U.S. Department of
ENERGY

Strategic Sustainability Performance Plan

Discovering Sustainable Solutions to Power and Secure America's Future

Report to The White House Council on Environmental Quality and Office of Management and Budget

September 2010

United States Department of Energy
Washington, DC 20585

Department of Energy
Strategic Sustainability Performance Plan

Discovering Sustainable Solutions to Power and Secure America's Future

Table of Contents

Appendices

List of Tables

List of Figures

Section 1: Department Policy and Strategy

I. Department Policy Statement

The federal government is the largest consumer of energy in the U.S. economy. In Executive Order (EO) 13514, *Federal Leadership in Environmental, Energy and Economic Performance,* President Obama calls on federal agencies to set a shining example on sustainability for the rest of the nation by improving our environmental, energy and economic performance – and achieving targeted reductions in our greenhouse gas (GHG) emissions – by 2020.

For several years, as required by earlier Executive Orders and statutes, the Department of Energy (DOE) has worked diligently to manage our operations and facilities ever more sustainably, with considerable success. Now, DOE will build on its progress to date and work to achieve a 28% reduction in Scope 1 and 2 GHG emissions and 13% reduction in Scope 3 emissions while improving energy efficiency, water conservation, waste reduction and sustainable acquisition.

DOE will comply with EO 13514 by "Discovering Sustainable Solutions to Power and Secure America's Future," the title of our Strategic Sustainability Performance Plan (SSPP). Our strategy for success includes instituting wholesale cultural change to factor sustainability and GHG emission reductions into all DOE corporate management decisions; planning, executing, evaluating, and continually improving DOE operations to maximize sustainable use of energy and natural resources; developing cost-effective energy efficiency and renewable energy projects; improving the performance of existing DOE building stock; using low-GHG emitting energy sources to replace existing grid energy; and preventing pollution and eliminating waste.

In the first year of executing the SSPP, we will focus on further integrating sustainability planning into DOE's programming and budget development process; addressing policy, procedural and operational challenges that limit our ability to reduce water, waste, energy, and fuel use; and leveraging our corporate culture to emphasize sound environmental stewardship over the long term.

DOE embraces the challenge of EO 13514 as an opportunity to promote sustainable operations and address the crisis of climate change. As Secretary of Energy Steven Chu has remarked, "With a serious commitment to energy efficiency, widespread deployment of technologies we have, and an aggressive investment in science, we can dramatically reduce our carbon emissions and reinvigorate our economy at the same time. This is not only our opportunity; it is our responsibility to future generations."

AUG – 9 2010

Daniel B. Poneman
Senior Sustainability Officer
Deputy Secretary – U.S. Department of Energy

Date

II. Sustainability and the Department's Mission

Sustainability is fundamental to the Department of Energy's research mission and operations as reflected in the Department's Strategic Plan. Our overarching mission is to *discover the solutions to power and secure America's future.* We are implementing our mission through three strategic goals:

- ***Innovation*****,** to maintain U.S. global leadership in science and engineering
- ***Energy,*** to build a competitive and sustainable clean energy economy to secure America's energy future
- ***Security,*** to reduce nuclear dangers and environmental risks

To accomplish its mission, the Department focuses on achieving a number of ambitious strategic priorities. DOE invests in science to achieve transformational discoveries. It is pursuing clean, secure energy, by reducing our dependence on oil and changing the landscape of energy demand and supply. The Department is positioning the U.S. to lead on climate change technology and science. DOE advances economic prosperity by creating green jobs and increasing the Nation's competitiveness. It cleans up the environmental legacy left by nuclear weapons and nuclear energy research programs, and works to protect national security by maintaining the nation's nuclear deterrent and preventing nuclear proliferation.

The DOE Strategic Sustainability Performance Plan (SSPP) is fundamentally based on the Department's mission, vision, and strategic plan. It is through these synergies that DOE will meet the goals of all the applicable "greening the government" executive orders and statutes.[1]

Innovation. This strategic goal covers basic and applied research in scientific programs that include bioscience, environmental and climate science, advanced materials, and even the fundamental nature of matter and energy at the atomic and molecular scales. Energy-related research supports the goals of a low-carbon, energy-efficient economy through transformational breakthroughs. In addition, DOE constructs and operates the world's premier scientific facilities and instruments that researchers depend on to extend the frontiers of science and technology.

Energy. Clean energy and sustainability lie at the core of the Department's mission. DOE contributes to a competitive, low-carbon economy through scientific breakthroughs leading to new technologies that enhance energy efficiency and

[1] Key Executive Orders and statutes include: EO 13514 *Federal Leadership in Environmental, Energy, and Economic Performance* (2009); EO 13423 *Strengthening Federal Environmental, Energy, and Transportation Management* (2007); National Energy Conservation Policy Act of 1978; Energy Policy Act of 1992; Energy Policy Act of 2005; Energy Independence and Security Act of 2007.

productivity while bringing clean, reliable, and affordable energy technologies to the marketplace.

The Department champions sustainability initiatives in such diverse areas as vehicle and fuel technologies, building technologies, renewable energy technologies, and energy efficiency and storage. In addition, DOE promotes nuclear power as a resource capable of meeting the Nation's energy, environmental and national security needs by resolving technical and regulatory barriers through research, development and demonstration. DOE also leads national efforts to modernize the electric grid, enhance security and reliability of the energy infrastructure, and facilitate recovery from disruptions of energy supply. DOE is involved in advancing carbon capture and storage (CCS) technologies, which can play an important role in reducing domestic GHG emissions while preserving the option of using an abundant domestic fossil energy resource. DOE is committed to integrating the results of these initiatives into our operations to achieve the goals of the relevant EOs and statutes.

*Security***.** Issues of nuclear safety and security are a top priority as DOE transforms the Nation's nuclear weapons stockpile and supporting infrastructure to be more responsive to the threats of the 21st Century. The Department has proven its ability to integrate sustainability into its national security mission through such efforts as designing and operating sustainable buildings, despite operational constraints that may limit opportunities for conventional resource conservation in this area.

The Department is also responsible for the largest nuclear environmental cleanup project in the world and is committed to completing this mission in a sustainable manner. The Department manages its post-closure environmental responsibilities to reduce waste site footprints, ensures the future protection of human health and the environment, and increases the number of legacy management custody-and-control sites in beneficial reuse.

Although the nature of the Department's stockpile security and environmental cleanup responsibilities pose challenges, DOE is committed to finding opportunities within its portfolio to achieve and exceed the sustainability goals.

DOE will address these challenges by pursuing the following key objectives:

- Fostering a culture of energy efficiency and sustainability
- Improving data quality to inform operations and decision making
- Optimizing allocation of resources to achieve EO goals while safeguarding the mission
- Applying the best sustainability practices
- Adopting emerging, promising technologies

III. Greenhouse Gas Reduction Goals

The Department's estimated Scope 1 and 2 FY 2008 baseline is 4.6 million metric tons (mT) CO_2e (Figure 1). As of May 2010, there were 87 buildings and structures scheduled for completion by FY 2020 (in development at CD-2 or above). Although some of these facilities will replace older, less efficient operations, this new construction could increase the Department's GHG level to at least 5.5 million $mTCO_2e$/year. Despite this potential increase in emissions, DOE will identify opportunities to offset these operations while striving to meet its GHG reduction goals. The Department also identified an estimated baseline of 748,000 $mTCO_2e$ for its Scope 3 FY 2008 baseline.

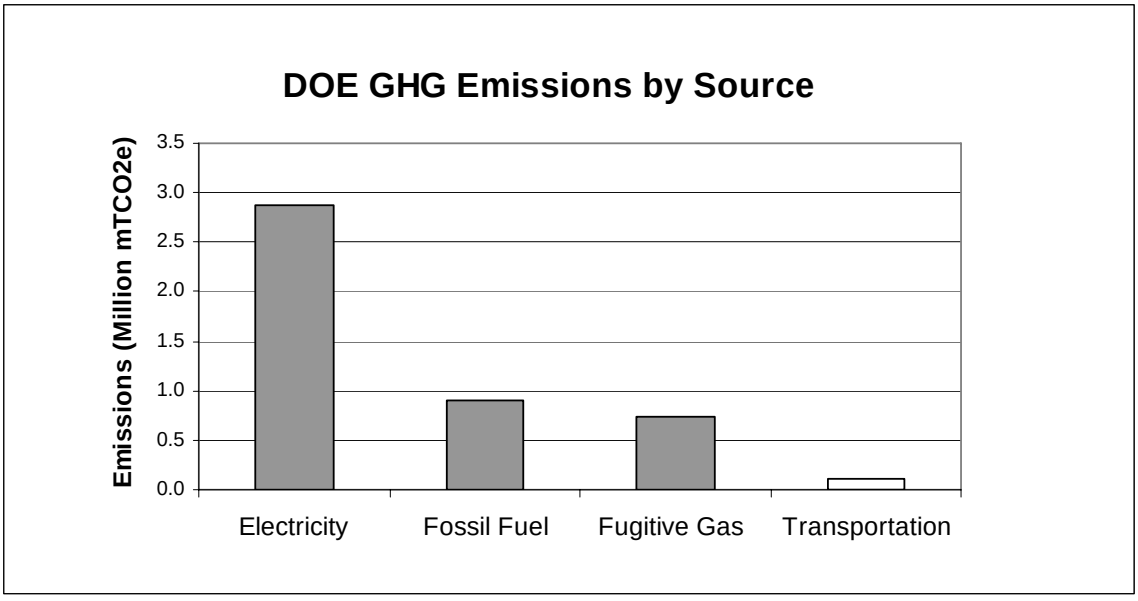


Figure 1: Estimated DOE 2008 Scope 1 and 2 Greenhouse Gas Inventory by Source

The Department established the following GHG emission reduction goals for fiscal year (FY) 2020:

- Reducing Scope 1 and 2 GHG by 28% (1.3M $mTCO_2e$ from the FY 2008 baseline)
- Reducing Scope 3 GHG by 13% (97,000 $mTCO_2e$ from the FY 2008 baseline)

DOE's strategy to achieve these targets takes full advantage of the extent to which emissions are linked to changes in other related performance parameters, particularly energy. For Scope 1 and 2 emissions, the Department will:

- Prioritize investment in efficiency measures and infrastructure improvements based on carbon intensity
- Reduce the use of petroleum-based fuels
- Deploy operations and maintenance best practices
- Install asset-level metering

- Assess and upgrade its real property portfolio to meet the high-performance sustainable building principles
- Reduce non-carbon dioxide (CO_2) fugitive emissions, specifically sulfur hexafluoride (SF_6)
- Assess the feasibility of using DOE facilities as technology innovation sites for carbon capture and sequestration or beneficial reuse.
- Explore low carbon, next generation energy technologies such as fuel cells, cogeneration, biomass, other renewable technologies and additional technologies as developed.

The Department of Energy maintains one-of-a-kind mission essential facilities (accelerators, light sources, nuclear processes, petroleum reserves and supercomputing facilities) that are inherently energy and/or water intensive. To address these unique sustainability issues, the Department will establish internal expert transformation teams, accountable to each Under Secretary, to determine opportunities to improve the energy and water use efficiency of these facilities. The Department will establish a process to account for, and report their energy, water and GHG contribution/reduction concurrent with its normal facilities portfolio. DOE will conduct internal departmental discussions to determine how goals will be met without affecting mission accomplishment.

To reduce its Scope 3 emissions, the Department will:

- Expand the use of teleconferencing, video conferencing, and web-based meetings to reduce employee air travel
- Reduce transmission and distribution (T&D) losses through on-site power generation
- Reduce waste generation by increasing sustainable purchasing and recycling

The full benefit of all efforts to reduce GHG emissions will be realized when the Department's corporate culture embraces the full range of sustainable practices. To this end, the Department is strengthening its commitment to resource conservation as a core value. All DOE organizations, including their Federal and contractor personnel, are expected to exhibit sustainable behavior, which contributes to this SSPP.

IV. Plan Implementation

a. Internal Coordination and Communication

The Department established a governance model (see Appendix 2) to prepare the SSPP and begin implementation of the EO. The model reflects the decentralized nature of DOE's operational activities, and draws in the maximum amount of internal expertise and operational performance data. It provides broad representation from Headquarters, DOE sites, and DOE contractors, and fosters effective communication and coordination. The model, graphically illustrated in Appendix 2, includes the following elements:

- ***Senior Sustainability Steering Committee (SSSC)***. The Deputy Secretary is the Senior Sustainability Officer (SSO) and chairs this committee comprised of the Under Secretaries, Chief Financial Officer (CFO), General Counsel (GC), Director of the Office of Management, Chief Health, Safety and Security Officer, and the Assistant Secretary for Energy Efficiency and Renewable Energy. The SSSC aligns DOE business practices with the goals of the EOs and related statutes.
- ***Sustainability Integration Team (SIT).*** The committee is co-chaired by a senior manager from Headquarters and from Field Operations, and includes representatives from various DOE organizations. Working Group co-chairs participate in SIT discussions. The SIT supervised the development of the initial SSPP. This team discussed and resolved issues relating to the SSPP however had no line authority to direct or implement policy. The function and organizational placement of the SIT is subject to change.
- ***Working Groups (WG).*** Working Groups are comprised of members from Headquarters and from Field Operations. They provide subject-matter expertise to the SIT.

Implementation and coordination of the SSPP will occur through existing DOE lines of authority. In addition, the Field Management Council, National Laboratory Directors Council, Energy Facilities Contractors Operations Group, communities of practice, assistance networks and working groups will enhance the communication of Plan implementation. The Department's directives system will incorporate and institutionalize implementation procedures by which DOE will meet SSPP goals.

For long-term implementation and oversight, the Department will establish a Sustainability Performance Office (SPO) to coordinate corporate oversight, foster behavior change, evaluate performance, facilitate information management, and report progress toward sustainability goals. The SPO will support the Deputy Secretary in their role as the SSO, as well as the Under Secretaries, DOE sites, and other offices as appropriate. The SPO will be staffed with full-time-equivalent senior-level professionals.

b. Coordination and Dissemination of the Plan to the Field
The SSPP was developed with significant participation from Headquarters elements, field representatives, and DOE contractors. As such, a large number of key personnel, representing a cross-section of the Department, were involved in the discussions, analyses and decision making associated with this Plan.

At the site level, the Department will build on the Environmental Management System (EMS) process, required by EO 13423 and already in place at its sites, to implement the goals articulated in this Plan.

c. Leadership & Accountability
The Secretary is personally committed to achieving the EO and statutory targets and is leading the effort to change the Department's culture to integrate sustainability into all DOE operational decisions. The Secretary's designation of the Deputy Secretary as SSO demonstrates the Department's high-level commitment to sustainability. In addition, the establishment of the SSSC and the designation of the SSO as its chair, ensures continued senior level attention to achieving sustainability goals. Further, senior leaders, managers, staff, and DOE contractors will be held accountable commensurate with their responsibilities for performance under the EOs and related statutes.

The three Under Secretaries will be accountable for all planning, resourcing, implementation, and reporting to achieve sustainability goals within their organizations. Internal sustainability scorecards will assess the level of success at each level of the Department (individual sites, programs, and Under Secretary). These scorecards will be reviewed by the SSO to evaluate performance and determine best paths toward meeting sustainability goals on a regular basis.

d. Department Policy and Planning Integration
The Department has several mechanisms in place within which the SSPP will be integrated with existing policy and planning efforts. For example, the SSPP is a key initiative within the Energy goal of the Department's Strategic Plan. Execution of the SSPP will also be integrated into the Department's performance planning, budget formulation and execution processes. In addition, the SSPP will be linked to policy initiatives primarily emanating from the DOE Office of Energy Efficiency and Renewable Energy. Table 1 provides detailed information on the linkage to other policy and planning mechanisms.

e. Department Budget Integration
Consistent with the objectives of EO 13514, the Department is committed to further integrating the principles of sustainability into its decision-making and budget development processes. The annual budget process will be informed by the goals of the SSPP, starting at the Under Secretary level and progressing through the Program Secretarial Offices (PSO) to the sites. Future internal DOE budget guidance will include information on the importance of sustainability, GHG emissions reduction, and resource

conservation. The Department will align its site-level environmental, energy, and real property planning systems to elevate sustainability in site management and budgeting processes.

Working with their program offices, sites will continue to utilize energy savings performance contracts (ESPC) and utility energy service contracts (UESC) as practical. ESPC projects that require appropriated funding payments may be submitted through the DOE budget process.

f. Methods for Evaluation of Progress

DOE will utilize, integrate, and streamline existing Department data collection mechanisms to evaluate progress toward meeting goals from EOs and related statutes, including:

- ***Pollution Prevention Tracking and Reporting System (PPTRS),*** collects environmental, purchasing, and best practices data.
- ***Energy Management System version 4 (EMS4),*** collects site energy and water consumption and costs.
- ***Federal Automotive Statistical Tool (FAST),*** collects fleet inventory and fuel use.
- ***Consolidated Energy Data Report (CEDR),*** collects additional data on metering requirements, water use, renewable energy generation and purchases, and sustainable buildings.
- ***Site Sustainability Plan Performance Reporting,*** collects data on site identified sustainability projects and supports Energy Independence and Security Act (EISA) Section 432 compliance.
- ***Integrated Facilities Infrastructure (IFI) Crosscut,*** identifies the resource requirements associated with Ten Year Site Plan implementation.
- ***Ten Year Site Plans (TYSP),*** collects planned additions or changes to the real property portfolio.
- ***Facilities Information Management System (FIMS),*** collects data concerning real property attributes and use.

DOE will develop and promulgate internal DOE Sustainability Scorecards to track program and site performance towards meeting the SSPP goals. This scorecard will be developed and disseminated for internal review and comment during the first part of FY 2011. DOE will also prepare DOE's semi-annual report to OMB and CEQ in response to the sustainability scorecard process.

Table 1: Critical Planning Coordination

The following table shows the long-term integrating relationship between the SSPP and other planning and reporting efforts used by DOE. A "Yes" means the SSPP has been integrated into the subject report, "P" means it will be integrated within the next fiscal year, "No" means it has not yet been planned for integration, and "N/A" means integration is not applicable or not appropriate.

Originating Report / Plan	Scope 1 & 2 GHG Reduction	Scope 3 GHG Reduction	Develop and Maintain Agency Comprehensive GHG Inventory	High-Performance Sustainable Design / Green Buildings	Regional and Local Planning	Water Use Efficiency and Management	Pollution Prevention and Waste Elimination	Sustainable Acquisition	Electronic Stewardship and Data Centers	Department Innovation
GPRA Strategic Plan	Yes	Yes	N/A	Yes	P	P	P	P	Yes	Yes
Circular A-11 300s	N/A	N/A	N/A	No	N/A	N/A	N/A	Yes	No	N/A
Annual Energy Data Report	Yes	Yes	Yes	N/A	N/A	Yes	N/A	N/A	N/A	N/A
EISA Section 432 Facility Evaluations/ Project Reporting	Yes	N/A	N/A	No	N/A	Yes	N/A	N/A	Yes	Yes
Budget	P	P	P	P	P	P	P	P	P	P
Asset Management Plan / 3 Year Timeline	P	N/A	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A
Circular A-11 Exhibit 53s	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	N/A
OMB Scorecards	N/A	N/A	N/A	Yes	N/A	Yes	N/A	Yes	Yes	N/A
DOE's Annual Federal Fleet Report to Congress and the President	Yes	N/A	Yes	N/A	Yes	N/A	N/A	Yes	N/A	Yes
Data Center Consolidation Plan	N/A	N/A	N/A	P	N/A	N/A	N/A	P	P	P
Environmental Management System	Yes	P	P	Yes	No	Yes	Yes	Yes	Yes	P
Site Sustainability Plans	P	P	P	Yes	P	Yes	P	Yes	P	No
High Performance and Sustainable Buildings Implementation Plan	P	N/A	N/A	Yes	P	Yes	N/A	P	N/A	N/A
Affirmative Procurement Plan for Green Purchasing	No	P	N/A	Yes	No	Yes	Yes	Yes	Yes	No
US Climate Change Technology Program Strategic Plan (2006)	Yes	Yes	Yes	Yes	Yes	N/A	N/A	Yes	Yes	Yes
Federal GHG Accounting & Reporting Guidance	Yes	Yes	Yes	N/A	N/A	Yes	Yes	Yes	N/A	Yes
Federal Procurement Data System	N/A	N/A	N/A	P	N/A	N/A	N/A	Yes	P	N/A

V. Evaluating Return on Investment

The Department will establish a process to prioritize projects that most cost-effectively meet the SSPP's energy and environmental goals, while generating the greatest cost savings for DOE as it executes its mission. Each project considered for funding will be evaluated first on economic Return on Investment (ROI) and then on an ROI that includes environmental and social benefits. DOE will calculate the ROI of resource conservation and GHG reduction projects as described below.

