U.S. Department of
ENERGY

2011 Strategic Sustainability Performance Plan

Report to The White House
Council on Environmental Quality

United States Department of Energy
Washington, DC 20585

CONTENTS

SECTION 1: AGENCY POLICY AND STRATEGY

I. Agency Policy Statement

In this second annual Strategic Sustainability Performance Plan (SSPP), the Department of Energy commits to act aggressively 'with the fierce urgency of now.' Considering the challenges of strengthening the Nation's economy and confronting global climate change, and energy insecurity, DOE recognizes its mission is vital and urgent and can only succeed through teamwork and continuous improvement.

DOE commits to meeting its sustainability goals and reducing greenhouse gas emissions by:

- **Enhancing Efficiency Gains.** DOE laboratories have set up cross-functional teams to identify cost-effective energy solutions. These efforts will build on past successes, including the implementation of a DOE-developed cryogenic refrigeration innovation at three DOE megawatt-scale particle accelerators, which reduces their electricity needs by one-third.
- **Expanding Clean Energy.** DOE will continue to leverage its own expertise to identify and pursue utility scale renewable energy projects on DOE land. By the end of FY 2011, DOE will operate new biomass and photovoltaic renewable plants providing 52 megawatts of clean energy. The Department will pursue larger utility scale renewable energy projects that could provide up to 155 megawatts in new clean energy through cross-cutting laboratory partnerships. DOE will prioritize resources rigorously and highly leverage the assets at its disposal to develop and deploy clean energy technologies.
- **Evolving Sustainable Campuses.** DOE sites will accelerate efforts to transform its sites into sustainable campuses. For example, Oak Ridge National Laboratory's (ORNL) Sustainable Campus Initiative integrates technologies, operations, and business processes to promote sustainability. Many DOE sites, including ORNL, make use of energy savings performance contracts (ESPC) and utility energy savings contracts (UESC), avoiding the need to use appropriated funding for some energy efficiency projects. DOE will maintain its status as a top agency user of ESPCs, as it has awarded over $400 million of ESPC projects that annually save over 5 trillion BTU since 2007.
- **Engaging Employees and the DOE Community.** Through this SSPP and its newly established Sustainability Performance Office, DOE will cut across stove-piped programs, embrace whole-enterprise thinking, and challenge established habits and procedures. DOE encourages behavior change through a Department-wide annual sustainability awards program that recognizes sustainability achievements throughout the complex. Leading by example, DOE Headquarters also implemented an electricity reduction competition between different sectors of the DOE Forrestal building to raise awareness and save energy.

As a leader in developing clean energy and energy efficiency technologies, DOE will continue to aggressively leverage its core mission to ensure that the Department meets and exceeds the goals of Executive Order 13514, while leading the Federal government and the Nation to a more sustainable future.

Daniel B. Poneman
Senior Sustainability Officer
Deputy Secretary of Energy

5/31/2011
Date

II. Sustainability and the Agency Mission

Sustainability is fundamental to the Department of Energy's research mission and operations as reflected in the Department's Strategic Plan. The mission of the Department of Energy is to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions. We are implementing our mission through the following strategic goals:

- Catalyze the timely, material, and efficient transformation of the Nation's energy system and secure U.S. leadership in clean energy technologies
- Maintain a vibrant U.S. effort in science and engineering as a cornerstone of our economic prosperity, with clear leadership in strategic areas
- Enhance nuclear security through defense, nonproliferation, and environmental efforts

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 sustainability Executive Orders (EOs) and statutes.[1]

Clean Energy

There is compelling evidence that carbon-dioxide (CO_2) emissions from human activities are adversely affecting the climate. Any path close to "business as usual" will imperil future generations with dangerous and unacceptable economic, social, and environmental risks. The conventional use of fossil fuels is a major source of these emissions. In particular, our excessive dependence on oil is taking us down a costly, insecure, and environmentally dangerous path. Our responsibility to future generations is to eliminate greenhouse gas (GHG) emissions and transition to a sustainable energy future. The Department champions sustainability initiatives in such diverse areas as vehicle and fuel technologies, building technologies, renewable energy

[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); Resource Conservation and Recovery Act of 1976; National Energy Conservation Policy Act of 1978; Energy Policy Act of 1992; Energy Policy Act of 2005; Energy Independence and Security Act of 2007.

technologies, and energy efficiency and storage. DOE is committed to integrating the results of these initiatives into our operations to achieve the goals of the relevant EOs and statutes.

Science and Engineering

Innovation will drive our economic prosperity in an increasingly competitive world. DOE must continue to cultivate technology through basic science and research to discover new ways of harnessing energy. Although the U.S. still leads the world in computers, communications, biotechnology, aerospace, and other technology industries, we are being challenged in all of these areas. It is imperative that we reverse the loss of U.S. manufacturing jobs, particularly in high technology manufacturing, and maintain a wide set of opportunities for our citizens by rebuilding manufacturing capabilities.

Nuclear Security

The Department is committed to learning from the recent disaster in Japan and will continue to strengthen America's nuclear safety and security to ensure protection from these types of events. These issues 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. DOE also 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.

Objectives and Implementation

DOE will address sustainability through the following key objectives:

- Enhancing efficiency gains
- Improving data quality to inform operations and decision making
- Evolving sustainable campuses
- Applying the best sustainability practices
- Engaging employees and the DOE community
- Adopting emerging, promising technologies
- Integrating sustainability into existing management structures

As DOE's mission continues to evolve, increases in energy consumption and GHG emissions may occur. While striving to achieve progress in innovative energy development, some DOE facilities are energy and/or water intensive and may increase use of these resources. DOE will identify opportunities to improve the energy and water use efficiency of these facilities and any additional increases in energy consumption to ensure we meet our sustainability goals.

High energy mission specific facilities (HEMSF) at the Department's National Laboratories play an essential and unique role in fundamental research and in development of the innovative, breakthrough technologies required for DOE to deliver on its core missions in energy, scientific discovery and national security. HEMSF are separately constructed, mission-specific facilities, such as accelerators (particle and light sources), reactors (fusion and fission), high performance computers, high performance lasers and similar facilities and the closely coupled conventional facilities necessary for their operations HEMSF. HEMSF represent unique and often world-leading, core-mission relevant, capabilities relative to other research apparatus funded by DOE, other government agencies and /or industry. Many of HEMSF are user facilities effectively managed by DOE and used by scientists and engineers across the globe to conduct research and development. Such facilities account for a significant percentage of DOE's electrical energy consumption.

Planned new HEMSF are designed with energy efficiency in mind and incorporate successful energy reduction strategies. For example, the development of an energy saving refrigeration innovation called the "Ganni Cycle" has been developed at Thomas Jefferson National Accelerator Facility (J-Lab) for application to cryogenic refrigeration systems. This innovation was subsequently adopted by two other DOE megawatt-scale particle accelerators: Brookhaven National Laboratory's (BNL) Relativistic Heavy Ion Collider (RHIC) and the Spallation Neutron Source (SNS) at Oak Ridge National Laboratory (ORNL). This innovation reduces their electricity needs by one-third over the conventional refrigeration technology.

DOE performs its mission while operating in 47 locations across the U.S. with a Federal and contractor staff of over 127,000.

Total # Employees	127,376[a]
Total Acres Land Managed	2,300,000
Total # Facilities Owned	18,713
Total # Facilities Leased (GSA lease)	55
Total # Facilities Leased (Non-GSA)	446
Total Facility Gross Square Feet (GSF)	129,000,000
Operates in # of Locations throughout U.S.	47[b]
Operates in # of Locations outside of U.S.	N/A
Total # Fleet Vehicles Owned	3,928
Total # Fleet Vehicles Leased	11,180
Total # Exempted-Fleet Vehicles (Tactical, Emergency, Etc.)	835
Total Operating Budget FY 2010 ($MIL)	$24,425
Total # Contracts Awarded FY 2010	4,889
Total Amount Contracts Awarded FY 2010 ($MIL)	$20,671
Total Amount Spent on Energy Consumption FY 2010 ($MIL)	$401
Total MBTU Consumed per GSF	249.3
Total Gallons of Water Consumed per GSF	62
Total Scope 1&2 GHG Emissions (Comprehensive) FY 2008 Baseline $MMTCO_2e$	4.634
Total Scope 1&2 GHG Emissions (Subject to Agency Scope 1 & 2 Reduction Target)	4.622

FY 2008 Baseline $MMTCO_2e$	
Total Scope 3 GHG Emissions (Comprehensive) FY 2008 Baseline $MMTCO_2e$	0.858
Total Scope 3 GHG Emissions (Subject to Agency Scope 3 Reduction Target) FY 2008 Baseline $MMTCO_2e$	0.851

[a] 14,945 Federal Employees, 112,431 Contractor Employees as of September 30, 2010

[b] Includes major sites as listed in the FY 2010 DOE GHG Inventory Management Plan

III. Greenhouse Gas Reduction Goals

The Department established the following GHG reduction goals for FY 2020:

- Scope 1 & 2: 28% from the FY 2008 baseline
- Scope 3: 13% from the FY 2008 baseline

DOE established its FY 2008 target baseline as:

- Scope 1 & 2: 4,622,785 $mTCO_2e$
- Scope 3: 851,778 $mTCO_2e$.

In the FY 2010 GHG inventory DOE reported target emissions of:

- Scope 1 & 2: 4,003,023 $mTCO_2e$,
- Scope 3: 841,841 $mTCO_2e$

DOE reduced Scope 1 & 2 emissions by 13 percent and Scope 3 emissions by one percent since FY 2008. DOE's Scope 1 & 2 emissions reductions are primarily due to credits from renewable energy certificate (REC) purchases, energy efficiency improvements and fugitive emission reductions.

Additionally, DOE will continue to reduce its emissions by:

- Prioritizing investment in efficiency measures and infrastructure improvements based on carbon intensity
- Evaluating proposed projects by accounting for economic, social, and environmental costs and benefits
- Reducing the use of petroleum-based fuels and number of vehicles in the Federal fleet
- Deploying operations and maintenance best practices
- Installing asset-level metering to better manage resource use
- Meeting the Federal Guiding Principles for High-Performance Sustainable Buildings
- Reducing GHGs and non-CO_2 fugitive emissions, specifically sulfur hexafluoride (SF_6)
- Exploring low carbon energy technologies such as fuel cells, cogeneration, biomass, and other renewable technologies

- Expanding the use of teleconferencing, video conferencing, and web-based meetings to reduce employee air travel
- Establishing an employee telework pilot and hoteling framework
- Providing employee incentive programs for car/van-pooling and use of public transportation
- Reducing transmission and distribution (T&D) losses through additional on-site power generation
- Reducing the amount of waste sent to landfill by increasing sustainable purchasing and diversion rates

The full benefit of efforts to reduce GHG emissions will be realized as DOE embraces a full range of sustainable practices. To promote employee engagement and raise energy conservation awareness, DOE initiated the "Forrestal Electric Metering Competition" in January 2011. This Headquarters metering campaign designated sub-metered zones that compete against each other to achieve the greatest energy reductions specifically associated with individual employee electricity use. All DOE employees, both Federal and contractor alike, are expected to engage in sustainable behavior.

The American Recovery and Reinvestment Act (Recovery Act) provided significant research and development funding that will benefit the entire Nation, in addition to the Federal government:

- $16.8 billion provided to DOE's Office of Energy Efficiency and Renewable Energy (EERE) to advance clean energy development including biomass, geothermal, solar, wind and hydropower
- $2 billion directed to DOE's Advanced Research Projects Agency (ARPA-E), Office of Science (SC) and Loan Guarantee Program to develop and advance emerging clean energy technologies
- $3.4 billion provided to DOE's Office of Fossil Energy to further develop carbon capture and storage technologies
- $2.85 billion issued to DOE's Office of Energy Efficiency and Renewable Energy to develop advanced batteries, transportation electrification and vehicles technologies

Recovery Act funding increased the pace at which DOE is decommissioning its facilities, some of which consume significant energy. For example, the Recovery Act is accelerating the cleanup and demolition of the Hanford Plutonium Finishing Plant, which will reduce electricity consumption by over 15,000 MW per year. Despite these reductions, Recovery Act projects have also resulted in temporarily larger fleets and the construction of temporary new office space. DOE anticipates this increase in activity to decline with the completion of these activities, well before FY 2020. For example, the construction of temporary office space at Hanford will bring about a short term increase of approximately 219 MWh per year but is only expected to last until FY 2012.

