD goals for non-hazardous solid waste diversion are reflected.

To improve the rate at which C&D debris is recycled, the Department will incorporate language into C&D contracts that requires diversion of materials and debris in line with the Department's C&D debris diversion goals. The Department will also develop and implement a DoDI to strengthen C&D diversion requirements. Environmental assessment protocols will be evaluated and revised, as appropriate, to incorporate EO 13514 requirements and DoD goals for C&D diversion. The Department will provide resources and training to all installation solid waste managers and unit-level staff to raise awareness of DoD solid waste diversion goals and related requirements.



Recycling Cardboard, Anniston Army Depot, AL

Photo: U.S. Army

The Department will review the myriad practices that can be implemented to reduce waste generation and promote source reduction. General practices such as reusing materials, procuring products with less packaging (through contract language), using closed loop systems for the return of products or packaging, and procedural changes that result in less waste all achieve a reduction in waste generation. The Department will identify techniques that affect behavioral changes, such as establishing role models (leadership support), prompts, promotion, incentives, and training. Existing training programs specific to various types of activities – such as health care and food service – will be evaluated for opportunities to incorporate source and waste reduction training.

### Recovery of Landfill Gas

The Department will conduct analyses to determine the best options for landfill gas projects. First DoD will survey the landfills it owns to develop a short list of landfills that present the most promise for LFG projects, in terms of return on investment. A more rigorous financial analysis will be conducted on this short list to identify the two best options for moving forward. Using the EPA Landfill Methane Outreach Program database, the Department will also identify the set of military installations located adjacent to communities with large landfills, and then discuss with these installations the potential suitability of buying LFG from their community landfill. This analysis will allow the Department to determine where the greatest potential lies for producing and/or procuring energy from LFG.



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

### Goal 6 Sub-Goals

#### SUB-GOAL 6.1 On-Site Releases and Off-Site Transfers of Toxic Chemicals Reduced 15% by FY 2020, Relative to FY 2007

##### Metric

The total release of toxic chemicals to the environment and off-site transfers of such chemicals, in terms of the Toxics Release Inventory (TRI) Reportable Quantity (in pounds released or transferred), relative to the calendar year 2007 baseline for EPCRA Section 313 toxic chemicals reported between January 1 - December 31, 2006. DoD reports this information to EPA annually. The sub-goal does not include releases from ammunition production, military munitions, operational range activities, mission critical weapon system support activities, and conventional and chemical military munitions demilitarization.

##### Annual Targets

Calendar year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 6.1 Targets					5%			10%		15%

#### SUB-GOAL 6.2 100% of Excess or Surplus Electronic Products Disposed of in Environmentally Sound Manner

##### Metric

The percent of excess or surplus DoD electronic products disposed of in an environmentally sound manner, where environmentally sound is defined as either:

- donating to a charitable cause;
- using a manufacturer's take-back or trade-in service; or
- trading-in, recycling (including refurbishment and resale) or disposal through a facility that is fully licensed for treatment and disposal, and in a manner consistent with the EPA guide titled "Plug-In to eCycling: Guidelines for Materials Management" (<http://www.epa.gov/osw/partnerships/plugin/pdf/guide.pdf>).

Electronic products are defined as per the [DoD Electronics Stewardship Plan](#): devices that are dependent on electric currents or electromagnetic fields in order to work properly.

##### Annual Targets

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 6.2 Targets	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

#### SUB-GOAL 6.3 100% 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 [4150.7-P](#) and DoDI [4150.7-M](#), 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 Environmental Protection Agency rules and regulations and are accepted as valid certifications.

##### Annual Targets

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 6.3 Targets	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

## Goal 6 Responsible OSD Offices

Sub-Goal 6.1: AT&L/I&E

Sub-Goal 6.2: DLA

Sub-Goal 6.3: Armed Forces Pest Management Board (AFPMB)

## Goal 6 Status

### Chemical Use, Releases and Transfers

Objective 2.2 of the 2007 [Defense Installations Strategic Plan](#) required the development of goals and an action plan for pollution prevention and toxic or hazardous materials management to meet the sustainability requirements in EO 13423. As a result, DoD submitted to the Office of the Federal Environmental Executive in February 2008 its *Toxic and Hazardous Chemicals Reduction Plan*, centered on lifecycle chemical management. Each Military Department subsequently committed to reduce three chemicals.

The Department has been working on reducing the use of hazardous and toxic chemicals, as well as proactively addressing risks from emerging contaminants, for several years. The text box on the next page illustrates the breadth of DoD policies that address pollution prevention and the minimization of waste from toxic and hazardous materials. The Department's Joint Group on Pollution Prevention and Joint Service Solvent Substitution, Environmental Security Technology Certification Program, and Technology Transfer Program all address different aspects of hazardous and toxic material reduction. The work of these groups covers a wide range of topics, spanning the development of new materials and processes, testing and validation of substitute processes and materials, demonstrations at DoD facilities, development of specifications, and ultimately, the transfer of new solutions to the commercial sector.

The Department's Emerging Contaminants Program, launched in 2006, identifies chemicals with evolving science and regulatory standards, assesses the likelihood and severity of risks to the environment, health and safety, and assesses the mission considerations associated with their continued use. For certain contaminants of interest, the program identifies proactive risk management measures which may include research, development, and testing of substitute materials; means to minimize release and exposure; and means to minimize use. To date, the program has scanned over 300 chemicals and conducted detailed risk analyses on 21 of them, and DoD's Emerging Contaminants Governance Council has endorsed risk management measures for seven of the chemicals. As a result, and perhaps most noteworthy, in 2009 the Department issued a policy memo titled [Minimizing the Use of Hexavalent Chromium](#). Hexavalent chromium, a known carcinogen, is found in a number of products used to perform a range of DoD functions, in particular corrosion protection. Feasible substitutes have been found for some uses of hexavalent chromium. This policy directs the DoD Components to seek safer, more environmentally responsible alternatives wherever feasible and in keeping with the DoD mission. Harvard University's Kennedy School of Government recognized the Emerging Contaminants Program as a finalist in its 2009 Innovation in American Government Award. The Department has codified program responsibilities related to Emerging Contaminants in [DoDI 4715.18](#).

The Department supported the establishment of the Water and Environmental Technology Center in partnership with Temple University, the University of Arizona, Arizona State University, pharmaceutical and aerospace industries, equipment manufactures, and analytical laboratories. This National Science Foundation University-Industrial Cooperative Research Center is addressing emerging contaminants issues, including among other topics the development and evaluation of substitute materials.



## **DoD Policies, Procedures, and Instructions for Preventing Pollution and Minimizing Waste from Toxic and Hazardous Chemicals and Other Materials**

### *Policy Memos*

[Minimizing the Use of Hexavalent Chromium \(2009\)](#)

[Consolidated Emergency Planning and Community Right-to-Know Act \(EPCRA\) Policy for DoD Installations, Munitions Activities, and Operational Ranges \(2006\)](#)

### *Defense Federal Acquisition Regulation Supplements:*

**223.3** [Hazardous Material Identification and Material Safety Data \(2005\)](#)

**223.71** [Storage and Disposal of Toxic and Hazardous Materials \(2005\)](#)

**223.72** [Safeguarding Sensitive Conventional Arms, Ammunition and Explosives \(2005\)](#)

**252.223-7001** [Hazard Warning Labels \(2005\)](#)

**252.223-7006** [Prohibition on Storage and Disposal of Toxic and Hazardous Materials \(2005\)](#)

### *Department of Defense Directives:*

**4715.1E** [Environment, Safety, and Occupational Health \(2005\)](#)

**4715.11** [Environmental and Explosives Safety Management on Operational Ranges Within the United States \(2007\)](#)

**4715.12** [Environmental and Explosives Safety Management on Operational Ranges Outside the United States \(2007\)](#)

**5000.01** [The Defense Acquisition System \(2007\)](#)

### *Department of Defense Instructions:*

**4150.07** [DoD Pest Management Program \(2008\)](#)

**4715.02** [DoD Regional Environmental Coordination \(2009\)](#)

**4715.3** [Environmental Conservation Program \(1996\)](#)

**4715.4** [Pollution Prevention \(1998\)](#)

**4715.5** [Management of Environmental Compliance at Overseas Installations \(1996\)](#)

**4715.6** [Environmental Compliance \(1996\)](#)

**4715.7** [Environmental Restoration Program \(1996\)](#)

**4715.8** [Environmental Remediation for DoD Activities Overseas \(1998\)](#)

**4715.9** [Environmental Planning and Analysis \(1996\)](#)

**4715.10** [Environmental Education, Training and Career Development \(1996\)](#)

**4715.14** [Operational Range Assessments \(2005\)](#)

**4715.15** [Environmental Quality Systems \(2006\)](#)

**4715.18** [Emerging Contaminants \(2009\)](#)

**5000.02** [Operation of the Defense Acquisition System \(2008\)](#)

### *Military Standard*

**882D** [DoD Standard Practice for System Safety \(2000\)](#)

The Department's efforts to manage the potential impacts from the European Union REACH regulation will also benefit DoD's hazardous and toxic chemical reduction goals. DoD is drafting a strategic plan to promote military readiness by addressing global defense supply chain concerns expected to result from REACH implementations. Included in the plan are measures to prevent disruptions to the supply chain



Practice Fighting Fire Simulated with Propane Rather Than Open Burning of Diesel

Photo: U.S. Navy

by ensuring the performance and reliability of substitutes for DoD mission purposes. DoD's efforts in association with REACH will exert a positive influence on DoD's efforts to adopt materials that are inherently more environmentally responsible.

The DoD Business Enterprise Integration Office is leading the DOD Hazardous Material (hazmat) Business Transformation, a process re-engineering effort for the purpose of providing accurate and reliable information for our warfighters, installations, and the ESOH

community to support better decision making in evaluating the use and reduction of hazardous chemicals. Integrated into the DoD Business Enterprise Architecture in 2006, it establishes requirements for reliable hazmat information and a common business process for hazmat management within a rigorous environmental management system framework. The effort is establishing common hazmat management architectures, processes, terminologies, data standards and attributes for the Military Departments, and upgrading existing infrastructure such as Material Safety Data Sheets for defense ESOH professionals. It will also establish standardized and authoritative Product Hazard Data sources for all of DoD and a centralized Hazmat Data Steward to ensure accurate and up-to-date linkages between data on hazardous materials and the exact hazardous product being used on an installation.

### Electronics Disposal

The Department already has a rigorous system in place to dispose of excess or surplus electronic products in an environmentally sound manner, either donating to a charitable cause; using a manufacturer's take-back or trade-in service; or trading-in, recycling or disposal through a facility that is fully licensed for treatment and disposal. DoD uses the DLA Defense Reutilization and Marketing Services ([www.drms.dla.mil](http://www.drms.dla.mil)) to turn over its surplus or excess electronics, ensuring that environmentally sound and best practices are applied to the handling of electronics equipments at the end of their life in the Department. The Defense Reutilization and Marketing Services has a web-based Electronic Turn-in Document system for submitting electronics for proper disposal, facilitating the disposal of electronics by making the process less labor-intensive. The system replaces the hard copy submissions of the disposal turn-in document, DD Form 1348-1A, making the submission of information easier by providing drop down menus and pre-populating many of the fields, such as DoD National Stock Number items, nomenclature, the demilitarization code (which specifies how the item is to be destroyed and/or disposed), and unit price. DoD facilities are also active participants in the Federal Electronics Challenge and the Electronics Recycle and Reuse Challenge run by EPA.