Financial ROI is one of several key factors in prioritizing projects and determining the ability to implement these projects (especially for direct appropriation proposals). In addition to the components of ROI, DOE may consider (although is not limited to) the following criteria when assessing projects:

- Cost per unit contribution to the SSPP energy and environmental goals
- Program/site priorities and future plans in support of its missions
- Local and regional planning factors
- Current site infrastructure and planned new construction
- Site energy or water consumption and cost trends
- Public visibility (DOE places value on showcasing technologies developed through its research efforts)
- Risk management consideration (e.g., environmental remediation from unplanned spills and releases)
- Safety and health
- Continuity of operations
- Social cost of carbon (SCC)

a. Economic Lifecycle Cost / Return on Investment

When evaluating proposed projects, DOE will use a rigorous cost-benefit analysis for selecting projects and initiatives. Return on Investment and Net Present Value (NPV) will be calculated per OMB Circular A-94 "Guidelines and Discount Rates for Benefits – Cost Analysis of Federal Programs." Other financial calculations may be performed to determine payback period, internal rate of return (IRR), and project cost effectiveness with regard to GHG, energy and water savings over time.

b. Social Costs & Benefits

Beyond a financial ROI, the Department will consider the social costs of GHG emissions and the benefits of abatement. These social costs will factor into the ROI analysis through the use of a nominal SCC as provided in "Social Cost of Carbon for

Regulatory Impact Analysis" under EO 12866.[2] The 2010 SCC value of $21.40 per mTCO2e will be used as an additional project review factor after an NPV and other financial analyses are completed, and its value will be adjusted over time to reflect inflation and other relevant escalation rates.

c. Environmental Costs & Benefits

DOE will continue to factor environmental costs and benefits into its ROI analysis. Previous statutes and EOs mandating resource conservation provide a strong framework to guide the Department's continuing efforts to reduce its collective environmental impact. DOE will apply lifecycle analysis to actions with environmental impacts to reveal the proportionality of their implementation costs to their contribution to the SSPP energy and environmental goals.

d. Mission-Specific Costs & Benefits

Many core DOE activities are highly energy intensive. Scientific tools (such as accelerators, synchrotron light sources, reactors and supercomputers), materials development processes, and environmental remediation (such as tank waste treatment), require ready access to reliable energy and backup power at reasonable costs. DOE will take proactive steps to address the energy supply sources at these facilities to maximize GHG reduction opportunities.

In completing its environmental responsibilities, DOE will consider opportunities to accelerate deactivation and decommissioning (D&D) of excess facilities as well as opportunities to deploy more sustainable D&D technologies such as *in situ* decommissioning. DOE will also continue to incorporate green remediation practices into its environmental cleanup program.

In addition, DOE will evaluate the use of mission specific research, such as energy efficiency and renewable energy, for projects that can be demonstrated at DOE sites. Such demonstrations can put DOE research into practice, increase DOE energy savings and renewable energy, and potentially reduce associated costs for DOE and commercial technology transfer.

e. Operations & Maintenance and Deferred Investments

DOE site managers are responsible for implementing effective real property management processes and proper application of operations and maintenance (O&M) funds. Maintenance and repair activities are prioritized based on many factors including safety, quality of life, protection of assets, and protection of the environment. The Department maintains a backlog of deferred maintenance (i.e., maintenance activities that were deferred beyond their optimal time for execution). Certain deferred

[2] See http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/smallmotors_tsd/sem_finalrule_appendix15a.pdf

maintenance results in increased energy usage and generates additional repair costs (e.g., a leaking roof will damage internal building components if not fixed). Site Managers will consider energy, water and GHG reduction opportunities when prioritizing maintenance, repair and deferred maintenance activities.

f. Climate Change Risk and Vulnerability

Climate change is expected to affect the United States in a number of ways. Warming oceans will raise sea levels, which could lead to negative consequences for DOE coastal sites. Climate change may also change patterns of rainfall, resulting in greater water scarcity in parts of the country. Increased water scarcity poses the greatest risk to DOE sites that rely on large amounts of water for waste processing and power generation, particularly those in drier regions of the country. Climate change may also increase the frequency and intensity of storms, which may lead to greater potential damage to DOE sites and an increased likelihood of power loss, localized flooding, and other threats to business continuity and infrastructure. DOE will study and consider these concerns as environmental factors when evaluating project prioritization.

g. Alternative Funding Approaches

The Department utilizes third-party financing mechanisms such as ESPCs and UESCs to finance energy efficiency and conservation measures. By using these approaches, the Department leverages private sector financing and expertise. When entering into alternative financing arrangements, DOE will work to ensure reasonable cost savings estimates, proper project implementation, sound contract oversight, and accurate measurement and verification of savings.

VI. Transparency

The Department commits to transparent communication on sustainability with both internal and external audiences. Keeping stakeholders apprised of DOE progress and results is consistent with DOE's Open Government Plan[3] and is essential to achieving the requisite cultural change needed to integrate sustainability as a Department core value.

The Department will engage in two-way internal communication to inform continuous improvement in the implementation of the EOs and related statutes. This will include gathering data and operational experience from DOE programs and sites through reporting processes, and dissemination of internal scorecards.

Information will be accessible through DOE's website where the SSPP, and associated milestones/performance information, will be posted. DOE will provide periodic updates on the status of programs, initiatives and accomplishments associated with the SSPP.

[3] http://www.energy.gov/open/documents/DOE_OGI_Plan_07Apr2010.pdf

Section 2: Performance Review & Annual Update

I. Summary of Accomplishments

The Department has made considerable progress in its sustainability efforts under the requirements of EO 13423 and related statutes. These accomplishments are summarized below and include discussion of successful programs, lessons learned and anticipated challenges.

Progress toward Facility Energy and Water Goals
In FY 2009, DOE reported a 17.4% decrease in energy intensity compared to FY 2003 for facilities subject to the statutory goal of 12%, as noted in Table 2. This reduction includes purchases of 778 billion British Thermal Units (Btu) of renewable energy. Without these purchases, DOE's reduction is 14%, still surpassing the 12% goal for the year.

Table 2: Energy Intensity Progress

Energy Management Requirement	FY 2003 Btu/GSF	FY 2009 Btu/GSF	% Change 2003 - 2009	FY 2009 Goal Target
Reduction of facility energy intensity	225,483	186,355	-17.4%	-12.0%

The reduction in energy intensity is the result of energy conservation measures, reduced mission-related activities and the downsizing of some operations and facilities. As manpower is reduced and facilities are closed, efforts to consolidate operations and minimize energy use in vacated buildings will continue.

During FY 2009, DOE sites use of renewable electric energy was 4.7% of total electricity use, surpassing the goal of 3% for FY 2009 (see Table 3). Of DOE's total 236 Gigawatt hours (GWH) of renewable electricity use, 225 GWH came from new renewable energy (RE) sources (developed after January 1, 1999).

Table 3: Renewable Energy Progress

	Renewable Electricity Use (MWH)	Total Electric Use (MWH)	RE as % of Total Electric Use	FY 2009 Goal Target
Eligible renewable electricity use as a percentage of total electricity use	235,945.0		4.7%	3.0%

In FY 2009, DOE facilities generated about 1,900 MWH of renewable electricity from 141 on-site projects, or approximately 0.8% of DOE's total of eligible renewable energy (purchases are the main source). In addition to renewable electric energy, DOE used 46.2 billion Btu of renewable biomass gas and thermal energy in FY 2009. Eight

renewable thermal energy projects, not counted under the statutory renewable energy goal, produced 182 billion Btu of energy.

There are several significant projects being pursued or underway that will increase RE generated at DOE sites. Construction started on a biomass co-generation plant at the Savannah River Site, which will replace an existing old and inefficient coal plant, and save an estimated 100,000 metric tons of CO_2 annually[4] and 1.4 billion gallons of water. Two additional biomass steam plants are under construction at Savannah River, replacing existing fossil-fuel-fired plants and reducing the miles of steam piping needed to move the heat. A biomass steam generation plant is scheduled to be operational in 2011 at Oak Ridge National Laboratory (ORNL). It will replace four aging natural gas-fired boilers and reduce annual CO_2 emissions by over 55,000 metric tons, along with significant reductions in air pollutants. The National Energy Technology Laboratory installed satellite biomass low pressure steam and hot water boilers in various DOE buildings at its Pittsburgh, Pennsylvania site, replacing the existing landlord operated coal fired high pressure central steam plant. DOE will continue to identify renewable energy projects and/or technology demonstrations at sites that can contribute to sustainability goals.

As shown in Table 4, DOE sites reported a 2.6% decrease in water intensity for FY 2009 compared to FY 2007, however this does not meet the 4% reduction required by EO 13423. The intensity reduction over the past year is partially due to reduced mission-related activities, implementation of best management practices and water conservation measures (e.g., leak detection and repair).

Table 4: Water Intensity Progress

Water Intensity Reduction Goal	FY 2007 Gallon/GSF	FY 2009 Gallon/GSF	% Change 2007 - 2009	FY 2009 Goal Target
Reduction in potable water consumption intensity	64.8	63.1	-2.60%	-4.00%

DOE recognizes the potential to save money and natural resources through water conservation. DOE encourages its field offices and sites to include water management plans within their facility management plans. DOE will work to increase efforts associated with water conservation as described in Goal 6.

The Department recently funded many facility efficiency improvements through its aggressive use of ESPCs. These investments totaled $139 million in FY 2008 and $176

[4] Though the plant under construction is estimated to result in the GHG savings mentioned, the contractor has retained rights to the carbon "credits," so the GHG savings may not count toward DOE's GHG reduction goals. The renewable energy attributes of the generation are retained by DOE under the contract, so the project will count toward the Department's renewable energy goal.

million in FY 2009 (33% and 43% of annual facility energy costs, respectively). DOE will continue to pursue alternative finance projects as appropriate.

Progress toward Fleet Transportation Goals

DOE demonstrates compliance with requirements to decrease petroleum use, increase use of alternative vehicle fuels, and the other requirements for covered fleet vehicles as shown in Table 5.

Table 5: DOE's FY 2009 Performance in Meeting EPACT 2005 and EO 13423 Requirements

Authority/ Mandate	Performance Measure	Goal/Requirement	DOE Performance in FY 2009
Energy Policy Act (EPACT) 1992	Alternative fuel vehicle (AFV) acquisitions	75% of the 733 covered light-duty vehicles (LDV) acquired in FY 2009 must be AFVs	Acquired 1,237 AFVs and earned 169 additional credits[1] for a total of 1,406 credits or 192% of covered acquisitions. ***Compliant***
EO 13423	Reduce consumption of subject[2] petroleum by 2% annually through the end of FY 2015 from FY 2005 baseline[3]	Reduce consumption of subject petroleum to below FY 2009 target of 6,798,690 gasoline gallon equivalents (GGE)	Reduced consumption of subject petroleum to 6,185,765 GGE (8.3% below the FY 2009 target). ***Compliant***
	Increase annual alternative fuel consumption by 10% (compounded annually) through the end of FY 2015 from FY 2005 baseline[2]	Increase alternative fuel consumption equal to or above FY 2009 target of 913,276 GGE	Increased alternative fuel consumption to 1,307,721 GGE (43.2% over the FY 2009 target). ***Compliant***
EPACT 2005, Section 701	Alternative fuel use in AFVs	Operate all dual-fuel AFVs on alternative fuel unless the AFV is granted a waiver for fuel availability or cost	Used 340 GGE of alternative fuel per non-waivered dual-fuel AFV. ***Compliant***

[1]Credits earned for biodiesel use.

[2]"Subject" petroleum includes the petroleum used in all light-duty, medium-duty, and heavy-duty vehicles, unless such vehicles are exempted from EO 13423 (e.g., law enforcement, emergency, and military tactical vehicles, and vehicles operated outside of the U.S.).

[3]DOE's FY 2005 subject petroleum baseline is 7,389,881 GGE and FY 2005 alternative fuel baseline is 623,779 GGE.

The Department continues to transform its vehicle fleet to utilize alternative fuels. In order to further reduce GHG emissions from petroleum use, DOE is exploring options to transform its fleet. In April 2010, DOE announced that it will leverage EO 13514 to double its hybrid vehicle fleet. Replacing 850 DOE vehicles with hybrid vehicles will bring the total number of hybrids at the Department to 985, while DOE continues to reduce the overall size of its vehicle fleet.

Progress toward Other Sustainability Goals

In FY 2009, DOE attained a status of "Green" on three out of four environmental stewardship performance metrics on the OMB scorecard: Environmental Management Systems (EMS), Affirmative Procurement Program, and Electronic Stewardship.

Through its ongoing implementation of robust site-level EMS, DOE institutionalized an effective framework for implementing sustainability throughout the complex. All sites have fully implemented EMS, most of which already address many EO 13514 goals. Environmental Management Systems provide a structure for the site-level cross-cutting and multi-functional coordination necessary to plan for, and achieve, the Department's sustainability goals.

DOE continued its leadership in Federal electronics stewardship in FY 2009. Over 97% of computers leased or purchased by DOE were Electronic Product Environmental Assessment Tool (EPEAT)-registered; over 95% of DOE sites extended life-spans of computers and monitors to at least 48 months; and over 99% of DOE end-of-life or surplus electronics were reused or recycled. In addition, over 90% of DOE sites, representing over 95% of DOE Federal and contractor personnel, employed power management on computers and monitors.

During FY 2009 DOE was unable to demonstrate implementation of Federal *Guiding Principles for Sustainable Design* (GP) in 3% of its new, existing and leased enduring buildings larger than 5,000 square feet. DOE's status changed from "Green" to "Red" with only 1.2% of eligible buildings meeting the GP. DOE has committed to completing a large number of building-level evaluations (FY 2011-2012), and will continue numerous projects to bring additional buildings into GP conformance. The Department is closely monitoring this effort, and will continue to provide technical support and training to its Program Offices and sites to increase the rate at which buildings can meet the GPs.

DOE sites have already implemented several green waste management systems. All sites have recycling programs in place, reporting in FY 2009 a 49% diversion of waste Department-wide. Twenty-one sites have recycling programs that cover compostable and organic materials, diverting over 10,000 metric tons from landfills in FY 2009.

DOE purchases of recycled-content products exceeded $38M in FY 2009. Sites reported an increase in the variety and number of sites purchasing bio-based products, and over 98% of DOE Federal and contractor personnel reported preferences for, and purchases of, ENERGY STAR® products. Sites also reported a preference for and purchase of Federal Energy Management Program (FEMP)-designated and WaterSense labeled products.

Federal Energy Management Program Activities

Unique among other Federal agencies is the coordinating and support role of DOE's Federal Energy Management Program (FEMP). FEMP's mission is to "facilitate the

Federal Government's implementation of sound, cost-effective energy management and investment practices to enhance the nation's energy security and environmental stewardship." Given the strong association between greenhouse gas (GHG) emissions and energy management, FEMP has been specifically tasked under EO 13514 to provide critical support to the White House Council on Environmental Quality (CEQ) in implementing the Order including providing detailed recommendations for GHG accounting and reporting, guidance on Federal fleet management, technical assistance to agencies, and chairing several interagency working groups. Currently, FEMP also has a key role in supporting DOE's internal sustainability efforts. Further details on FEMP's Government-wide and internal support roles, recent activities, and accomplishments related to EO 13514 are provided in Appendix 3.

II. Goal Performance Review

The Strategy. To achieve the goals outlined in this plan, and achieve the Secretary of Energy's intent to demonstrate Sustainable Science, the Department will organize its management and implementation efforts in four major areas. First, DOE will strengthen its internal management structure to enhance decision-making, analysis and accountability, with significant responsibilities delegated to the Under Secretaries but performance tracked centrally. Second, the Department will undertake a wholesale assessment of its sustainability posture, collecting critical energy and efficiency data across the entire complex in order to inform future investments decisions. Third, the Department will put in place a robust goal attainment and performance management system based on metering, benchmarking and documented efficiency gains. Finally, in recognition that goal attainment is, at the end of the day, a question not only of technology and data, but of leadership, the Department will establish dedicated efforts to change individual and collective behavior through incentive programs and periodic reporting to the Department's uppermost management. All of this will be accomplished as rapidly as possible while maintaining a commitment to public transparency and mission accomplishment.

DOE Organization. Under the Deputy Secretary (who is also the SSO) are the Under Secretary for Nuclear Security, the Under Secretary for Science, and the Under Secretary for Energy. Program Secretarial Offices report to the Under Secretaries. The National Nuclear Security Administration (NNSA) is aligned under the Under Secretary for Nuclear Security. The Office of Science is aligned under the Under Secretary for Science. All other major PSOs are aligned under the Under Secretary for Energy. The Management PSO, which is responsible for the Headquarters offices, and the four Power Marketing Administrations work directly for the Office of the Secretary. All DOE sites are aligned under a PSO.

New Positions. DOE will establish a Sustainability Performance Office (SPO) to assist the SSO in the performance of this plan. The office will focus on data collection, analysis,

reporting, providing expertise as necessary, and other duties as assigned. The SPO may require new FTEs. The FY 2011 SSPP will provide a more detailed discussion of mission, and organizational placement of this office.

Environmental Management Systems. DOE will continue to use its existing EMS as the overarching planning and management process to achieve the sustainability goals of the EOs and related statutes. The Deputy Secretary ordered the Department to integrate its environmental and energy management directives, including conformance to International Standards Organization (ISO) 14001 as the Department's standard for environmental management systems and the requirements of EO 13514. The Department will promulgate an Order in FY 2011 to require sites to revise their EMS, as necessary, to incorporate activities and programs to meet the goals and targets identified in this SSPP, to ensure conformance with the ISO 14001 standard, and to provide annual reports to Headquarters on their progress in achieving the EO and SSPP goals. The Department will also use this new Order to align its corporate policies and requirements to support the integration of energy use reduction and environmental sustainability into site operations and activities.

Sustainability Transformation Teams. DOE will leverage its scientific expertise by directing the DOE National Laboratories and sites to collectively collaborate using the full suite of resources at their disposal (including the expertise of laboratory scientists and engineers) to develop innovative, crosscutting strategies for meeting the Executive Order goals. The Sustainability Transformation Teams will aggressively address DOE operations, including high-energy mission specific equipment and facilities, to identify opportunities to improve sustainability and achieve mission requirements. The strategies recommended by the Transformation Teams will be reported to the cognizant Under Secretaries for use by all DOE sites. These strategies will be integrated with and align with the Site's ongoing sustainability planning efforts.

SSPP Roll-Out. The SSPP will be introduced to DOE personnel through a well coordinated roll out. Activities will include:

- Distribution of a memo from the SSO to DOE personnel introducing the SSPP
- Publication and public distribution of the SSPP on a DOE website
- Convening a GHG summit of senior DOE leadership (to include laboratory Chief Operating Officers and Chief Financial Officers)
- Verification that energy conservation and recycling are included in all new employee orientation programs

1. GOAL: Scope 1 & 2 Greenhouse Gas Reduction

The Department's overarching mission is to *discover the solutions to powering and securing America's future*. As such, the Department has developed programs and funding approaches and has invested in a range of technologies that increase efficiency, produce clean, renewable energy, and improve transportation efficiency. Over the years, many such technologies were demonstrated and used at DOE sites. These were deployed under DOE Order 430.2B and prior Orders. DOE will expand these activities for EO 13514 with reduction of GHG emissions as the integrating performance metric to increase its sustainability.

EO 13514 directed each agency to select a combined Scope 1 and 2 GHG emissions reduction goal. The Department selected a combined Scope 1 and 2 GHG emissions reduction goal of 28% (from DOE's FY 2008 baseline). To reach this goal DOE will:

a. Improve the energy efficiency of processes, buildings, and facilities
b. Increase the amount of renewable energy used, with emphasis on development of renewable energy generation on DOE sites
c. Reduce the fossil fuel use of the vehicle fleet
d. Reduce non-CO_2 fugitive gas emissions that produce GHG

Each of these strategies is discussed below.

a. Energy Efficiency in Processes and Facilities: Reduce Facility Energy Intensity

DOE's real property portfolio includes over 10,000 buildings and trailers representing more than 126M gross square feet (GSF) of office buildings, laboratories, staging facilities, and warehouses at 47 major sites across the country[5].

i. Goal Description

EISA 2007, as amended by the National Energy Conservation Policy Act (NECPA), requires a 30% energy intensity reduction for federal facilities by 2015 (relative to a 2003 baseline). This goal is consistent with the goal set in Section 2a of EO 13423 and is included in Section 1.b.1 of DOE Order 430.2B.

[5] DOE currently owns approximately 22M GSF of space that is outgranted, or leased to third parties over which the Department has no operational or management control. Because the outgranted facilities are not under DOE's operational control, they are not included in DOE's Scope 1 and 2 GHG inventory or the SSPP. Examples include the U.S. Enrichment Corporation's Portsmouth, Ohio and Paducah, Kentucky.

ii. Current Status

Figures 2 and 3 illustrate DOE's total energy use and energy intensity, respectively, for DOE's real property portfolio from 2003 to 2009. The charts show energy subject to the 30% energy intensity goal and total energy use (which includes energy excluded from the goal).

By the end of FY 2009, DOE had achieved an energy intensity reduction of 14% (17.4% if Renewable Energy Certificates [RECs] are included). The majority of energy conservation projects have been performed through the leveraging of ESPC contracts, as well as the implementation of best practices and demand side management.