Numerous Federal agencies benefited from Recovery Act funding used by the DOE Federal Energy Management Program (FEMP) to provide additional technical assistance to agencies.

FEMP leveraged $13M in Recovery Act funding to implement one-year technical assistance efforts resulting in $74M worth of energy efficiency, renewable energy, training and smart grid projects throughout the Federal government.

DOE also leveraged Recovery Act funding to provide a grant to Clark Atlanta University (CAU) for creation of the Atlanta University Consortium (AUC) Sustainability Campus Community Initiative (ASCCI). This collaborative venture includes CAU, Morehouse College, and Spelman College and seeks to develop future generations of energy conscious leaders. ASCCI will create programs for college students and college-bound high school students to receive employment and hands-on training at AUC facilities and DOE Laboratories.

IV. Plan Implementation

a. Internal and External Coordination and Communication

The Department's sustainability successes rely on transparency, teamwork and communication. Points of contact have been established in every Departmental element, creating a core framework of sustainability, programmatic and technical subject matter experts.

DOE utilizes the following elements to coordinate and communicate its sustainability efforts:

- **Senior Sustainability Steering Committee (SSSC).** The Associate Deputy Secretary 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, Chief Information Officer, Director of the Sustainability Performance Office and the Assistant Secretary for Energy Efficiency and Renewable Energy.
- **Sustainability Performance Office (SPO).** As the DOE corporate lead for sustainability, the SPO supports the Deputy Secretary in performing the duties of the SSO, as well as the Under Secretaries, Power Marketing Administrations, DOE National Laboratories and sites, and other offices as appropriate.
- **DOE Sustainability Working Group (SWG).** This group features representatives from each Under Secretary office, involved Departmental elements, PMAs and individuals from the field. The SWG provides an open forum for issue discussion and charters sub-working groups to investigate specific sustainability issues.
- **Under Secretarial Offices, PMAs, Office of Management.** Each Under Secretary, PMA and real-property owning organization designated sustainability points of contact that serve as the main point of contact on all sustainability issues. The Under Secretaries plan, resource, implement, monitor, report and manage the achievement of DOE's sustainability goals. The Under Secretaries will coordinate with each other to leverage best practices and ensure the successful achievement of DOE's sustainability goals.
- **Corporate Partners.** Several Headquarters support offices play key roles in sustainability implementation, including developing policies and guidance, coordinating working groups and assistance networks, and developing and deploying training and technical assistance.

These members also established points of contact, participate in the SWG and work closely with the SPO in implementing the Department's SSPP.

Implementation and coordination of the SSPP occurs 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 enhance the communication of plan implementation. The Department's directives system incorporates and institutionalizes implementation procedures by which DOE will meet SSPP goals.

For long-term implementation and oversight, the Department established the Sustainability Performance Office. The SPO provides corporate oversight of requirements set forth by statutes, regulations, EOs, Secretarial, Presidential, and Congressionally-mandated goals. The SPO collects performance and planning data and conducts sustainability analysis and reporting for DOE to foster behavior change; facilitate information management; and evaluate performance and report progress toward sustainability goals.

b. Coordination and Dissemination of the Plan to the Field

The SSPP is developed with significant participation from Headquarters elements, field representatives, and DOE Management and Operating (M&O) 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. The sustainability points of contact will continue to coordinate all activities with their field counterparts. The new DOE Order on Departmental Sustainability (436.1) codifies the implementation of the SSPP by all Departmental Elements, sites and National Laboratories. DOE Order 436.1 provides an overarching sustainability policy for the Department to ensure compliance with sustainability requirements and statutes implemented through the SSPP, Site Sustainability Plans (SSPs) and Environmental Management Systems (EMSs). The SSPP is available to all of DOE and the public on the SPO website (www.sustainability.energy.gov). DOE Order 436.1 is available at DOE's directives website (www.directives.doe.gov).

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 ensures continued senior level attention to achieving sustainability goals. Further, DOE Order 436.1 ensures that senior leaders, managers, staff, and DOE contractors are accountable for meeting sustainability requirements.

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

d. Agency Policy and Planning Integration

DOE's Strategic Plan exemplifies the Department's commitment to sustainability. The plan commits DOE to:

- Lead by example in transforming domestic energy use,
- Partner with other Federal agencies to influence energy consumption and sustainability across the government, and
- Ensure DOE's real property portfolio is managed effectively and sustainably to meet current and future needs by the most economical means available.

The SSPP embodies DOE's sustainability commitment laid out in the Strategic Plan. The Department has integrated the SSPP into ongoing policy and planning efforts. Execution of the SSPP is also integrated into the Department's performance planning, budget formulation and execution processes. Table 1 provides detailed information on the linkage to other policy and planning mechanisms.

e. Agency Budget and Policy Integration

Consistent with the objectives of EO 13514, the Department continues to integrate the principles of sustainability into its decision-making and budget development processes. The annual budget process is informed by the goals of the SSPP, starting at the Under Secretary level and progressing through the Program Secretarial Offices (PSO) to the sites. Internal DOE budget guidance includes information on the importance of sustainability, GHG emissions reduction, and resource conservation. The Department is continuing to 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 well as research additional financing options. ESPC projects that require appropriated funding payments may be submitted through the DOE budget process.

f. Methods for Periodic Monitoring and Evaluation of Progress

DOE continues to 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, sustainable acquisition and product purchases, and best practices data
- 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, training 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
- Ten Year Site Plans (TYSP) collect planned additions or changes to the real property portfolio
- Integrated Facilities Infrastructure (IFI) Crosscut identifies the resource requirements associated with TYSP implementation
- Facilities Information Management System (FIMS) collects data concerning real property attributes and use, including achievement of High Performance Sustainable Building Guiding Principles
- Annual EMS reporting, conducted through FedCenter, collects information on the scope and status of DOE EMSs
- DOE Internal Scorecards display current performance on sustainability goals and provides future performance projections
- OMB Scorecards assess DOE status and progress on sustainability actions

DOE will continue to research the implementation of enterprise software to reduce data calls, implement dashboards and streamline the number of systems used to collect sustainability data.

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, “No” means it has not yet been planned for integration and “N/A” means integration is not applicable or not appropriate.

Table 1: Critical Planning Coordination

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	Yes	No	Yes	No	Yes	Yes
Agency Capital Plan	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Circular A-11 300s	N/A	N/A	N/A	No	N/A	N/A	N/A	Yes	No	N/A
Annual GHG Inventory and Energy Data Report	Yes	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Yes	N/A
EISA Section 432 Facility Evaluations/ Project Reporting/ Benchmarking	Yes	N/A	N/A	Yes	Yes	Yes	N/A	N/A	Yes	Yes
Budget	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Asset Management Plan / 3 Year Timeline	N/A	N/A	N/A	Yes	Yes	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	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
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	Yes	N/A	N/A	N/A	N/A	Yes	N/A
Environmental Management System	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Instructions for Implementing Climate Change Adaptation Planning	N/A	N/A	N/A	N/A	Yes	Yes	N/A	N/A	N/A	Yes
Other (reports, policies, plans, etc.)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DOE Site Sustainability Plans	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DOE High Performance and Sustainable Buildings Implementation Plan	No	No	N/A	Yes	Yes	Yes	Yes	Yes	No	N/A
Affirmative Procurement Plan for Green Purchasing	Yes	N/A	N/A	Yes	No	Yes	Yes	Yes	Yes	No

Federal Procurement Data System	N/A	N/A	N/A	Yes	N/A	N/A	N/A	Yes	Yes	N/A

V. Evaluating Return on Investment

The Department is working to 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) that includes the full lifecycle costs and benefits of the project, and then on an ROI that includes environmental and social benefits. For the purpose of prioritizing projects, 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 also consider (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. ROI 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 and established by "Social Cost of Carbon for Regulatory Impact Analysis" in EO 12866.[2]

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. For the purposes of the ROI, 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), maintaining emergency crude oil reserves, 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 and efficiency opportunities at these facilities to maximize GHG reductions.

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.

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

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, mission dependency, 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 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, Vulnerability and Adaptation

Climate change is expected to affect the U.S. in a number of ways. Warming oceans are expected to 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 industrial processes, 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.

To address the requirements of the *Federal Agency Climate Adaptation Planning Implementing Instructions*, DOE designated its Associate Deputy Secretary as the DOE Senior Agency Official responsible for climate adaptation planning. An internal DOE Climate Change Adaptation Planning Working Group was recently established to assess DOE's climate change vulnerability and develop DOE's climate change adaptation planning documents. This working group is co-chaired by the SPO and the Office of Climate Change Policy and Technology in the Office of Policy and International Affairs (PI).

g. Alternative Funding Approaches

The Department utilizes fixed price, performance based contracts such as ESPCs and UESCs to make investments in energy efficiency and conservation measures. By using these approaches, the Department leverages private sector financing and expertise. When entering into these contracts, 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 continue to engage in internal communication to enhance continuous improvement in the implementation of the EOs and related statutes. This includes gathering data and operational experience from DOE programs and sites through existing reporting processes wherever possible, and dissemination of internal scorecards to provide feedback on progress toward goals. DOE also established a virtual comment box accessible to all DOE staff through email (sustainability@hq.doe.gov) to collect ideas and suggestions on DOE sustainability efforts.

Information is accessible through DOE's website where the SSPP, and associated milestones/performance information, are posted. DOE provides periodic updates on the status of programs, initiatives and accomplishments associated with the SSPP. This information can be found at www.sustainability.energy.gov.

SECTION 2: PERFORMANCE REVIEW & ANNUAL UPDATE

I. Summary of Accomplishments

DOE is proud to list its many major sustainability achievements achieved in FY 2010. DOE employees and contractors creatively and actively overcome many challenges to integrate sustainable practices into their operations. These accomplishments have not gone unrecognized. For example, the Council on Environmental Quality (CEQ) gave Green Gov Presidential Awards to two DOE sites:

- Green Innovation Award: Sandia National Laboratories (SNL) is now using 350 solar-powered Global Electric Motorcars carts as primary means of campus transportation, avoiding approximately 184,800 pounds of carbon dioxide and 700 pounds of sulfur dioxide annually.
- Lean, Clean and Green Award: DOE's Idaho National Laboratory (INL) implemented sustainable transportation programs and practices including streamlining its fleet of 115

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

buses and using alternative fuels. Overall, this initiative decreased DOE petroleum fuel consumption by 21 percent and increased alternative fuel use by 56 percent.

Bonneville Power Administration (BPA) received recognition from EPA for achievements in two categories in the EPA Region 10 2010 Champions of Environmental Leadership and Green Government Award competition: Overall Environmental Leadership and Energy. BPA received the Overall Environmental Leadership award for their Energy Smart Federal Partnership. Between FY 2001 and FY 2010, BPA completed energy efficiency projects with 21 Federal agencies in the Pacific Northwest, resulting in electrical savings of more than 170 million kWh per year. These projects also generated gas, steam and water savings. BPA and their Bureau of Reclamation partners received the Energy award for their Grand Coulee Dam lighting retrofit project. The project retrofitted or replaced more than 10,000 fixtures, raising the Dam's capacity by nearly 9 million kilowatt-hours per year.

DOE also maintains several awards programs that recognize and incentivize sites and programs for excellence in sustainability performance. Winners will be recognized in a sustainability award ceremony in October 2011.

Many of the projects described below not only demonstrate DOE's commitment to sustainability but also illustrate how an integrated project can contribute to multiple sustainability goals.