### Pesticide Use

Pesticides encompass a variety of substances used to control pests, including insects, weeds and fungus. DoD has reported pesticide use since 1993. That rate has declined from using approximately 892,000 pounds of active ingredient in 1993 to the point where DoD now uses less than one-half the amount of active ingredient (approximately 400,000 pounds). However, the issue of overall pesticide use is a sensitive one. While the goal for the Military Departments and their respective installations is to use the

absolute minimum amount of pesticides, there are often cases where pesticides are the only choice. Examples include the need to conduct control operations where pests such as aggressive weeds encroach upon mission sensitive areas such as runways, or where Zebra Mussels invade water bodies. It is likely that the need for invasive species management and control in the United States will continue to increase. These situations require quick, effective, and safe management and control. The Armed Forces Pest Management Board (AFPMB) and senior pest management professionals are evaluating approaches to address future reductions while continuing to support the current mission.

The overall rate for certification of pesticide applicators has remained consistently above 95 percent since 1994. However, due to normal personnel turnover across the DoD and due to the amount of time it takes to achieve the required certifications, the 100 percent goal proves an elusive target. By working with the EPA to address the issue, DoD ensured that new personnel now have up to two years to achieve the requisite certifications. During that time period, these personnel are allowed to apply pesticides as long as they are under the direct onsite supervision of someone who is appropriately certified. The numbers and percentages of applicators certified by the Military Departments and the Defense Logistics Agency are forwarded to the AFPMB annually where they are collated and provided to the EPA and other DoD offices as necessary.

## **Goal 6 Implementation Methods**

### **Chemical Use, Releases, and Transfers**

The Department will develop training on chemical management systems that will be offered through the Defense Acquisition University (DAU). This training will provide information on existing systems used by the Army and Navy to make informed choices based on the environmental, health, and safety risks of chemicals and materials during the design of weapons system platforms.

The Department will issue a DoDI for Sustainable Chemical and Material Management to create an overarching, integrated chemicals policy. This policy will assist the Department with regulatory compliance and acquisition requirements, as well as Agency obligations under EO 13514 and EO 13423. With regard to toxic chemicals, DoD recognizes that developing alternatives will likely involve major changes in projects and/or processes with an extended transition period. This transition could result in temporary annual increases in toxic chemical releases prior to reaching the 2020 goal.

The Department will evaluate lessons learned from successful accomplishments by the Joint Group on Acquisition Pollution Prevention to address the need to rapidly develop and deploy alternatives to ozone depleting substances. Building on these lessons, the Department will explore the development of a new group to develop joint technology requirements, joint proposals for funding from the DoD Environmental Security Technology Certification Program, and pursue improvements to facilitate more rapid adoption and commercialization of substitute materials and processes. The Department will coordinate these efforts and where appropriate involve federal agencies with mission responsibilities that align with this effort, such as EPA, the National Aeronautics and Space Administration, and the Department of Commerce.

The Department will monitor the progress of DoD Components on toxic and hazardous chemical reduction plans, and will continue to evaluate risks from emerging contaminants. It will develop proactive risk management measures where they are determined to be necessary based on risks and lifecycle cost advantages.

### **Electronics Disposal**

The Department will maintain its strict compliance system on environmentally sound electronic disposal.

## Pesticide Management

It is critical that the personnel who apply pesticides on DoD installations are certified, and the current DoD processes for certification and reporting are efficient and effective. However, the AFPMB and the Military Departments will continue to interact with EPA to ensure that DoD remains in compliance with future EPA requirements, and that EPA remains aware of the unique needs of DoD and its installations. See sub-goal 8.3 for more information on the Department's plans for the use of pesticides.

## 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

### Goal 7 Sub-Goals

#### 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, bio-based, environmentally preferable (e.g., certified by the Electronic Product Environmental Assessment Tool), 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 Federal Procurement Data System will be used as the source of data on contracts meeting these requirements.

##### Annual Targets

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 7.1 Targets	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

#### SUB-GOAL 7.2 15% of Existing Buildings Conform to the Guiding Principles on High Performance and Sustainable Buildings By FY 2015, Holding Through FY 2020

##### Metric

The percent of existing buildings over 5,000 ft<sup>2</sup> (combined 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 Targets

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 7.2 Targets	7%	9%	11%	13%	15%	15%	15%	15%	15%	15%

### Goal 7 Responsible OSD Offices

Sub-Goal 7.1: AT&L/DP&AP

Sub-Goal 7.2: AT&L/I&E

## Goal 7 Status

### Procuring Goods and Services That Are Sustainable

DoD has been a leader in sustainable procurement, becoming the first agency to establish a Green Procurement Program (GPP), in 2004. The objective of the DoD GPP is to achieve 100% compliance with mandatory federal green procurement programs in all procurement transactions. Under the program DoD:

- has developed a Green Procurement Strategy, designed as a living document in order to accommodate emerging federal requirements on sustainable procurement and acquisition, with the most recent update being November 2008;
- has developed a set of green procurement metrics;
- offers training for employees;
- established an online Green Procurement tracking system on the Defense Logistics Agency's web-based Green Procurement Report (<http://www.dlis.dla.mil/erlsgpr/>); and
- set up a site on the Defense Environmental Network & Information eXchange ([DENIX](#)) to share green procurement and bio-based best practices.

In addition, DoD facilities actively participate in the [Federal Electronics Challenge](#) to help ensure that DoD purchases electronics that are registered with EPEAT.

DoD makes available the online Green Procurement training, Continuous Learning Module for Contracts, CLC 046, at the DAU website. The module is being updated to provide information for all types of users and actions required to be in compliance with sustainable procurement requirements. For example:

- requirements staff will understand the steps needed when building a requirement;
- buyers will know which questions to ask of vendors and which suggestions to make to customers;
- contract administrators will know what to look for when checking performance; and
- managers will understand how their performance and that of DoD is being monitored.



Photo: U.S. Army

DoD is in the process of incorporating sustainability into DoD acquisition processes by developing sustainability criteria to guide researchers, developers, contracting officials and program managers to make more environmentally sustainable decisions from an array of alternatives that meet performance



requirements. The products being developed are: a set of sustainability factors to be considered at key milestones in the acquisition process; guidance on the types of lifecycle costs that need to be considered when analyzing alternatives, making tradeoffs, and developing designs; and guidance on how to weigh or score various non-cost factors. The first phase of the project, which began in FY 2010, is benchmarking the best practices in industry and other government agencies. OSD's Chemical and Material Risk Management office plans to develop the criteria and perform some pilot testing.

### **High Performance and Sustainable Buildings**

The FY 2008 [Federal Real Property Report](#) shows that 75,740 buildings – approximately one-fourth of the total DoD building inventory – have areas exceeding the EO 13514 Section 2(g)(iii) threshold of 5,000 ft<sup>2</sup>. In order to comply with the EO 13514 mandate for sustainable buildings by FY 2015, the Department must renovate 11,361 (15 percent) of these buildings to meet the Guiding Principles. An assessment of the Department's current compliance with the Guiding Principles is underway, slated for completion later this calendar year.

## **Goal 7 Implementation Methods**

### **Procuring Goods and Services That Are Sustainable**

Procuring goods and services that are sustainable presents an enormous opportunity for the Department to make better decisions on matters that often have long lasting environmental impacts. For this reason,

DoD has identified a wide range of improvements to its procurement system and the training of DoD personnel in charge of procurement. The OSD Defense Procurement and Acquisition Policy office will develop an annual reporting requirement of specific green procurement policy implementation to ensure compliance with 95 percent procurement conducted sustainably. One of the first steps the Department will take will be to update the Federal Procurement Data System to adequately track green procurement data and progress and capture specific information on products. The Department will develop a DoDI by the end of FY 2011 that designates lead offices for oversight over the Green Procurement Program, and defines responsibilities, requirements, and procedures for establishing and implementing sustainable procurement programs across DoD functional areas and organizations. The Department will also explore the option of establishing a multi-discipline working group to develop a value engineering approach (see Federal Acquisition Regulation (FAR) Part 48) in the procurement conducted for sustainability products and services on the part of contractors.

By the third quarter of FY 2011, the Department will develop standard contract language to reflect the need for products and services (apart from the acquisition of weapon systems and their components and spare parts) to be energy-efficient, water-efficient, bio-based, environmentally preferable, non-ozone depleting, and containing recycled content or non-toxic or less toxic alternatives, where such products and services meet agency performance requirements. Contract language will include a requirement to acquire uncoated printing and writing paper containing at least 50 percent postconsumer fiber for use at DoD installations, as per U.S.C. 10 §2378. The Department intends to incorporate standard contract language into all new contract actions by FY 2012.

The Department will modify contract planning and development tools and forms to alert users – especially specification writers and requirements developers – to comply with green purchasing requirements. The modifications will also give consideration to further greening products and services associated with the contract beyond what is mandated. In addition, DoD will modify tools, forms, and checklists used by contracting officers and contract specialists to ensure that contract documents such as requests for proposals and solicitations comply with green procurement requirements.

DoD will request revisions to the relevant FAR clauses to mandate specific sustainable procurement requirements. In FY 2011, DoD will initiate Defense Federal Acquisition Regulation Supplement

(DFARS) Cases and appropriate guidance to the Procedures, Guidance and Information in DFARS Parts 212, 214, 215 and Part 237, to add the following language:

1. FAR Part 12 – add evaluation factor language for the procurement of commercial items that address the acquisition of green procurement products and services.
2. FAR Part 14.201-8 – add price related evaluation factor language for sealed bids that address the acquisition of green procurement products and services.
3. FAR Part 15.304 – add evaluation factor language for contracting by negotiation that addresses the acquisition of green procurement products and services.
4. FAR Part 37.601 – add language that encourages the development of performance incentives for contractors that encourages them to acquire green procurement products and services.

In addition, the Department will improve the guidance it provides on procurement. By the first quarter of FY 2011, the Department will develop and disseminate guidance on how to address green product mandates and other sustainability requirements in procurement and contract audits, and considerations of green procurement mandates with Small Business Set-Asides. Also by this time the Department will add guidance to the Procedures, Guidance and Information on approaches to green service and supply contracts (aside from those for facilities), and it will provide guidance specific to the purchase card program for integrating green procurement or sustainability requirements. DoD will examine existing procurement systems, such as the DoD Standard Procurement System and Army Acquiline PRWeb system, to ensure that sustainability considerations are incorporated into decision criteria.