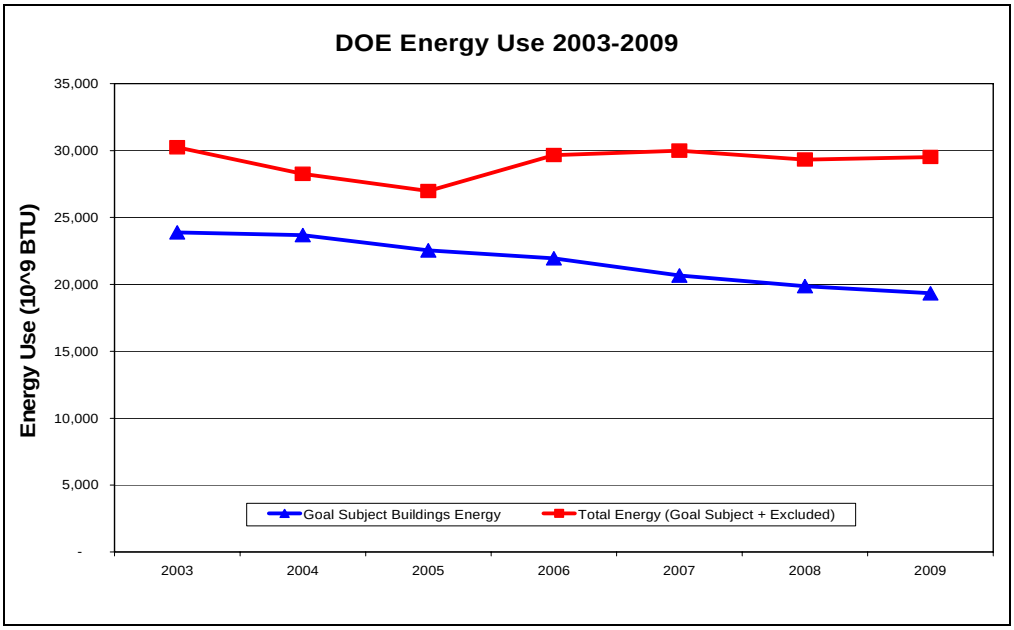


Figure 2: Total Energy Use for DOE Real Property

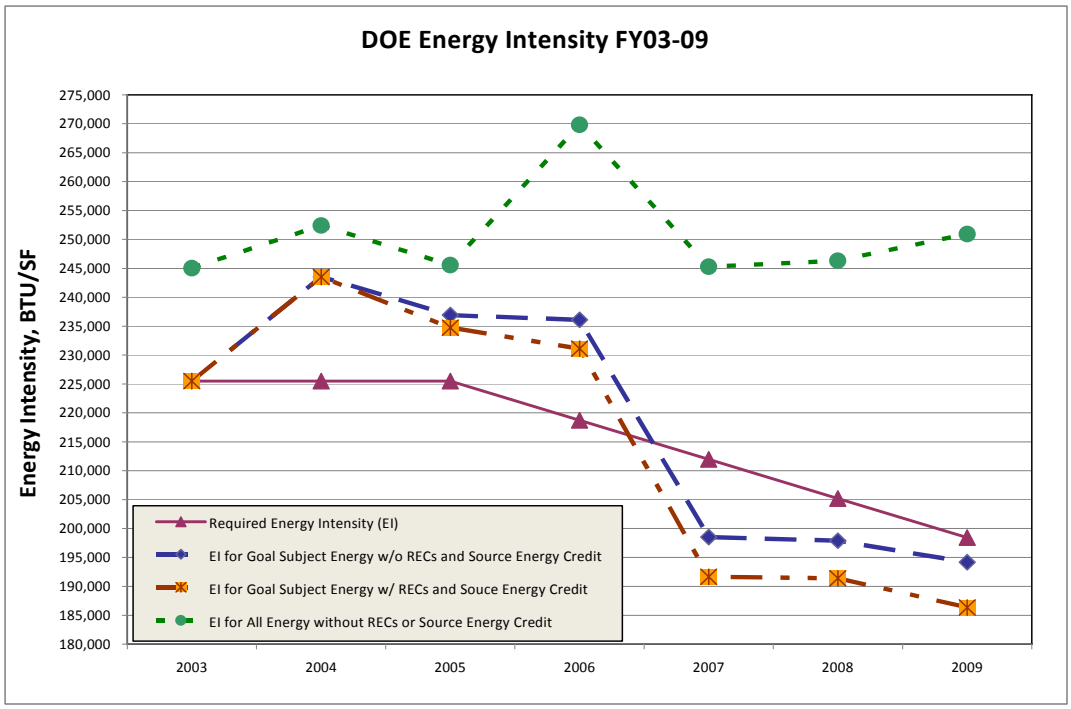


Figure 3: Energy Intensity FY03-FY09

iii. Special Considerations

Achieving Scope 1 and 2 GHG reduction targets for FY 2020 will be more challenging than simply meeting the energy intensity reduction target. NECPA allows for the exclusion of certain processes and facilities from the energy intensity calculation. However, the GHG emissions of these loads are not excluded under EO 13514, and are currently subject to the 28% GHG reduction goal.

DOE continues to look for ways to reduce process loads at excluded facilities without adversely affecting the mission of the Department and its facilities. The Sustainability Transformation Teams will examine innovative approaches to achieving mission goals in alignment with SSPP goals.

iv. Implementation Methods

While sufficient projects to meet the energy intensity goal are still being identified, the Department will focus on the following actions:

- Conducting process assessments, and energy and recommissioning audits
- Metering processes and individual buildings for performance diagnostics
- Benchmarking building performance, with internal and external disclosure

- Implementing projects (energy conservation measures [ECM]) to include recommissioning of buildings

As a priority, DOE will conduct site assessments and energy audits on facilities and process energy use. These audits and assessments will be used to identify projects to support all the goals of this plan, to include energy efficiency, cool roofs, and potential implementation of combined heat and power (CHP) units (with or without biomass fuels). These audits will coincide with audits required by Section 432 of EISA 2007 and a DOE survey of energy and water efficiency technologies installed at each site.

Over time, buildings depart from their design behaviors. These deviations may occur from operator intervention, sensor degradation or equipment malfunction. The return of a building's operating systems to their design condition will often result in improved energy efficiency. DOE will perform recommissioning assessments on 75% of its buildings (in terms of energy use) as a priority, and will identify buildings most in need of recommissioning measures.

DOE will establish two special purpose teams to apply, and assist site personnel learn about state-of-the art water and energy auditing techniques. One team will be formed from DOE's Industrial Programs Office and will focus on process and industrial assessments. Among other topics, this team will look for appropriate opportunities to apply CHP technology, and will assist in the performance of boiler assessments to improve boiler efficiency to full compliance with EPA proposed rules for boiler tune-ups/audits. The second team will be formed from DOE's Building Technologies Program Office and will focus on building energy, water and recommissioning assessments. Low or no cost corrective measures will be implemented in the near-term, whereas corrective measures with larger impact will be addressed in future budget submissions. These teams will provide assessments and technical assistance to sites, programs, SPO and the Under Secretaries to enable sharing of technical expertise, public and private best practices, and access to state-of-the-art industrial process and building assessments.

Metering is critical to resource control, as well as measurement and verification (M&V) of implemented ECMs. It is currently estimated that only 40% of DOE's buildings are individually metered for electricity.[6] NECPA, as amended by EPAct 2005, requires the installation of electrical meters by 2012, with advanced electrical meters "to the maximum extent practicable."

[6] Metering guidance can be found at: http://www1.eere.energy.gov/femp/pdfs/adv_metering.pdf

EISA 2007 mandates appropriate building level metering of natural gas and steam by 2016. Electrical meter installation will remain a near-term priority.

DOE will re-evaluate, update and promulgate internal metering guidance. Sites will adjust their metering plans accordingly.

The majority of DOE buildings fall into one of two groups: a multi-building facility (often called a campus), or stand-alone buildings. DOE's metering philosophy differs between these two groups and is discussed below.

1) Multi-building sites
    - For unmetered buildings and processes, DOE will install electricity meters so that at least 90% of the multi-building facility (in terms of energy use) is metered.
    - For unmetered buildings and processes, DOE will install natural gas and steam meters, as appropriate, so that at least 90% of the multi-building facility (in terms of energy use) is metered.

2) Stand alone buildings, such as headquarters buildings in Washington DC and Germantown MD, that are not part of multi-building facilities will be metered for electricity, natural gas, and steam, and benchmarked through monthly reporting of energy use.

To increase transparency of energy and building performance information, the Department will use metering data for benchmarking purposes. Benchmarking is a key energy efficiency management tool. It allows facility managers to compare individual building performance to similar buildings, and allows comparison to the building's performance in previous years. DOE will benchmark all individually metered buildings in Energy Star Portfolio Manager to allow DOE decision makers to analyze building energy use on a building, site, or portfolio level to better inform corporate budget decisions.

Under DOE Order 430.2B, DOE sites annually submit data on the status of their actual and potential energy efficiency and renewable energy projects. Currently, DOE has over 100 projects under contract for a combined investment of about $500M (with about $340M of that under ESPC contract). An additional 35 projects are in development (meaning they are preparing to solicit bids). DOE will continue to identify and develop energy efficiency and renewable energy projects (to include building commissioning and recommissioning) to reduce the energy cost and footprint of the various sites. A summary of energy projects underway is provided in Appendix 4.

Over the long term, the Department will reduce facility energy intensity by:

- Installing energy improvements in existing buildings (equipment upgrades; improving maintenance, commissioning procedures, and

operating procedures, retrofitting with "cool roofs"[7] and ENERGY STAR® materials and appliances where appropriate, and building envelope improvements)
- Construction of new buildings that are highly efficient and follow the GP of sustainability (see Goal 4)
- Disposing excess real property inventory
- Reduction of process energy loads where practical
- Utilization of advanced building metering for real time control and display, and to encourage energy efficient practices among employees through awards and incentives
- Utilization of DOE facilities for energy demonstration projects and emerging technologies for commercial use
- Systematic consideration of energy reduction as a factor in the decision process for maintenance and repair
- Re-benchmarking individually metered buildings (annually) to compare building performance to peers and to past years. Building energy performance benchmarks will be publically disclosed
- Re-verifying (periodically) that "green buildings" continue to meet green building certifications
- Recognizing highest performing buildings with Secretarial Awards.

Reducing the energy intensity of existing facilities will continue to be a major component of the sustainability strategy. Purchased electricity accounts for approximately 60% of DOE's Scope 1 and 2 GHG inventory.

Existing Facilities. Numerous opportunities exist to improve the energy efficiency of existing buildings. These include:

- Installing more efficient equipment or better equipment controls
- Improving maintenance, commissioning, and operating procedures)
- Retrofitting buildings with "cool roofs"
- Using ENERGY STAR® materials and appliances
- Improving the building envelope (insulation, windows, and weatherization)

Facility Deactivation and Decommissioning. DOE will continue to dispose of assets no longer needed for current or future mission. Facilities identified for disposition, but not removed will operate at minimal energy levels so as to prevent further environmental degradation.

[7] See Secretary of Energy memo of June 1, 2010: Installation of Cool Roofs on Department of Energy Buildings

From 2003 through 2009, DOE conducted D&D procedures on about 2.1M GSF per year (averaging about 400 buildings/year). For planning purposes, it is assumed that about 2M GSF per year of building inventory will be decommissioned and disposed of each year from FY 2010 through FY 2020. The Department uses a "one-for-one" policy, which states that for every square foot of new construction, one square foot of similar building type must be removed.[8]

New Construction. DOE Order 430.2B requires all new construction and major renovations under $5M to comply with the GP, and buildings above that threshold to achieve Leadership in Energy and Environmental Design (LEED) Gold certification, if it had not reached critical decision 2 (CD-2) before October 1, 2008. Both LEED Gold criteria and the GP analyze and score energy efficiency, water efficiency, and energy saving strategies. As of May 2010, there are 87 buildings and structures scheduled for completion by FY 2020 (in development at CD-2 or above). These buildings will add in excess of 6M GSF and consume over 800,000 MWH of electricity and over 400M cubic feet of natural gas each year.

As anticipated construction of new facilities may increase future energy consumption, the Department is ensuring facilities are designed and built to operate as efficiently as possible while achieving mission goals. Increased energy consumption will be offset by increased renewable energy generation, energy efficiency, and REC procurement, as necessary.

v. Department Lead for Goal

The three Under Secretaries are responsible for meeting the target to include the planning, budgeting, development, implementation and oversight.[9]

vi. Positions

As previously described, DOE plans to establish an SPO.

DOE will conduct a "training needs assessment" of all DOE designated energy managers and develop a strategy for addressing noted shortfalls. DOE will require the Facility Energy Manager of every DOE site to attain a Certified Energy Manager qualification. The Energy Manager position on all sites with

[8] House Report 109-086 – Energy and Water Development Appropriations Bill, 2006. http://thomas.loc.gov/cgi-bin/cpquery/R?cp109:FLD010:@1(hr086)

[9] The three Under Secretaries are responsible for each of their operations, the DOE Office of Management (MA) is responsible for the two Headquarters buildings, the DOE Office of Health, Safety and Security (HSS) is responsible for the National Training Center, and each Administrator of a Power Marketing Administration is individually responsible for their organization.

greater than 5 million square feet of buildings shall be a full time position focused on water, energy and GHG management.

b. Renewable Electricity Installation & Use

A number of DOE sites are located in areas with abundant renewable energy resources (to include solar in New Mexico, wind in Texas and Idaho, and biomass in South Carolina). Even before the current group of statutes and Executive Orders, DOE led the Nation in the development of renewable energy.

i. Goal Description

EPAct 2005 requires federal agencies to ensure that no less than 5% of its electric energy comes from renewable sources from 2010-2012, and that no less than 7.5% be from renewable electric sources in FY 2013 and beyond. EO 13423 requires that at least half of the required renewable energy come from "new" (post 1999) renewable energy sources, and encourages departments to install renewable energy generation on site for use by the site.

ii. Current Status

Most DOE sites have installed and use some form of renewable power. The larger scale renewable electricity installations are located in Colorado, including almost 2 MW from photovoltaic (PV) arrays and up to 4 MW from wind turbines. DOE has smaller projects in other locations, including rooftop PV arrays in Washington DC, geothermal power in Wyoming, and dish Sterling solar power systems in New Mexico. Additional large-scale projects being developed on DOE property include a major biomass powered co-generation plant in South Carolina and a 37 MW PV system in New York.

At the beginning of FY 2010, DOE received 0.16% of its electrical energy from on-site renewable sources. By FY 2011, DOE expects to add another 0.5% of renewable electricity, primarily from wind energy at the National Renewable Energy Laboratory (NREL). An additional 4.4% of on-site renewable electric power (primarily from the biomass powered CHP plant at the Savannah River Site) is expected to be on line by the end of FY 2012, for a total of 5.1% of DOE's electricity consumption coming from renewable sources.

iii. Special Considerations

Many potential alternatively financed or PPA projects do not meet NPV or ROI criteria because of the limited contracting periods currently authorized for these projects. Expanding the contracted period for PPAs could expand commercial interest in developing and financing renewable energy projects.

DOE will work to determine how this period could be expanded for future negotiation.

Large bulk energy contracts have allowed DOE sites to obtain highly favorable energy rates in many regions of the country. On a purely economic basis, many renewable energy technologies may not be able to compete with this low cost of energy, however renewable energy has many benefits. Moving forward, the Department will take social and environmental costs into consideration when determining the best mix of energy sources and negotiating future utility contracts.

DOE owns and controls large tracts of land that have been reclaimed after industrial cleanup. Much of this land requires long-term monitoring and is not currently suitable for unconstrained development. DOE will examine the feasibility of using this land for future RE production. The Department is pursuing Enhanced Use Leasing (EUL) authority to improve opportunities to make this land useful without interfering with the long-term monitoring effort.

iv. Implementation Methods

Renewable energy assessment reports for a large number of DOE sites were completed in the 2007-2009 timeframe. A sufficient number of projects were identified to meet the RE goal from on-site projects, however, few projects were found to have a positive NPV or ROI at that time. DOE will continue to evaluate the more promising projects for development while researching favorable new projects.

In the near term DOE will:

- Conduct site surveys and identify new projects
- Collaborate with other Federal agencies to leverage opportunities and best practices
- Develop and construct renewable energy projects as appropriate
- Purchase “green power” to meet statutory and EO goals as necessary
- Work with other agencies to determine best practices for alternative financing mechanisms.

Site assessments and energy audits will enable DOE to identify new, more promising projects. In the past, many renewable energy projects could not compete against the low cost of grid-supplied energy. Factors that increase the local cost of electricity (such as a carbon tax, grid congestion, or new billing structure) may significantly change the financial viability of renewable energy projects. As such, additional assessments will be conducted each year to investigate the technical and economic feasibility of new projects or

to re-evaluate the financial viability of an existing proposal where local factors may have changed.

DOE funds the development of many new RE technologies. The Department will evaluate its sites to determine their potential to perform large-scale demonstration and/or installation of new RE and EE technologies

While most previous large projects were funded using alternative financing methods, other promising projects may need a combination of appropriated and alternative funding to be considered for development. In addition, DOE will evaluate the use of renewable energy PPAs in the western United States for periods longer than 10 years (through the Western Area Power Administration).

During the period FY 2012-2020, DOE will demonstrate leadership by achieving the following goals:

- Produce at least 7.5% of its electricity from on–site sources (eliminate the need to buy green power)
- Co-fire all coal-fed boilers with biomass to the maximum extent possible (where an economic source of biomass is available)
- Conduct large-scale demonstration of promising RE technologies at DOE sites

v. Department Lead for Goal

The three Under Secretaries are responsible for meeting the target to include the planning, budgeting, development, implementation and oversight.

vi. Positions

As previously described, DOE plans to establish an SPO.

c. Fleet

DOE maintains a diverse fleet of vehicles. While some are passenger vehicles, others are medium- and heavy-duty trucks or are special purpose vehicles. At the end of 2009, the DOE fleet consisted of 14,279 vehicles managed by 96 reporting organizations distributed throughout the United States. This fleet included 5,067 E-85 capable vehicles, 213 compressed natural gas vehicles, 135 hybrids, 13 liquid natural gas, and three liquid petroleum gas vehicles.

i. Goal Description

EISA 2007 and EO 13423 require a 2% per year reduction in fleet petroleum use through FY 2015 (from a FY 2005 baseline). EO 13514 incorporates this requirement and extends it to 2020, for an overall reduction of 30%. EISA 2007 also requires federal agencies to increase the use of non-petroleum fuels by 10% annually. EISA 2007, EO 13423 and EO 13514 all provide direction for federal agencies to purchase low GHG emitting vehicles, including alternative fuel vehicles.

ii. Current Status

DOE currently meets all annual requirements of the law and the various EOs. DOE has already met the 2013 milestone for alternative fuel use.

iii. Special Considerations

The commencement or completion of a large environmental management activity (which frequently uses a significant number of heavy duty vehicles) may drive DOE's fuel statistics up or down by a significant percentage. As a result, petroleum fuel usage numbers will fluctuate along a trend line. While DOE met the petroleum reduction goal in 2009, many projects will start and stop before FY 2020. To date DOE has not reduced fuel usage enough to ensure the fluctuation remains below the required limit, and thus will determine and undertake additional measures to ensure continued compliance.

DOE has a large proportion of medium-and heavy-duty vehicles, almost three times the proportion of other Federal agencies. While few cost effective fuel savings options currently exist, DOE will consider shifting to biofuels where possible, and will closely examine potential solutions in the research and development pipeline and move to adopt them where appropriate.

iv. Implementation Methods

DOE is taking large, bold steps to reach the various goals:

- Replace the Idaho National Laboratory (INL) diesel bus fleet
- Use a Geographic Information System optimization tool to guide relocation of light weight vehicles
- Purchase hybrid electric vehicles (HEV)
- Relocate E-85 capable vehicles
- Develop infrastructure to support electric vehicles (EV) and plug-in hybrid electric vehicles (PHEV)
- Increase use of biodiesel for diesel fueled vehicles
- Downsize to smaller vehicles where feasible
- Conduct driver training

- Eliminate unnecessary vehicles in the fleet

The DOE bus fleet at INL is a major consumer of petroleum diesel fuel. DOE intends to replace these buses with new buses powered by compressed natural gas. Doing so, DOE will greatly reduce its petroleum use, increase its use of alternative fuels, and entice employees who currently drive to the site to take the bus (reducing Scope 3 GHG emissions). The timing and method to conduct this replacement is currently under evaluation.

The Department of Energy is funding development of a fleet optimization tool by NREL. This tool will optimize the deployment of alternative fuel vehicles to maximize their use of alternative fuels; and to optimize the fleet vehicle inventory to ensure mission needs are met with the appropriate size and number of vehicles. DOE intends to use this program in the management of its light vehicle fleet.

DOE has committed to acquiring a large number of HEVs. These vehicles, with better fuel economy than the vehicles they replace, will reduce the Department's purchase of gasoline. DOE will replace 850 gasoline vehicles with HEVs in the near future.

In parallel with the purchase of these HEVs, DOE will relocate its E-85 capable vehicles into regions of the country where E-85 is more commercially available. Where needed, DOE will install filling stations on site or at a convenient location to support the relocation of E-85 vehicles. These actions will increase access of E-85 capable vehicles to E-85 fuels, increasing the Department's use of alternative fuels.