Overall, as a result of these efforts and those listed below, DOE is on track or ahead of schedule in meeting a number of its sustainability goals:

Greenhouse Gas Scope 1 & 2

- Target: - 28 percent by 2020, from a 2008 baseline
- 2010 Status: 13 percent reduction

Energy Intensity

- Requirement: -15 percent in 2010, -30 percent by 2015 from a 2003 baseline
- 2010 Status: -18 percent reduction

Electricity from Renewable Energy Sources

- Requirement: 5 percent in 2010-2013, 7.5 percent by 2013
- 2010 Status: 9 percent

Potable Water Intensity Reduction

- Requirement: 2 percent annually from 2007, 16 percent by 2015, 26 percent by 2020
- 2010 Status: 12 percent reduction

Energy Intensity and Renewable Energy

In FY 2010, Secretary Chu directed all DOE offices to install cool roofs whenever cost effective over the lifetime of the roof when replacing or constructing new roofs at DOE facilities. Cool roofs can reduce energy use for cooling by up to 15 percent, which in turn reduces cooling related costs and GHG emissions. Leading by example, the Department installed a cool roof on the West building of its Forrestal headquarters complex in December 2010, with another scheduled for completion in the fall of 2011. Many DOE sites including BNL, also installed cool roofs in FY 2010. In addition, NNSA and the Office of Nuclear Energy (NE) proactively support the Secretary's "cool roofs" initiative. NNSA established its Roof Asset Management Program (RAMP) in 2005 and adopted cool roofs as the program standard in FY 2007. In FY 2010, 420,000 square feet of cool roofs were installed at six NNSA sites, and 66,000 square feet at INL. These new roofs total nearly half a million square feet and, in conjunction with their concurrent insulation upgrades, will result in annual savings of $100,000 in heating and cooling costs.

DOE's sites continue to aggressively pursue opportunities to generate renewable energy on site, innovating as necessary, to find economically viable and regionally appropriate solutions. In FY 2010, DOE exceeded the FY 2013 renewable energy goal by obtaining 9 percent of the energy it consumed through on-site renewable energy generation or the purchase of renewable energy credits.

Also in FY 2010, BP Solar began construction of one of the Nation's largest solar photovoltaic arrays on DOE/BNL property. The 32 MW of solar photovoltaics (PV) is being developed for the Long Island Power Authority (LIPA). BNL worked extensively with LIPA, BP Solar, the State of New York, and other organizations to evaluate the site and develop the project. Upon start-up in late FY 2011, the array will be the largest single PV array in the Northeast. The project is being financed by BP Solar resulting in minimal costs to taxpayers. The array will span 195 acres and will result in an avoidance of approximately 31,000 tons of carbon per year over its 30 to 40 year life span. As an outcome of siting this large array at BNL, BP Solar and the Laboratory will develop a solar research program that will look at impacts of climate change on large utility-scale PV systems as well as R&D for solar power storage and inverter efficiencies. Brookhaven Site Office (BHSO), SC and BNL are working with FEMP to explore the possibility of credit for the siting of the large array towards BNL's on-site renewable energy goals.

At ORNL, work with regional and local partners resulted in the development of a solar-assisted charging station for electric vehicles. Funded by the Recovery Act and regional partner funding, the project became operational in April 2011. The charging stations are comprised of solar paneled canopies over parking lot spaces equipped with outdoor battery storage to accommodate vehicle charging requirements and grid demands during peak periods. ORNL is also developing a new biomass plant through an ESPC to replace an aging dual fired plant (natural gas and fuel oil), which is expected to reduce energy consumption of its offices and laboratories by 50 percent, water usage by 23 percent, fossil fuel consumption by 80 percent, and Scope 1 GHG emissions by 46 percent (relative to the FY 2008 baseline). The ORNL project

clearly demonstrates how multiple sustainability can be addressed by one well-developed and deployed, integrated project.

At Y-12, a coal-fired plant in operation since the 1950s was replaced. The old plant had experienced repeated boiler failures and mechanical problems during the coldest temperatures of the 2009 - 2010 winter season and its boilers had declined to 52 percent efficiency, requiring a yearly average of 51,000 tons of coal resulting in 5,000 tons of ash. The new boilers are 82 percent efficient and use natural gas to produce the required steam with no resulting ash. The emission from the plant of particulate matter, sulfur dioxide and nitrogen oxide are projected to decrease by approximately 71, 99 and 95 percent, respectively. This project also contributes to water, GHG, and waste reduction goals.

The National Renewable Energy Laboratory's (NREL) solar thermal installations produce an estimated 10.2 MBTU of renewable thermal energy through the solar hot water systems, ventilation air preheating systems, and trombe walls. The Renewable Fuel Heat Plant (RFHP) utilizes urban wood wastes and forest thinnings generated from Front Range Healthy Forest Initiative activities and other wood wastes to displace natural gas usage on site. This project was installed through an ESPC and is projected to offset nearly 63 percent of NREL's current natural gas use.

Fugitive Emissions

J-Lab pioneered a SF_6 capture and recycle system in 1997, well in advance of any external requirement to minimize fugitive emissions. J-Lab continues to improve and adapt the system, which has prevented the release of 900,000 $mTCO_2e$ to date. J-Lab is also assisting other DOE facilities examining similar approaches.

Argonne National Laboratory (ANL) formed an SF_6 users group in FY 2010 to raise awareness, evaluate opportunities for reductions, and develop and implement leak detection and repair procedures. This effort led to a 73 percent reduction in SF_6 emissions for ANL when compared to the FY 2008 baseline.

Lawrence Livermore National Laboratory (LLNL) reduced its annual use of SF_6 at the Flash X-Ray system by more than 87 percent by introducing a recirculation system that purifies SF_6 for reuse and reduces the amount of gas released during maintenance operations.

Princeton Plasma Physics Laboratory (PPPL) decreased its use of SF_6 by 45 percent by purchasing leak detection equipment, locating and repairing leaks, redesigning components, and improving its inventory process.

High-Performance Sustainable Buildings

In the summer of 2010, DOE and NREL completed construction of the first phase of NREL's new Research Support Facility (RSF). By virtue of its low energy design and planned consumption of

only on-site generated renewable energy, this 220,000 square foot facility is targeted for LEED Platinum certification and net-zero energy status. RSF will house over 800 NREL employees and increased the NREL campus square footage by 60 percent, while only adding an additional 6 percent in energy consumption. Designed to use 50 percent less energy than building to current code, and powered by on-site photovoltaics, the RSF showcases innovations in passive lighting, heating, and cooling technologies and design. In addition to energy efficiency, the RSF also utilizes sustainable building materials, such as recycled runway materials, piping, and regionally produced timber (from pine beetle kills).

NREL provides regular tours of the RSF for Federal agencies and regional and local partners, as well as provides assistance on how to best achieve these high performance buildings through design-bid contracts. The RSF has won over 18 prestigious awards ranging from green building to community contribution awards. In addition, Jeff Baker, Director of Laboratory Operations at the DOE Golden Field Office, received the Partnership for Public Service Samuel J. Heyman Service to America Medal (SAMMY) Science and Environmental Medal for his leadership in the design and construction of the RSF. This award recognizes a Federal employee for a significant contribution to the U.S. in activities related to science and the environment.

NNSA's Facilities and Infrastructure Recapitalization Program (FIRP) reduces maintenance backlog, improves site utilities, and eliminates excess facilities across the nuclear weapons enterprise. In FY 2010 under FIRP, NNSA converted 47 buildings from the centralized system to local boilers. The installation included 106 hot water boilers, five steam boilers, new natural gas connections and meters. The new heating system will save nearly 12 million gallons of water per year and is about 85 percent efficient, compared to the 65 percent efficiency rating for the old boilers. It will reduce both energy usage and associated pollutants by about 60 percent. Sixty percent of the materials removed from buildings to prepare for the installation of the local boilers were recycled.

The Science Laboratory Infrastructure (SLI) portfolio accounts for 16 buildings which will be compliant with Guiding Principles for Sustainable Existing Buildings by FY 2015. The Physical Science Facility (PSF) at Pacific Northwest National Laboratory (PNNL) achieved a LEED Silver certification and the two companion third party financed projects achieved LEED Gold. The Modernization of Laboratory Facilities (MLF) project at ORNL will obtain LEED Gold certification after construction is complete. All SLI projects, including major renovations, will achieve LEED Gold certification, or equivalent.

During FY 2010, the National Energy Technology Laboratory (NETL) began construction on a replacement Daycare facility at its Morgantown, W.V. campus. The B-40 Daycare facility is being designed and constructed to meet LEED Platinum certification and will incorporate in its design geothermal heating system and a 25 kW roof mounted photovoltaic system. This system will provide electricity to the building during its peak load operation.

Regional and Local Planning

INL has been instrumental in creating the INL Park & Ride system and in supporting the Linx Transportation Cooperative. Linx is developing software and enlisting regional transportation providers and customers to build the Nation's first rural transportation cooperative. This cooperative is increasing the effectiveness, affordability, and practicality for members of the public, as well as corporate customers, to use regional mass transit providers rather than personal vehicles for transportation across significant parts of Idaho, Wyoming, and Montana. The INL Park & Ride helped streamline INL's mass transit system by providing safe, efficient and sustainable transportation to work for INL employees throughout the eastern Idaho region.

Additionally, INL installed the region's first E85 fuel island that is open to the public. INL is working with the media to inform the community that the fueling station provides both E85 and biodiesel fuels for public consumption.

The Office of Legacy Management (LM) maintains approximately 87 sites in 28 states and Puerto Rico. Of these 87 sites, several are located on tribal lands. LM coordinates and attends quarterly meetings with representatives of the Navajo Nation and Hopi Tribe to discuss local issues. LM invited representatives of these tribes to Grand Junction to present at a two day Tribal Cultural Awareness Training event that identified cultural sensitivities and supplemented training on interactions with Native American tribal governments. The training was also open to LMS contractor staff and other Federal agencies, and approximately 80 individuals attended. In addition, LM works closely with the Navajo Nation to coordinate water withdrawal from the San Juan River for use in irrigating phytoremediation plots at the Shiprock Site.

Water Use Efficiency and Management

In November 2009, the Savannah River Site (SRS) broke ground on a new biomass cogeneration facility that replaces a deteriorating, inefficient coal powerhouse and oil-fired boilers. This project will generate cost savings of approximately $35 million per year in energy and operation and maintenance costs, as well as reduce air emissions and water intake from the Savannah River by over 1.4 billion gallons per year. SRS is completing this project through an ESPC.

As part of an ESPC project, ORNL identified 65 buildings that used standard-flow plumbing fixtures. The ESPC project upgraded these plumbing fixtures by installing faucet aerators, faucet flow restrictors, low-flow showerheads, urinal flush valves, and low-flow toilets contributing to domestic water savings and reducing domestic hot water use, providing for lower fossil fuel use for water heating. This initiative eliminated the use of approximately 12 million gallons per year of potable water and the generation of approximately 12 million gallons of sanitary wastewater, reduced the use of fossil fuels used to heat the eliminated hot water use, and supported DOE's water conservation efforts and goals. The project resulted in a cost avoidance of approximately $35,000 per year.

NREL is implementing energy and water efficient features in new buildings and continuing to systematically implement water conservation retrofits such as the use of xeriscape plants that require little to no irrigation. NREL continues to only irrigate new landscaping and to rely on natural rainfall once plants are established. NREL is also participating in a 2-year Sustainable Sites Initiative (SITES™) pilot program, to promote sustainable land development and management practices that support low impact landscapes.

Pollution Prevention and Waste Reduction

DOE sites with established recycling and pollution prevention programs are realizing significant financial savings. The Y-12 Site implemented 84 reuse or recycling initiatives in FY 2010, resulting in more than 49,760 metric tons of materials being reused or recycled, which represents more than 89 percent of Y-12's industrial solid waste stream. Completed projects include transferring materials for reuse to other government agencies and to the Y-12 History Center, and recycling materials to support the overall goals of waste reduction. This diversion effort resulted in savings of approximately $4.7 million.