An underlying issue that the Department will address is that many purchasing actions are conducted according to specifications prepared by others. To solve this problem the Department will ensure that the Specification Preparing Activities (SPAs) have updated specifications that are in line with the requirements of sub-goal 7.1 and its underlying federal requirements. The Department will require the Military Departments to identify the specifications needing to be reviewed or updated, and it will develop a schedule by which the changes will be completed. As a start, the Department will direct the SPAs to complete the work to incorporate the energy efficiency requirements of EAct by the end of first quarter of FY 2012. DoD will develop internal metrics to track the review of specifications for application of green procurement requirements or sustainability provisions.

Another key area for promoting sustainable procurement is how exceptions are handled. The

Department will provide DoD-wide guidance on how to treat exceptions to green product mandates, including specific directions on signature authority for exceptions to the EAct requirements on energy efficient products. The Department will also develop a standard form for use DoD-wide to document how and why an exception applies. The exact format of the form is yet to be determined, but it will be modeled after one already in use by DLA and the Navy.

Revisions are also needed to the National Stock Number (NSN) system. The Department will direct that NSN items not conforming to EAct will be eliminated from the inventory by a set time (the end of FY 2012 is being considered). As a result, any user wanting a non-conforming NSN to remain available will



**Bridge Consisting of 95% Recycled Plastic, Camp Mackall**

Photo: U.S. Army

have to perform the analysis and documentation for exceptions described in the preceding paragraph.

A critical path to sustainable procurement is a rigorous review of progress and compliance. By FY 2012, the Department will incorporate the requirements of its GPP into protocols for compliance inspection, management system audits, contract audits, and Government Commercial Purchase Card audits. It will perform GPP reviews at 5 percent of installations and facilities, and for 33 percent of new contract actions, by FY 2013, using FY 2012 as the baseline. The Department will also incorporate sustainable procurement into the periodic reviews that each DoD Component conducts on their respective contracting organizations, with the goal of ensuring that 100 percent of reviews have incorporated sustainability over the course of a three year period.

To meet the goal of 95 percent sustainable procurement, it will be necessary for the Department to integrate green procurement into all appropriate audit and training programs, and to ensure that training reaches the lowest level of implementation. The Department will update existing procurement training courses and provide them annually to all relevant DoD personnel:

- technical and requirements planners;
- contracting specialists;
- contracting and procurement officers;
- personnel requisitioning products or services through any source of supply (e.g., facilities managers, construction managers, fleet managers, and information technology managers);
- government-wide commercial purchase card holders; and
- environmental managers.

The Department will also provide targeted training for the following audiences:

- Contracting Officer's Representatives – their training will be augmented with modules on procurement conducted sustainability and the Military Departments automated requisition (such as the Army PRWeb program).
- Personnel preparing specifications – training will be provided on green procurement requirements and how to properly use contracting mechanisms with respect to green specifications.
- Purchase card holders – training will be updated to ensure that the green procurement provisions are adequately addressed.
- Purchase Card managers at the DoD and DoD Component level – the Department is considering requiring expanded training, beyond the two hours DAU training, to provide a more comprehensive understanding of green mandates and the implementation of a conforming program for the unique purchase card business area, including audit provisions tailored for sustainability.

An essential component to sustainable acquisition and procurement is sustainable manufacturing. The Department will seek to incorporate sustainable manufacturing into the acquisition practices used at its organic manufacturing facilities (arsenals, depots, and shipyards) and its procurement of components and systems. It will do so by incorporating sustainable manufacturing into three guidance and directive documents pertaining to acquisition: the guidance provided in the [Defense Acquisition Guidebook](#); the direction in [DoDI 5000.2, Operation of the Defense Acquisition System](#), and the instruction at Defense Acquisition University. Sustainable manufacturing has numerous practical benefits, including cost savings, an improved ability to comply with regulations and avoid environmental liability, and an improved perception of DoD with Congress and the public. The Department of Commerce defines sustainable manufacturing as “the creation of manufactured products that use processes that are non-polluting, conserve energy and natural resources, are economically sound, and are safe for employees,

communities, and consumers”. This definition touches upon many concepts that already operate independently within DoD among the environmental, engineering, financial, safety, and occupational health circles. Sustainable manufacturing is a keystone concept that integrates sustainability practices from these different functional spheres in such a way that issues can be addressed holistically and transparently. For example, if a depot engineer wants to install a less polluting machine into a production process, he or she should also consider proper disposal of the old machine, energy consumption of the new machine, the costs and benefits of the capital investment, and worker safety.

### **Electronic Stewardship Component of Sustainable Procurement**

See the sub-section on *Electronic Stewardship and Data Centers* under Implementation Methods for Goal 1 for information on energy-related electronic stewardship topics.

### **High Performance and Sustainable Buildings**

A major part of DoD’s approach to reducing energy use by facilities will be through the high performance building requirements of EO 13514, including:

- All new construction and major renovation of DoD buildings complying with the Guiding Principles.
- Ensuring that at least 15 percent of DoD’s existing buildings and building leases over 5,000 ft<sup>2</sup> meet the Guiding Principles by FY 2015.
- Demonstrating annual progress toward 100 percent conformance with the Guiding Principles for the entire building inventory.
- Operating, maintaining and managing facilities to reduce energy consumption.
- Having all new buildings designed to achieve “zero net energy” (using no more energy than they generate) beginning in FY 2020.
- Ensuring that rehabilitation of DoD-owned historic buildings utilizes best practices and technologies to promote long-term viability of the buildings.



[High Performance and Sustainable Buildings Guidance](#), issued in December 2008 by the Interagency Sustainability Working Group, provides guidance on implementing the Guiding Principles. For new construction and major renovations with a design contract that was awarded prior to October 1, 2008, this guidance allows a building to meet its high performance requirements through a third-party certification such as LEED in lieu of complying with the Guiding Principles.

DUSD(I&E) will soon issue policy that directs new buildings, structures, and major renovations be

designed and built to conform to the Guiding Principles *and* a minimum LEED Silver level rating. This new DoD policy is designed to complement and reinforce existing Military Department policies from a DoD-level: through the UFC program (DoD’s building codes), the policy dictates that all new vertical construction and major renovations will not only conform to the Guiding Principles, but LEED as well. Since policy memos have a relatively short lifespan, the next policy step will be to codify the policy by issuing a DoD Directive or Instruction that will govern sustainable buildings actions for the future. The Department will begin preparing a Sustainable Buildings Implementation Plan in FY 2010, based on the existing 2007 *Defense Installations Strategic Plan*. Also, the Department will issue policy in FY 2011 that establishes a schedule for updating the UFC to ensure that the most current industry standards are incorporated, drive improvements in construction practices, and ensure that practices keep pace with advances in technology.

DoD manages the largest portfolio of historic properties in the federal government, and has an opportunity to highlight the inherently sustainable qualities of many of its historic buildings. As stewards of some of the nation's most significant historic resources, the Department will continue to adaptively reuse and renovate these historic buildings, reducing landfill demolition and construction waste, and setting an example for achieving the goals of Section 2(g) and 10(b) of the Executive Order.

## GOAL 8 Sustainability Built into DoD Management Systems

### Goal 8 Sub-Goals

#### SUB-GOAL 8.1 All Environmental Management Systems Effectively Implemented and Maintained

##### Metric

Overall DoD status using the Federal Environmental Management System Metrics as reported in the Defense Environmental Programs Annual Report to Congress. The overall DoD status is a color rating (Green, Yellow or Red) for all DoD facilities and organizations for which an environmental management system (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 Targets

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 8.1 Targets	green	green	green	green	green	green	green	green	green	green

#### SUB-GOAL 8.2 The Sustainability of Transportation and Energy Choices in Surrounding Areas Optimized by Coordinating with Related Regional and Local Planning

##### Metric

Instances of coordination by DoD, at any level, which ensured that all relevant factors, including GHG emissions, were considered in making the best decisions in the interest of sustainable transportation and energy choices in the area. This engagement can take the form of coordinating its own transportation, energy, and/or facility planning with surrounding communities, and/or participating in regional- or community-level planning related to transportation or energy (including environmental impact statements and environmental assessments).

#### SUB-GOAL 8.3 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 were prepared, reviewed and updated annually by a DoD-certified pest management consultant and/or the installation pest management coordinator. 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 Targets

Fiscal year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sub-Goal 8.3 Targets	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

### Goal 8 Responsible OSD Offices

Sub-Goals 8.1 and 8.2: AT&L/I&E

Sub-Goal 8.3: AFPMB

### Goal 8 Status

#### Environmental Management Systems

DoD made significant progress in 2009 implementing Environmental Management Systems (EMSs) and in strengthening already existing EMSs. Compared with 2008, the Department increased the percentage of EMSs that were “fully implemented” from 28 percent to 95 percent. Additionally, the Department increased its performance level on the Federal EMS Metrics from ratings of 32 percent Green, 38 percent Yellow and 30 percent Red in FY 2008, to ratings of 48 percent Green, 38 percent Yellow and 14 percent Red in 2009. This 50 percent increase in Green ratings and corresponding 50 percent decrease in Red ratings demonstrates the Department’s continued commitment and emphasis on EMS performance. Additionally, 2009 saw DoD complete a thorough update of its Compliance Management Plan, and issue formal EMS guidance to the DoD Components via DoDI [4715.17](#), *Environmental Management Systems*.

#### Local and Regional Integrated Planning

The Office of Economic Adjustment (OEA), through the Defense Economic Adjustment Program, helps state and local governments adjust community planning in response to the needs of nearby military installations, for example for military ranges, training routes, and growing military missions. OEA provides community planning assistance to achieve compatibility between the military mission and neighboring civilian communities, supporting a cooperative planning effort to identify and assess community impacts and develop a strategic action plan to respond to these impacts.

In response to the growth of military missions, OEA guides a participatory stakeholder process involving the installation and state and local government officials to develop a growth management plan that responds to community impacts. The Joint Land Use Study process is used to prevent the introduction of incompatible civilian development that may impair the military mission, for example by diminishing the availability of resources in the vicinity of a military installation, such as air, land, water, and the electromagnetic spectrum. The planning process promotes a partnership among the military and host communities through an open, continuous dialogue to address community impacts while assuring that community activities and development are compatible with the DoD mission.

The Department has provided technical and financial assistance to state and local government to support regional transportation planning in response to major DoD activities. The need to ensure that community development does not interfere with military installation missions can pose important challenges and opportunities for communities in ways that cross jurisdictional boundaries. However, many regions lack sufficient staff and other resources to undertake cooperative, long-term, strategic regional planning. Through the Defense Economic Adjustment Program, the Department provides technical and financial assistance to enhance the planning capacity of local communities. This support enables the region, with DOD input, to develop land use and transportation plans that promote mixed-use development, centralize public infrastructure, and support housing diversity and multi-modal transportation, especially regional rapid transit.