DOE recognizes that EV and PHEV will be available in the near future. In preparation for these vehicles, DOE will establish a program to encourage the installation of electric charging stations for site use, and for use by commuters. Where possible, this program would be tied to the installation of on-site renewable energy generation. These actions would reduce DOE's purchase of petroleum fuels and would provide an incentive for commuting employees to purchase electric capable vehicles (EV or PHEV), reducing Scope 3 emissions.

DOE also will conduct training of potential drivers to help them develop skills and behaviors to maximize the fuel economy of these vehicles. This training will be provided to both federal and site contractor employees.

v. Department Lead for Goal

The three Under Secretaries are responsible for meeting the target to include the planning, budgeting, development, implementation and oversight.

vi. Positions

As previously described, DOE plans to establish an SPO.

d. Fugitive Emissions

i. Goal Description

DOE will reduce GHG emissions from non-CO_2 sources, and will set specific yearly reduction milestones in the near future.

ii. Current Status

DOE's non-CO_2 GHG emissions comprise an estimated 14% of the DOE Scope 1 and 2 GHG inventory. These estimates are being validated while a new process is developed to track fugitive emissions. The majority of these GHG emissions are from of SF_6 gas releases, where SF_6 is commonly used as an electric insulator (dielectric medium) in high-voltage electrical equipment. Its release is attributed to three causes: maintenance, equipment failure, and gas seepage. Release estimates are based on historical purchasing documents and not by direct monitoring for leakage. As such, these estimates do not differentiate between the various causes of leakage or the fluctuating inventory of gas in the subject equipment.

iii. Special Considerations

Over 95% of the SF_6 emissions come from nine sites, with over 80% coming from just four sites. DOE will work to determine how best to reduce SF_6 emissions. Reduction efforts will be targeted to these specific sites.

iv. Implementation Plan

DOE will address SF_6 emissions through a two-fold approach:

- Reduce SF_6 released during maintenance actions
- Find an alternative dielectric medium that is eco-friendly and provides comparable or superior electrical insulation performance

Reducing maintenance emissions will be accomplished with capture and storage equipment, developing procedures to recapture and then reuse SF_6 recovered during maintenance actions, developing training, and deploying the SF_6 capture program at key DOE sites. The necessary capture equipment is commercially available.

A Fugitive Gas Working Group will be established to share information and monitoring/control technology amongst those sites with such gases. This group will also be tasked to look for an environmentally friendly replacement material. If no such material can be found, DOE will consider providing support for the development of an eco-friendly replacement material.

v. Department Lead for Goal

The three Under Secretaries, with assistance from the Office of Procurement Assistance Management and the Office of Health, Safety and Security, are responsible for target planning, budgeting, development, implementation and oversight.

vi. Positions

As previously described, DOE plans to establish an SPO.

Table *6*: Goal 1 Planning Table[10]

	SCOPE 1&2 GHG TARGET	Unit	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	….	FY 20
Buildings	Energy Intensity Reduction Goals. BTU/SF reduced from FY03 base year)	%	15%	18%	21%	24%	27%	30%	hold	…	hold
	Planned Energy Intensity Reduction. (BTU/SF reduced from FY03 base year)	%	18%	19%	21%	24%	27%	30%	hold	…	hold
	Meter building and processes on multi-building sites for electricity (% of energy use on each site)	%	20%	75%	90%	hold	hold	hold	hold	…	hold
	Meter buildings and processes on multi-building sites for natural gas, steam and chill water (% of resource use on each site)	%	5%	10%	25%	50%	75%	90%	hold	…	hold
Renewables	Renewable Electricity Goals (Percent of electricity from renewable sources)	%	5%	5%	5%	7.5%	hold	hold	hold	…	hold
	Planned Renewable Electricity Use (Percent of electricity from renewable sources)	%	5%	5%	5%	7.5%	hold	hold	hold	…	hold
Fleet	Petroleum Use Reduction Targets (Percent reduction from FY05 base year)	%	10%	12%	14%	16%	18%	20%	22%	…	30%
	Planned Petroleum Use Reduction(Percent reduction from FY05 base year)	%	15%	18%	21%	24%	27%	30%	hold	…	hold
	Alternative Fuel Use in Fleet AFV Target (Percent increase from FY05 base year)	%	61%	77%	95%	114%	136%	159%	hold	…	hold
	Planned Alternative Fuel Use in Fleet AFV(Percent increase from FY05 base year)	%	125%	142%	159%	hold	hold	hold	hold	…	hold
	Scope 1 & 2 - Reduction Target (reduced from FY08 base year)	%	-2%	-2%	0%	4%	8%	12%	17%	…	28

2. GOAL: Scope 3 Greenhouse Gas Reduction

There are many categories of Scope 3 GHG emissions. For the Plan submitted in June 2010 only three categories are considered: employee travel, contracted waste disposal, and transmission and distribution losses from purchased electricity. While reduction actions for each category are separate, they primarily focus on changing human decisions: find ways to perform less travel,

[10] Funding amounts provided are strictly estimates and are subject to change.

produce less waste, and use less electricity. Future Scope 3 GHG reporting is expected to require expanding the reported categories of emissions, thus adjusting DOE's overall reduction goal accordingly.

i. Goal Description

After reviewing the preliminary DOE Scope 3 GHG inventory for FY 2008 and anticipating the impact of travel and recycling likely to be put in place, DOE set Scope 3 GHG reduction goals as follows:

- Federal employee travel: 12%
- Contracted waste disposal (waste not currently recycled or reused): 12%
- Transmission and Distribution losses from purchased energy: 16 %

Pending the inclusion of new categories, the overall DOE Scope 3 GHG reduction goal is 13%. As new categories are added in subsequent years, the overall goal will change.

ii. Department Status

DOE's Scope 3 GHG emissions for FY 2008 were estimated to be just under 750,000 $mTCO_2e$. This estimate includes the categories comprising Scope 3 emissions as prescribed and required by the White House's Council on Environmental Quality (CEQ) and the Office of Management and Budget (OMB) for 2010:

- Federal employee business air and ground travel
- Employee commute
- Contracted solid waste disposal
- Contracted waste water discharge
- Transmission & Distribution (T&D) losses related to purchased electricity

iii. Special Considerations

DOE consists of about 15,000 Federal employees. However, contractors manage and operate DOE sites under a government owned, contractor operated (GOCO) model. They consist of about 70,000 personnel who perform functions at DOE sites in direct support of the DOE mission. DOE elected to include these prime contractor activities in its Scope 3 calculations. Prime contractors not associated with site operations, as well as all subcontractors, interns and visitors are not included in DOE's Scope 3 calculations.

iv. Implementation Methods

Achievement of the reduction goals requires a combination of policy and behavior change. Implementation methods for each category are described below.

Business Air Travel

- Increasing use of web-based meetings
- Reducing air travel, except where necessary for mission accomplishment

DOE will conduct an internal survey to determine where additional bandwidth and equipment are needed to support an increase in web-based meetings. Once the required equipment has been ordered and installed, DOE will reassess the need for and criteria used to approve air travel.

Efforts will be made to reduce or eliminate short range (<300 miles) air travel by shifting transportation modes to a train or bus (where time, cost and mission accomplishment allows).

Business Ground Travel

- Reducing car rentals by promoting carpooling at conferences and other meetings
- Research establishing a government rate for PHEV and HEV rentals
- Encouraging the use of public or group transportation modes at destination cities
- Benefiting from increased fuel efficiency under 2016 Corporate Average Fuel Economy (CAFE) standards for private auto mileage and rental vehicles
- Benefiting from large-scale conversion of conventional taxi fleets into hybrid fleets in major metropolitan areas

DOE will encourage employees attending the same meeting to share a car (a rental car for out of town meetings).

Employee Commuter Travel

- Promoting carpooling
- Promoting public transit and shared-commuting modes where available
- Benefiting from increased fuel efficiency under 2016 CAFE standards

DOE will survey all sites to determine the actual implementation of carpooling incentives, and use of monetary incentives to encourage employees to use public transportation. Where an opportunity presents, DOE sites will survey their Federal and contractor employees to determine impediments to the increased use of public transportation. Where sufficient interest is expressed, sites will work with local and regional transportation organizations (see Goal 5) to address employee concerns and develop public transportation options that meet their needs.

Contracted Waste Disposal

- Expanding waste reduction and recycling programs

- Introducing environmentally focused product packaging requirements
- Increasing reusability or recyclability requirements in procurement practices

Actions in support of contracted waste disposal are addressed under Goal 7 and 8 of this Plan. Sites will continue to encourage employees to recycle and reuse materials.

Contracted Waste Water Treatment

- Encouraging Telecommuting

DOE will survey all sites to determine the applicability and implementation of existing telecommuting policy. Upon completion of this survey DOE will review and, if needed, revise its existing telecommuting policy.

Transmission and Distribution Losses

- Increasing on-site generation of electricity
- Increasing purchases of green energy

Actions to reduce the need to purchase electricity from the grid include reduction of need (energy efficiency) and increase of local supply (local generation). These issues are addressed in Goal 1.

v. Department Lead for Goal

The three Under Secretaries are responsible for meeting the target to include the planning, budgeting, development, implementation and oversight.

vi. Positions

As previously described, DOE plans to establish an SPO.

Table 7: Goal 2 Planning Table[11]

SCOPE 3 GHG TARGET	Units	FY 10	FY 11	FY 12	FY 13	FY 14	….	FY 20
Overall Agency Scope 3 Reduction Target (reduced from FY08 base year)	%	0%	1%	2%	3%	4%		13%
Sub-Target for Federal Employee Travel	%	0%	1%	2%	3%	4%	….	12%
Sub-Target for Contracted Waste Disposal	%	0%	1%	2%	4%	6%	….	12%
Sub-Target for Transmission and Distribution Losses from Purchased Energy	%	0%	0%	1%	3%	5%	….	16%

[11] Funding amounts provided are strictly estimates and are subject to change.

3. GOAL: Comprehensive Greenhouse Gas Inventory

The development of a comprehensive GHG inventory is critically dependent on the accuracy and completeness of the input data. DOE will refine current data collection methods to acquire the data needed to produce a complete, accurate and sustainable inventory.

i. Goal Description

DOE is required to provide a comprehensive inventory of Scope 1, 2, and specified Scope 3 emissions to the CEQ Chair and OMB Director by January 2011 and annually thereafter.

ii. Current Status

DOE sites report fuel and utility purchasing data into a DOE database (EMS-4). This data is used to develop an inventory of GHG emissions from electric and carbon based fuels. Non-CO_2 based GHG emissions are tracked through ad-hoc data calls to determine the purchase history and quantity of known GHG emitting substances. The historical context of many past purchases remains unknown; hence GHG emission reports from these substances are only estimates.

Scope 3 GHG emissions from Federal employee air travel were based on data accessible through GSA. Contractor air travel data was collected via a data call. Data requested by the CEQ-provided Scope 3 GHG Targeting Tool (gallons of fuel for rental cars, miles travelled for personally owned vehicles, bus, rail, subway) was not available. Instead, DOE derived this information from travel claim information retained for FY 2008. Data requested by the Scope 3 GHG Targeting Tool was not readily available for commuter travel. Instead, this information was developed using individual site specified methods (e.g., past commuter surveys, sampling, estimates from employee home zip code information, etc.)

Contracted solid and liquid waste data is currently collected by a DOE database (PPTRS), although solid waste figures do not currently separate out construction and demolition debris. Electricity consumption data for calculation of T&D losses is readily available in the EMS-4 database.

Once issued, DOE will use final Federal guidance to develop final Scope 1, 2, and 3 inventories.

iii. Special Considerations

DOE elected to include site contractor data in GHG reporting. While this did not affect Scope 1 and 2 data or Scope 3 data associated with contracted waste or electrical T&D losses, Scope 3 travel data was affected. Without having been

previously tasked to maintain this data, contractors were able to respond to the data request in various levels of completeness. To remedy this situation, DOE will adjust data collection and retention requirements for contractors once final GHG inventory guidance is released.

iv. Implementation Methods

Preliminary GHG emissions inventories have used data obtained through established annual reports, supplemented with ad hoc requests for information. In the future, existing Federal and DOE databases will be adjusted to reflect the requirements contained in the final Federal guidance for GHG inventory accounting. DOE will work through the SPO to enhance the GHG emissions data gathering and reporting process, as follows:

- Embed final Federal guidance into DOE's guidance and instructions to sites for inventory development and associated data gathering
- Compile and disseminate best practices and guidance to sites to ensure relevance, consistency, completeness, transparency and accuracy of GHG and underlying data
- Assess implementation of guidance and the existence and effectiveness of internal controls and systems intended to ensure the quality of GHG inventory and supporting data
- Establish a sustainable mechanism for future development and refinement of DOE's GHG inventories to reflect evolving scope, methods and changes to the DOE complex

v. Department Lead for Goal

The SSO is responsible for inventory development and reporting. Until the SPO is established, FEMP will support inventory development.

vi. Positions

As previously described, DOE plans to establish an SPO.

4. GOAL: High-Performance Sustainable Design

High-performance sustainable buildings (green buildings) are a critical part of DOE's sustainability plan as buildings are responsible for a large percentage of energy use and GHG emissions. Good quality, efficient, and sustainable workplaces will offer a strategic advantage in the recruitment and retention of our 21st Century workforce.

DOE's building strategy is two pronged: design and construct new buildings that use reduced energy (until ultimately constructing net-zero energy buildings), and upgrade existing buildings to meet the requirements of the *Sustainable Building*

Guiding Principles. DOE's High Performance and Sustainable Buildings (HPSB) Implementation Plan (SBIP) provides a summary of the Department's HPSB commitments and activities.

i. Goal Description

The Department has adopted the EO 13514 goals of:

a. Beginning in FY 2020, all new Federal buildings are designed to achieve net-zero energy by FY 2030

b. All new construction, major renovation and alteration of buildings comply with the GP

c. At least 15% of the Department's enduring buildings and building leases meet GP by FY 2015

d. Demonstrate annual progress toward 100% conformance with GP for entire building inventory

e. Demonstrate use of cost-effective, innovative building strategies to minimize energy, water and materials consumption

f. Manage existing building systems to reduce energy, water, and material consumption in a manner that achieves a net reduction in Departmental deferred maintenance costs

g. Optimize performance of the Department's real property portfolio – examine opportunities to decrease environmental impact through consolidation, reuse and disposal of existing assets prior to adding new assets

h. Ensure use of best practices and technology in rehabilitation of historic Federal properties

ii. Current Status

As of June 2010, 30 DOE buildings (1.7% of DOE's enduring buildings) have met the requirements of the GP, of which 25 have achieved LEED certification. The trend line to meet the 15% goal by FY 2015 would have required 90 buildings (5%) to have met the GP by this date. DOE is continuing to pursue compliance with the Guiding Principles and LEED certification. DOE is pursuing net-zero buildings such as NREL's Research Support Facility (RSF), the world's largest net-zero office building, which achieved LEED Platinum certification in June 2010, and Building 3156 at ORNL. DOE's Office of Science is planning 20 projects under its National Laboratory Infrastructure Modernization Program designed to achieve LEED Gold.

iii. Special Considerations

The DOE portfolio contains many special purpose buildings that require innovative methods of energy and water reduction. The STTs will address the atypical attributes of these buildings when attempting to achieve sustainability goals.

DOE does not include outgranted buildings (properties over which the Department has no operational control) in its plan for meeting the GP goals.

iv. Implementation Methods

DOE will develop a comprehensive understanding of existing building status and progress toward GPs through surveys and assessments. Upon completion, DOE will prepare a plan to overcome operational and financial barriers to compliance. DOE will continue to train staff on GP and provide technical assistance reviews as appropriate.

a. Net-Zero Energy by FY 2030

The Net-Zero Energy Commercial Building Initiative is a government research program sponsored by DOE that focuses on improving the energy efficiency of commercial buildings in the U.S. DOE is supportive of the net-zero energy concept and will use internal expertise to meet this goal. A net-zero energy building uses minimal energy that is supplied by on-site renewable resources.

Prior to FY 2020, DOE will develop a process to integrate net-zero energy design principles (as practicable and life-cycle cost effective) into all projects that have not yet achieved CD-2 (establishment of a baseline).

DOE will develop best practices and other guidance based on its operational experience implementing net-zero buildings at several of its laboratories.

b. New Construction

The SBIP includes further detail on DOE's approach to ensure all new construction and major renovation complies with the GP.

Per DOE guidance, all new construction and major building renovations of $5M or greater and not having reached CD-2 status before October 1, 2008 will attain LEED New Construction (NC) Gold certification. All buildings below the $5M threshold are required to comply with the GP to the extent practical and lifecycle cost effective. DOE considers any building that achieves LEED NC Gold or better to comply with the requirements of the GP.

c. Existing Buildings

The SBIP also includes detail on DOE's approach to achieving GP compliance with existing buildings. During the planned site assessments in FY 2011 and FY 2012, DOE will identify buildings to achieve GP status by FY 2015, and will identify the work and resources required for this effort. The first priority will be to complete building assessments for enduring buildings and to focus on buildings that are currently closest to achieving compliance with the GP. Currently, DOE is conducting a study of completed assessments to identify

obstacles to achieving the GP. Lessons learned will be shared across the Department, resulting in an increase in compliance.

Meeting the GP goals requires attention to day-to-day details at the site level, as well as the integration of both short- and long-term planning. DOE will implement a scorecard process to measure progress toward completing facility assessments and sustainability GP compliance.

GP assessment and compliance status will continue to be tracked at the Headquarters level through the Sustainability section of DOE's real property database. Data will be reviewed on a quarterly basis to track progress toward assessing all buildings and meeting the 15% goal. The Department will provide further guidance concerning real world application of the GP requirements, and will implement a process to verify performance of buildings identified as meeting the GPs.

d. Conformance of All Buildings to Meet GP

Once DOE meets the goal of 15% GP compliance it will continue assessing and renovating enduring buildings in order to reach 100% GP compliance. New buildings, reaching CD-2 after October 1, 2008 and in excess of $5M, will be designed to achieve LEED Gold certification and will be in compliance with the GPs. Progress will be tracked through the Sustainability section of DOE's real property database.

e. Minimize Energy, Water and Materials Consumption

DOE is currently incorporating cost-effective, innovative building strategies, such as highly reflective "cool roofs, to minimize energy, water and materials consumption.

DOE will pursue the following strategies in order to manage building systems to reduce energy, water and materials consumption and maintain mission readiness:

- Annually invest 2% - 4% of site replacement plant value to sustain the real property portfolio
- Encourage retro-/re-commissioning
- Continue green purchasing of maintenance materials
- Purchase ENERGY STAR® and WaterSense® compliant products and replacement parts
- Install variable frequency drives (VFD)
- Utilize preventive and predictive maintenance programs to avoid future costs (e.g., roof leaks, mechanical failures).

- Collect existing information on cost-effective, innovative building strategies in a central repository to disseminate lessons learned and best practices

While sustainability is typically factored into all new construction and major renovation projects, it is only one of many elements that must be considered in day-to-day O&M projects (such as roof projects, heating, ventilating and air conditioning [HVAC] projects, etc.). At the site level, facility managers typically use a matrix of factors (e.g., safety, security, energy use, cost, quality of life, mission impact) to prioritize O&M project decisions.

f. Manage Buildings to Minimize Resource Use

Many factors, including energy and water conservation, are taken into account when establishing maintenance priorities. Minimizing utility consumption continues to be a key driver of routine maintenance actions. DOE has successfully stopped the growth of deferred maintenance in its real property portfolio. The Department will continue to fund maintenance and repair at industry-standard levels and will seek to leverage funds to control/ reduce deferred maintenance and to improve sustainability. The Department will determine the effect of sustainable building management on the deferred maintenance inventory.

g. Disposition and Adaptive Reuse

DOE requires that real property assets not fully utilized or in excess of mission needs be identified for reuse or disposal. DOE has been a Federal leader in real property disposition since 2003 when the Government Accountability Office included all real property within its high risk list.

DOE complies with the one-for-one replacement legislation (excess space/ offset requirement) as mandated by House Report 109-86, which means that an existing building is required to be consolidated, reused, or disposed of prior to a new building being constructed or purchased/leased.

h. Rehabilitation of Historic Properties

The Department has over 1,200 buildings classified as National Historical Landmarks (NHL), National Register Listed (NRL), or National Register Eligible (NRE). Historic properties are managed at the site level. DOE will ensure the use of best practices in the rehabilitation of historic properties. To the greatest extent legally permissible, the Department will also apply the GP to historic buildings during rehabilitation.

v. Department Lead for Goal

The three Under Secretaries, with assistance from the Office of Engineering and Construction Management, are responsible for planning, budgeting, development, implementation and oversight.

vi. Positions

As previously described, DOE plans to establish an SPO.