At ANL, the Engineering Support - Intense Pulsed Neutron Source (AES-IPNS) Group redistributed and recycled equipment and materials from a closed facility. Recycling efforts diverted over 79 metric tons from landfills, and by salvaging and distributing equipment to other DOE laboratories and facilities for reuse, the AES-IPNS group has saved DOE over $7 million in new research equipment.

NREL began a composting pilot program in April 2010 which encompassed five buildings on campus. In a six month period, NREL composted 68,468 pounds of material. In October 2010, the composting program was rolled out to the entire laboratory and nearly doubled the amount of compost from September to October. NREL's near zero waste initiative encourages staff to reduce waste in the workplace and engages employees, stakeholders and businesses in environmental practices.

For sites in remote locations, mature markets for diverted materials may not exist; however, sites are still making strides in waste prevention. Pacific Northwest National Laboratory (PNNL) helped create a local market for construction and demolition (C&D) waste. PNNL conducted market research to identify possible construction waste vendors and determined preferred method of delivery or pickup. PNNL then provided the vendor information to construction contractors, established collection areas, and incorporated collection areas and training into site orientation. In addition to diverting 200 metric tons of construction materials, this effort assisted the site in meeting LEED certification standards for the project and improved safety during construction.

Sustainable Acquisition

Site activity also includes new procurement systems and processes. For example, the Strategic Petroleum Reserve (SPR) was among those sites that recently created an integrated online tool

to facilitate procurement of green products and services that allows for tracking and reporting. J-Lab and Pantex have also taken steps to eliminate the ability of staff to purchase some non-compliant products. Much of this activity involves working relationships with the suppliers themselves, which helps ensure that sustainable acquisition is a part of any ordering or contractual arrangements. DOE sites also continue to be pioneers in fields such as biobased products. Y-12 and SNL established programs to research and evaluate new biobased products for their own use, while some sites are piloting biobased printing toner.

Electronic Stewardship and Data Centers

During the past year DOE sites conducted assessments to determine implementation of advanced metering at their primary data centers. To date, 13 DOE Sites have installed advanced metering in 23 data centers, with four additional sites (about 20 data centers) expected to be completed by FY 2012. A substantial method to reduce energy use in DOE's data centers is the implementation of virtual server technologies. Every DOE site implemented various degrees of server virtualization with major efforts being completed by NREL (70 percent virtualized), ORNL (80 percent virtualized) and SPR, where 90 percent of business servers have been virtualized.

DOE Sites also implemented power management for end user systems such as PCs, laptops and monitors. Four sites are currently testing and planning to deploy end-user advanced power management software services in FY 2011. The EPA Environmental Benefits Calculator projects financial savings of nearly $5 million dollars for DOE in FY 2010 due to Green IT lifecycle management practices. Almost three quarters of the estimated $5 million was generated through power management practices.

The Hanford “Green in Three” initiative already saved the site millions of dollars through wireless Voice Over Internet Protocol (VOIP) technology, eliminating costly facilities, cables, and wiring, as well as extensive staffing to maintain the old systems. Hanford savings have extended to other Federal agencies such as Transportation Security Administration (TSA) and the Nuclear Regulatory Commission (NRC) who have taken advantage of DOE’s data center consolidation to share space and consolidate their own operations.

NREL is leading a task to identify Green IT innovations, efforts and operational practices used by DOE laboratories that drive the development of IT and its use. This effort highlights DOE laboratory accomplishments for IT sustainability and resulting reductions in our environmental footprint. A copy of the 2010-2011 report will be released in the summer of 2011.

The DOE Golden Field Office (GFO) instituted a computer desktop/server virtualization program for approximately 500 personnel. Prior to this initiative, the average energy consumption per user was 227.48 watts, with an annual operation cost of $70.98 per user. Upon completion of the initiative, the average energy consumption per user is 29.42 watts, with an annual operation cost of $9.18 per user. Prior to virtualization, the annual GHG emissions from use of desktops and laptops was 5.6 tons of CO_2e for 125 personnel. After virtualization, the annual GHG emissions from use of thin clients/virtual machines was 2.6 tons of CO_2e for 500

personnel. The Golden Field Office was able to reduce their carbon footprint significantly and realize a 52 percent reduction in cost even with a 75 percent increase in users.

II. Goal Performance Review

GOAL 1: Scope 1 & 2 Greenhouse Gas Reduction

DOE's Scope 1 & 2 GHG reduction target is 28 percent from the FY 2008 baseline by FY 2020. To reach it DOE will continue to:

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

DOE established its FY 2008 target baseline as:

- Scope 1 & 2: 4,622,785 mTCO_2e

In the FY 2010 GHG inventory DOE reported emissions of:

- Scope 1 & 2: 4,003,023 mTCO_2e

Between FY 2008 and FY 2010, DOE reduced Scope 1 & 2 emissions by 13 percent. DOE will continue to participate in interagency Scope 1 and 2 emissions, high performance sustainable buildings, renewable energy, and energy intensity workgroups, especially regarding best practice sharing and data collection and calculations. Additionally, DOE set internal interim targets to ensure achievement of GHG emission goals presented in the SSPP and to showcase the Department's commitment to being a leader in Federal sustainability efforts.

a) Buildings

1) Reduce Facility Energy Intensity

DOE's real property portfolio includes over 10,000 buildings and trailers representing roughly 129 million gross square feet (GSF) of office buildings, laboratories, staging facilities, and warehouses at 47 major sites across the country.[4]

[4] DOE currently owns approximately 22 million 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

a. Goal Description

The National Energy Conservation Policy Act (NECPA), as amended by EISA 2007, requires a 30 percent energy intensity reduction for Federal facilities by 2015 (relative to a 2003 baseline). The goal set in Section 2a of EO 13423 is consistent with the law.

b. Agency Lead for Goal

The three Under Secretaries, PMAs and the Headquarters facility manager are responsible for meeting the target within their respective portfolios, including planning, budgeting, development, implementation and oversight.[5] A portfolio is defined as the total inventory of land, buildings, other structures and improvements under the cognizance of each Under Secretary, PMA and/or the Headquarters facility manager. The SPO, Under Secretary sustainability points of contact, site offices and Office of Engineering and Construction Management (OECM) provide technical assistance and oversight.

c. Implementation Methods

Projects to meet the energy intensity goal are identified and developed wherever possible. The Department will continue to focus on:

- Metering individual buildings and processes[6] for energy performance
- Benchmarking building performance and identifying best practices
- Implementing projects (energy conservation measures [ECM]) including recommissioning of buildings
- Employing the principles of high performance sustainable building design for all new construction
- Educating DOE employees and encouraging their participation in workplace energy conservation programs and activities
- Ensuring all new construction and major renovations over $5 million are at least LEED New Construction (NC) Gold certified

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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.

[5] 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 (PMA) is individually responsible for their organization.

[6] A distinct energy or water consuming operational system traversing multiple buildings and/or "other structures and facilities (OSF)" [as classified in DOE's Facilities Information Management System (FIMS)]

- Performing recommissioning assessments at 75 percent of DOE facilities to identify and implement priority recommissioning measures
- Assessing DOE facilities through energy, natural gas, steam, and water audits and condition assessments to identify potential projects to support sustainability goals

DOE's near–term priority is metering its buildings and processes, and conducting energy audits and assessments. To facilitate achievement of energy intensity goals and showcase the Department's commitment to leading Federal sustainability efforts, internal metering goals were set that exceed requirements of statute and EO. These actions will help identify projects that support SSPP goals, and will be aligned, with audits required by Section 432 of EISA 2007.

Over time, buildings depart from their design behaviors. These deviations may occur from operator intervention, sensor degradation or equipment malfunction. These energy assessments and audits will also include evaluations of the need for recommissioning.

DOE will leverage expertise from its program offices wherever appropriate, such as the Federal Energy Management (FEMP), Building Technologies, and Industrial Technologies Programs. These programs will provide technical assistance to sites and programs, through the SPO and designated sustainability representatives for the Under Secretaries, PMAs and HQ to support the Department's achievement of its sustainability goals.

NECPA, as amended by EPAct 2005 and clarified by the current published FEMP guidance[7], requires the installation of electrical meters by 2012 on all individual buildings with the use of advanced electrical meters "to the maximum extent practicable." EISA 2007 adds to this requirement that appropriate buildings must also be metered for natural gas and steam by FY 2016. DOE developed and disseminated internal metering guidance that clarifies metering performance and reporting requirements, including the Department's own goals and directives, and outlines the key elements of a proper metering plan. All of DOE's sites are in the process of updating metering plans in September 2011 and each year thereafter.

The majority of DOE buildings fall into one of two groups: a multi-building facility (often called a campus), or stand-alone buildings. DOE will meter by these categories:

1) Multi-building sites:

- For each site, DOE will install electricity meters on individual buildings or processes so that these individually metered buildings and processes account for at least 75 percent of the site's total electricity use by October 1, 2011, working toward a goal of 90 percent by October 1, 2012.

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

- For each site, DOE will install natural gas, steam and chilled water meters on individual buildings or processes so that these individually metered buildings and processes account for at least 10 percent of the site's natural gas, steam and chilled water use by October 1, 2011 (10 percent for each utility) and 90 percent by October 1, 2015 (90 percent for each utility).

2) Stand alone buildings, such as headquarters buildings in Washington, D.C., and Germantown, MD, that are not part of multi-building facilities, will be metered for electricity, natural gas, and steam, and chilled water, and benchmarked annually using monthly energy usage data.

DOE Under Secretaries are responsible for ensuring the above requirements are met for multi-building sites and stand-alone buildings, and that:

- At least 90 percent of electricity use across their Under Secretary portfolio is metered at an individual building or process level by the beginning of FY 2012.
- At least 90 percent of natural gas, steam and chilled water (90 percent for each utility) use across their Under Secretary portfolio is metered at an individual building or process level by the beginning of FY 2015.

To increase transparency of energy and building performance information, DOE will use metering data for benchmarking as a key energy efficiency management tool. Benchmarking 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 enable DOE decision makers to analyze building energy use on a building, site, or portfolio level to better inform corporate budget decisions.

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

- Installing energy conservation improvements in existing buildings (equipment upgrades; improving maintenance, commissioning procedures, and operating procedures, retrofitting with "cool roofs"[8] unless determined uneconomical by a lifecycle cost analysis and ENERGY STAR® materials and appliances, and building envelope improvements)
- Constructing new buildings that comply with the Guiding Principles for High Performance Sustainable Buildings, either outright or by equivalence
- Continue improving efficiency of process energy loads
- Utilize advanced building metering for real time control and display, and to encourage energy efficient practices

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

- Systematically considering energy reduction as a factor in the decision process for maintenance and repair
- Verifying (periodically) that High Performance Sustainable Buildings continue to meet the Guiding Principles
- Prominently recognizing innovation and high performance in energy efficiency throughout the Department
- Installing cool roofs on new construction projects currently at CD-2 or less or its equivalent or when replacing roofs unless determined not cost effective by a lifecycle cost analysis and ensuring all new roofs have a thermal resistance of at least R-30
- Purchasing energy efficient products and IT systems
- Encouraging behavior and organizational change resulting in lower energy consumption

d. Positions

Site Office and Contractor facility managers carry out these actions and are supported by Program Offices sustainability points of contact and several FTEs in SPO.

e. Planning Tables

For more information on DOE's efforts to reduce Scope 1 & 2 GHG emissions, refer to the planning table at the end of this section.

f. Agency Status

In FY 2010, DOE reported an 18 percent decrease in energy intensity from the FY 2003 baseline for facilities subject to the EPAct goal when measured in British Thermal Units (BTU) per GSF. DOE's energy intensity was 185,883 BTU/GSF in FY 2010, compared to 227,691 BTU/GSF in FY 2003. DOE received credit for purchases of 805 billion BTU of renewable energy.