Photo: U.S. Army

Another good example of DoD coordination with regional and local planning is OSD's Sustainable Ranges program. The purpose of the program is to ensure the availability of military training and testing ranges now and into the future while protecting the environment. It does so by supporting education and engagement of key stakeholders and strengthening regional partnerships to effect landscape-level planning. OSD partners with federal agencies, state and local governments, academia, nongovernmental organizations and other stakeholders to develop solutions at the national, regional and local levels to shared challenges such as land use, energy, pollution and population growth. Regional partnerships convene stakeholders from federal and state governments to address natural resource management, water quantity and quality, land use, and other emerging issues like climate change in a common, collaborative framework. One of the key components of the program is the Readiness and Environmental Protection Initiative (REPI). REPI forms coordinated regional planning and community partnerships that share the costs of protecting land, providing continued military access to the resources

necessary for training and testing while remaining excellent stewards of the environment and good neighbors in communities across America. The program works to ensure the long-term accessibility and capability of military training areas by working with stakeholders to develop a framework of compatible land use efforts. Military Departments use REPI funding to implement partnerships and projects according to their own processes.

### **Pesticide Use Management**

Pesticide use at the installation level is recorded and reported to the Military Departments' respective chains of command. The Military Departments and DLA also submit an annual report to the AFPMB on their respective overall annual pesticide use. The second measure of merit in DoD 4150.07 specifically states that 100 percent of DoD installations shall have an approved Pest Management Plan. This metric has been recorded by the AFPMB since 1994 when barely half of all installations had such plans in place. While DoD has significantly improved this percentage, it has yet to achieve its stated goal of 100 percent (the average for 2008 and 2009 was 80 percent). There are multiple reasons for not achieving the goal related to the ongoing Base Realignment and Closure process, but key among them are the current conflicts in Iraq and Afghanistan, which have resulted in a lack of qualified personnel at many installations to develop and annually review the plans, and at the headquarters level to review and approve the plans.

## Goal 8 Implementation Methods

### Environmental Management Systems

EMSs are important tools for the Department to achieve the objectives, goals and sub-goals of its Strategic Sustainability Performance Plan. DoD now has a solid guidance structure in place on Environmental Management Systems. In April 2009, the Department issued DoDI [4715.17](#), *Environmental Management Systems*, which sets standard and assigns responsibilities throughout the Department for EMS implementation and maintenance. Additionally, in November 2009 the Department completed a revision to its Compliance Management Plan, which augments the DoDI by further clarifying how the EMS approach is used in DoD. Combined with DoD Component-level guidance, the Department is well positioned to continue efforts to fully implement and thoroughly maintain EMS as the primary management approach to environmental programs.



### Local and Regional Integrated Planning

The Department has long been proactively advancing regional and local integrated planning and will continue to do so. Moving forward, an increased emphasis will be placed on ensuring that sustainability factors such as transportation, energy and GHG emissions are considered when coordinating on planning with surrounding communities and regional entities, especially planning relating to transportation, energy, and facility siting. For example, sustainable transportation can be optimized through transit-oriented planning that designs bus routes to be close to large employment centers such as military installations or DoD office buildings. For proposed new or expanded Federal facilities, the Department will update its guidance to ensure that all Environmental Impact Statements and Environmental Assessments required under the National Environmental Policy Act (NEPA) identify and analyze any impacts associated with energy usage and alternative energy sources.

### Pesticide Use Management

The primary method to accomplish reductions in the use of pesticides is for all DoD installations to continue to adhere to the principles of integrated pest management, where all available control and management tools are examined and only those that are the most environmentally sound, effective, efficient and safe are used. DoD continues to strive for every installation to have an approved Pest Management Plan. This information is then forwarded to EPA as well as other appropriate DoD offices. As per DoDI [4150.07](#), the Department established a goal of reducing its pesticide usage by both government and contractor pesticide applicators on DoD installations by 50 percent from its average rate between FY 2002 and 2003 (measured in pounds of active ingredient, where usage was 389,000 pounds in 2002/2003). This goal is in the process of being re-evaluated by the AFPMB and senior pest management professionals from all of the Military Departments and DLA.

A potential major driver in attaining this goal in the near future is the EPA's implementation of the National Pollutant Discharge Elimination System (NPDES) permitting process for applying pesticides in and around water, as a part of the Clean Water Act. This process is scheduled to begin in 2011. A significant portion of NPDES involves having integrated control plans which follow best management practices and the principles of integrated pest management. These EPA-directed plans are directly



aligned with the Pest Management Plans generated by DoD installations. With the EPA's increased emphasis on monitoring pesticide applications, the Military Departments are reviewing their current personnel and mission requirements and are revising them where needed to meet the EPA's directives. As a part of this, the Military Departments will continue to have their pest management professionals assist the installations in building the DoD mandated pest management plans, which in turn will be used to support their respective NPDES permit processes. The overall results of these efforts will be reported to the AFPMB on an annual basis.

## Part III: Agency Self Evaluation

As requested, the Department provides Yes/No answers to the following questions regarding critical aspects of the Plan:

Does your plan provide/consider overarching strategies and approaches for achieving long-term sustainability goals?	Yes
Does your plan identify milestones and resources needed for implementation?	Yes
Does your plan align with your agency's 2011 budget submission?	Yes
Is your plan consistent with your agency's FY 2011 budget and appropriately aligned to reflect your agency's planned FY 2012 budget submission?	Yes
Does your plan integrate existing EO and statutory requirements into a single framework and align with other existing mission and management related goals to make the best use of available resources?	Yes
Does your plan provide methods for obtaining data needed to measure progress, evaluate results, and improve performance?	Yes

### Planned Actions Relevant to OMB Scorecards

The strategies and approaches for achieving all goals and sub-goals are described in the "Implementation Methods" sections, laying out a clear path for the Department to make the transformation to sustainability in way that advances the DoD mission. Milestones are provided for each sub-goal in the form of annual targets from FY 2011 through FY 2020, charting a path to reach 2020 objectives. Provided below are brief summaries of the Department's planned actions from July 2010 through June 2011 for achieving the goals of the OMB scorecards on electronic stewardship, transportation management, and energy management. For more detailed information, please see the individual Implementation Methods sections for each goal.

#### Energy Management Scorecard

**Facility Energy Efficiency (sub-goals 1.1 and 7.2)** – The Department will issue policy in FY 2011 that establishes a schedule for updating the UFC to ensure that the most current industry standards are incorporated, to drive improvements in construction practices and ensure that practices keep pace with advances in technology. The Department will begin preparing a Sustainable Buildings Implementation Plan in FY 2010. On metering electricity, DoD is well along to meeting the goal of 100 percent by FY 2012 based on current contract commitments to meter installations, with a forecast to have 86 percent of all eligible DoD buildings metered in FY 2010.

**Use of Renewable Energy (sub-goal 1.2)** – By the third quarter of FY 2011, the Department will conduct an analysis of the potential for renewable energy generation on different properties in the U.S. Each location will be evaluated based on the availability of renewable energy resources, energy-related risk assessments, and the possibility of any mission or readiness impacts of the energy facility.

**Facility Water Consumption Intensity (sub-goal 2.1)** – The Department will evaluate opportunities for water reuse in wastewater treatment systems it operates during FY 2011.

#### Environmental Stewardship Scorecard

**Environmental Management Systems (sub-goal 8.1)** – DoD is already implementing the guidance

recently put into place on EMSs: DoDI [4715.17](#), “Environmental Management Systems”, issued in April 2009; and the November 2009 revision to the DoD Compliance Management Plan.

**Green Procurement Program (sub-goal 7.1)** – Extensive information on planned DoD actions are described in the Methods section. A few examples:

- 1) By the first quarter of FY 2011, the Department will develop and disseminate guidance on how to address green product mandates and other sustainability requirements in procurement and contract audits, and considerations of green procurement mandates with Small Business Set-Asides.
- 2) By the end of calendar year 2010, the Department will add guidance to the Procurement Guidance Instruction on approaches to green service and supply contracts and it will provide guidance specific to the purchase card program.
- 3) By the third quarter of FY 2011, the Department will develop standard contract language to reflect the need for products and services to comply with the required sustainability criteria.
- 4) The Department will develop a DoDI by the end of FY 2011 that designates lead offices for oversight of the Green Procurement Program, and defines responsibilities, requirements, and procedures for establishing and implementing sustainable procurement programs across DoD functional areas and organizations.
- 5) The Department intends to incorporate standard contract language into all new contract actions by FY 2012.

**Sustainable Buildings (sub-goal 7.2)** – The Department will begin preparing a Sustainable Buildings Implementation Plan in FY 2010. An assessment of the Department’s current compliance with the Guiding Principles is underway, slated for completion later this calendar year.

**Electronic Stewardship (sub-goals 1.1, 5.1 and 6.2)** – In FY 2010 the OSD CIO office will be reviewing the each DoD Component’s plan to enable power management features on its eligible electronics equipment. The Department will maintain its strict compliance system regarding environmentally sound electronic disposal.

Also relating to electronic stewardship is sub-goal 5.1 on reducing the use of printing paper. By the end of FY 2011, the Department will issue a policy stating that reducing the use of printing paper is a priority for DoD, and directing the DoD organizations specified in the sub-goal 5.1 performance metric to issue and implement a policy for minimizing the use of paper. Also by this time, the Department will develop and issue DoD-wide guidance on effective strategies for reducing the use of paper, for example by encouraging the use of digital documents in lieu of paper, requiring printers with automatic duplexing capability to default to this setting, and modifying routine office tasks to reduce paper use. The Military Departments and DLA are expected to meet the requirements of sub-goal 5.1 by no later than the end of FY 2012.

### **Transportation Management Scorecard**

**(Sub-goal 1.3)** The Department will launch a study by the first quarter of FY 2011 on approaches that will accelerate its progress in reducing petroleum use by its vehicles, including incorporating the transportation elements of EO 13423 into relevant position descriptions and performance evaluations.

## Appendix A

### Acronyms

AFB	Air Force Base
AFPMB	Armed Forces Pest Management Board
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
AT&L	Acquisition, Technology and Logistics
Btu	British thermal unit
C&D	construction and demolition
CEQ	Council on Environmental Quality
CIO	Chief Information Officer
CO <sub>2</sub>	carbon dioxide
DAU	Defense Acquisition University
DENIX	Defense Environmental Network & Information eXchange
DFARS	Defense Federal Acquisition Regulation Supplement
DLA	Defense Logistics Agency
DoD	Department of Defense
DOE	Department of Energy
DoDI	Department of Defense Instruction
DOEP&P	Director of Operational Energy Plans and Programs
DP&AP	Defense Procurement and Acquisition Policy
DR&E	Defense Research and Engineering
DUSD	Deputy Under Secretary of Defense
EISA	Energy Independence and Security Act of 2007
EO	Executive Order
EPA	Environmental Protection Agency
EPAct	Energy Policy Act of 2005
EPCRA	Emergency Planning and Community Right-to-Know Act
EPEAT	Electronic Product Environmental Assessment Tool
ESOH	Environment, Safety, and Occupational Health
FAR	Federal Acquisition Regulation
FEE	Federal Environmental Executive
FEMP	Federal Energy Management Program
FOB	forward operating base
FY	fiscal year
FYDP	Future Year Defense Plan
GCM	General Circulation Model
GHG	greenhouse gas
GPP	Green Procurement Program

HVAC	heating, ventilation and cooling
I&E	Installations & Environment
IESNA	Illuminating Engineering Society of North America
INRMP	Integrated Natural Resources Management Plan
IPCC	Intergovernmental Panel on Climate Change
ISWM	Integrated Solid Waste Management
JLUS	Joint Land Use Study
KPP	Key Performance Parameter
L&MR	Logistics & Materiel Readiness
LEED	Leadership in Energy and Environmental Design
LFG	landfill gas
LID	low impact development
mmscfd	million standard cubic feet per day
MW	megawatt
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NSN	National Stock Number
O&M	operations and maintenance
OEA	Office of Economic Adjustment
OEP&P	Operational Energy Plans and Programs
OMB	Office of Management and Budget
OSD	Office of the Secretary of Defense
P&R	Personnel and Readiness
PESHE	Programmatic Environment, Safety, and Occupational Health Evaluation
QDR	Quadrennial Defense Review
REACH	Registration, Evaluation, Authorisation and Restriction of Chemical Substances
REC	Regional Environmental Coordinator
REPI	Readiness and Environmental Protection Initiative
ROI	return on investment
SERDP	Strategic Environmental Research and Development Program
SPA	Specification Preparing Activities
SSC	Senior Sustainability Council
SSO	Senior Sustainability Officer
SF <sub>6</sub>	sulfur hexafluoride
TRI	Toxics Release Inventory
UFC	Unified Facilities Criteria
U.S.C.	United States Code
USD	Under Secretary of Defense

## Appendix B

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## Appendix C. Draft DoD Sustainability Scoring System to be Used in FY 2011

Colors are illustrative only to show the red/yellow/green color coding concept being considered for the scoring system.