Table 8: Goal 4 Planning Table[12]

SUSTAINABLE HIGH PERFORMANCE BUILDINGS (Buildings Meeting Guiding Principles)	Units	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	….	FY 20
Owned Facilities Targets	%	5%	7%	9%	11%	13%	15%	….	hold
Leased Facilities Targets	%	5%	7%	9%	11%	13%	15%	….	hold
Total Facility Targets	%	5%	7%	9%	11%	13%	15%	….	hold

5. GOAL: Regional and Local Planning

DOE sites operate in a variety of environmental settings and social environments. Some sites are attached to military bases, some are affiliated with major universities, while others stand alone. In every case, sites must engage with the regional and local planning groups to 1) be good neighbors, 2) effectively coordinate work and its consequences that cross site boundaries, 3) effectively communicate with the local community/public and 4) improve the quality of life for site employees. DOE sites routinely interact with the local community at a number of levels. To date, these interactions have been managed primarily at the site level unless a specific circumstance required higher level support. As a result, DOE Headquarters has not tracked specific site involvement with regional and local planning groups.

i. Goal Description

The Department adopts the EO 13514 goals to:

a. Incorporate participation in regional transportation planning into existing policy and guidance
b. Align the Department's policies to increase the effectiveness of local energy planning

[12] Funding amounts provided are strictly estimates and are subject to change.

c. Incorporate sustainable building location into policy and planning for new Federal facilities and leases
d. Update Departmental policy and guidance to ensure that all Environmental Impact Statements and Environmental Assessments required under the National Environmental Policy Act (NEPA) for proposed new or expanded Federal facilities identify and analyze impacts associated with energy usage and alternative energy sources
e. Update Departmental policy and guidance to ensure coordination and consultation with Federal, State, Tribal, and local management authorities regarding impacts to local ecosystems, watersheds, and environmental management associated with proposed new or expanded Federal facilities

ii. Current Status

DOE sites are actively involved with their neighbors and stakeholders in several ways:

- DOE cleanup sites have active Site Advisory Boards.
- NEPA reviews provide the opportunity for comment on proposed DOE actions by individuals, as well as by local, regional, and State organizations.
- DOE sites publish and distribute annual Site Environmental Reports, which describe monitoring activities and the environmental status of their sites.
- At several cleanup sites, DOE provides land to community reuse organizations to support economic development.

The specificity of regional/local planning envisioned by EO 13514 is not currently reflected in DOE orders/guidance. However, DOE has existing internal orders promulgating requirements covering new construction and major renovations of existing buildings (including leased facilities), and *High Performance and Sustainable Buildings Guidance*[13]. Further, these orders require that land use planning be consistent with NEPA.

iii. Special Considerations

None.

iv. Implementation Methods

DOE Headquarters will improve its knowledge and understanding of the state of interaction between sites and their local/regional organizations. The Department will then develop additional DOE-wide guidance, as needed. The following paragraphs address each subgoal in turn.

[13] (http://www.wbdg.org/pdfs/hpsb_guidance.pdf)

a. Regional Transportation
DOE sites will incorporate participation in regional transportation planning into their site policy and guidance documents, if not already included. Close coordination benefits both the site and the surrounding community by allowing for improved regional transportation infrastructure and long-term improvements to quality of life through reduced traffic and emissions.

As discussed in Goal 2, where public transportation is not readily available or not well used and where sufficient employee interest is expressed, sites will work with local and regional transportation organizations to develop public transportation options that meet their employee's needs.

b. Energy Coordination
Following the Department's review of site interaction with the local community, DOE will conduct a comprehensive review of Department Orders and policy letters to ensure that proper support of local energy planning efforts is incorporated. If required, new DOE Orders will be promulgated to address local energy planning.

c. Building Policy
As required by Federal Acquisition Regulation Subpart 7.105(b) (16), DOE will incorporate sustainable building location and siting considerations into acquisition plans for new Federal facilities and leases. DOE will also adopt a pending Federal Acquisition Regulations (FAR) revision requiring Federal agencies, and contractors obtaining facilities on their behalf, to comply with the GP.

In addition, DOE will review and implement (as appropriate) recommendations developed by the U.S. Department of Transportation (DOT), U.S. Department of Housing and Urban Development (HUD), and U.S. Environmental Protection Agency (EPA) (including *Recommendations for Sustainable Locations for Federal Facilities, and Recommendations for Federal Local Transportation Logistics*) when developing or modifying new procedures or instructions on facilities placement.

d. NEPA Guidance
DOE will update Departmental policy and guidance to ensure all Environmental Impact Statements and Environmental Assessments for proposed new or expanded DOE facilities identify and analyze impacts associated with energy usage, GHG emissions, and alternative energy sources. A revised DOE NEPA policy will be developed for review and approval.

e. Coordination on Ecosystems

The Department encourages on-going, pro-active engagement by DOE sites with their respective local, regional, and tribal planning bodies to coordinate efforts to improve land use, transportation, growth management and sustainability policy. Where appropriate, integrated planning with these bodies already occurs to ensure site and community efforts achieve synergy. Following the Department's review of site interaction with local communities, DOE will conduct a comprehensive review of Department Orders and policy letters to ensure alignment with this goal.

Most local and regional coordination is conducted at the site level. Local and regional planning activities will be integrated with each site's 10-year planning process. These plans will accomplish the following:

- Address on-site and off-site transportation infrastructure and planning
- Consider impacts to local ecosystems, watersheds, and environmental management
- Consider the effect of location and orientation of new construction, expansion or changing the purpose of existing facilities

If needed, DOE Program Offices will help sites develop and sustain interaction with the appropriate organizations.

v. Department Lead for Goal

The three Under Secretaries are responsible for meeting the target to include the planning, budgeting, development, implementation and oversight.

vi. Positions

As previously described, DOE plans to establish an SPO.

6. GOAL: Water Use Efficiency and Management

Water is essential to the DOE mission as industrial processes account for the majority of DOE's potable and non-potable water use. For example, many sites use evaporative cooling towers for air conditioning and process heat removal; and the Strategic Petroleum Reserve uses water to pump oil from its caverns and to maintain cavern operability. Most D&D activities use significant quantities of water to reduce airborne contamination.

Water recycling and reuse strategies are important factors in reducing water consumption. This is especially important for remote sites where water must be trucked in to support the facilities and on sites where water is scarce and excess use may have an adverse affect on neighboring down-stream areas, watersheds and

underground aquifers. Opportunities exist to convert from once-through cooling water system to systems designed to reuse cooling water, or use gray water and/or storm water runoff for cooling.

Infrastructure projects may also have a benefit of saving significant amounts of potable water. These projects are often completed for reasons other than water conservation and therefore such benefits are often overlooked.

i. Goal Description

The Department adopts the following goals of EO 13514:

a. Reducing potable water consumption intensity 2% annually through FY 2020 (or at least 26% total reduction by FY 2020), relative to the FY 2007 baseline
b. Reducing industrial, landscaping, and agricultural water consumption 2% annually (or 20% total by the end of FY 2020), relative to a FY 2010 baseline
c. Identifying, promoting, and implementing water reuse strategies that reduce potable water consumption consistent with State law
d. Achieving objectives established by EPA in Storm water Guidance for Federal facilities

ii. Department Status

DOE has not made satisfactory progress toward meeting the water reduction goals. To date, DOE has reduced its potable water intensity by 2.6% as compared to the FY 2007 baseline, below the 4% reduction expected by the goal.
Some DOE sites have implemented large water projects. Examples include:

- The Los Alamos National Laboratory (LANL) initiated a project to upgrade the existing Sanitary Effluent Recycle Facility (SERF). When the project is fully complete, LANL expects to save approximately 114 million gallons per year (MGY) by treating sanitary effluent from LANL's domestic wastewater treatment facility and returning that water for reuse within the LANL complex.
- Lawrence Berkeley National Laboratory (LBNL) optimizes the operation of the cooling towers by increasing the cycles of concentration from five to at least 15, reducing makeup water consumption by about one-third. This improvement saves approximately 14 MGY.
- Sandia National Laboratories (SNL) implemented the MicroFab project, which incorporates a number of "green" building features that support LEED-NC certification. It incorporates a high efficiency ultra-pure water generation process, process water recycling loop, and reclaim/reuse of water for cooling tower and scrubber applications. Other project-specific green measures include occupant-based water efficient plumbing fixtures and low-water use landscape design.
- SNL and LLNL each use a reverse osmosis recycling system in their cooling towers to substantially reduce potable water consumption.

DOE will work with these sites to develop and disseminate best practices on water conservation projects throughout the DOE complex.

iii. Special Considerations

DOE faces several challenges in meeting the water conservation goal. Many DOE facilities are located in regions where water is inexpensive therefore water projects may not be lifecycle cost effective. Water use is essential to conducting critical operations. These challenges will be addressed through an integrated approach including water assessments, increased metering, identification of potential opportunities, considering inclusion of social costs for water in project evaluation, as well as collaboration and sharing of best practices across the DOE complex.

iv. Implementation Methods

DOE's focus will be to identify projects to meet its water use efficiency goals. Water conservation efforts consist of five main components:

- Installing meters to accurately determine water use patterns
- Conducting leak detection and water consumption surveys to identify water conservation and repair projects
- Reducing potable water and industrial, landscaping, and agricultural water consumption
- Identifying and implementing water reuse and recycling strategies
- Managing storm water runoff as it impacts local environments

DOE will also work to repair/replace broken water meters and install new water meters to identify and monitor all water sources that contribute to determination of total water use under this goal.

The Department will identify and prioritize water saving opportunities by conducting site water surveys across the DOE Complex, to include water pipe leak detection and a review of process water practices. The procedure will focus primarily on sites thought to be most susceptible to leakage (i.e., due to age, incongruent meter readings, etc.). The Department will use the results of these surveys to prioritize leak repairs consistent with the most significant losses.

A review of process water practices will determine which processes would successfully use ground, gray, or storm water for cooling (as opposed to potable water), and determine where once-through cooling systems can be modified to reuse the cooling water. Additionally, site surveys will be conducted DOE-wide to determine the penetration of water reduction technologies and opportunities for further implementation.

If not already completed, sites will prepare a water efficiency policy and a water management plan. Management will communicate with employees and stakeholders on the organization's commitment to water conservation efforts,

water reuse and recycling, and the benefits of these projects on local and regional water supplies. These plans will be integrated into each site's EMS.

DOE facility managers will consider all potential water efficiency improvements and practices in their facility's operation and maintenance. Capital improvement projects will include water consumption reduction technologies.

Sites will comply with federal stormwater management guidance issued under EISA Section 438, in addition to Federal stormwater management guidance issued under EO 13508, *Chesapeake Bay Protection and Restoration*, by implementing appropriate technologies such as bio-retention areas, porous pavements, green roofs, and rainwater collection systems.

v. Department Lead for Goal

The three Under Secretaries are responsible for meeting the target to include the planning, budgeting, development, implementation and oversight.

vi. Positions

As previously described, DOE plans to establish an SPO.

Table 9: Goal 6 Planning Table[14]

WATER USE EFFICIENCY & MGMT	Units	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	…	FY 20
Potable Water Reduction Targets (gal/SF reduced from FY07 base year)	%	6%	8%	10%	12%	14%	16%	…	26%
Planned Potable Water Reduction (gal/SF reduced from FY07 base year)	%	3%	7%	10%	12%	14%	16%	…	26%
Industrial, Landscaping, and Agricultural Water Reduction Targets (gal reduced from FY10 base year)	%	0%	2%	4%	6%	8%	10%	…	20%
Planned Industrial, Landscaping, and Agricultural Water Reduction (gal reduced from FY10 base year)	%	0%	2%	4%	6%	8%	10%	…	20%

[14] Funding amounts provided are strictly estimates and are subject to change.

7. GOAL: Pollution Prevention and Waste Elimination

In accordance with the hierarchy established in the Pollution Prevention Act of 1990, the Department's primary objective is to prevent or reduce pollution at the source whenever feasible. Pollutants and wastes that cannot be prevented through source reduction will be diverted from entering the waste stream through environmentally safe and cost-effective reuse or recycling to the greatest extent practicable.

Current DOE Orders establish EMS as the management framework for implementing the sustainable practices and goals of EO 13423, from which many of the goals and performance metrics of EO 13514 derive. DOE specifies a number of sustainable practices related to pollution prevention and waste reduction or elimination including source reduction, green purchasing, toxic chemical use reduction and recycling. The Orders apply to all elements responsible for the management and operation of the Department's facilities and activities, including contractors managing Government facilities. All elements of the DOE organization are responsible for compliance with the requirements and flowing down the requirements into their contracts and subcontracts.

DOE will update and combine its energy and environmental directives to ensure that the policies and practices for achieving sustainability goals are firmly established within the Department. Once approved, the provisions of these directives will be included in the appropriate site contracts. For pollution prevention and waste elimination or reduction, DOE will ensure that the existing policies and practices for source reduction, green purchasing, recycling, and toxic chemical use reduction and reporting are expanded and integrated with the Department's overall sustainability and GHG management strategy.

This section groups the subgoals as follows: waste diversion (a, b, c, g), toxic chemical reduction (f, h, i, j, k), and paper use (d, e).

a. Increase source reduction of pollutants and waste
b. Divert at least 50% non-hazardous solid waste by FY 2015, excluding construction and demolition (C&D) debris
c. Divert at least 50% C&D materials and debris by FY 2015
d. Reduce printing paper use
e. Increase use of uncoated printing and writing paper containing at least 30% post-consumer fiber
f. Reduce and minimize the acquisition, use, and disposal of hazardous chemicals and materials
g. Increase diversion of compostable and organic materials from the waste stream
h. Implement integrated pest management and landscape management practices to reduce and eliminate the use of toxic and hazardous chemicals and materials

i. Increase Departmental use of acceptable alternative chemicals and processes.
j. Decrease Departmental use of chemicals to assist in achieving FY 2020 GHG reduction targets (See Section II - 1 and 2 above)
k. Report in accordance with Sections (301-313) of the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986

a. Waste Diversion (Subgoals a, b, c, g)

i. Goal Description

The Department adopts the EO 13514 goal to divert, at a minimum, 50% of its non-hazardous solid waste and its non-hazardous, non-radioactively contaminated C&D materials and debris by FY 2015. It also adopts the EO's non-quantitative source reduction goal and the goal to increase the diversion of compostable and organic material from the waste stream.

ii. Department Status

DOE sites currently divert non-hazardous solid waste on a regular basis. The Department tracks and reports its waste and recycling performance results in the PPTRS. In FY 2009, DOE recycled 49% of its total non-hazardous solid waste by weight.

Certain DOE sites account for and recover pollution and waste management costs similar to what is often done for energy and water use savings. This represents a best practice that can be disseminated throughout the DOE Complex to enable further cost recovery.

iii. Special Considerations

The Department is responsible for the disposition of significant quantities of equipment, materials and debris that could potentially be cleared for recycling, but are restricted by Departmental policies and directives. Materials that cannot be cleared after this verification effort will not be included in the 50% goal calculation.

iv. Implementation Methods

Preventing or reducing the amounts of pollutants and wastes at the source through behavior change (e.g., product or process substitution and reuse, recycling, or composting materials rather than disposal) contributes to the Department's waste elimination and GHG reduction targets, reduces environmental and safety hazards, protects environmental resources, minimizes life-cycle cost and liability of DOE programs, and maximizes operational sustainability. The framework supporting source reduction and waste materials diversion exists and has proven to be effective.

To reduce pollution and increase recycling DOE will:

- Conduct sustainability assessments
- Report volumes and/or weight of waste streams
- Reconsider restrictions preventing clearance of items potentially available for recycling
- Increase awards and incentives
- Disseminate best practices
- Increase the recyclable content of procured items

Sustainability assessments, such as pollution prevention opportunity assessments will continue to be an important method used to identify opportunities for operational process, product, or behavioral changes. It will also ease the development of objectives and measurable targets that support their implementation.

The Department does not presently track non-hazardous solid waste separately from C&D materials and debris. However, DOE will develop a baseline for each of these goal areas to separately assess its performance in diverting C&D debris or other non-hazardous solid waste.

Sites and Headquarters will use EMSs to manage performance in this area and report the following, as applicable, on an annual basis, in *metric ton* units:

- Non-hazardous solid waste generated and diverted from disposal
- Compostable and organic materials diverted from the waste stream
- Construction and demolition material and debris generated and the amount diverted from disposal
- Material and debris generated from posted radiological areas including wastes identified by regulatory agreement as potentially contaminated with hazardous or radioactive constituents
- Non-hazardous solid waste generated and the amount diverted from disposal, excluding material from posted radiological areas and wastes identified by regulatory agreement as potentially contaminated with hazardous or radioactive constituents

DOE will consider participation in EPA's C&D waste pilot, pending efforts to quantify solid waste and C&D debris baselines.

Sites will verify the effectiveness and reliability of their clearance-of-property procedures to identify those materials that cannot be cleared for unrestricted reuse or recycling. Headquarters will continue efforts to minimize impacts from the moratorium on release of volumetrically-contaminated metals and the suspension on release for recycling of metals from posted radiological areas.

The Department will augment its existing Environmental Sustainability (*ES*tar) award programs to recognize and incentivize sites and programs that successfully reduce the generation of pollutants and wastes and effectively divert from disposal those materials that can be recycled or reused.

The Department will encourage its sites to adopt, as a best practice, "cost of service" charges that consider the full life-cycle of liabilities associated with programs, including procurement, facility management, regulation, worker safety and security, and waste disposal. Building operational costs into overhead charges or user fees provides financial incentives for sustainable behavior by making transparent the true environmental and social costs of waste generation and toxic material use. Service charges can be collected and used to offset the cost of sustainability assessments, of investments in recycling infrastructure, or to fund the implementation of identified opportunities.

Source reduction is facilitated through supply contracts that specify procurement of environmentally preferable products (EPP) and contracts that establish the requirement for service providers to track and report on those purchases. Similarly, the Department's waste diversion goals can be achieved through requirements ensuring a percentage of the waste or C&D material and debris are recycled or reused, and that performance data is reported back to the Department.

Performance to date indicates that DOE may achieve the 50% goal before FY 2015. DOE will verify individual goal compliance for both non-hazardous solid waste and for C&D materials and debris and determine how to continue its work on diverting waste.

Headquarters will ensure that practices having the potential to result in significant reductions in pollutant and waste generation through source reduction and significant diversion of pollutants and wastes from disposal are disseminated across the Department.

v. Department Lead for Goal

The three Under Secretaries, with assistance from the Office of Health, Safety and Security, are responsible for planning, budgeting, development, implementation and oversight.

vi. Positions

As previously described, DOE plans to establish an SPO.

b. Toxic Chemical Reduction (Subgoals f, h, i, j, k)

i. Goal Description

The Department adopts the EO goals to develop sustainable pollution prevention practices and to reduce using chemicals that are toxic, hazardous and contribute to GHG emissions.

ii. Department Status

The Department operates under a toxic chemical use and reduction implementation plan developed in response to EO 13423. DOE sites have already surveyed their facilities and operations for the presence of toxic chemicals, and have used their EMS systems to develop and implement programs to identify and achieve reduction and/or elimination targets.

Toxic chemical use and release reduction efforts have included examination of numerous facilities and operations to inventory chemical stock and dispose of unneeded materials. These efforts have resulted in several DOE sites no longer having to file EPCRA Section 313 Reports.

iii. Special Considerations

None.

iv. Implementation Methods

DOE addresses the chemical usage reduction requirements of EO 13514 that focus on toxic, hazardous and GHG-contributing chemical emissions with an EMS-focused approach based on the existing directives and its Toxic Chemical Reduction Plan. This approach requires all sites to establish toxic chemical reduction or elimination efforts, including sustainability assessments of chemical using operations, as objectives and measurable targets within the framework of their existing EMS. Establishment of site-specific chemical reduction objectives and measurable targets take into account site operating conditions, life cycle cost effectiveness, mission parameters, GHG emission reductions (i.e., the greatest GHG reduction potential) and other environmental, safety and health factors (e.g., toxicity).

While DOE sites annually report on environmental sustainability performance, progress in identifying and implementing chemical use reduction opportunities is not included. The Department will update its reporting practices to monitor this progress and to ensure that data collection supporting the new sustainable goals and targets under EO 13514 is achieved.

To address Goals 7.f and 7.i, DOE will evaluate data sources such as site EPCRA reports, site Chemical Inventory and Tracking Systems, and available

ozone-depleting substance (ODS) and GHG inventories to identify chemicals of greatest concern for targeted reduction or elimination efforts. DOE will gather and analyze information from its sites in order to promote complex-wide adoption of strategies, including best practices, which prove to be effective at reducing chemical usage. The Department also will develop guidance on toxic, hazardous and GHG-contributing chemical reduction strategies for the DOE complex.

Goal 7.h will be addressed by implementing integrated pest management (IPM) and other appropriate landscape management practices. While some sites have already implemented IPM practices into their EMS, not all have. To comply with EO 13514, the Department will modify its policies to require sites to employ IPM and appropriate landscaping management practices within the site's EMS framework and provide annual updates on the status of their IPM activities.

In compliance with Goal 7.i, DOE will decrease its use of chemicals to reduce health and safety impacts and GHG emissions.