The reduction in energy intensity is the result of energy conservation measures, reduction of mission-related activities, and, in some cases, the downsizing of operations and facilities. For instance, in FY 2010 DOE disposed of 350 assets, for reduction of nearly 2 million GSF. The removal of these assets from DOE's inventory reduces energy demands associated with their maintenance and operation. At the same time, new facilities are being designed for energy efficiency, and retrofits, such as those highlighted below, are generating energy savings in DOE's existing buildings.

g. Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant energy intensity projects included in the 2010 SSPP, none have been cancelled or suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI.

h. Highlights

- DOE is leading by example and promoting awareness in energy intensity reductions by sub-metering its Forrestal headquarters complex in Washington, D.C. In January 2011, DOE began its "Forrestal Electric Metering Competition", where designated sub-metered "zones" compete against each other to achieve the greatest monthly energy usage reduction. DOE is also arranging for additional lighting and HVAC system improvements at its Washington, D.C. headquarters through an ESPC, planned for completion by December 2011. These improvements are expected to result in an additional 21 percent reduction in energy intensity at Headquarters.

- DOE's sites have been finding other creative ways to take leadership to reduce their energy intensity. For example, ORNL's first "maximum energy efficiency building", Building 3156, runs exclusively on electrical power and reduced its annual electricity consumption by 40 percent (100 MWh/yr to 60 MWh/yr) through retrofit of cost-effective energy conservation measures. The remaining electricity consumed by the building is offset by an ORNL-owned, grid integrated, 65 kW photovoltaic array.

- The Los Alamos National Laboratory (LANL) completed a Detailed Energy Survey in which energy conservation measures were identified and planned through an ESPC. This will result in annual savings of $1.2M over a 20-year period. Additionally, LANL is progressing with significant footprint reduction efforts. Since FY 2003, the campus has decommissioned and demolished 667,000 square feet of campus space and anticipates the removal of an additional 900,000 square feet by FY 2014.

- On August 28, 2008, NETL awarded a Biomass and Alternative Methane Fuels (BAMF) ESPC which incorporates installation/implementation of 13 Energy Conservation Measures (ECM) at NETL's sites in Morgantown, WV; Pittsburgh, PA; and Albany, OR. Of the 13 ECM's, 11 were completed in FY 2010. An HVAC Hood Control Improvement in Morgantown is planned for completion in FY 2011.

2) *Increase Renewable Electricity Installation & Use*

DOE leads the Nation in the research, development and deployment of renewable energy. As such, DOE sites take advantage of this research and their locations in areas with abundant renewable energy resources, including solar in New Mexico, wind in Texas and Idaho, and biomass in South Carolina. In FY 2010, DOE exceeded the renewable energy goal by utilizing renewable energy credits in conjunction with on-site renewable energy generation systems for 9 percent of its energy consumption.

a. Goal Description

EPAct 2005 requires Federal agencies to ensure that no less than 5 percent of electric energy comes from renewable sources in 2010-2012, and that no less than 7.5 percent 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 agencies to install renewable energy generation on site for use by the site. The Government's policy is to acquire supplies and services that promote energy and water efficiency, advance the use of renewable energy products, and help foster markets for emerging technologies. DOE aims to ensure that, to the extent feasible, the agency implements renewable energy generation projects on agency property for agency use, as instructed in EO 13423 and EO 13514.

b. Agency Lead for Goal

The three Under Secretaries, PMAs and the Headquarters facility manager are responsible for meeting the target to include the planning, budgeting, development, implementation and oversight. The SPO, Under Secretary sustainability points of contact, site offices, FEMP and EERE program offices provide technical assistance.

c. Implementation Methods

DOE continues to evaluate promising projects and performance based contracting opportunities. In addition, DOE EERE renewable program offices are providing technical advice and assistance to DOE sites. DOE also recently signed a Memo of Understanding (MOU) to provide assistance on solar projects to the Public Building Service of the General Services Administration (GSA). The Secretary will implement policy guidance on the Department's statutory authority to give preference to Indian tribes or tribal entities for the purchase of renewable energy or renewable energy by-products (including renewable energy credits) generated on Indian lands.

DOE will continue:

- Leveraging its own technical expertise and provide technical assistance to its sites to help them develop new solutions
- Exploring opportunities for demonstrating new renewable energy technologies at DOE sites
- Developing and constructing new renewable energy on its sites
- Purchasing renewable energy credits until on-site solutions are developed
- Leveraging FEMP and EERE program expertise and work with other agencies to determine best practices for performance based contracting and investments

Ongoing site assessments and energy audits enable DOE to identify new, more promising projects. 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 existing proposals

with changes in factors influencing economic viability (e.g., local and regional energy rates, market incentives, and new or improved technologies).

DOE will evaluate the use of renewable energy Power Purchase Agreements (PPAs) in the Western U.S. for periods longer than 10 years as authorized through the Power Marketing Administrations (PMAs). In addition, 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 renewable energy production. Through its Asset Revitalization Initiative, DOE will continue to research the use of legacy nuclear weapon lands and sites for renewable energy deployment, regional and public-private partnerships and beneficial reuse.

As part of incorporating green remediation practices into the ongoing environmental cleanup program at DOE sites, the Department will collaborate with EPA in examining the feasibility of adopting tenants of the Agency's RE-Powering America's Land Initiative on locating renewable energy projects at sites undergoing clean-up. This initiative entails a practical application of the Principles for Greener Cleanups for minimizing the environmental "footprint" of activities undertaken when cleaning up a contaminated site, ensuring protectiveness of a remedy, and improving its environmental outcome through the use of renewable energy resources.

DOE will demonstrate leadership by aligning renewable energy procurement practices with stated Federal policies. Goals include:

- Producing its electricity from on–site renewable sources (electric and thermal)
- Implementing DOE policy guidance for the purchase of renewable energy or renewable energy by-products generated on Indian lands from Indian tribes or tribal enterprises
- Co-firing all coal-fed boilers with biomass to the maximum extent possible (where an economic source of biomass is available)
- Conducting large-scale demonstration of promising renewable energy technologies at DOE sites
- Providing in-house technical expertise and assistance to its sites to facilitate renewable energy projects
- Continuing to research renewable energy options including additional on-site installations, emerging technologies, and bundled RECs
- Sharing best practices and providing technical assistance to other agencies

d. Positions

Within DOE's SPO at least two permanent Federal staff are accountable for providing assistance, assessing and reporting performance on this goal part time. Under Secretary sustainability points of contact, site offices, FEMP, the Office of Indian Energy Policy and Programs, and other EERE technical programs provide assistance.

e. Planning Tables

For more information on DOE's efforts to reduce Scope 1 & 2 GHG emissions, refer to the planning table at the end of this section.

f. Agency Status

During FY 2010, DOE sites reported eligible renewable electric energy totaling 463 gigawatt hours (GWH) or 9 percent of the DOE's total electricity use of 5,133 GWH, surpassing the goal of 5 percent for FY 2010. Of DOE's total renewable electricity use, 296 GWH was new renewable energy for sources developed after January 1, 1999 (6 percent).

g. Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant renewable energy projects or initiatives included in the 2010 SSPP, none have been cancelled or suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI.

h. Highlights

- As aforementioned, SRS broke ground on a new biomass cogeneration facility that replaces a deteriorating, inefficient coal powerhouse and oil-fired boilers. This project will generate a savings of approximately $35 million per year in energy and operation and maintenance costs, as well as reduce air emissions, including 100,000 tons per year of GHG emissions.
- At PNNL, the use of geothermal heating and cooling systems in two buildings – the Biological Sciences Facility (BSF) and Computational Sciences Facility (CSF) results in energy use (30 percent) and CO_2 emissions (38 percent) reductions when compared to standard designed laboratories. The energy use reduction translates to annual savings of $270,000. In addition, the BSF and CSF each received LEED Gold certifications in FY 2010.
- NREL, already a proven leader in the development and use of renewable energy technologies, added another three new PV installations in FY 2010, bringing total renewable electricity generation to 32 percent of total campus requirements.
- A permanent 250 kW low temperature geothermal unit, a 6 kW Proven wind turbine, and a Sterling Engine are currently operating at Rocky Mountain Oilfield Testing Center (RMOTC).

RMOTC is currently producing and consuming 8.9 percent of its field electrical demand from onsite generation of renewable energy.

- LM installed a 51 kW solar photovoltaic system and solar thermal system at its Tuba City site. This system produces 4 percent of the site's power needs and supplies power to the grid when the plant is not operating. The solar thermal component reduced energy consumption at Tuba City by 10 percent.

3) Space Management Policies

Energy Information Agency (EIA) data suggests that the average commercial office worker consumes about 40 mmBTU per person per year. Comparative DOE per capita energy consumption remains unknown as the Department does not yet track all energy consumption on an asset level. DOE believes that as more detailed and accurate building level consumption becomes available due to meeting metering and reporting goals, its energy consumption data in office spaces will compare more favorably with the commercial average.

Internal DOE policies will be updated with Federal employee space requirements. DOE will also identify forums for sites to share successful practices with others, e.g., teleworking policy and its impact on space requirements.

b) Fleet

DOE maintains a diverse fleet of vehicles due to its unique set of programs and objectives, including passenger vehicles, medium- and heavy-duty trucks and special purpose vehicles. At the end of FY 2010, the DOE fleet consisted of 15,108 vehicles managed by 96 reporting organizations distributed throughout the U.S. This fleet includes 5,564 E-85 capable vehicles, 138 compressed natural gas vehicles, 537 hybrid electric vehicles (HEVs), and two liquid petroleum gas vehicles.

a. Goal Description

EISA 2007 and EO 13423 require a 2 percent per year reduction in fleet petroleum use through FY 2015 (from a FY 2005 baseline). EO 13514 incorporates this requirement and extends it to FY 2020, for an overall reduction of 30 percent. EISA 2007 requires Federal agencies to increase the use of non-petroleum fuels by 10 percent annually. EISA 2007, EO 13423 and EO 13514 all provide direction for Federal agencies to purchase low GHG emitting vehicles, including alternative fuel vehicles. DOE Headquarters Fleet Managers will develop a coordinated plan to decrease the fleet size by 35 percent from the FY 2005 baseline by FY 2015.

b. Agency Lead for Goal

The three Under Secretaries, PMAs, and the Headquarters facility manager are responsible for meeting the target within their respective organizations to include the planning, budgeting, development, implementation and oversight. SPO, Under Secretary sustainability points of contact, site offices, the Office of Management, Headquarters fleet administrators and site fleet managers provide technical assistance.

c. Implementation Methods

DOE is taking large, bold steps to reach various fleet goals. DOE will continue:

- Increasing use of biodiesel for diesel fueled vehicles
- Downsizing to smaller vehicles
- Conducting driver training
- Releasing fleet driving and acquisition best practices
- Eliminating unnecessary vehicles in the fleet
- Ensuring E-85 purchases are properly captured and reported
- Utilizing optimization tools to ensure fleets are right sized

The DOE bus fleet at INL is a major consumer of petroleum diesel fuel. INL is in negotiations with GSA to replace these buses with new buses powered by compressed natural gas. This change will greatly reduce DOE's petroleum use, increase its use of alternative fuels, and entice employees who currently drive to the site to take the provided shuttle bus (reducing Scope 3 GHG emissions). The timing and method to conduct this replacement is currently being evaluated.

DOE is in Phase II of a three year plan for acquiring a large number of HEVs. These vehicles have better fuel economy than the previous vehicles. DOE will replace 1,200 gasoline vehicles with HEVs in the near future. In addition, DOE is increasing access of E-85 capable vehicles to E-85 fuels, by relocating its E-85 capable vehicles into regions of the country where E-85 is more commercially available and installing/converting numerous filling stations on site to support the fleet of E-85 vehicles. Use of E-85 fuels increases the Department's use of alternative fuels.