SUB-GOALS		2011 Target	2011 Actual	SCORE (red/yellow/green)
<b>Objective #1: The Continued Availability of Resources Critical to the DoD Mission is Ensured</b>				
<b>GOAL #1: The Use of Fossil Fuels Reduced</b>				
1.1	Energy Intensity of Facilities Reduced by 30% of FY 2003 Levels by FY 2015 and 37.5% by FY 2020	18%	X%	
1.2	18.3% of Energy Consumed by Facilities is Produced or Procured from Renewable Sources by FY 2020	6.5%	X%	
1.3	Use of Petroleum Products by Vehicle Fleets Reduced 30% by FY 2020 Relative to FY 2005	2%	X%	
<b>GOAL #2: Water Resources Management Improved</b>				
2.1	Potable Water Consumption Intensity by Facilities Reduced by 26% of FY 2007 Levels by FY 2020	8%	X%	
2.2	Industrial and Irrigation Water Consumption Reduced by 20% of FY 2010 Levels by FY 2020	8%		
2.3	All Development and Redevelopment Projects of 5,000 Square Feet or Greater Maintain Pre-Development Hydrology to the Maximum Extent Technically Feasible	100%	X%	

SUB-GOAL		2011 Target	2011 Actual	SCORE (red/yellow/green)	
<b>Objective #2: DoD is a U.S. Government Leader in Reducing Greenhouse Gas Emissions</b>					
<b>GOAL #3: GHG Emissions from Scope 1 and 2 Sources Reduced 34% by FY 2020 Relative to FY 2008</b>					X%
<b>GOAL #4: GHG Emissions from Scope 3 Sources Reduced 13.5% by FY 2020 Relative to FY 2008</b>				TBD	X%
4.1	Greenhouse Gas Emissions from Employee Air Travel Reduced 7% by FY 2020 Relative to FY 2011	0%	X%		
4.2	30% of Eligible Employees Teleworking at Least Once a Week, on a Regular, Recurring Basis, by FY 2020	10%	X%		
4.3	50% of Non-Hazardous Solid Waste Diverted from Disposal in Landfills Not Owned by DoD by FY 2015 and Thereafter Through FY 2020	42%	X%		
<b>Objective #3: The Ongoing Performance of DoD Assets Ensured by Minimizing Waste and Pollution</b>					
<b>GOAL #5: Solid Waste Minimized and Optimally Managed</b>					
5.1	All DoD Organizations Implementing Policies by FY 2014 to Reduce the Use of Printing Paper	1	X		
5.2	50% of Non-Hazardous Solid Waste Diverted from the Waste Stream by FY 2015 and Thereafter Through FY 2020	42%	X%		
5.3	60% of Construction and Demolition Debris Diverted from the Waste Stream by FY 2015, and Thereafter Through FY 2020	52%	X%		
5.4	Ten Landfills Recovering Landfill Gas for Use by DoD by FY 2020	0	X		



SUB-GOAL		2011 Target	2011 Actual	SCORE (red/yellow/green)
<b>GOAL #6: The Use and Release of Chemicals of Environmental Concern Minimized</b>				
6.1	On-Site Releases and Off-Site Transfers of Toxic Chemicals Reduced 15% by 2020, Relative to 2007	n/a	X%	
6.2	100% of Excess or Surplus Electronic Products Disposed of in Environmentally Sound Manner	100%	X%	
6.3	100% of DoD Personnel and Contractors Who Apply Pesticides Are Properly Certified	100%	X%	
<b>Objective #4: Continuous Improvement in DoD Mission Achieved through Management and Practices Built on Sustainability &amp; Community</b>				
<b>GOAL #7: Sustainability Practices Become the Norm</b>				
7.1	95% of Procurement Conducted Sustainably	95%	X%	
7.2	15% of Existing Buildings Conform to the Guiding Principles on High Performance and Sustainable Buildings By FY 2015, Holding Through FY 2020	7%	X%	
<b>GOAL #8: Sustainability Built into DoD Management Systems</b>				
8.1	All Environmental Management Systems Effectively Implemented and Maintained	green	X	
8.2	The Sustainability of Transportation and Energy Choices in Surrounding Areas Optimized by Coordinating with Related Regional and Local Planning	<i>qualitative assessment</i>		
8.3	All DoD Installations Have Integrated Pest Management Plans Prepared, Reviewed, and Updated Annually by Pest Management Professionals	100%	X%	

## Appendix D

### Requirements of EO 13514 and Other Recent Federal Requirements Relating to Sustainability

Area	EO 13514	EO 13423	EISA	EPAct, Farm Bill
<b>Energy Use</b>	§2(a)(i): Reducing energy intensity in agency buildings should be considered.		§431 (existing federal bldgs): 3% reduction per year in fossil fuel use from 2008 through 2015, or 30% total by 2015, relative to FY03. §433 (new or majorly renovated buildings): fossil-fuel use halved by 2030 relative to FY03, and sustainable design principles applied to their siting, design, and construction. DOE Secretary to establish a federal green certification program. In addition to water conservation required by this section, "water conservation technologies shall be applied to the extent that the technologies are life-cycle cost-effective". §434 (large capital energy investments such as HVAC): must employ "the most energy efficient designs, systems, equipment, and controls that are life-cycle cost effective". Natural gas and steam must be metered. §434 (leasing): as of 3 years after signing, all leases must be for Energy Star buildings.	EPAct §102: Agencies can keep savings from energy and water reductions. EPAct §103: Bldgs must be metered for electricity. EPAct §701: Vehicles with dual fuel capabilities shall be operated on alternative fuels.
	§2(g)(i): All new buildings entering planning in 2020 or later designed to achieve zero-net-energy use by 2030.			
	§2(g)(ii),(iii): At least 15% of existing agency buildings (including leased) meet the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings by FY15, as well as all new construction, major renovation and repair. Annual progress will be made towards 100% compliance for the building inventory.			
	§2(g)(iv): Pursue cost-effective, innovative strategies, such as highly reflective and vegetated roofs, to minimize consumption of energy, water, and materials.			
	§2(g)(v): Manage existing building systems to reduce consumption of energy, water, and materials, and identifying alternatives to renovation that reduce existing assets' deferred maintenance costs.			
	§2(g)(vi): When adding assets to the agency's real property inventory, identifying opportunities to consolidate and dispose of existing assets, optimize the performance of the agency's real property portfolio, and reduce associated environmental impacts.			
	§2(g)(vii): Ensuring that rehabilitation of federally owned historic buildings utilizes best practices and technologies in retrofitting to promote long-term viability.			

Area	EO 13514	EO 13423	EISA	EPAct, Farm Bill
<b>Renewable Energy</b>	§2(a)(ii): Consider increasing agency use of renewable energy and implementing renewable energy generation projects on agency property. (Note, however, that U.S.C. 10 §2911(e) requires DoD to produce or procure not less than 25% of the total energy consumed within its facilities from renewable sources during FY 2025.)	§2(b): Ensure that (i) at least half of the statutorily required renewable energy consumed by the agency in a FY comes from new renewable sources, and (ii) to the extent feasible, implement renewable energy generation projects on agency property for agency use.	§523: If lifecycle cost-effective, as compared to other reasonably available technologies, not less than 30% of the hot water demand for each new Federal building or Federal building undergoing a major renovation be met through the installation and use of solar hot water heaters.	EPAct §203: Renewable energy ≥3% in FY07-09; 5% in FY10-12; 7.5% in FY13 and beyond (compared to total electricity consumption).
<b>Vehicle Fleets</b>	§2(a)(iii): (A) Use low greenhouse gas emitting vehicles including alternative fuel vehicles; (B) Optimize the number of vehicles in the agency fleet; (C): If the agency operates a fleet of at least 20 motor vehicles, reduce the agency fleet's total consumption of petroleum products by a minimum of 2% annually through the end of FY20 relative to FY05.	§2(g): (i) reduce the "fleet's total consumption of petroleum products by 2% annually through the end of fiscal year 2015" relative to FY05 (if at least 20 motor vehicles); (ii) 10% increase in non-petroleum fuel annually relative to FY05; (iii) plug-in hybrids once economically viable.	§141: purchase only low GHG-emitting vehicles. §142: 20% reduction in vehicle petroleum use, 10% increase in non-petroleum fuel use, annually by FY15 relative to FY05. §246: a renewable fuel pump for every fleet by 1/1/10. §526: alternative fuels cannot be used if lifecycle GHG emissions are greater than from petroleum sources.	
<b>Scope 3 GHG Emissions</b>	§2(b): in setting the Scope 3 target, consider: (i) Supply Chain - opportunities with vendors and contractors to address and incorporate incentives to reduce GHG emissions. (ii) Employee Travel - implementing strategies for transit, travel, training, and conferencing that actively support lower-carbon commuting and travel by agency staff. (iii) GHG emission reductions associated with pursuing other relevant goals in this section. (iv) Developing and implementing innovative policies and practices to address scope 3 emissions unique to agency operations.			