Pursuant to EO 13514, DOE is paying greater attention to reducing fugitive GHG emissions. The Department will continue to work with sites that use non-CO_2 GHGs to identify and implement measures to reduce leakage and recapture gases at risk of leakage when routine maintenance is performed. Sites will redesign existing equipment, purchase new equipment to minimize or eliminate the release of non-CO_2 GHGs and seek out substitute gases that have lower global warming potentials.

v. Department Lead for Goal

The three Under Secretaries, with assistance from the Office of Health, Safety and Security, are responsible for planning, budgeting, development, implementation and oversight.

vi. Positions

As previously described, DOE plans to establish an SPO.

c. Paper Use (Subgoals d, e)

i. Goal Description

The Department adopts EO 13514 goals to reduce printing paper use while purchasing uncoated paper containing at least 30% post-consumer fiber.

ii. Department Status

The Department's sustainable procurement efforts are described in the Goal 8 discussion of this SSPP. Federal agencies and their contractors are

required to procure products with 30% recycled content by numerous federal and DOE procurement documents[15]. In FY 2009, 87% of paper purchases met this goal.

iii. Special Considerations
None

iv. Implementation Methods
Reuse of paper is not currently reported by DOE sites. The Department will update its reporting practices to monitor compliance with this goal.

All DOE sites will address each of the following methods to reduce the use of office paper:

- Setting printers and copiers to duplex print and copy by default
- Developing a plan to retire printers incapable of duplex printing
- Image reduction, through copying and printing of multiple pages on a single page
- Using thinner paper where higher quality paper is not essential
- Implementing innovative approaches to paper use reduction through print management technology and electronic document management, display and storage technologies
- Encouraging digital storage of records and files wherever the law allows
- Assessing policies and procedures that require excessive document printing when electronic filing and transmittal are allowable

Sustainable procurement is a key mechanism to acquire the paper, technology and software to enable this implementation.

v. Department Lead for Goal
The three Under Secretaries, with assistance from the Office of Procurement Assistance Management and the Office of Health, Safety and Security, are responsible for planning, budgeting, development, implementation and oversight.

vi. Positions
As previously described, DOE plans to establish an SPO.

[15] Paper purchases are conducted pursuant to 40 CFR 247, as well as FAR 23.704, and Department of Energy Acquisition Regulation (DEAR) 923.4, 970.2304 and 970.5223-2.

Table 10: Goal 7 Planning Table[16]

POLLUTION & WASTE ELIMINATION	Units	FY 10	FY 11	FY 12	FY 13	FY 14	FY15	….	FY 20
Non-Hazardous Solid Waste Diversion Targets (non C&D)	%	10%	20%	30%	40%	50%	50%	….	50%
C&D Material & Debris Diversion Targets	%	10%	20%	30%	40%	50%	50%	….	50%

8. GOAL: Sustainable Acquisition

The Department has a foundation of policies, procedures, guidance and programs that will achieve the sustainable acquisition requirements of EO 13514. The Department of Energy Acquisition Regulation (DEAR) establishes uniform acquisition policies that implement and supplement the FAR.

DOE Order 450.1A establishes goals and a number of sustainable practices related to the acquisition of environmentally preferable products, including designated recycled-content products, designated biobased-content products, non-ozone depleting substances, non- or less-toxic materials, and green (environmentally preferable and energy efficient) electronics. The Order applies to all DOE elements responsible for the management and operation of DOE sites, including contractors managing Government facilities.

DOE Order 430.2B outlines the requirements and responsibilities for managing energy in DOE facilities and fleets. This Order includes transportation/fleet management and provision of access to alternative fuel infrastructure. Both Orders are well aligned with the requirements of the EO and have a direct relationship with and rely on effective procurement and acquisition.

i. Goal Description

The Department adopts the following EO 13514 goals:

a. Ensure 95% of new contract actions, including task and delivery orders under new contracts and existing contracts, require the supply or use of products and services that are energy efficient (ENERGY STAR® or FEMP-designated), water efficient, bio-based, environmentally preferable (including EPEAT-registered products), non-ozone depleting, contain recycled content, or are non-toxic or less toxic alternatives
b. Update Departmental affirmative procurement plans (also known as green purchasing plans or environmentally preferable purchasing plans), policies

[16] Funding amounts provided are strictly estimates and are subject to change.

and programs to ensure that all Federally-mandated designated products and services are included in all relevant acquisitions)

ii. Current Status

Policies, Procedures and Guidance. DOE's policies, procedures and green procurement language are contained within the FAR, DEAR, and the Strategic Integrated Procurement Enterprise System (STRIPES).[17] Additionally, there are several government websites and other sources that contain listings of EPPs, EPEAT and other sustainable products.[18] DOE procurement and contractor purchasing personnel use these regulations and lists for all appropriate purchases and contracts.

Performance Management and Reporting. DOE has established mechanisms for gathering, analyzing and reporting facility energy and environmental performance data, and monitoring and reporting performance of the Federal Procurement Data System, as well as Contractor procurement and purchasing.

The PPTRS compiles sustainable acquisition-related data from DOE sites and offices on an annual basis. It includes site-level purchasing data for recycled content, bio-based content, EPEAT registered products, and policy questions on the site requirements or preferences for purchase of ENERGY STAR®, FEMP-designated, and WaterSense products. Unfortunately, these questions do not align well with the categories required by EO 13514.

The Federal Procurement and Contractor Purchasing System Balanced Scorecards integrate core performance measures with DOE mission, vision and strategy. The scorecards, compiled on an annual basis, are informed by stakeholder surveys and internal performance management/reporting mechanisms, and are accessible on DOE's external web site.[19]

Training and Continuing Education. The Department provides federal procurement and contractor purchasing staff with guidance and best practices on DOE's Procurement and Acquisition external web site and access to external sites such as U.S. EPA's Environmentally Preferable Purchasing Training site. Additionally, DOE facilities have established mechanisms to maintain awareness and exchange of best practices around sustainable procurement (e.g., Green Procurement Teams, Green Acquisition Advocates). Many DOE sites conduct Pollution Prevention/Environmental Stewardship tracking of EPP. Certain sites provide training for their buyers and procurement staff.

---

[17] (see http://www.management.energy.gov/policy_guidance/procurement_acquisition.htm)

[18] (see U.S. Department of Energy Sustainable Acquisition, Recycling, and Pollution Prevention Practices Fiscal Year 2008 Report; http://www.hss.doe.gov/nuclearsafety/env/reports/eo13423/fy2008rpt.pdf)

[19] (http://www.management.energy.gov/726.htm)

Assessment and Monitoring. DOE has established mechanisms to monitor the effectiveness of its procurement and acquisition functions. The acquisition and financial assistance self-assessment checklist[20] consists of Federal procurement compliance criteria, including green procurement questions, and a method for assessing performance of the Federal procurement offices (and major site contractor purchasing organizations). The Procurement Management Review (PMR) process evaluates procurement practices at major DOE sites by staff from DOE's Office of Procurement and Assistance Policy with a periodicity of three to five years. The assessment addresses the effectiveness of the procurement organization, and compliance with procurement statutes, regulations, and procedures but does not currently consider verification of contractor compliance with green purchasing contract requirements.

iii. Special Considerations

None.

iv. Implementation Methods

The Department is well positioned to achieve the 95% sustainable acquisition goal by:

- Consolidating required contracting actions into a master FAR clause dealing with Affirmative Procurement Programs
- Updating master listings of environmentally preferred products on a routine basis
- Including new fields in an internal database to track affirmative procurement actions
- Updating the procurement and contracting balanced scorecard to include the 95% goal
- Upgrading training of procurement and contracting personnel
- Adjusting the PMR process to address compliance with contracted green procurement requirements

The Department will recommend update and expansion of the main FAR contract clause 970.5223-2 *Affirmative Procurement Program* that documents the procurement requirements for meeting many of the EO 13514 goals. It will address the components of green/sustainable purchasing outlined in this EO goal, including GHG emission reduction considerations and enhanced reporting requirements. This all-inclusive affirmative acquisition clause is presently in development.

DOE will continue to update master listings of environmentally preferable products to enable efficient access, and to better incorporate appropriate contract

[20] (http://www.management.energy.gov/documents/FedComplianceCritChecklist.pdf)

provisions, for services, commodities and technology. The Department draws its listings of EPPs, EPEAT and other sustainable products from external websites.[21]

The Department will enhance the scope and types of questions in PPTRS to measure the proportion of new contract actions for products against the 95% goal.

The Federal Procurement and Contractor Purchasing System balanced scorecards will be modified to include the 95% goal for new contract actions so that progress can be measured, demonstrated and benchmarked. Performance goals also can be integrated within the STRIPES and Acquisition Career Management data systems for Federal procurement, and Local Purchasing Information Systems for contractor purchasing.

DOE will provide training/orientation to DOE and contractor procurement staff through three primary mechanisms:

- Initial on-site orientation
- Continuing education through computer-based training
- Periodic site and program network interactions

Orientation sessions, held primarily through web meetings, will build initial awareness of DOE sustainability goals. Computer-based training modules will be developed for use by existing and new personnel. DOE will benchmark and leverage existing best practices to inform the above actions, including those from sites that already have implemented approaches to sharing best practices. These efforts will fulfill the need for a continuing knowledge resource for both federal procurement and contractor purchasing employees.

The Department will increase emphasis on compliance monitoring and reporting and will augment its existing mechanisms to incorporate the requirements of the EO in FY 2011. Self assessment checklists and the PMR process will be updated accordingly and used to evaluate compliance of new contract actions with the EO goals, and that delivery of services, commodities or technology is consistent with contract requirements. The frequency of PMRs will be assessed to ensure that a representative number of sites are reviewed annually, with results being reported annually.

v. Department Lead for Goal

The three Under Secretaries, with assistance from the Office of Procurement and Assistance Management and NNSA Office of Acquisition and Supply Management,

[21] (see U.S. Department of Energy Sustainable Acquisition, Recycling, and Pollution Prevention Practices Fiscal Year 2008 Report; http://www.hss.doe.gov/nuclearsafety/env/reports/eo13423/fy2008rpt.pdf)

are responsible for planning, budgeting, development, implementation and oversight.

vi. Positions

As previously described, DOE plans to establish an SPO.

Table 11: Goal 8 Planning Table[22]

SUSTAINABLE ACQUISITION	Units	FY 10	FY 11	FY 12	….	FY 20
New Contract Actions Meeting Sustainable Acquisition Requirements	%	75%	95%	hold	hold	hold
Energy Efficient Products (Energy Star, FEMP-designated, and low standby power devices)	%	TBD	TBD	TBD	TBD	TBD
Water Efficient Products	%	TBD	TBD	TBD	TBD	TBD
Biobased Products	%	TBD	TBD	TBD	TBD	TBD
Recycled Content Products	%	TBD	TBD	TBD	TBD	TBD
Environmentally Preferable Products/ Services (excluding EPEAT)	%	TBD	TBD	TBD	TBD	TBD
SNAP/non-ozone depleting substances	%	TBD	TBD	TBD	TBD	TBD

9. GOAL: Electronic Stewardship and Data Centers

This goal addresses energy management and optimization for information technology (IT) systems including equipment found in office, laboratory, production environments and in data centers. Activities supporting this goal will reduce the Department's GHG emissions and achieve other EO related sustainability goals such as DOE Order 450.1A, which requires that computers and other electronic equipment used in government agencies enable ENERGY STAR® power management features (if available). This section also implements an IT Sustainability self-assessment checklist to identify energy management improvements and best practices as a method of capturing and reporting compliance with EO 13514. Covered facilities are identified pursuant to the guidance found within EISA 2007, Section 432.

i. Goal Description

The Department adopts the following EO 13514 goals:

a. Establish and implement policy and guidance to ensure use of power management, duplex printing, and other energy efficient or environmentally preferred options and features on all eligible Departmental electronic products

[22] Funding amounts provided are strictly estimates and are subject to change.

b. Update Departmental policy to reflect environmentally-sound practices for disposition of all excess or surplus electronic products
c. Update Departmental policy to ensure implementation of best management practices for energy efficient servers and Department data centers
d. Identify how DOE intends to meet technology energy consumption reduction goals in its data centers
e. Discuss how DOE plans to meet the technology energy reduction goals in data centers
f. Discuss how DOE will increase the quantity of electronic assets disposed through sound disposition practices

ii. Current Status

DOE policies currently address personal computer and laptop power management, operation of workgroup printers, environmentally preferable purchasing and affirmative procurement. Program offices have access to an extensive list of resources to assist with this goal.[23] Additionally, PPTRS tracks the percentage of personal computers and computer networks that have power management features enabled. Data for FY 2009 indicates that 90% of DOE sites, representing 95% of departmental personnel, employ power management practices.

The Department has about 100 computer rooms in operation at its sites. In the recent years, DOE conducted extensive research concerning data center energy efficiencies through its work on the design of new data center facilities. The *Data Center Profile Software Tool Suite*[24] developed by LBNL and used by DOE Program Offices and other Federal agencies, assesses the energy efficiency posture of existing data centers and identifies opportunities for improvement. FEMP recently published guidance based on NREL and LBNL research entitled *Best Practices Guide for Energy-Efficient Data Center Design.*[25]

In addition, the Department has initiated an enterprise IT service consolation program, the Energy Information Technology Services (EITS) [26], which has eliminated redundant IT infrastructure and has standardized IT services. EITS provides an efficient model for further DOE IT service consolidation and is expected to be an effective tool to meeting the objectives of the FDCCI and this goal.

iii. Special Considerations

Data Centers and their supported electronic systems account for a significant percentage of DOE's overall energy consumption (i.e., in excess of 15%). These

[23] http://www.management.energy.gov/disposal_programs_resources.htm
[24] http://www1.eere.energy.gov/industry/datacenters/software.html
[25] http://www1.eere.energy.gov/femp/pdfs/eedatacenterbestpractices.pdf
[26] http://eits.doe.gov

computer systems, whether for supercomputing or business applications, can be 100 to 200 times more energy intensive than office space and can employ a variety of unique, non-commercial electrical equipment, all of which requires development of decommissioning and disposal plans.

iv. Implementation Methods

a. Policy and guidance for electronic products.

The Department will develop a policy for power and resource management of end-user electronic systems. This policy will take into consideration unique site environments and IT system requirements. An IT Sustainability best practices scorecard will be developed to identify, recommend, implement, and track efficiencies gained from environmentally sound operation of electronic products. Sites will account for electric power conservation or avoidance, and will report this annually via the Department's coordinated sustainability tracking and reporting framework.

b. Data center best management practices

DOE will assess needs and institutionalize industry best practices for data center infrastructure and IT operations management. Best practices under consideration include:

- Advanced data center power and environmental metering
- Environmental systems optimization and management strategies
- Review of availability (data center tier) requirements
- Server utilization monitoring and power management
- Storage de-duplication and optimization strategies
- Server virtualization and consolidation strategies
- Private/public cloud computing strategies
- Backup/recovery and Disaster Recover/Continuity of Operations modernization
- Hosted virtual desktops and thin client technologies
- Unified communication and network optimization strategies
- IT Infrastructure Library/Capability Maturity Model process improvement for IT system and data center management and operations
- Outside air, spot cooling, and other advance cooling technologies Efficient uninterruptible power supplies and power distribution technologies

DOE sites will be surveyed to identify and benchmark use of best practices. This goal will be achieved by cataloguing and making these best practices accessible throughout the DOE Complex, and utilizing these to identify, plan and implement projects to effect improvements. This benchmark will also support the Federal Data Center Consolidation Initiative and associated IT system inventories.

c. Data center energy consumption reduction goals
and
d. Data center energy reduction goals

This goal complements and supports the OMB Federal Data Center Consolidation Initiative (FDCCI). While the FDCCI focuses on DOE's federal data centers, the SSPP includes both DOE federal and contractor operated data centers. An Integrated Project Team (IPT) has been established to manage the efforts of the DOE Federal Data Center Consolidation Plan. This IPT will assist the Under Secretaries and their M&O contractors in the implementation of the activities for this goal. DOE will implement a phased approach, consistent with the method specified in the FDCCI as follows:

- Phase 1 – Data Center Characterization & IT Infrastructure Asset Inventory Baseline
- Phase 2 – Consolidation Analysis & Strategic Decisions
- Phase 3 – Consolidation Plan(s) Development
- Phase 4 – Consolidation Project Execution
- Phase 5 – Ongoing Optimization Support

DOE recognizes that implementing consolidation projects is only the beginning of a comprehensive IT infrastructure and data center sustainability program. DOE will introduce and implement data center and IT system best practices as supported by the SSPP goals. A comprehensive compliance scorecard will capture, report and monitor data center, IT system, energy / GHG reductions and other SSPP recommended best practices implemented in the DOE federal domain.

e. Environmentally sound disposition practices

Many electrical products in use can be disposed through standard environmentally sound practices. However, DOE's use of unique, non-commercial electrical equipment requires non-standard decommissioning and disposal. DOE will take the following actions:

- Update the procurement process to ensure that acquisition plans cover the disposition of replaced equipment
- Revise current DOE decommissioning procedures to mandate where appropriate the use of standard disposal programs in place at sites
- Prepare procedures to decommission and dispose of equipment inappropriate for commercial recycling services

Changes to the procurement process will be implemented, as described under the Goal 8 discussion. Revision of existing or preparation of new DOE procedures will be implemented accordingly.

v. Department Lead for Goal

The three Under Secretaries are responsible for meeting the target to include the planning, development, implementation and oversight. DOE established an Integrated Project Team (IPT) to assist the Under Secretaries and capitalize on department-wide consolidation opportunities.

vi. Positions

As previously described, DOE plans to establish an SPO. Additional positions associated with this goal will be determined at a later date. Subject matter experts, provided from throughout the Department, will advise the team.

Table 12: Goal 9 Planning Table[27]

ELECTRONIC STEWARDHIP & DATA CENTERS	Units	FY 10	FY 11	FY 12	…	FY 20
% of device types covered by current Energy Star specifications that must be energy-star qualified	%	N/A	90%	95%	….	hold
% of electronic assets covered by sound disposition practices	%	>95%	>95%	>95%	….	hold
% of cloud activity hosted in a data center	%	N/A	TBD	TBD	….	TBD
% of agency data centers independently metered or advanced metered and monitored on a weekly basis	%	N/A	90%	100%	….	hold
Reduction in the number of agency data centers	%	N/A	TBD	TBD	….	hold
% of agency, eligible electronic products with power management and other energy-environmentally preferable features (duplexing) actively implemented	%	N/A	95%	100%	….	hold
% of agency data centers operating with an average central processing unit (CPU) utilization of 60-70%	%	N/A	TBD	TBD	….	hold
% of data centers operating at a PUE range of 1.3 – 1.6	%	N/A	25%	50%	….	hold
% of covered electronic product acquisitions that are EPEAT- registered	%	N/A	95%	95%	….	hold
% of agency data center activity implemented via virtualization	%	N/A	TBD	TBD	….	hold

10. GOAL: Department Innovation

The first goal in the Department's strategic plan is **Innovation;** *to maintain U.S. global leadership in science and engineering.* The Department will continue to research, develop, demonstrate and deploy innovative solutions and initiatives to advance sustainability.

[27] Funding amounts provided are strictly estimates and are subject to change.

i. Goal Description

The Department is considering several innovative sustainable initiatives:

- Cool roof technology
- Net-zero or low-carbon DOE sites
- Energy efficient computer server facilities

ii. Current Status

Cool Roof Technology. Cool roofs (not necessarily white in color) reject solar heat instead of absorbing heat. Installation of cool roofs reduces heat gain, thereby reducing the amount of air conditioning required in a building. Cool roofs also lower roof membrane temperatures and reduce heat island effect, which improves roof top air conditioner heat rejection.

DOE's NNSA's Roof Asset Management Program (RAMP) is a unique, corporate approach to roof management across the Department's nuclear weapons complex. By treating roofs at multiple sites as an aggregate portfolio and earmarking a reliable funding stream, this program can achieve consistency in condition assessments and economies of scale in roof repairs and replacements. The RAMP program has directed resources to the most compelling roofing deficiencies of the complex, documented significant savings, and enhanced the value added to the facilities portfolio through optimal repairs. Sandia National Laboratory has installed 2.1M SF of cool roofs at the facilities, which accounts for 76% of the total site roofing.

Net-zero or Low Carbon DOE Sites. The Department continues to implement innovative building strategies, thus demonstrating a commitment to minimize energy, water, and materials consumption. For example, ORNL has completed retrofits that are expected to establish an office building as DOE's first net-zero energy building. The facility is controlled by a building automation system. Data on the building has been submitted to the Zero Energy Buildings Database and is currently under review. Additional examples of DOE energy reduction accomplishments were previously described in Section 2.I.

Energy Efficient Computer Server Facilities. Computer facilities offer great opportunities for energy conservation through consolidation of operations, improved hardware and improved physical infrastructure. Also, computer facilities are good candidates for fuel cell or other "local generation" technologies. To illustrate, NREL is planning to use its Golden, Colorado net-zero energy facility to demonstrate several energy efficiency innovations. As part of this effort, it is greening its data center by consolidating servers and by leveraging the local climate to provide "free cooling," using energy efficient fans and outdoor air to replace traditional computer room air conditioners (reducing power consumption by 65%).

iii. Special Considerations
None.

iv. Implementation Methods
Apply cool roof technology on DOE buildings. DOE is establishing a department-wide policy directing installation of cool roof technology where local conditions make it appropriate and with consideration of life cycle costs. Broadening the application of NNSA's RAMP concept, a department-wide approach to roof management will provide a proven mechanism to achieve this goal.