DOE recognizes that electric vehicles (EVs) and plug-in hybrid electric vehicles (PHEVs) will be more available in the near future. In preparation, 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 will be tied to the installation of on-site renewable energy generation. These actions will reduce DOE's purchase of petroleum fuels and provide an incentive for commuting employees to use electric capable vehicles (EVs or PHEVs), reducing Scope 3 emissions.

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

d. Positions

Two Headquarters fleet administrators work on DOE Federal fleet issues full time. In addition, SPO, Under Secretary sustainability points of contact, site offices and site fleet managers provide technical assistance on a part time basis.

e. Planning Tables

For more information on DOE's efforts to reduce Scope 1 & 2 GHG emissions, refer to the planning table at the end of this section.

f. Agency Status

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 shift to biofuels where possible. DOE will also closely examine potential solutions in the research and development pipeline and move to adopt them where appropriate.

The commencement or completion of a large environmental management (EM) 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. During FY 2010, numerous mission increases, including accelerated cleanups funded by the Recovery Act, generated an increase in petroleum (diesel) fuel consumption for heavy duty/construction fleet vehicles. This increased demand resulted in DOE missing the 2 percent agency target for this reporting year. DOE is reviewing options to undertake additional measures to ensure continued compliance.

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

g. Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant fleet projects or initiatives included in the 2010 SSPP, none have been cancelled or suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI

h. Highlights

- DOE eliminated three of the five executive vehicles in the Headquarters DOE fleet and replaced the remaining two with energy efficient hybrid electric leased sedans from GSA
- DOE is continuing to purchase HEVs and is contributing to the development of infrastructure to support EVs and PHEVs, including PHEV stations at Headquarters, NREL, PNNL, ORNL (some are solar assisted charging)
- NNSA laboratories contributed to fleet goals by designing and operating a photovoltaic vehicle at SNL, adding hydrogen taxis to the fleet at LLNL, and converting 40 percent of the total fleet at LANL to alternative fuel/hybrid-electric vehicles

c) Fugitive Emissions

a. Goal Description

Fugitive emissions are considered to be those emissions that result from the intentional or unintentional release of non-combustion GHGs. DOE will reduce GHG emissions from non-CO_2 sources, through yearly reduction milestones in the near future.

The vast majority of DOE's fugitive GHG emissions are SF_6 gas releases, which accounted for 80.6 percent of the fugitive emissions in the FY 2010 GHG inventory. SF_6 is commonly used as an electric insulator (dielectric medium) in accelerators, switchgear, and high-voltage power supplies. Releases result from maintenance, equipment failure, and gas seepage.

b. Agency Lead for Goal

The three Under Secretaries and PMAs are responsible for target planning, budgeting, development, implementation and oversight within their respective portfolios. The SPO, Under Secretary sustainability points of contact, site offices, Office of Health, Safety and Security (HSS) and facility managers provide technical assistance.

c. Implementation Methods

DOE operates a relatively small number of facilities that use a large quantity of SF_6, and will continue to focus on opportunities to reduce emissions associated with these activities. DOE will address fugitive emissions by:

- Reducing SF_6 released during maintenance actions
- Strengthening leak detection and repair programs to minimize releases during experiments or operations
- Conducting opportunity assessments to identify reduction opportunities operations using high-GWP GHGs

- Researching an alternative dielectric medium that is eco-friendly and provides comparable or superior electrical insulation performance
- Continuing the Fugitive Emissions Working Group, which meets monthly to share best practices, emerging technologies, and policy changes

Reducing maintenance emissions is accomplished through the use of capture and storage equipment to recover and reuse high-GWP GHGs that would otherwise be released. Sites will also develop training to support the deployment of the capture equipment which is commercially available. Leak detection and repair programs, which already exist for other pressurized gas systems, can be augmented to also focus on SF_6 systems.

DOE National Laboratories generally have fewer pieces of equipment that use SF_6, but certain operations, such as accelerators, require very large quantities. DOE efforts focus on conducting process-specific opportunity assessments for reductions as well as emphasizing maintenance and leak detection.

d. Positions

Site offices and facilities managers and operations employees manage fugitive emission reductions. In addition, technical assistance is provided by SPO, HSS, Under Secretary sustainability points of contact, and several DOE offices on a part time basis.

e. Planning Tables

For more information on DOE's efforts to reduce Scope 1 & 2 GHG emissions, refer to the planning table at the end of this section.

f. Agency Status

DOE's non-combustion GHG emissions comprise approximately 11 percent of the DOE Scope 1 and 2 GHG inventory for FY 2010, and include:

- Industrial fugitive emissions – 9.3% (of DOE Scope 1 and 2 GHG emissions)
- Industrial process emissions – 0.95%
- Anthropogenic on-site landfill emissions – 0.7%
- On-site wastewater treatment facilities emissions – 0.03%

DOE combines industrial fugitive emissions and industrial process emissions as "fugitive emissions" for management purposes. Fugitive emission reductions caused a six percent drop in DOE Scope 1 and 2 GHG emission inventory.

Seven sites in FY 2010 contributed to 78 percent of total fugitive emissions and 89 percent of SF_6 emissions. While these sites are the largest fugitive emission emitters, they are also among

the sites that reported the largest decreases in fugitive emissions between FY 2008 and FY 2010. Capture and reuse efforts to reduce SF_6 in FY 2010 resulted in reductions of 42 percent when compared to the FY 2008 baseline. Additional reduction efforts will be primarily targeted to these specific sites.

DOE created the internal Fugitive Emissions Working Group (FEWG) to improve the exchange of information on technologies and approaches to managing fugitive emissions. Key goals of the FEWG are to identify measures to reduce leakage and improve capture of fugitive gases at risk of release, and to identify environmentally preferred alternatives. FEWG efforts in FY 2010 focused on SF_6 emissions abatement due to its impact on the Department's GHG inventory.

g. Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant fugitive emissions projects or initiatives included in the 2010 SSPP, none have been cancelled or suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI.

h. Highlights

- Focused efforts on SF_6 controls resulted in a 42 percent decrease in the SF_6 emissions in FY 2010 compared to the baseline
- Power administrations maintain thousands of pieces of equipment requiring a steady pressure of SF_6, making preventative maintenance and leak detection and repair operational priorities. BPA and the Western Area Power Administration (WAPA) have actively worked to minimize SF_6 emissions in their operations for over a decade with much success, achieving annual leakage rates at 1 percent or less
- SLAC National Accelerator Laboratory reduced SF_6 emissions by nearly 50 percent through tracking of SF_6 in the site's chemical management system, conducting a leak detection and corrective action campaign, replacing seals and piping where necessary, and acquiring SF_6 recovery equipment. In addition, an experiment that used large quantities of HFC-134a was discontinued after FY 2008, avoiding emissions of 4,700 $mTCO_2e$.

Goal 1 DOE Planning Table

	SCOPE 1&2 GHG TARGET	Unit	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	…	FY 20
Buildings	Energy Intensity Reduction Goals. BTU/SF reduced from FY03 base year)	%	15%	18%	21%	24%	27%	30%	…	hold
	Planned Energy Intensity Reduction. (BTU/SF reduced from FY03 base year)	%	17%	18%	21%	24%	27%	30%	…	hold
	Renewable Electricity Goals (Percent of electricity from renewable sources)	%	5%	5%	5%	7.5%	hold	hold	…	hold
	Planned Renewable Electricity Use (Percent of electricity from renewable sources)	%	9%	9%	10%	10%	11%	11%	…	hold
Fleet	Petroleum Use Reduction Targets (Percent reduction from FY05 base year)	%	10%	12%	14%	16%	18%	20%	…	30%
	Planned Petroleum Use Reduction(Percent reduction from FY05 base year)	%	5%	12%	14%	16%	18%	20%	…	hold
	Alternative Fuel Use in Fleet AFV Target (Percent increase from FY05 base year)	%	61%	77%	95%	114%	136%	159%	…	hold
	Planned Alternative Fuel Use in Fleet AFV(Percent increase from FY05 base year)	%	163%	hold	hold	hold	hold	Hold	…	hold
	(NEW) Senior Executive Fleet Replaced with Low-GHG, High Efficiency Vehicles (Percent replaced from FY08 baseline year)	%	-	100%	hold	hold	hold	hold	…	hold
	Fugitive Emissions	%	42%	45%	50%	hold	hold	hold	…	hold

	SCOPE 1&2 GHG TARGET	Unit	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	…	FY 20
	Total Scope 1&2 GHG Emissions (Comprehensive)[9]	MMTCO$_2$e	4.023	3.995	3.948	3.856	3.763	3.763	…	3.348
	Total Scope 1&2 GHG Emissions (Subject to Agency Scope 1&2 GHG Reduction Target)	MMTCO$_2$e	4.003	3.976	3.929	3.837	3.744	3.744	…	3.328
	Overall Agency Scope 1&2 Reduction (reduced from FY08 base year)	%	13%	14%	15%	17%	19%	19%	…	28%

GOAL 2: Scope 3 Greenhouse Gas Reduction & Develop and Maintain Agency Comprehensive Greenhouse Gas Inventory

DOE established a 13 percent reduction target for agency-wide Scope 3 GHG emissions in absolute terms by FY 2020, relative to the FY 2008 baseline. DOE's Scope 3 emissions consist of:

- Federal and contractor employee business air, ground travel, and employee commuting
- Transmission and distribution (T&D) losses related to purchased electricity
- Contracted municipal solid waste disposal and sanitary wastewater treatment

DOE efforts primarily focus on changing human decisions, such as finding ways to travel less, use teleconferencing or producing less waste through individual decisions and sustainable campuses.

a. Goal Description

The Department has set a Scope 3 GHG reduction goal of 13 percent by FY 2020 and established interim targets to ensure achievement of this goal.

b. Agency Lead for Goal

The three Under Secretaries, PMAs and the Headquarters facility manager are responsible for meeting the target within their respective portfolios, including planning, budgeting, development, implementation and oversight. The SPO, HSS, Under Secretary sustainability

[9] Includes biogenic releases

points of contact, site offices and National laboratories provide technical assistance and oversight. The SPO is responsible for developing DOE's annual GHG inventory, establishing and coordinating the verification process, and reporting the inventory to FEMP, the CEQ Chair and OMB Director. DOE's SPO is also responsible for entering the inventory into the FEMP GHG Reporting Portal.

c. Implementation Methods

DOE will continue to determine data collection needs and update data collection processes to conform reporting requirements for Scope 3 emissions. In the meantime DOE will compile a list of best practices and lessons learned provided in SSPs and awards programs to share with all sites. DOE will continue to participate in interagency Scope 3 emissions workgroups, especially regarding data collection and calculations.

Achievement of the reduction goals requires a combination of policy and behavior change. Implementation methods for each Scope 3 category are described below.

Employee Commuting

DOE will survey all sites to determine current commuting practices and use of incentives to encourage employees to use public transportation. Based on survey findings DOE will set a path forward based on best practices with a focus on:

- Promoting carpooling/vanpooling
- Promoting public transit and shared-commuting modes where available
- Ensuring all sites have a telework policy and encouraging telework and alternative work schedule programs

Business Air & Ground Travel

DOE will reduce its business air and ground travel by:

- Increasing use of web-based meetings and teleconferencing
- Reducing air travel, except where necessary for mission accomplishment
- Reducing car rentals by promoting carpooling, public, or group transportation at conferences and meetings
- Researching the establishment of a government rate for PHEV and HEV rentals
- Encouraging the use of public or group transportation
- Benefitting from large-scale conversion of conventional taxi fleets into hybrid fleets in major metropolitan areas
- Establishing or adjusting travel policies to reduce the carbon footprint of DOE travelers

Contracted Wastewater Treatment & Municipal Solid Waste Disposal

To reduce its contracted wastewater treatment and municipal solid waste disposal, DOE will focus on:

- Expanding waste reduction, composting and recycling programs
- Introducing environmentally focused product packaging requirements for acquired products
- "Greening" the DOE supply chain by purchasing environmentally preferable products
- Increasing reusability or recyclability requirements in procurement practices

Actions in support of contracted waste disposal are addressed in Goal 5.