Area	EO 13514	EO 13423	EISA	EPA Act, Farm Bill
<b>Water Use Efficiency and Mngt</b>	§2(d)(i): Reduce potable water use intensity by 2% annually through FY20, or 26% by the end of FY20, relative to FY07.	§2(c): Beginning in FY08, reduce water consumption intensity, relative to the baseline of the agency's water consumption in FY07, through life-cycle cost-effective measures by 2% annually through the end of FY15 or 16% by the end of FY15.		
	§2(d)(ii): Reduce agency industrial, landscaping, and agricultural water consumption by 2% annually or 20% by the end of FY20 relative to FY10.			
	§2(d)(iii): Consistent with State law, identify, promote, and implement water reuse strategies that reduce potable water consumption.			
	§2(d)(iv): Storm Water Management - implement and achieve the objectives identified in the storm water management guidance (issued by EPA as required under §14).		EISA §438: Maintain or restore the pre-development hydrology of the property with regard to the temperature, rate, volume, and duration of storm water flow for development and redevelopment footprints exceeding 5,000 sq ft.	
<b>Sustainable Procurement</b>	<p>Ensure that 95% of new contract actions, excluding weapon systems, are:</p> <ul style="list-style-type: none"> <li>- energy-efficient (Energy Star or FEMP)</li> <li>- water-efficient</li> <li>- biobased</li> <li>- environmentally preferable (e.g., certified by the Electronic Product Environmental Assessment Tool, EPEAT)</li> <li>- non-ozone depleting</li> <li>- contain recycled content</li> <li>- non-toxic or less-toxic alternatives</li> </ul> <p>where such products meet agency performance requirements.</p>	<p>§2(d): Requires acquisitions of goods and services to: (i) use sustainable practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products; and (ii) use of paper ≥30% post-consumer fiber content. §3(e): Ensure that contracts for contractor operation of government-owned facilities or vehicles require the contractor to comply with the provisions of this order to the same extent as if the agency operated the facilities or vehicles.</p>	<p>EISA §524: must purchase appliances whose stand-by mode uses 1 watt or less, or the best available if &lt;1 W not available. EISA §525: must purchase products designated by Energy Star or the Federal Energy Management Program.</p>	<p>EPA Act §104: requires procurement of energy-efficient products. §108: amends Solid Waste Disposal Act to increase use of waste in products such as fly ash in cement in federal projects. Farm Bill Title IX, §9002: procurement preference for the highest bio-based content.</p>

Area	EO 13514	EO 13423	EISA	EPAct, Farm Bill
<b>Regional and Local Integrated Planning</b>	§2(f)(i): Transportation Planning - Participate in regional transportation planning and recognizing existing community transportation infrastructure.			
	§2(f)(ii): Energy Planning - Align federal policies to increase effectiveness of local planning for energy choices.			
	§2(f)(iii): Transit-Oriented Community Planning - Ensure that planning of new Federal facilities or new leases includes consideration of sites that are pedestrian friendly, near existing employment centers, and accessible to public transit, and emphasizes existing central cities and, in rural communities, existing or planned town centers.			
	§2(f)(iv): New/Improved Facilities - Identify and analyze impacts from energy usage and alternatives in all EISs and EAs for proposed new or expanded facilities.			
	§2(f)(v): Regional Coordination - Coordinate with regional programs for Federal, State, tribal, and local ecosystem, watershed, and environmental management.			
<b>Environmental Management Systems</b>	§2(j)(i),(ii): Continue implementation of existing environmental management systems (EMSs) to achieve the performance necessary to meet the goals of this order.	§3(b)(i): Ensure use of EMS as the primary management approach for addressing environmental aspects of internal agency operations and activities.		

Area	EO 13514	EO 13423	EISA	EPA Act, Farm Bill
<b>Pollution Prevention and Waste Minimization</b>	§2(e)(i): Source Reduction - minimize the generation of waste and pollutants through source reduction.			
	§2(e)(iii): Construction - Divert at least 50% of construction and demolition materials and debris by the end of FY15.			
	§2(e)(iv): Paper - reduce printing paper use and acquiring uncoated printing and writing paper containing at least 30% postconsumer fiber.	§2(d)(ii): Use of paper of at least 30% post-consumer fiber content.		
	§2(e)(v): Toxics - Reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of.	§2(e)(i): Ensure that the agency reduces the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of.		
	§2(e)(viii),(ix): Chemical Use - Increase agency use of acceptable alternative chemicals and processes in keeping with the agency's procurement policies; and decrease agency use of chemicals where such decrease will assist the agency in achieving GHG targets.			
	§2(e)(vi): Organics - Increase diversion of compostable and organic material from the waste stream.	§2(e): (ii) Ensure that the agency increases diversion of solid waste as appropriate; and (iii) maintains cost-effective waste prevention and recycling programs in its facilities.		
	§2(e)(ii): Divert at least 50% of non-hazardous solid waste, excluding construction and demolition debris, by the end of FY15.			
	§2(e)(vii): Pest Mngt - Implement integrated pest management and other appropriate landscape management practices.			
	§2(e)(x): Reporting in accordance with the requirements of §301 - §313 of the Emergency Planning and Community Right-to-Know Act of 1986.			

Area	EO 13514	EO 13423	EISA	EPA Act, Farm Bill
<b>Electronics Stewardship</b>	§2(i)(i): Ensure procurement preference for EPEAT products.	§2(h): Ensure that the agency (i) when acquiring an electronic product, meets at least 95% of those requirements with an Electronic Product Environmental Assessment Tool (EPEAT)-registered electronic product, unless there is none; (ii) enables the Energy Star feature on agency computers and monitors, (iii) establishes and implements policies to extend the useful life of agency electronic equipment, and (iv) uses environmentally sound practices with respect to disposition of agency electronic equipment that has reached the end of its useful life.		
	§2(i)(ii): Establish and implement policies to enable power management, duplex printing, and other environmentally preferable features.			
	§2(i)(iii): Employ environmentally sound practices with respect to the agency's disposition of all agency excess or surplus electronic products.			
	§2(i)(iv): Ensure the procurement of Energy Star and FEMP designated electronic equipment.			
	§2(i)(v): Implement best practices in energy efficient management of servers and Federal data centers.			

## Appendix E

### Federal Requirements Relating to Each Sub-Goal

A summary of which federal requirements are addressed by each sub-goal is provided in Table A.1, shown in terms of the section numbers of Executive Orders and legislation.

#### **Sub-Goal 1.1 Energy Intensity of Facilities Reduced by 30% of FY 2003 Levels by FY 2015 and 37.5% by FY 2020**

##### **Federal Statutory and EO Requirements Addressed by Sub-Goal 1.1**

- **EO 13423 §2(a):** Improve energy efficiency and reduce GHG emissions of the agency through reduction of energy intensity by 3 percent annually through FY 2015 or 30 percent by the end of FY 2015, relative to FY 2003.
- **EISA §431:** In existing federal buildings, 3 percent reduction per year in fossil fuel use from FY 2008 through FY 2015, or 30 percent total by FY 2015, relative to FY 2003.

##### *New Construction and Major Renovation*

- *Standards:* EO 13514 §2(g) requires all new buildings entering planning in 2020 or later designed to achieve zero-net-energy use by 2030, and new construction to be 30 percent more efficient than ASHRAE and IESNA standards, and major renovations 20 percent below pre-renovation 2003 baseline.
- *Guiding Principles:* EO 13514 §2(g) requires all new agency construction, major renovation and repair are to comply with the [Guiding Principles](#) set forth in the 2006 Memorandum of Understanding on Federal Leadership in High Performance and Sustainable Buildings (see below), which [implementation guidance](#) provided by the Interagency Sustainability Working Group.
- *Guiding Principles:* EO 13423 §2(f) requires that new construction and major renovation of agency buildings comply with the Guiding Principles.
- *Design Principles:* EISA §433: For new or majorly renovated buildings, fossil-fuel use halved by 2030 relative to FY 2003, and sustainable design principles are to be applied to their siting, design, and construction.

##### *Existing Buildings*

- *Guiding Principles:* EO 13514 §2(g): At least 15 percent of existing agency buildings (including leased) are to meet the Guiding Principles (see below) by FY 2015. Annual progress will be made towards 100 percent compliance for the agency's building inventory.
- *Guiding Principles:* EO 13423 §2(f): 15 percent of the existing Federal capital asset building inventory of the agency as of the end of FY 2015 incorporates the sustainable practices in the Guiding Principles(see below).
- *Replacement of Large Energy Equipment in Buildings:* EISA §434 requires the replacement of installed equipment, such as HVAC systems or components, to use the most energy efficient designs, systems, equipment, and controls that are life-cycle cost effective.
- *Metering Natural Gas and Steam:* EISA §434 requires natural gas and steam to be metered by October 16, 2016.

##### *Both New and Existing*

- *Leased Buildings:* EISA §434 requires all buildings with new leases to be certified Energy Star beginning in FY 2010.



**Table A.1. Federal Requirements Related to the Sub-Goals of the DoD Strategic Sustainability Performance Plan**

#	Sub-Goal	Key Federal Requirements Addressed
<b>Objective #1: The Continued Availability of Resources Critical to the DoD Mission is Ensured</b>		
<b>GOAL #1: The Use of Fossil Fuels Reduced</b>		
1.1	Energy Intensity of Facilities Reduced by 30% of FY 2003 Levels by FY 2015 and 37.5% by FY 2020	EO 13423 §2(g), (i); EO 13423 §2(a), (f); EISA §431, 433, 434; EPAAct §102, 103.
1.2	18.3% of Energy Consumed by Facilities is Produced or Procured from Renewable Sources by FY 2020	U.S.C. 10 §2911(e)
1.3	Use of Petroleum Products by Vehicle Fleets Reduced 30% by FY 2020	EO 13514 §2(a) (iii); EO 13423 §2(g); EISA §141, 142, 246, 526; EPCAT §701
<b>GOAL #2: Water Resources Management Improved</b>		
2.1	Potable Water Consumption Intensity by Facilities Reduced by 26% of FY 2007 Levels by FY 2020	EO 13514 §2(d), (g); EO 13423 §2(c), (f); EISA §433; EPAAct §102
2.2	Industrial and Irrigation Water Consumption Reduced by 20% of FY 2010 Levels by FY 2020	EO 13514 §2(d)(ii)
2.3	All Development and Redevelopment Projects of 5,000 Square Feet or Greater Maintain Pre-Development Hydrology to the Maximum Extent Technically Feasible	EO 13514 §2(d), (g); EO 13423 §2(f); EISA §438

#	Sub-Goal	Key Federal Requirements Addressed
<b>Objective #2: DoD is a U.S. Government Leader in Reducing Greenhouse Gas Emissions</b>		
<b>GOAL #3: Greenhouse Gas Emissions from Scope 1 and 2 Sources Reduced 34% by FY 2020, Relative to FY 2008</b>		
<b>GOAL #4: Greenhouse Gas Emissions from Scope 3 Sources Reduced 13.5% by FY 2020, Relative to FY 2008</b>		
4.1	Greenhouse Gas Emissions from Employee Air Travel Reduced 7% by FY 2020 Relative to FY 2011	CEQ guidance on EO 13514 §2(b)(ii)
4.2	30% of Eligible Employees Teleworking at Least Once a Week, on a Regular, Recurring Basis, by FY 2020	CEQ guidance on EO 13514 §2(b)(ii)
4.3	50% of Non-Hazardous Solid Waste Diverted from Disposal in Landfills Not Owned by DoD by FY 2015 and Thereafter Through FY 2020	CEQ guidance on EO 13514 §2(b)(ii)
<b>Objective #3: The Ongoing Performance of DoD Assets Ensured by Minimizing Waste and Pollution</b>		
<b>GOAL #5: Solid Waste Minimized and Optimally Managed</b>		
5.1	All DoD Organizations Implementing Policies by FY 2014 to Reduce the Use of Printing Paper	EO 13514 §2(e)(iv), 2(i)
5.2	50% of Non-Hazardous Solid Waste Diverted from the Waste Stream by FY 2015 and Thereafter Through FY 2020	EO 13514 §2(e); EO 13423 §2(e)
5.3	60% of Construction and Demolition Debris Diverted from the Waste Stream by FY 2015, and Thereafter Through FY 2020	EO 13514 §2(e); EO 13423 §2(e)
5.4	Ten Landfills Recovering Landfill Gas for Use by DoD by FY 2020	EO 13514 §1, §2(a)
<b>GOAL #6: The Use and Release of Chemicals of Environmental Concern Minimized</b>		
6.1	On-Site Releases and Off-Site Transfers of Toxic Chemicals Reduced 15% by FY 2020, Relative to FY 2007	EO 13514 §2(e)
6.2	100% of Excess or Surplus Electronic Products Disposed of in Environmentally Sound Manner	EO 13514 §2(i); EO 13423 §2(h)
6.3	100% of DoD Personnel and Contractors that Apply Pesticides Properly Certified	EO 13514 §2(e)(vii)