Achieve a "net-zero or low carbon" status at DOE site(s). The Department will consider additional use of the following technologies to develop net-zero or low carbon DOE sites:

- Cogeneration plants can generate electricity and recapture waste heat to provide central heating or cooling for facilities and processes. Gas turbine technology is well established for such applications, and there are many working models.
- Fuel cell technology is available to address smaller power requirements.
- The Department will evaluate sites to determine their potential to perform large-scale demonstration of new renewable energy and energy efficiency technologies.
- Nuclear energy is low carbon and could replace a significant carbon load at DOE sites. The Department plans to evaluate the feasibility of using small modular reactors at one or more DOE sites.
- DOE will consider demonstration projects for co-firing or the outright replacement of coal with biomass, and the use of carbon sequestration where feasible.

Create the most energy efficient computer server facilities. The Department controls about 50 diverse data centers that can be optimized and used as best practice models for other agencies, universities, and the private sector. DOE will conduct surveys of data centers to identify and benchmark use of electronic best management practices as a basis for advancing, evaluating and demonstrating new high-efficiency technologies. DOE will target selected data centers to demonstrate the new data center infrastructure technologies and how they optimize data center energy efficiency.

v. Department Lead for Goal
The three Under Secretaries are responsible for meeting the target to include the planning, budgeting, development, implementation and oversight.

vi. Positions

As previously described, DOE plans to establish an SPO.

Section 3: Department Self Evaluation

1. Self Evaluation

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 [(a)]
Does your plan align with your agency's 2011 budget submission?	Yes [(b)]
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 [(c)]
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

[(a)] Budget submissions for FY 2010 and FY 2011 occurred prior to release of EO 13514. Projects included in those fiscal years were not coded in a manner that would allow for linking with sustainability goals. DOE will begin coding associated projects for inclusion in subsequent SSPPs with established milestones where appropriate.

[(b)] The FY 2011 budget request included funding necessary to continue the government-wide data collection and analysis process within FEMP required by EO 13514. The submission also requested funding to begin DOE-specific work on sustainability initiatives. However, the overall FY 2011 budget request was not based on the requirements of EO 13514. The FY 2012 budget submission will better align with the SSPP.

[(c)] This plan will inform the FY 2012 budget submission.

2. Planned Actions

The Department will focus on integrating sustainability planning elements into the programming and budget development process; addressing policy, procedural, and operational barriers to reducing water, energy, and carbon based fuel usage; and instilling a corporate culture that emphasizes sound long-term environmental stewardship. DOE will also realign its policies and data tracking mechanisms with the SSPP. Actions included below may be under development, dates are subject to change, and projects are subject to availability of funding. Additional details and information on the actions will be provided in future SSPPs.

Programming and budget development process

JUL-DEC 2010

- Sustainability Transformation Teams begin their efforts. Efforts will be integrated with and aligned with Site's ongoing sustainability planning (SEP 2010) [Sec. 2.II pg. 18]

- Final Site Sustainability Plans submitted (DEC 2010)

JAN-SEP 2011

- Align the SSPP with FY 2012 budget (FEB 2011) [Sec 1.IV.e, pg. 7]
- Review and recommend approaches to incorporating social, environmental and climate considerations into project prioritization (FEB 2011) [Sec. 1.V.a/b/c, pg. 10]
- Prepare a plan to overcome operational and financial barriers to compliance with all of the *Sustainable Building Guiding Principles* (APR 2011) [Goal 4.iv, pg. 40]
- Initiate a study to consider DOE long-term climate change adaptation strategies (JUN 2011) [Sec. 1.V.f, pg. 12]

Procedural and operational changes

JUL-DEC 2010

- Stand-up Sustainability Performance Office (SPO) to support the Senior Sustainability Officer (SSO) reporting, analysis, and decision-making functions (AUG 2010) [Sec. 1.IV.a, pg. 6; each goal subsection iv. Positions]
- Issue guidance as needed for Site Sustainability Plans (AUG 2010) [Sec 1.IV.f, pg. 8]
- Implement Department-wide cool roof program (AUG 2010) [Goal 10.iv, pg. 67]
- Align sustainability planning process with EISA Section 432 facility evaluation and benchmarking requirements (SEP 2010) [Goal 1.a.iv., pg. 22]
- Establish Fugitive Gas Working Group through Sustainability Transformation Teams to share information and monitoring/control technology amongst those sites with such gases in the development of their Site Sustainability Plans (SEP 2010) [Goal 1.d.iv, pg. 32]
- Update reporting practices to monitor compliance with printing paper use reduction and purchase of 30% recycled content paper goals (SEP 2010) [Goal 7d/e.iv, pg. 56]
- Implement an internal performance management process with Scorecards tracking Department, Program, and site level progress on all sustainability measures with periodic briefings to the SSO, specifically in conjunction with the Department's budget formulation and execution processes (DEC 2010) [Sec. 1.IVf, pg. 8]
- Develop a plan to align Departmental data collection and reporting processes to support all sustainability performance requirements (DEC 2010) [Sec. 2.II, pg. 18]
- Use NREL's Fleet Optimization Tool to produce recommendations for DOE's FY 2011 Fleet ordering process (DEC 2010) [Goal 1b.iv, pg. 30]
- Initiate phased installation of dedicated meters for data centers subject to identification (DEC 2010) [Goal 9d, pg. 63]

- Initiate surveys of sites to identify and benchmark use of electronic data center best management practices subject to identification (DEC 2010) [Goal 9b, pg. 63]
- Standup and deploy Process/Industrial Technical Assistance Team supported by EERE's Industrial Programs Office as requested by DOE sites (DEC 2010) [Goal 1a.iv, pg. 22]
- Standup and deploy Buildings Assessments/Commissioning Technical Assistance Team supported by EERE's Building Technology Program as requested by DOE sites (DEC 2010) [Goal 1a.iv, pg. 22]
- Conduct a training needs assessment of all DOE's designated site energy managers as required by facility size, develop strategy for addressing shortfalls. (DEC 2010) [Goal 1a.vi, pg. 25]
- Update and issue metering guidance (DEC 2010) [Goal 1.a.iv, pg. 23]

JAN-SEP 2011

- Evaluate Site Sustainability Plans submitted through Under Secretaries/ Programs (JAN 2011) [Section 1.IV.f pg. 8]
- Survey Federal and contractor employees at all DOE sites to determine current commuting practices and impediments to the increased use of public transportation (JAN 2011) [Goal 2.iv, pg. 35]
- Identify additional ESPCs and associated funding if needed (MAY 2011) [Goal 1a.iii, none.]
- Identify sites in need of water optimization projects (JUN 2011) [Goal 6.iv, pg. 48]
- Complete comprehensive evaluations of 75% of DOE's covered facilities including energy/water audits and roof assessments to identify potential projects and required investment in support of EO goals per 42 U.S.C. 8253(f)(3) (JUN 2011) [Goal 1.a.iv, pg. 22; Goal 6.iv, pg. 48]
- Perform recommissioning assessments at 75% of DOE's covered facilities to identify and implement priority recommissioning measures per 42 U.S.C. 8253(f)(3) (JUN 2011) [Goal 1.a.iv, pg. 22]
- Update site metering plans based on revised metering guidance (AUG 2011) [Goal 1.a.iv, pg. 23]
- Issue a comprehensive sustainability directive to replace separate energy and environment directives (SEP 2011) [Section 2.2, pg. 18, Goal 7, pg. 50]
- Commence replacement of 850 conventional gasoline vehicles with Hybrid Electric Vehicles, and move AFVs to locations with commercial access to alternative fuels (SEP 2011) [Goal 1.c.iv, pg. 30]
- Sub-meter electricity, natural gas, and steam, as appropriate on multi-building sites so that at least 75% of each site (in terms of energy load) is sub-metered 42 U.S.C. 8253(e) (SEP 2011) [see Goal 1.a.iv, pg. 23]

- Use Energy Star Portfolio Manager to benchmark energy performance of metered buildings covered under the statute and disclose performance rating annually over time per 42 U.S.C. 8253(f)(8) (SEP 2011) [Goal 1.a.iv, pg. 23]
- Conduct integrated, whole systems industrial assessments of DOE energy-intensive processes (SEP 2011) [Goal 1.a.iv, pg. 22]
- Evaluate sites to determine potential as test-beds for large-scale demonstrations of new EE/RE technologies (SEP 2011) [Sec. 1.V.d, pg. 11; Goal 1.b.iv, pg. 28]
- Identify buildings to achieve compliance with sustainable buildings guiding principles by FY 2015, and the resources required for this effort (SEP 2011) [Goal 4.iv.c, pg. 40]
- Ensure participation in regional transportation planning is incorporated into site policy and guidance documents (SEP 2011) [Goal 5.iv.a, pg. 45]
- Prepare water efficiency policies and water management plans for each site or update existing plans (SEP 2011) [Goal 6.iv, pg. 48]
- Initiate verification of the effectiveness and reliability of site clearance-of-property procedures to identify those materials that cannot be cleared for unrestricted reuse or recycling (SEP 2011) [Goal 7.b/c.iv, pg. 52]
- Update and include GHG-contributing elements into guidance on toxic, hazardous and chemical reduction strategies for the DOE complex (SEP 2011) [Goal 7. f/i. & iv, pg. 55]
- Implement an all-inclusive affirmative acquisition clause for all DOE procurement actions (SEP 2011) [Goal 8.iv, pg. 59]
- Update master listings of environmentally-preferable products for use in the DOE complex (SEP 2011) [Goal 8.iv, pg. 59]
- Modify PPTRS to capture data to measure the proportion of new contract actions for products against the 95% sustainable acquisition goal (SEP 2011) [Goal 8.iv, pg. 59]
- Modify Federal Procurement and Contractor Purchasing System balanced scorecards to include the 95% goal for new contract actions (SEP 2011) [Goal 8.iv, pg. 60]
- Complete surveys and benchmark site data centers to identify and implement best management practices, subject to identification (SEP 2011) [Goal 9.iv.b, pg. 63]
- Revise existing procedures for environmentally sound disposition of electronics (SEP 2011) [Goal 9.iv.e, pg. 64]
- Develop and implement a policy for power and resource management of end-user electronic systems across the DOE complex (SEP 2011) [Goal 9.iv.a, pg. 63]

FY 2012

- Acquire SF_6 capture and storage equipment, develop training, and deploy SF_6 capture program at key DOE sites (SEP 2012) [Goal 1.d.iv, pg. 31]

- Use the findings of facility evaluations and assessments to prioritize water leak repairs consistent with the most significant losses (SEP 2012) [Goal 6.iv, pg. 48]
- Complete verification of the effectiveness and reliability of clearance-of-property procedures to identify those materials that cannot be cleared for unrestricted reuse or recycling (SEP 2012) [Goal 7.b/c.iv, pg. 52]
- Prioritize for implementation all identified data center projects (SEP 2012) [Goal 9.iv.d, pg. 64]
- Sub-meter electricity use on multi-building sites so that all appropriate buildings and processes are sub-metered (at least 90% of each multi-building site's electricity load) per 42 U.S.C. 8253(e) (OCT 2012) [Goal 1.a.iv, pg. 23]
- Sub-meter natural gas and steam, as appropriate, on multi-building sites on a schedule so that all appropriate buildings and processes are sub-metered (at least 90% of each multi-building site's thermal load) by October 2015 per 42 U.S.C. 8253(e) [Goal 1.a.iv, pg. 23]

Corporate culture

JUL-DEC 2010

- Commence periodic sustainability progress briefings from the Under Secretaries to the SSO (OCT 2010) [None]
- Communicate the SSPP to DOE employees and contractors (NOV 2010) [Sec. 2.II, pg. 18]
- Include energy conservation and recycling in employee orientation programs (NOV 2010) [Sec. 2.II, pg. 18]
- Conduct a GHG and energy summit among senior DOE leadership (to include laboratory Chief Operating Officers and Chief Financial Officers) (DEC 2010) [Sec 2.II, pg. 18]
- Establish a website for sharing sustainability best practices (DEC 2010) [Sec. 1.VI, pg. 12; Goal 4.iv, pg. 40; Goal 7, pgs. 52; Goal 8.iv, pg. 58; Goal 9.iv, 63]
- Develop a plan for retiring Departmental printers incapable of duplex printing (DEC 2010) [Goal 7.d.iv, pg. 56]
- Include GHG management and energy awareness issues within the DOE Facilities and Real Estate workshop (DEC 2010) [None]

JAN-SEP 2011

- Commence periodic sustainability updates from the SSO to the Secretary of Energy (JAN 2011) [EO 13514 Section 8.i]
- Identify regional transportation planning, ecosystem, watershed, and environmental management initiatives affecting sites and opportunities to work with local authorities to align energy policies and sitting of renewable energy infrastructure (FEB 2011) [Goal 5.iv, pgs. 45-46]
- Develop incentive program to encourage car sharing for employees attending out of town meetings (MAR 2011) [Goal 2.iv, pg. 35]

- Survey all sites to assess deployment of carpooling incentives, and develop recommendations for additional employee incentives to use public transportation (SEP 2011) [Goal 2.iv, pg. 35]
- Augment DOE's existing Environmental Sustainability (*ES*tar) award programs (SEP 2011) [Goal 7a.iv, pg. 53]
- Develop computer-based training modules for sustainable acquisition subject to identification (SEP 2011) [Goal 8.iv, pg. 60]
- Increase emphasis on sustainable acquisition compliance monitoring and reporting through Procurement Management Reviews (SEP 2011) [Goal 8.iv, pg. 60]
- Assess state of interaction between sites and their local/regional organizations (SEP 2011) [Goal 5.iv, pg. 44]

FY 2012

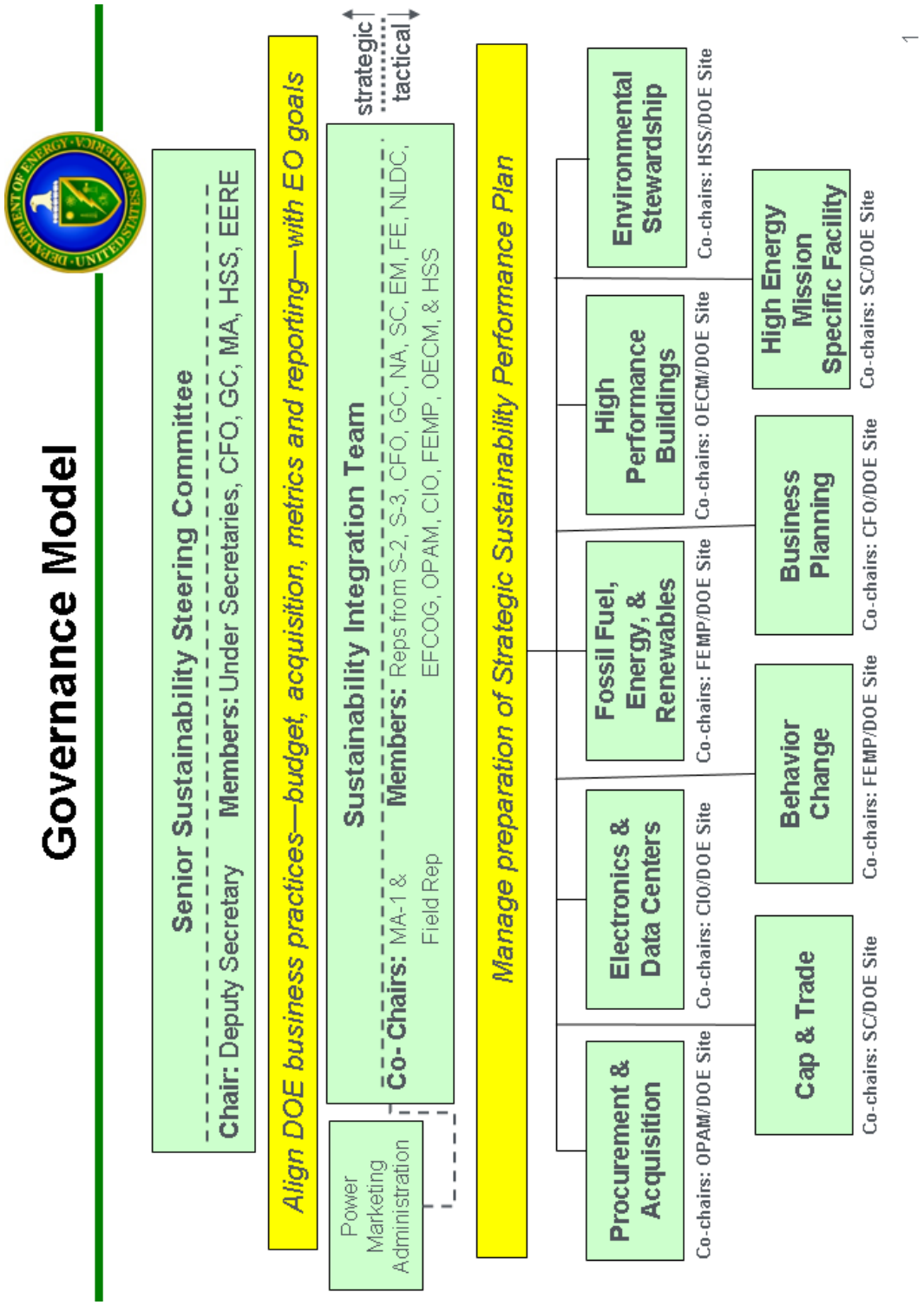
- Ensure facility energy managers are qualified Certified Energy Managers (CEM); include requirement for GOCO sites to have a CEM certified facility energy manager during next contract amendment or renegotiation (SEP 2012) [Goal 1.a.vi, pg. 25]
- Ensure all sites comprising greater than 5 million square feet of facility space have full-time energy managers (SEP 2012) [Goal 1.a.vi, pg. 25]
- Deploy computer-based sustainable acquisition training (SEP 2012) [Goal 8.iv, pg. 60]

Appendix 1: Abbreviations

AFVs – *Alternative Fuel Vehicle*
BTU – *British Thermal Unit*
C&D – *Construction and Demolition*
CAFE – *Corporate Average Fuel Economy*
CEQ – *Council on Environmental Quality*
CFO – *Chief Financial Officer*
CFR – *Code of Federal Regulations*
CO_2 – *Carbon Dioxide*
CPU – *Central Processing Unit*
D&D – Deactivation and Decommissioning
DEAR – *DOE Acquisition Regulation*
DOE – *U.S. Department of Energy*
DOT – *U.S. Department of Transportation*
EFCOG – *Energy Facility Contractors Group*
EISA – *Energy Independence Security Act*
EMS – *Environmental Management System*
EO – *Executive Order*
EPA – *Environmental Protection Agency*
EPACT – *Energy Policy Act*
EPCRA – *Emergency Planning and Community Right-to-Know Act*
EPEAT – *Electronic Product Environmental Assessment Tool*
EPP – *Environmentally Preferable Product*
ESPC – *Energy Savings Performance Contract*
EUL – *Enhanced Use Lease*
FAR – *Federal Acquisition Regulation*
FAST – *Federal Automotive Statistical Tool*
FEMP – *Federal Energy Management Program*
FIMS – *Facilities Information Management System*
FY – *Fiscal Year*
GC – *General Counsel*
GHG – *Greenhouse Gas*
GOCO – *Government Owned, Contractor Operated*
GP - *Federal Guiding Principles for Sustainable Design*
GPRA – *Government Performance and Results Act*
GSA – *General Services Administration*
GSF – *Gross Square Feet*
HPSB – *High Performance and Sustainable Buildings*
HVAC – *Heating, Ventilating, and Air Conditioning*
HEVs – *Hybrid Electric Vehicles*
HUD – *Department of Housing and Urban Development*
IFI – *Integrated Facilities Infrastructure (Crosscut)*
IT – *Information Technology*

IMP – *Integrated Pest Management*
LANL – *Los Alamos National Laboratory*
LBNL – *Lawrence Berkeley National Laboratory*
LEED – *Leadership in Energy and Environmental Design*
LLNL – *Lawrence Livermore National Laboratory*
MGY – *Million of Gallons of Water per Year*
$mTCO_2e$ – *Metric Ton Carbon Dioxide Equivalent*
MWH –*Megawatt hour*
NEPA – *National Environmental Policy Act*
NNSA – *National Nuclear Security Administration*
NPV – *Net Present Value*
NREL – *National Renewable Energy Laboratory*
O&M – *Operation & Maintenance*
OCIO – *Office of the Chief Information Office*
OMB – *U.S. Office of Management and Budget*
ORNL – *Oak Ridge National Laboratory*
PHEV - *Plug-in Hybrid Electric Vehicles*
PMR – *Procurement Management Review*
PPA – *Power Purchase Agreement*
PPTRS – *Pollution Prevention Tracking and Reporting System*
PV – *Photovoltaic (Solar Power)*
REC – *Renewable Energy Certificate*
PSO – *Program Secretarial Official*
ROI – *Return on Investment*
SBIP – *Sustainable Buildings Implementation Plan*
SCC – *Social Cost of Carbon*
SERF – *Sanitary Effluent Reclamation Facility*
SF – *Square Feet*
SF_6 - *Sulfur hexafluoride*
SIT – *Sustainability Integration Team*
SPO – *Sustainability Performance Office*
SSO – *Senior Sustainability Officer*
SSPP – *Strategic Sustainability Performance Plan*
SSSC – *Senior Sustainability Steering Committee*
STRIPES – *Strategic Integrated Procurement Enterprise System*
T&D – *Transmission and Distribution*
UESC – *Utility Energy Service Contract*
VFD – *Variable Frequency Drive*

Appendix 2: Sustainability Governance



Appendix 3: Federal Energy Management Program

FEMP GOVERNMENT-WIDE SUPPORT ROLE

The mission of the Department of Energy's (DOE) Federal Energy Management Program (FEMP) is to facilitate the Federal Government's implementation of sound, cost-effective energy management and investment practices to enhance the nation's energy security and environmental stewardship.