Transmission and Distribution Losses

To reduce Scope 3 GHG emissions associated with T&D losses from purchased electricity, DOE must reduce its consumption of purchased electricity. DOE will focus on consuming green electricity by:

- Increasing on-site generation of renewable energy/electricity
- Increasing purchases of green energy
- Implementing efficiency programs to reduce electricity consumption

d. Positions

At least one permanent Federal staff in the SPO is accountable (part-time) for assessing and reporting performance on this goal, as well as facilitating its achievement by engaging and working with the Under Secretary sustainability points of contact, HSS, site offices and National Laboratories.

e. Planning Tables

For more information on DOE's efforts to reduce Scope 3 GHG emissions, refer to the planning table at the end of this section.

f. Agency Status

Scope 3 Emissions

DOE elected to go beyond the required reporting of Federal employee Scope 3 GHG emissions by including contractor emissions. As of the end of FY 2010, DOE consisted of 14,945 Federal employees. However, contractors manage and operate DOE sites under a government owned,

contractor operated (GOCO) model. In FY 2010, GOCOs consisted of about 112,000 personnel who perform functions at DOE sites in direct support of the DOE mission.

DOE's Scope 3 GHG target emissions for FY 2008 were 851,778 $mTCO_2e$ and 841,841 $mTCO_2e$ in FY 2010. This reflects a one percent reduction in the past two years. In both years, employee commute constituted more the 50 percent of DOE's Scope 3 GHGs followed by T&D loss and Business Air Travel each about 20 percent.

DOE faces several challenges in meeting its Scope 3 reduction goal. Potential future increases in mission, especially scientific mission, will increase electricity use and therefore also T&D losses. DOE is also increasing its number of employees, and thereby employee commuting. Despite these challenges, DOE will aggressively work to reduce emissions ranging from on-site renewable energy generation to teleworking and carpooling/vanpooling.

GHG Inventory

DOE follows the Federal GHG Accounting and Reporting Guidance and associated Technical Support Document issued by CEQ to report its annual GHG inventory, including emissions from DOE M&O contractors.

DOE sites submit GHG-emission related data in original units into several DOE or Federal data systems:

- Pollution Prevention Tracking and Reporting System (PPTRS): environmental and purchasing data; fugitive emissions; employee commuting; contractor employee travel
- Federal Automotive Statistical Tool (FAST): fleet inventory and fuel use
- Consolidated Energy Data Report (CEDR): data on metering requirements, water use, renewable energy generation and purchases, and sustainable buildings
- Site Sustainability Plan Performance Reporting: data on site identified sustainability projects and EISA Section 432 compliance
- Facilities Information Management System (FIMS): data on real property attributes
- Federal Aviation Interactive Reporting System (FAIRS): Federal aircraft operations and cost data (Additional information received from the DOE Office of Aviation Management for aircraft fuel consumption)
- Computerized Accident, Incident Reporting System (CAIRS): used for DOE headcount
- GovTrip: used for Federal staff business travel data

DOE ensured the accuracy of reported emissions through an Inventory Management Plan (IMP). The IMP describes the management process used to conduct the inventory, including designation of data sources, procedures, and roles and responsibilities.

Each DOE site is expected to have a quality control / quality assurance process to ensure that source data, and its entry into the applicable databases, are routinely reviewed, and that any

errors in the data are corrected. After databases are closed, data is checked for completeness by the database administrators, ensuring that the submitted data is within a reasonable range. The data is then reviewed by appropriate personnel from the various PSOs and sustainability leads for the Under Secretaries to ensure data fields have been correctly populated.

DOE conducted a second party data verification procedure. The SPO reviewed data, identified and resolved any data quality issues, compiled data for Departmental level reporting, completed associated documentation, and submitted the data to the SSO for approval. Data submitted by the sites was verified by an independent team of Federal DOE staff (Verification Team) with no role in the development, management or calculation of the GHG inventory data. This review confirmed the efficacy of the data and identified and corrected any significant discrepancies before the final GHG emissions inventory was submitted. The Verification Team conducted a sample analysis of sites comprising 50 percent of DOE's total GHG emissions (scopes 1 and 2, and scope 3). For the FY 2008 and FY 2010 Inventories, the team concluded that DOE site-reported GHG data was complete, accurate and consistent. The SPO will evaluate findings from the Verification Team, as well as the results of the inventory, to prioritize data element and site-specific improvement opportunities to implement during the next GHG inventory.

For future inventories DOE will:

- Highlight the level of detail and methodology using ORNL's commuter survey as a best practice
- Provide guidance to sites about developing and maintaining source data and intermediate summaries and calculations that together substantiate entries in GHG databases (including a more efficient approach for verifying auto gas data)
- Develop a random approach to picking sites that contribute 50 percent or more of the Department's GHG emissions
- Accept consumption records from internal inventory management systems for energy sources consumed in bulk such as coal, fuel oil, diesel oil and gasoline
- Alter the schedule of data collection to ensure quality assurance / quality control in a more timely manner, not during the holiday seasons
- Embed the 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

g. Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant Scope 3 emissions projects or initiatives included in the 2010 SSPP, none have been cancelled or suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI.

h. Highlights

Many of DOE's sites are exploring methods to decrease Scope 3 GHG emissions:

- ANL is aiming to change the behavior of its employees by setting up a competition, "Car-gone," between major organizational units focused on reducing employee commuting and business travel through the use of carpooling, biking, high efficient vehicles, videoconferencing, and other green transportation activities. ANL is also going beyond traditional approaches and considering offsetting emissions by committing to reforestation efforts (e.g. American Forest's Global ReLeaf program).

- SLAC supports employee commuting by promoting the use of public transportation through the Marguerite shuttle which serves Stanford University and the surrounding community, including stopping at local public transportation systems such as the CalTrain and bus stops. Additionally, SLAC increased videoconferencing capabilities to decrease employee business travel.

- ORNL's Sustainable Campus Initiative is a multifaceted program that addresses everything from facility management to employee commuting and wellness. ORNL is incentivizing employees to reduce trips, use public transit, telework, and carpool/vanpool when possible.

- NREL is aggressively reducing GHG emissions from commuting. NREL provides:
  - Free public transportation system passes
  - Services for rideshare with an electronic bulletin board
  - Preferential parking incentives for carpooling or vanpooling, and
  - Vouchers to pay for vanpool.

- For on campus commuting, NREL provides a bicycle friendly infrastructure and alternatively-fueled shuttles. NREL also has a flexible work practice of giving employees the option of teleworking and an alternative work week. NREL's telework pilot program began in 2009 and currently 13 percent of staff participates.

- SRS is partnering with the "Georgia Clean Air" and South Carolina "Take a Break From the Exhaust" campaigns. Employees can utilize these campaigns to form and join carpools. Carpool information is regularly shared during SRS' annual site safety conferences. Surveys

were conducted in 2009 at two site entry points, approximately 20 percent of the commuters entering Jackson Barricade carpool and approximately 14 percent of commuters entering the New Ellenton Barricade carpool.

- The NETL's Green Transportation Pool Program promotes employee carpooling by sharing work schedules and home cities of interested employees on the NETL Intranet. Parking spaces are reserved for carpooling vehicles. NETL also encourages the use of videoconferencing and increased the number of videoconferencing centers.

Goal 2 DOE Planning Table

SCOPE 3 GHG TARGET	Units[10]	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	…	FY 20
Total Scope 3 GHG Emissions (Comprehensive) [11]	MMTCO2e	.849	.842	.833	.824	.816	.807	…	.747
Total Scope 3 GHG Emissions (Subject to Agency Scope 3 GHG Reduction Target)	MMTCO2e	.842	.835	.826	.818	.809	.801	…	.741
Overall Agency Scope 3 Reduction (reduced from FY08 base year)	%	1%	2%	3%	4%	5%	6%	…	13%

GOAL 3: High-Performance Sustainable Design / Green Buildings & Regional and Local Planning

High-Performance Sustainable Design/Green Buildings

High-performance sustainable buildings (green buildings) are a critical part of DOE's sustainability plan as buildings are responsible for a large percentage of resource consumption 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 three pronged: design and construct new buildings that use reduced energy (until ultimately constructing net-zero energy buildings), disposition of unused facilities, and upgrade existing buildings to meet the requirements of the Sustainable Building Guiding Principles (GP). DOE's High Performance and Sustainable Buildings (HPSB) Implementation Plan (SBIP) provides a summary of the Department's HPSB commitments and activities.

[10] GHG emissions are measured in mtCO2e and the percentage reductions are reductions in mtCO2e.

[11] Includes biogenic releases.

a. Goal Description

The Department is working towards meeting the following goals:

- Beginning in FY 2020, designing all new Federal buildings to achieve net-zero energy by FY 2030
- All new construction, major renovations, and alterations of buildings greater than 5,000 GSF must comply with the GP and where the work exceeds $5 million, each are LEED–NC Gold certification
- At least 15% of the Department's enduring buildings and building leases greater than 5,000 gross square feet meet GP by FY 2015
- Demonstrating annual progress toward 100% conformance with GP for entire building inventory
- Demonstrating use of cost-effective, innovative building strategies to minimize energy, water and materials consumption
- Managing existing building systems in a manner that achieves a net reduction in Departmental deferred maintenance costs while reducing energy, water and material consumption
- Optimizing performance of the Department's real property portfolio
- Examining opportunities to decrease environmental impact through consolidation, reuse and disposal of existing assets prior to adding new assets
- Ensuring use of best practices and technology in rehabilitation of historic Federal properties
- Incorporating sustainable practices into agency policy and planning for new Federal facilities and leases, and into lease renewal strategies
- Demonstrating use of cost-effective, innovative building and sustainable landscape strategies to minimize energy, water and materials consumption
- Operating and maintaining, and conducting all minor repairs and alterations for existing building systems to reduce energy, water and materials consumption in a manner that achieves a net reduction in agency deferred maintenance costs
- Optimizing performance of DOE's real property portfolio – disposing and consolidating excess and underutilized property
- Reducing need for new building and field office space by utilizing technologies to increase telework opportunities and expand delivery of services (over the internet or electronically)
- Conserving, rehabilitating, and reusing historic Federal properties, using current best practices and technology
- Aligning agency space actions (new leases, new construction, consolidation) with agency Scope 1 & 2 and Scope 3 GHG reduction targets
- Ensuring that leased space solicitations include a preference for buildings certified as LEED Gold and requirements for energy efficiency, including the use of renewable energy to the maximum extent practicable. Renegotiations or extensions of existing leases must include lease provisions that support the HPSB GP.

- Conducting a training needs assessment of all DOE designated site energy managers as required by facility size and developing a strategy to address shortfalls.

b. Agency Lead for Goal

The three Under Secretaries, PMAs and the Headquarters facility manager are responsible for planning, budgeting, development, implementation and oversight within their respective portfolios. The SPO, Under Secretary sustainability points of contact, site offices, OECM, the Office of the Chief Human Capital Officer (OCHCO), and the Office of the Chief Information Officer (OCIO) provide technical assistance and oversight.

c. Implementation Methods

DOE is developing a comprehensive understanding of existing building status and progress toward meeting GPs through surveys and assessments. DOE continues to work on a plan to overcome operational and financial barriers to compliance. DOE does not include outgranted buildings (properties over which the Department has no operational control) in its plan for meeting the GP goals. DOE will continue to train staff on GPs and provide technical assistance reviews as appropriate. This includes providing on-site GP assistance in implementing the HPSB Checklist embedded within the EPA's Portfolio Manager.

Net-Zero Energy by FY 2030

DOE will use internal expertise to meet the net-zero energy by FY 2030 goal in which buildings use minimal energy that is supplied by on-site renewable resources. DOE will build upon efforts made by the Commercial Building Initiative to improve the energy efficiency of its buildings

DOE will develop a process to integrate net-zero energy design principles into all projects that have not yet achieved CD-2 (establishment of a baseline).