#	Sub-Goal	Key Federal Requirements Addressed
<b>Objective #4: Continuous Improvement in the DoD Mission Achieved through Management and Practices Built on Sustainability and Community</b>		
<b>GOAL #7: Sustainability Practices Become the Norm</b>		
7.1	95% of Procurement Conducted Sustainably	EO 13514 §2(h), (g), (i); EO 13423 §2(h), (d), (e); EISA §524, 525; EPAAct §104, 108; Farm Bill Title IX, §9002; Resource Conservation and Recovery Act §6002
7.2	15% of Existing Buildings Conform to the Guiding Principles on High Performance and Sustainable Buildings By FY 2015, Holding Through FY 2020	EO 13514 §2(g); EO 13423 §2(f)
<b>GOAL #8: Sustainability Built into DoD Management Systems</b>		
8.1	All Environmental Management Systems Effectively Implemented and Maintained	EO 13514 §2(j); EO 13423 §3(b)(i)
8.2	The Sustainability of Transportation and Energy Choices in Surrounding Areas Optimized by Coordinating with Related Regional and Local Planning	EO 13514 §2(f)
8.3	All DoD Installations Have Integrated Pest Management Plans Prepared, Reviewed, and Updated Annually by Pest Management Professionals	EO 13514 §2(e)(vii)

- *Electrical Metering:* EO 13514 §2(g) mandates that federal agencies comply with the Guiding Principles, which require that all federal buildings be metered for electricity by October 1, 2012 (as per EAct §103), and the information used to optimize and verify electrical energy efficiency performance using the Energy Star Benchmarking Tool as described in the Guiding Principles (see below).
- *Fate of Savings:* EAct §102 allows agencies can keep savings from energy and water reductions.
- *Metering Electricity:* EAct §103 requires buildings to be metered for electricity by October 1, 2012.
- *Use of Electronic Equipment:* EO 13514 §2(i) requires agencies to establish and implement policies to enable power management on electronic equipment, and to implement best practices in energy efficient management of servers and Federal data centers. EO 13423 §2(h) requires agencies to ensure that the agency enables the Energy Star feature on agency computers and monitors.

### *Guiding Principles*

The Guiding Principles specifically pertaining to energy use are:

- Employ total building commissioning practices tailored to the size and complexity of the building and its system components in order to verify performance of building components and systems and help ensure that design requirements are met.
- Establish a whole building performance target that takes into account the intended use, occupancy, operations, plug loads, other energy demands, and design to earn the Energy Star voluntary labeling program targets for new construction and major renovation where applicable.
- *Measurement and Verification:* In accordance with DOE guidelines issued under section 103 of the Energy Policy Act of 2005, install building level utility meters in new major construction and renovation projects to track and continuously optimize performance. Compare actual performance data from the first year of operation with the energy design target. After one year of occupancy, measure all new major installations using the Energy Star Benchmarking Tool for building and space types covered by Energy Star. Enter data and lessons learned from sustainable buildings into the High Performance Buildings Database.
- Pursue cost-effective, innovative strategies, such as highly reflective and vegetated roofs, to minimize consumption of energy, water, and materials.
- Manage existing building systems to reduce consumption of energy, water, and materials, and identifying alternatives to renovation that reduce existing assets' deferred maintenance costs.

### **Sub-Goal 1.2 18.3% of Energy Consumed by Facilities is Produced or Procured from Renewable Sources by FY 2020**

#### **Federal Statutory Requirements Addressed by Sub-Goal 1.2**

**U.S.C. 10 §2911(e)** (or the 2010 National Defense Authorization Act §2852): DoD will produce or procure not less than 25 percent of the total energy consumed within its facilities during FY 2025 and each fiscal year thereafter from renewable energy sources, where renewable energy includes thermal as well as electric sources.

**EO 13514 §2(a)(ii):** Consider increasing agency use of renewable energy and implementing renewable energy generation projects on agency property.

**EO 13423 §2(b):** Ensure that, to the extent feasible, the agency implements renewable energy generation projects on agency property for agency use.

**EISA §523:** If lifecycle cost-effective, as compared to other reasonably available technologies, not less

than 30 percent of the hot water demand for each new Federal building or Federal building undergoing a major renovation be met through the installation and use of solar hot water heaters.

**EPAct §204:** The Administrator of General Services may establish a photovoltaic energy commercialization program for the procurement and installation of photovoltaic solar electric systems for electric production in new and existing public buildings. The acquisition of photovoltaic electric systems shall be at a level substantial enough to allow use of low-cost production techniques with at least 150 megawatts (peak) cumulative acquired during the 5 years of the program.

### **Sub-Goal 1.3 Use of Petroleum Products by Vehicle Fleets Reduced 30% by FY 2020 Relative to FY 2005**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 1.3**

**EO 13514 §2(a) (iii)(C):** For agencies operating a fleet of at least 20 motor vehicles, the fleet's total consumption of petroleum products will be reduced by a minimum of 2 percent annually through the end of FY 2020 relative to FY 2005. §2(a) (iii)(A) and (B) contribute to (C): use low greenhouse gas emitting vehicles including alternative fuel vehicles, and optimize the number of vehicles in the agency fleet.

#### **EO 13423 §2(g)**

- (i) Reduce the fleet's total consumption of petroleum products by 2 percent annually through the end of FY 2015 relative to FY 2005 (if at least 20 motor vehicles).
- (ii) 10 percent annual increase in the use of non-petroleum fuel, relative to FY 2005.
- (iii) Use plug-in hybrids once cost reasonably comparable, on the basis of life-cycle cost.

#### **EISA**

- §141: only low GHG-emitting vehicles will be purchased, if available.
- §142: 20 percent reduction in vehicle petroleum use, and a 10 percent increase in non-petroleum fuel use annually, by 2015 relative to FY 2005.
- §246: a renewable fuel pump must be installed for every fleet by January 1, 2010, except for DoD fueling centers with a fuel turnover rate of less than 100,000 gallons of fuel per year.
- §526: alternative fuels cannot be used if lifecycle GHG emissions are greater than from conventional petroleum sources.

**EPAct §701:** Vehicles with dual fuel capabilities shall be operated on alternative fuels.

### **Sub-Goal 2.1 Potable Water Consumption Intensity by Facilities Reduced by 26% of FY 2007 Levels by FY 2020**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 2.1**

#### **EO 13514 §2(d):**

- Reduce potable water consumption intensity by 2 percent annually through fiscal year 2020, or 26 percent by the end of FY 2020, relative to FY 2007.
- Reduce industrial, landscaping, and agricultural water consumption by 2 percent annually or 20 percent by the end of FY 2020 relative to FY 2010.
- Consistent with State law, identify, promote, and implement water reuse strategies that reduce potable water consumption.

#### **EO 13514 §2(g)**

- At least 15 percent of existing agency buildings (including leased) meet the Guiding Principles by FY 2015, as well as all new agency construction, major renovation and repair. Annual progress

will be made towards 100 percent compliance for the agency's building inventory. The 2006 Memorandum of Understanding on Federal Leadership in High Performance and Sustainable Buildings set forth a set of Guiding Principles. That specifically pertaining to water consumption:

- Indoor water use is to be reduced 20 percent below baseline calculated for the building by FY 2015, on top of Energy Policy Act of 1992 fixture performance requirements.
- Outdoor use of potable water is to be at least 50 percent less than that consumed by conventional means (in terms of plant species and plant densities) by FY 2015.
- Manage existing building systems to reduce consumption of energy, water, and materials, and identifying alternatives to renovation that reduce existing assets' deferred maintenance costs.

#### **EO 13423**

- §2(c): Beginning in FY 2008, reduce water consumption intensity, relative to the baseline of the agency's water consumption in FY 2007, through life-cycle cost-effective measures by 2 percent annually through the end of FY 2015 or 16 percent by the end of FY 2015.
- §2(f): Ensure that new construction and major renovation...comply with the Guiding Principles..., and that 15 percent of the existing Federal capital asset building inventory of the agency as of the end of FY 2015 incorporates the sustainable practices in the Guiding Principles.

**EISA §433:** For new or majorly renovated buildings, sustainable design principles are to be applied to their siting, design, and construction. In addition to any use of water conservation technologies otherwise required by this section, water conservation technologies shall be applied to the extent that the technologies are life-cycle cost-effective.

**EPAct §102:** Agencies can keep savings from energy and water reductions.

### **Sub-Goal 2.2 Industrial and Irrigation Water Consumption Reduced by 20% of FY 2010 Levels by FY 2020**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 2.2**

**EO 13514 §2(d)(ii):** Reduce industrial, landscaping, and agricultural water consumption by 2 percent annually or 20 percent by the end of FY 2020 relative to FY 2010.

### **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**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 2.3**

**EO 13514 §2(d):** Implement and achieve the metrics identified in the storm water management guidance (issued by EPA as required under §14).

#### **EO 13514 §2(g)**

- At least 15 percent of existing agency buildings (including leased) meet the Guiding Principles by FY 2015, as well as all new agency construction, major renovation and repair. Annual progress will be made towards 100 percent compliance for the agency's building inventory. The 2006 Memorandum of Understanding on Federal Leadership in High Performance and Sustainable Buildings set forth a set of Guiding Principles. That specifically pertaining to storm water management:
  - Employ design and construction strategies that reduce storm water runoff and polluted

site water runoff.

- Pursue cost-effective, innovative strategies, such as highly reflective and vegetated roofs, to minimize consumption of energy, water, and materials.
- Manage existing building systems to reduce consumption of energy, water, and materials, and identifying alternatives to renovation that reduce existing assets' deferred maintenance costs.

EO 13423 §2(f): Ensure that new construction and major renovation...comply with the Guiding Principles..., and that 15 percent of the existing Federal capital asset building inventory of the agency as of the end of FY 2015 incorporates the sustainable practices in the Guiding Principles.