FEMP's primary customers are the Federal agencies subject to legislative and Executive Order (EO) mandates in support of the following activities:

- Reducing the energy intensity in existing buildings
- Increasing the use of renewable energy technologies
- Reducing water consumption
- Reducing petroleum use in Federal fleets and increasing use of alternative fuels
- Metering electricity, natural gas, and steam use in facilities
- Assuring that all new buildings designs are 30 percent more efficient than relevant code
- Using sustainable design when constructing new buildings and using sustainable environmental practices
- Procuring energy-efficient products that are in the top 25 percent of their class

FEMP assists its Federal customers in meeting their energy management goals by delivering an array of products organized into three distinct service lines:

- Project transaction services facilitate the use of alternative finance mechanisms across the Federal Government by helping to identify financing opportunities, providing alternative finance training, assisting with baseline audits, providing project facilitation, assisting in project evaluation and selection, providing full project life-cycle support, and sharing lessons learned.
- Applied technology services provide technical assistance and training services across the Federal Government, enabling agencies to meet their energy efficiency and renewable energy goals in the areas of sustainable design, water conservation, fleet management, operations and maintenance best practices, metering and energy-efficient products.
- Decision support services assist with the coordination of DOE and inter-agency planning, reporting, and communication processes supporting legislative and other initiatives; publication of rules and guidance; energy awareness; and customer service support.

FEMP INTERNAL DOE SUPPORT ROLE

Although its mission supports all Federal Government agencies, FEMP currently supports DOE in-house energy management and green house gas reduction activities from its position under the Office of Energy Efficiency and Renewable Energy (EERE).

DOE Order 430.2b requires each DOE site to develop energy, sustainable building, and fleet management plans (commonly called Executable Plans – now included in Site Sustainability Plans). FEMP develops guidelines for these plans and conducts department-wide analysis when they are submitted. In addition, FEMP gathers data and provides DOE's energy, water, and vehicle fleet data input for submittal in annual reports to Congress.

FEMP SUPPORT OF EO 13514

Executive Order (EO) 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, established GHG emissions as a unifying priority for Federal energy and environmental management, thus necessitating a deliberate planning process for managing GHGs. FEMP has provided ongoing, direct technical assistance to Federal agencies concerning the development of comprehensive GHG emission inventories through one-on-one meetings between agencies and FEMP technical assistance points of contact. FEMP is actively involved in the development of Federal guidance for implementing the Executive Order, including GHG, fleet management, and water conservation activities.

To assist agencies develop GHG reduction targets under Section 2(a) of EO 13514, FEMP developed pre-populated Scope 1 and 2 GHG targeting tools to enable Federal agencies to develop top-down estimates of their GHG emissions from 2008 energy use and project avoided emissions from meeting mandated goals for 2015. This tool provided ways for agencies to evaluate projections and determine their 2020 GHG reduction goals. FEMP also provided input into the Scope 3 GHG targeting tool to help agencies estimate and understand their Scope 3 emissions, providing a basis for evaluating targeted reductions to be met by FY 2020 as required under Section 2(b) of EO 13514.

As required under Section 9(a) of EO 13514, FEMP chaired the interagency working group and developed the detailed recommendations for the Federal GHG accounting and reporting procedures that were delivered to CEQ in April 2010. These recommendations include:

> "procedures that will ensure that agencies accurately and consistently quantify and account for greenhouse gas emissions from all scope 1, 2, and 3 sources, using accepted greenhouse gas accounting and reporting principles."

As required under Section 12 of EO 13514, FEMP also developed guidance and a comprehensive handbook on Federal fleet vehicle management that:

> "addresses the acquisition of alternative fuel vehicles and use of alternative fuels; the use of biodiesel blends in diesel vehicles; the acquisition of electric vehicles for appropriate functions; improvement of fleet fuel economy; the optimizing of fleets to the agency mission; petroleum reduction strategies, such as the acquisition of low greenhouse gas emitting vehicles and the reduction of vehicle miles traveled; and the installation of renewable fuel pumps at Federal fleet fueling centers."

Further, FEMP is developing and piloting a reporting tool that agencies may use to develop their GHG inventories while also meeting their obligations for annual energy reporting. This activity is in accordance with Section 9(c) of EO 13514 which directs DOE, with 1 year of the date of the order:

> "through its Federal Energy Management Program. . . ensure consistent and accurate reporting under this section, provide electronic accounting and reporting capability for the Federal greenhouse gas reporting procedures developed under subsection (a) of this section, and to the extent practicable, ensure compatibility between this capability and existing Federal agency reporting systems."

More recently, CEQ requested DOE to co-chair with EPA an interagency working group to prepare recommendations for water efficiency guidance to assist Federal agencies in meeting their obligations under Section 2(d) of EO 13514. This section establishes water efficiency goals pertaining to reduced potable water consumption intensity and reduced industrial, landscaping, and agricultural water consumption. This activity is a continuation of work FEMP has been performing under the prior EO 13423, so this working group is already in place, has been meeting since the issuance of EO 13514, and has already delivered preliminary guidance to CEQ.

Throughout the EO 13514 implementation process, FEMP staff members have been detailed to work at the CEQ's Office of the Federal Environmental Executive (OFEE) to provide expertise on GHG targeting, accounting, and reporting. In addition, FEMP facilitates government-wide education and training on Federal GHG management. FEMP's activities have included presenting and co-hosting workshops for Senior Sustainability Officers and working level staff on EO implementation; and launching and maintaining various GHG websites for use by Federal government working groups. FEMP is currently developing a web-based course to train Federal employees in GHG accounting policies and procedures.

Appendix 4: DOE Energy Projects

PROJECT PROGRESSION

Energy audits (both internal and external) identify potential energy efficiency measures or renewable energy projects for consideration. After careful technical, financial, and programmatic analysis, a subset of these projects move forward and are proposed for funding. These projects are then placed in-development, ultimately leading to a contract award. After construction, these projects are commissioned and then considered operational. DOE identifies and develops most projects through a process similar to this, with the pipeline constantly being replenished with new projects.

ENERGY EFFICIENCY

The Department of Energy leads the Federal government in the use of Energy Savings Performance Contracts (ESPC), both in total investment and in total expected savings. All large projects are considered for ESPC funding before other forms of funding are considered.

Since 1998, DOE has signed 19 ESPC contracts, providing $451M of energy efficiency investment at 15 sites, with $1,551M in total expected cost savings (5.5 million MMBtu of energy savings). Excluding the two large ESPC contracts discussed below, the average DOE site ESPC award is about $10M and remains in effect for about 18 years. Energy conservation measures (ECMs) currently under contract (operational or under construction) are provided in Table 15.

Two large projects currently awarded and under construction include:

Savannah River Site (Areas D, K and L): DOE is replacing an ageing coal fueled electric power plant with a modern, state of the art biomass plant to produce both heat and electrical power (760,775 MMBtu of heat, 77,500 MWh electrical). The site is also installing two biomass heat/steam only plants to supply remote heating loads (33,300 MMBtu of heat). In addition to reducing the green house gas emissions from the site, these projects will save water and will eliminate maintenance on many miles of steam lines.

Oak Ridge National Laboratory: DOE is converting a coal fueled steam/heating plant into a plant fueled by biomass (384,103 MMBtu), greatly reducing the greenhouse gas emissions from this site.

ENERGY PRODUCTION

DOE also develops projects to offset energy purchased from the electrical grid. Doing so reduces the Scope 2 GHGs produced at the electrical generating source, and the Scope 3 GHGs resulting from losses during Transmission and Distribution of the electricity. These projects tend to fall into two categories: (1) production of clean, renewable power

(normally by solar, wind, and geothermal energy generated on site) and (2) clean energy purchases (normally by Power Purchase Agreements for third party generated electricity produced on a DOE site, or by green power purchases). Three major projects are currently under construction:

Los Alamos National Laboratory (LANL) Green Power purchase: The Army Corps of Engineers is installing a low flow turbine in its hydroelectric dam at Abiquiu, New Mexico. LANL has agreed to purchase about 80% of this power via a long term power purchase agreement (7,000 MWh electrical/year). This project will meet 3.3% of LANL's renewable goal.

National Renewable Energy Laboratory (NREL) renewable energy development: NREL is installing about 2,500 MW of photovoltaic power on the roofs of the Research Support Facility. When completed, these systems will provide over 3.8 million MWh of electrical energy per year. In addition, NREL is in the process of completing two wind turbine projects (3.8 MW combined), which are capable of producing about 11 million MWh of electrical energy per year. When all currently contracted and operating NREL renewable energy projects are on line, the site will produce about 90% of its electrical and 67% of its thermal energy needs. These projects are funded using a mixture of appropriated funds, Power Purchase Agreements and a Cooperative Research and Development Agreement.

Brookhaven National Laboratory (BNL): BNL will lease land to BP Solar will develop a 37 MW photovoltaic array on BNL land. This energy (60,770 MWh/year) will be sold to the Long Island Power Authority (LIPA) under a power purchase agreement. BNL purchases its electrical power from LIPA.

DOE has met renewable energy goals by purchasing Renewable Energy Certificates (REC), and was cited in EPA's Green Power Partnership's Top 20 Purchasers list (for the year ending April 2010) for purchasing RECs or Green Power for 4% of DOE's electrical energy consumption.

Table 13: Energy Savings Performance Contracts currently in place (1999-2010)

Project Title	Agency	Project Investment ($M)	Guaranteed Cost Savings ($M)	Annual Energy Savings (MMBtu)	Lighting Improvements	Building Automation Systems	HVAC Improvements	Energy Surveys	Boiler Improvements	Piping & Distribution Improvements	Chiller Improvements	Electrical Distribution System Improvements	Water & Sewer System Improvements	Electrical or Cogen System Improvements	Renewable Energy Systems
NREL Biomass ESPC	EERE	$4	$13	41,272											2007
Hanford 1 - Richland Ops	EM	$12	$20	19,845		2009	2009		2009		2009				
Savannah River Site Biomass	EM	$183	$945	3,830,578				2009						2009	2009
NETL Pittsburgh/Morgantown	FE	$6	$13	23,862	2008	2008	2008						2008		2008
HQ (Forrestal & Germantown)	MA	$29	$60	49,177	2010		2010	2010		2010			2010		
Idaho National Laboratory	NE	$34	$78	56,059	2008 2001	2008		2008	2008			2001			
Lawrence Livermore	NNSA	$11	$26	97,650		2008									
Los Alamos National	NNSA	$15	$29	62,181	2010	2010									
Nevada Test Site	NNSA	$7	$16	18,717	2009	2009									2009
North Las Vegas	NNSA	$1	$2	5,666	2002										
Pantex Plant	NNSA	$24	$66	310,613	2006 2000	2006 2000	2006 2000			2006 2000					2000
Y-12	NNSA	$29	$62	133,056	2001	2001		2009		2009	2009 2001				
Argonne	SC	$7	$12	69,913	2009 2004	2004	2009 2004	2009			2009				
Fermi National Accelerator	SC	$2	$3	11,206	2010			2010	2010			2010			
Oak Ridge National Laboratory	SC	$88	$207	770,092	2008 1999	2008	2008		2008			2008	2008 1999		

(For each Energy Conservation Measure, the date is the fiscal year of contract award)

Appendix 5: Summary of DOE Orders

Key requirements of the following EOs and DOE Orders are summarized below:

- DOE Order 430.1B – Real Property Asset Management
- DOE Order 430.2B – Departmental Energy, Renewable Energy and Transportation Management
- DOE Order 450.1A – Environmental Protection Program

DOE ORDER 430.1B

Purpose: To establish a corporate, holistic, and performance-based approach to real property life-cycle asset management that links real property asset planning, programming, budgeting, and evaluation to program mission projections and performance outcomes.

Key Requirements:

- Document results of real property asset site planning and performance in a Ten-Year Site Plan (TYSP) that is kept current and covers a 10-year planning horizon. For closure sites, disposition plans must be developed.
- Develop a land-use plan to provide a clear view of the land-use issues, capabilities, opportunities, and limitations of a site. Land-use plans should be tailored based on local site condition and must consider the National Environmental Policy Act, site planning and asset management, stakeholder public participation, economic development under community reuse organizations, environmental law, cultural asset management, historic preservation, and natural resource management, and other factors.
- Excess real property assets that are appropriate for economic-development transfer must be identified and disposed of in accordance with 10 CFR 770, Transfer of Real Property at Defense Nuclear Facilities for Economic Development (reference b). Real estate actions for out-grant must be performed in accordance with the Joint DOE/EPA Interim Policy Statement on Leasing Under the Hall Amendment, dated June 30 1998 (reference x), and applicable DOE directives.
- Real property assets will be maintained in a manner that promotes operational safety, worker health, environmental protection and compliance, property preservation, and cost-effectiveness while meeting the program missions.
- Acquisition of real property assets through construction must be planned and accomplished to meet program mission projections, with planning to include life-cycle cost considerations. Planning for disposition must be initiated when real property assets are identified as no longer required for current or future programs.
- All DOE elements must develop real property asset performance measures commensurate with their duties and responsibilities.

DOE ORDER 430.2B

Purpose: To provide requirements and responsibilities for managing DOE energy, buildings, and fleets.

Key Requirements:

- Maximize utilization of private sector, third-party financing, particularly from Energy Savings Performance Contracts (ESPC) and Utility Energy Services Contracts (UESC) applied in a life cycle cost effective manner
- By FY 2015, reduce energy intensity by no less than 30 % on average across the entire Department, relative to the Department's energy use in FY 2003.
- By FY 2015, reduce potable water use by no less than 16 %, relative to the Department's potable water use in FY 2007.
- Install advanced electric metering systems at all Department sites in accordance with the DOE metering plan for site monitoring of electric energy. Standard metering systems for steam, natural gas and water must also be installed and centrally monitored at all Department sites for steam, natural gas and water consumption.
- Install on-site renewable energy (electric and thermal) generation at all Department sites.
- Install sustainable building materials and practices throughout the Department's existing building assets and the attainment of the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Gold certification for all new construction and major building renovations in excess of $5 million and not having reached CD-2 before October 1, 2008. All buildings falling below this threshold are required to comply with the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (Guiding Principles).
- Meet the 15 % goal in EO 13423 dated January 24, 2007 section 2(f)(ii) for incorporating sustainable practices of the Guiding Principles for energy and water and related principles into the Department's capital asset building inventory.
- Utilize standardized operations and maintenance (O&M) and measurement and verification (M&V) protocols coupled with real-time information collection and centralized reporting capabilities.
- Perform commissioning of new equipment or retrofit construction to ensure that systems are designed, installed, functionally tested and capable of being operated and maintained to perform in conformity with the project intent.
- Perform retro-commission to review the condition of building systems and return equipment that has fallen out of desired operating parameters back into appropriate tolerances.
- Provide access to alternative fuel infrastructure throughout the Department to ensure that all alternative fuel vehicles will operate on alternative fuels to the greatest extent practicable, and replace DOE conventional-fuel vehicles with alternative fuel and hybrid technology vehicles, including plug-in hybrid electric vehicles as they become available.
- Increase development, generation and consumption of electric and steam, natural gas from renewable energy sources and combined heat and power sources.

- Increase use of non-potable water sources such as reclaimed, recycled and grey water for appropriate applications.
- Expedite improvement in the quality, consistency and centralization of data collected and reported through the use of commercially available software.
- Develop and commit to an Executable Plan (now included in Site Sustainability Plan) for each site that identifies their respective contributions toward meeting all of the Department-wide goals stated above.

DOE ORDER 450.1A

Purpose: To implement sound stewardship practices that are protective of the air, water, land, and other natural and cultural resources impacted by DOE operations, and by which DOE cost effectively meets or exceeds compliance with applicable environmental, public health, and resource protection requirements.

Key Requirements:

- Implement sustainable practices for enhancing environmental, energy, and transportation management performance, as stipulated in section 3(a) of EO 13423, through environmental management systems that are part of Integrated Safety Management (ISM) systems established pursuant to DOE P 450.4, *Safety Management System Policy*, dated 10-15-96.
- Develop and implement an environmental management system to be integrated into the site's ISM system.
- Achieve the DOE Sustainable Environmental Stewardship goals:
    - Reduce or eliminate the generation and/or toxicity of waste and other pollutants at the source through pollution prevention
    - Reduce or eliminate the acquisition, use and release of toxic and hazardous chemicals and materials
    - Maximize the acquisition and use of environmentally preferable products in the conduct of operations
    - Reduce or eliminate the environmental impacts of electronic assets
    - Reduce degradation and depletion of environmental resources through post-consumer material recycling

Appendix 6: Source Document References

Department of Energy, *Organization Chart,* November 30, 2009.
http://www.energy.gov/organization/orgchart.htm

Department of Energy, Environmental Management System
http://www.hss.energy.gov/nuclearsafety/env/ems/

Department of Energy, Financing Mechanisms
http://www1.eere.energy.gov/femp/financing/mechanisms.html

Department of Energy, *US Climate Change Technology Program Strategic Plan*, DOE-PI-0005, September 2006. http://www.climatetechnology.gov/stratplan/final/index.htm

Department of Energy, *High Performance and Sustainable Buildings Implementation Plan*, August 15, 2008.
http://www.management.energy.gov/documents/doe_hpsb_implement_plan.pdf

Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866, Appendix 15A.
http://www1.eere.energy.gov/buildings/appliance_standards/commercial/pdfs/smallmotors_tsd/sem_finalrule_appendix15a.pdf

Department of Energy, *Open Government Plan*, April 2010.
http://www.energy.gov/open/documents/DOE_OGI_Plan_07Apr2010.pdf

Department of Energy, Affirmative Procurement Program
http://management.energy.gov/business_doe/1151.htm

High Performance and Sustainable Buildings Guidance, December 1, 2008.
http://www.wbdg.org/pdfs/hpsb_guidance.pdf

House Report 109-086 – Energy and Water Development Appropriations Bill, 2006.
http://thomas.loc.gov/cgi-bin/cpquery/R?cp109:FLD010:@1(hr086)

Department of Energy Acquisition Regulations (DEAR)
http://management.energy.gov/DEAR.htm

Department of Energy, Procurement & Acquisition
http://management.energy.gov/policy_guidance/procurement_acquisition.htm

Department of Energy, *Balanced Scorecard Performance Assessment*, March 2004.
http://management.energy.gov/documents/AcqGuide1pt3.pdf

Department of Energy, *Balanced Scorecard – Performance Measurement and Performance Management Program*, January 2005.
http://management.energy.gov/documents/BSCProgramDescriptionDocumentJan2005.pdf

Department of Energy, Balanced Scorecard Federal Compliance Review Criteria – Acquisition and Financial Assistance Self Assessment Checklist, May 2008.
http://management.energy.gov/documents/FedComplianceCritChecklist.pdf

Strategic Integrated Procurement Enterprise System (STRIPES)
http://www.cfo.doe.gov/corpsyst/i-manage/STRIPES.htm

Federal Purchasing System Balanced Scorecard, and Contractor Purchasing System Balanced Scorecards (http://management.energy.gov/726.htm

U.S. Department of Energy, *Sustainable Acquisition, Recycling, and Pollution Prevention Practices Fiscal Year 2008 Report,* February 2009.
http://www.hss.doe.gov/nuclearsafety/env/reports/eo13423/fy2008rpt.pdf

Department of Energy, *Data Center Profile Software Tool Suite*
http://www1.eere.energy.gov/industry/datacenters/software.html

Department of Energy, *Best Practices Guide for Energy-Efficient Data Center Design,* February 2010 http://www1.eere.energy.gov/femp/pdfs/eedatacenterbestpractices.pdf

NNSA RAMP Program
http://www.fmlink.com/ProfResources/BestPractices/article.cgi?GSA:122408.html

DOE Order 430.1B – *Real Property Asset Management*, September 24, 2003.
https://www.directives.doe.gov/directives/current-directives/430.1-BOrder-bc1/view

DOE Order 430.2B – *Departmental Energy, Renewable Energy and Transportation Management*, February 27, 2008.
https://www.directives.doe.gov/directives/current-directives/430.2-BOrder-b/view

DOE Order 450.1A – *Environmental Protection Program*, June 4, 2008.
https://www.directives.doe.gov/directives/current-directives/450.1-BOrder-a/view