EISA §438: Maintain or restore the pre-development hydrology of the property with regard to the temperature, rate, volume, and duration of storm water flow for development/redevelopment footprints exceeding 5,000 sq ft.

#### **Sub-Goal 4.1 Greenhouse Gas Emissions from Employee Air Travel Reduced 7% by FY 2020 Relative to FY 2011**

##### **Federal Statutory and EO Requirements Addressed by Sub-Goal 4.1**

EO 13514 §2(b)(ii): Implement strategies and accommodations for transit, travel, training, and conferencing that actively support lower-carbon commuting and travel by agency staff.

#### **Sub-Goal 4.2 30% of Eligible Employees Teleworking at Least Once a Week, on a Regular, Recurring Basis, by FY 2020**

##### **Federal Statutory and EO Requirements Addressed by Sub-Goal 4.2**

EO 13514 §2(b)(ii): Implement strategies and accommodations for transit, travel, training, and conferencing that actively support lower-carbon commuting and travel by agency staff.

#### **Sub-Goal 4.3 50% of Non-Hazardous Solid Waste Diverted from Disposal in Landfills Not Owned by DoD by FY 2015, and Thereafter Through FY 2020**

##### **Federal Statutory and EO Requirements Addressed by Sub-Goal 4.3**

EO 13514 §2(e)

- Divert at least 50 percent of non-hazardous solid waste, excluding construction and demolition debris, by the end of FY 2015.
- Increase diversion of compostable and organic material from the waste stream.

#### **Sub-Goal 5.1 All DoD Organizations Implementing Policies by FY 2014 to Reduce the Use of Printing Paper**

##### **Federal Statutory and EO Requirements Addressed by Sub-Goal 5.1**

EO 13514 §2(e)(iv): Reduce printing paper use.

EO 13514 §2(i): Establish and implement policies to enable duplex printing.

#### **Sub-Goal 5.2 50% of Non-Hazardous Solid Waste Diverted from the Waste Stream by FY 2015 and Thereafter Through FY 2020**

##### **Federal Statutory and EO Requirements Addressed by Sub-Goal 5.2**

EO 13514 §2(e)

- Divert at least 50 percent of non-hazardous solid waste, excluding construction and demolition debris, by the end of FY 2015.
- Increase diversion of compostable and organic material from the waste stream.

EO 13423 §2(e): Ensure that the agency increases diversion of solid waste as appropriate and maintains cost-effective waste prevention and recycling programs in its facilities.

### **Sub-Goal 5.3 60% of Construction and Demolition Debris Diverted from the Waste Stream by FY 2015, and Thereafter Through FY 2020**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 5.3**

EO 13514 §2(e)

- Divert at least 50 percent of construction and demolition materials and debris by the end of FY 2015.

EO 13423 §2(e): Ensure that the agency increases diversion of solid waste as appropriate and maintains cost-effective waste prevention and recycling programs in its facilities.

### **Sub-Goal 5.4 Ten Landfills Recovering Landfill Gas for Use by DoD by FY 2020**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 5.4**

EO 13514 §1, §2(a).

### **Sub-Goal 6.1 On-Site Releases and Off-Site Transfers of Toxic Chemicals Reduced 15% by 2020, Relative to 2007**

#### **Federal Statutory and EO Requirements Relating to Addressed by Sub-Goal 6.1**

EO 13514 §2(e)

- Source Reduction: minimize the generation of waste and pollutants through source reduction.
- Reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of.
- Increase agency use of acceptable alternative chemicals and processes in keeping with the agency's procurement policies.
- Ensure that the agency reduces the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of.

### **Sub-Goal 6.2 100% of Excess or Surplus Electronic Products Disposed of in Environmentally Sound Manner**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 6.2**

EO 13514 §2(i): (iii) Employ environmentally sound practices with respect to the agency's disposition of all agency excess or surplus electronic products.

EO 13423 §2(h)

- (iii) Ensure that the agency uses environmentally sound practices with respect to disposition of agency electronic equipment that has reached the end of its useful life.
- (iv) Ensure that the agency establishes and implements policies to extend the useful life of agency electronic equipment.



### **Sub-Goal 6.3 100% of DoD Personnel and Contractors Who Apply Pesticides Are Properly Certified**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 6.3**

**EO 13514 §2(e):** promote pollution prevention and eliminate waste by implementing integrated pest management and other appropriate landscape management practices.

### **Sub-Goal 7.1 95% of Procurement Conducted Sustainably**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 7.1**

**EO 13514 §2(h):** Ensure that 95 percent of new contract actions, excluding weapon systems, are:

- energy-efficient (Energy Star or Federal Energy Management Program)
- water-efficient
- bio-based
- environmentally preferable (e.g., certified by the Electronic Product Environmental Assessment Tool (EPEAT))
- non-ozone depleting
- contain recycled content
- non-toxic or less-toxic alternatives

where such products meet agency performance requirements.

(EO 13514 has the same criteria for products and services as given in the Federal Green Procurement Preference Program established under EO 13423, but it adds this new quantitative requirement that 95 percent of new acquisitions must meet these criteria.)

**EO 13423 §2(h):** When acquiring an electronic product, ensure that it meets at least 95 percent of those requirements with an EPEAT-registered electronic product, unless there is none.

#### **EO 13514 §2(g)**

- **Real Property Inventory:** When adding assets to the agency's real property inventory, identifying opportunities to consolidate and dispose of existing assets, optimize the performance of the agency's real property portfolio, and reduce associated environmental impacts.
- **Historic Buildings:** Ensure that rehabilitation of federally owned historic buildings utilizes best practices and technologies in retrofitting to promote long-term viability of the buildings.

#### **EO 13514 §2(i):**

- Ensure procurement preference for EPEAT products.
- Ensure the procurement of electronic equipment designated Energy Star and/or Federal Energy Management Program.

#### **EO 13423**

- **§2(d):** Require in agency acquisitions of goods and services: (i) the use of sustainable environmental practices, including acquisition of bio-based, environmentally preferable, energy-efficient, water-efficient, and recycled-content products; and (ii) the use of paper with at least 30 percent post-consumer fiber content.
- **§3(e):** Ensure that contracts for contractor operation of government-owned facilities or vehicles require the contractor to comply with the provisions of this order to the same extent as if the agency operated the facilities or vehicles.

#### **EISA**

- **§524:** must purchase appliances whose stand-by mode uses 1 watt or less, or the best available if <1

W not available.

- §525: must purchase products designated by Energy Star or the Federal Energy Management Program.

#### **EPAct**

- §104 regarding procurement of energy-efficient products: Energy Star products and FEMP designated products shall be clearly identified and prominently displayed in any federal inventory or listing of products; General Services Administration and DLA shall supply only Energy Star products or FEMP designated products where possible and cost-effective; electric motors between 1 and 500 horsepower will be premium efficient motors. Agencies encouraged to maximize the efficiency of air conditioning and refrigeration equipment.
- §108: Amends the Solid Waste Disposal Act to increase the use of waste such as furnace slag and fly ash in cement or concrete in federal projects.

**Farm Bill** Title IX, §9002: Procurement preference for the highest bio-based content, for products costing >\$10,000, based on guidance to be written.

**Resource Conservation and Recovery Act (RCRA)** §6002 requires federal agencies to procure products composed of the highest percentage of recovered materials practicable.

### **Sub-Goal 7.2 15% of Existing Buildings Conform to the Guiding Principles on High Performance and Sustainable Buildings By FY 2015, Holding Through FY 2020**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 7.2**

**EO 13514** §2(g): At least 15 percent of existing agency buildings (including leased) are to meet the Guiding Principles (see below) by FY 2015. Annual progress will be made towards 100 percent compliance for the agency's building inventory.

**EO 13423** §2(f): 15 percent of the existing Federal capital asset building inventory of the agency as of the end of FY 2015 incorporates the sustainable practices in the Guiding Principles(see below).

#### ***Guiding Principles***

The Guiding Principles pertaining to energy use are:

- Employ total building commissioning practices tailored to the size and complexity of the building and its system components in order to verify performance of building components and systems and help ensure that design requirements are met.
- Establish a whole building performance target that takes into account the intended use, occupancy, operations, plug loads, other energy demands, and design to earn the Energy Star voluntary labeling program targets for new construction and major renovation where applicable.
- Measurement and Verification: In accordance with DOE guidelines issued under section 103 of the Energy Policy Act of 2005, install building level utility meters in new major construction and renovation projects to track and continuously optimize performance. Compare actual performance data from the first year of operation with the energy design target. After one year of occupancy, measure all new major installations using the Energy Star Benchmarking Tool for building and space types covered by Energy Star. Enter data and lessons learned from sustainable buildings into the High Performance Buildings Database.
- Pursue cost-effective, innovative strategies, such as highly reflective and vegetated roofs, to minimize consumption of energy, water, and materials.
- Manage existing building systems to reduce consumption of energy, water, and materials, and identifying alternatives to renovation that reduce existing assets' deferred maintenance costs.

Those pertaining to water consumption:

- Indoor water use is to be reduced 20 percent below baseline *{of unspecified year}* by FY 2015, on top of Energy Policy Act of 1992 fixture performance requirements.
- Outdoor use of potable water is to be at least 50 percent less than that consumed by conventional means (in terms of plant species and plant densities) by FY 2015.

Those pertaining to storm water management:

- Employ design and construction strategies that reduce storm water runoff and polluted site water runoff.
- Pursue cost-effective, innovative strategies, such as highly reflective and vegetated roofs, to minimize consumption of energy, water, and materials.
- Manage existing building systems to reduce consumption of energy, water, and materials, and identifying alternatives to renovation that reduce existing assets' deferred maintenance costs.

### **Sub-Goal 8.1 All Environmental Management Systems Effectively Implemented and Maintained**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 8.1**

EO 13514 §2(j): Continue implementing existing environmental management systems (EMSs) to achieve the performance necessary to meet the objectives of this order.

EO 13423 §3(b)(i): Ensure use of EMS as the primary management approach for addressing environmental aspects of internal agency operations and activities.

### **Sub-Goal 8.2 The Sustainability of Transportation and Energy Choices in Surrounding Areas Optimized by Coordinating with Related Regional and Local Planning**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 8.2**

EO 13514 §2(f) - advance regional and local integrated planning:

- Transportation Planning: participate in regional transportation planning and recognizing existing community transportation infrastructure.
- Transit-Oriented Community Planning: ensure that planning of new Federal facilities or new leases includes consideration of sites that are pedestrian friendly, near existing employment centers, and accessible to public transit, and emphasizes existing central cities and, in rural communities, existing or planned town centers.
- Energy Planning: align federal policies to increase effectiveness of local planning for energy choices.
- New/Improved Facilities: Identify and analyze impacts from energy usage and alternatives in all environmental impact statement and environmental assessments for proposed new or expanded facilities.

### **Sub-Goal 8.3 All DoD Installations Will Have Integrated Pest Management Plans Prepared, Reviewed, and Updated Annually by Pest Management Professionals**

#### **Federal Statutory and EO Requirements Addressed by Sub-Goal 8.3**

EO 13514 §2(e): promote pollution prevention and eliminate waste by implementing integrated pest management and other appropriate landscape management practices.