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

New Construction, and sustainable practices, policy, and planning

The SBIP includes further detail on DOE's approach to ensure all new construction and major renovation complies with the GP. The most recent version is available at: https://www.eecbg.energy.gov/team/pdfs/doe_hpsb_implement_plan.pdf.

DOE requires that all new building construction and major building renovations of $5 million or greater and not having reached CD-2 status before October 1, 2008 earn LEED-NC Gold certification. These projects will pursue distributed generation systems where feasible to improve energy efficiency and reduce GHG emissions. All buildings below the $5 million threshold greater than 5,000 GSF are required to comply with the GPs outright. DOE considers

any new building that achieves LEED-NC Gold or better to comply with the requirements of the GPs.

When acquiring new leased space, including build-to-suit lease solicitations, DOE will meet the requirements for leased facilities included in EO 13514 and include a preference for buildings certified as ENERGY STAR per EISA 2007 Section 435, those with LEED Gold certification, and those that use renewable energy to the maximum extent practicable. When entering into renegotiation or extension of existing leases, DOE will include lease provisions that support the HPSB GPs.

In accordance with guidance provided in the Guiding Principles for New Construction and Major Renovations-2008, DOE will also ensure that new construction is 30 percent more energy efficient than the baseline established by the American National Standards Institute (ANSI)/American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., (ASHRAE)/Illuminating Engineering Society of North America (IESNA) Standard 90.1-2007, Energy Standard for Buildings Except Low-Rise Residential, wherever practicable. Construction and renovation projects will strive to meet ASHRAE Standard 189.1-2009 Standard for the Design of High Performance Green Buildings whenever feasible, and ANSI/AIHA Z9.5-2003 Standard for Laboratory Ventilation, when appropriate.

Existing Buildings

During planned site assessments in FY 2011 and FY 2012, DOE will identify additional buildings to achieve GP status by FY 2015, and will identify the work and resources required for this effort. Completing building assessments for buildings not planned for disposal in FY 2015 or sooner and focusing on buildings closest to achieving compliance with the GPs is the Department's first priority. Currently, DOE is conducting a review of completed assessments to identify obstacles to achieving the GPs. To encourage efforts to comply with the GPs, DOE will continue to share lessons learned and will recognize and reward accomplishments.

Meeting the GP goals requires attention to details as well as the integration of both short- and long-term planning. DOE implemented a quarterly scorecard process to measure progress toward completing facility assessments and sustainability GP compliance tracked through DOE's corporate real property database. 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. DOE considers any existing building that achieves LEED-EB Silver or higher as complying with GPs.

Conformance of All Buildings to Meet GP

Once DOE meets the goal of 15 percent GP compliance by FY 2015 for its buildings greater than 5,000 GSF, it will continue assessing and renovating enduring buildings in order to annually progress toward 100 percent GP compliance. New buildings, reaching CD-2 after October 1, 2008 and in excess of $5 million, will be designed to achieve LEED Gold certification and will be

in compliance with the GPs. Progress will be tracked through DOE's corporate real property database.

Minimize Energy, Water and Materials Consumption

DOE currently incorporates cost-effective, climate-appropriate innovative building strategies, such as highly reflective cool roofs to minimize energy, water and materials consumption.

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

- Annually invest 2% to 4% of plant value to sustain the real property portfolio
- Utilize predictive and preventive maintenance to avoid future maintenance costs
- Collect existing information on cost-effective, innovative building strategies in a central repository to disseminate lessons learned and best practices
- Continue green purchasing of maintenance materials
- Purchase ENERGY STAR and WaterSense® compliant products and replacement parts
- Improve the efficiency of building mechanical systems to include actions such as the installation of direct digital control and variable frequency drives

Many factors, including safety, security, cost, quality of life, mission impact, and 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 will continue to fund maintenance and repair at industry-standard levels and will seek to leverage funds to control and reduce deferred maintenance and improve sustainability. DOE will also determine the effect of sustainable building management on the deferred maintenance inventory.

Federal Property Planning Disposition and Optimization of Performance of the Real Property Portfolio

DOE requires that real property assets not fully utilized or in excess of mission need to be identified for reuse or disposal. DOE has been a Federal leader in real property disposition since FY 2003 when the Government Accountability Office (GAO) 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 an existing building is required to be consolidated, reused, or disposed of prior to a new building being constructed or purchased.

DOE will examine industry methods for evaluating the efficiency of use of the Department's most common space types to determine the feasibility of surveying existing space for consolidation opportunities.

Increase Telework Opportunities and Expand Delivery of Services

The Department recognizes the potential for decreasing GHG emissions and operating costs through telework, especially when coupled with consolidations and dispositions. A May 2010 internal memorandum issued with support from the OCHCO provided past participation levels and set the following telework targets among Federal employees:

Actuals

- FY 2008: 11.8%; FY 2009: 13.5%

Goals

- FY 2010: 15.5%; FY 2011: 17.5%; FY 2012: 20%

The Department is leveraging the passage of the Telework Enhancement Act of 2010 to renew its commitment to telework and actively encourages employees to enter into telework agreements to allow for scheduled and unscheduled telework in emergency situations.

DOE OCIO offers remote access to facilitate telework, including:

- Outlook Web Access (OWA) – supports 5,000 concurrent users, limited to email, calendaring, task management, etc
- Virtual Private Network (VPN) - supports 10,000 concurrent users, currently has about 3,700 accounts
- Citrix Workplace - supports 800 concurrent users with full access to office applications and files

DOE headquarters recently developed a telework task force to develop a telework and hoteling pilot at Headquarters. The pilot will result in options and best practices for DOE to use in establishing a widespread telework program. DOE's OCIO closely monitors the results of teleworking trends and will work to expand capabilities as needed.

Conservation, Rehabilitation, and Reuse of Historic Federal Properties

DOE 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 GPs to historic buildings during rehabilitation.

Align Agency Space Actions

DOE recognizes the synergies between the GPs and GHG emissions reductions especially between the "Optimize Energy Performance" Guiding Principle and Scopes 1 and 2 emissions, and the "Reduce Environmental Impact of Materials" Guiding Principle and Scope 3 emissions.

DOE remains committed to building and occupying the most energy-efficient spaces possible considering available funding and mission requirements.

On-site energy generation offers important possibilities for reducing Scope 2 and 3 emissions while contributing toward renewable energy goals. All plans for new construction or consolidations requiring major renovations will consider an on-site energy generation component. DOE will continue to pursue legislation regarding its ability to enter into long term PPAs and EULs.

d. Positions

As of April 2011, the tracking of this goal in support offices is a shared duty by approximately seven Federal employees amounting to about 3 FTEs in OECM. SPO, Under Secretary sustainability points of contact, site offices and facility managers also provide assistance.

e. Planning Tables

For more information on DOE's efforts to increase high-performance sustainable design, and buildings refer to the planning table at the end of this section. To facilitate achievement of HPSB goals and showcase the Department's commitment to leading Federal sustainability efforts, internal targets have been set that exceed requirements of statute and EO.

f. Agency Status

As of April 2011, 44 DOE buildings (1.7 percent of all DOE buildings greater than 5,000 GSF and without disposition planned in 2015 or earlier) met the requirements of the GPs, of which 39 have achieved LEED certification. DOE is continuing its efforts to meet the 15 percent GP compliance goal by FY 2015. DOE is pursuing net-zero buildings such as NREL's Research Support Facility (RSF), the world's largest net-zero office building which remains under construction as the third and final wing of the RSF is expected to be completed at the end of 2011. The 138,000 sq. ft. expansion is being built based on lessons learned from the existing RSF, with smaller windows and a transpired solar air collector that is 50 percent larger. These changes will help increase the energy efficiency of the expansion by 17 percent. DOE's Office of Science continues to leverage its National Laboratory Infrastructure Modernization Initiative as it builds replacement facilities and performs major renovations designed to achieve LEED-NC Gold as applicable. Additionally, in FY 2010 DOE disposed of 350 assets, for reduction of nearly 2 million gross square feet (GSF), and is currently on-track to meet its FY 2011 target to dispose of 172 assets.

DOE is also currently in the process of assessing its Washington, D.C., headquarters for Guiding Principle conformance and LEED certification. Changes in performance due to recent efficiency improvements are being evaluated and opportunities to improve efficiency identified.

Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant High Performance Sustainable Buildings projects or initiatives included in the 2010 SSPP, none have been cancelled or suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI.

g. Highlights

- Building 3156 at ORNL is a two-story, 23-room office building that originally consumed about 100 megawatt hours per year (MWh/yr). A multi-disciplinary team of researchers, operations, and support personnel reduced the building's consumption to less than 60 MWh per year through energy-saving technologies and integrating on-site photovoltaics to make it a net-zero energy building.
- LLNL's TeraScale Simulation Facility (TSF), which houses two of the world's fastest supercomputers—BlueGene/L and ASC Purple - received LEED-NC Gold Certification through a baseline comparison with the computation directorate's other on-site data centers. LLNL's Building 451, the laboratory's second highest energy consumer behind TSF, also received LEED Silver for Existing Buildings Certification. The high performance computing datacenter is the fourth building onsite to be LEED-certified and the second to achieve a silver rating.
- The Mixed Oxide (MOX) Administration Building at SRS in Aiken, S.C. also earned LEED-NC Gold Certification, the first of three buildings which are part of the MOX project to pursue such certification.

Regional and Local Planning

a. Goal Description

The Department is working to meet the following goals:

- Incorporating participation in regional transportation planning into existing policy and guidance, while recognizing existing community transportation infrastructure
- Aligning the Department's policies to increase the effectiveness of local energy planning
- Incorporating sustainable building location into policy and planning for new Federal facilities and leases
- Updating 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
- Updating 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

b. Agency Lead for Goal

The three Under Secretaries, PMAs and the Headquarters facility manager are responsible for meeting the target within their respective portfolios, to include the planning, budgeting, development, implementation and oversight. The SPO, GC, Under Secretary sustainability points of contact and site offices provide technical assistance and oversight.

c. Implementation Methods

Participation and coordination with regional and local planning groups is essential for DOE's mission of transforming the Nation's energy system and securing U.S. leadership in clean energy technologies.

Regional and local planning is conducted and individualized based on site location. To provide appropriate overarching polices and guidance, DOE Headquarters asked sites to provide information on current and planned coordination with their regional and local planning groups in their FY 2010 SSPs. All DOE sites collaborate with their regional and local planning group to some extent.

Identified best practices will be shared with all sites for adoption and incorporation into policies and guidance, as appropriate.

d. Positions

At least one permanent Federal staff in the SPO are accountable (part-time) for assessing and reporting performance on this goal, as well as facilitating its achievement by engaging and working with the Under Secretary sustainability points of contact, PMAs, Headquarters and site offices.

e. Planning Tables

For more information on DOE's efforts on regional and local planning, refer to the planning table at the end of this section.

f. Agency Status

FY 2010 was the first year DOE Headquarters asked sites to provide information on what and how sites interact with their regional and local planning groups. Based on information provided in the SSPs, all sites collaborate with their regional and local planning groups. DOE will encourage all sites to participate and coordinate with their regional and local planning groups to the maximum extent possible. Close coordination benefits both the site and the surrounding

community by improving regional transportation and energy infrastructure and quality of life through reduced traffic and emissions along with improved environment.

DOE sites will continue to incorporate participation in regional transportation planning into their site policy and guidance documents. Sites will also continue to work with local and regional transportation organizations to develop public transportation options that meet the needs of DOE employees and needs.

As required, DOE will incorporate sustainable building location and siting considerations into acquisition plans for new Federal facilities and leases. In addition, DOE will review and implement 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) when developing or modifying new procedures or instructions on facilities placement, as appropriate.

g. Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant regional and local planning projects or initiatives included in the 2010 SSPP, none have been cancelled or suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI.

h. Highlights

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

- DOE is currently involved in the National Capital Planning Commission's Southwest Ecodistrict Initiative which aims to transform the 10th Street and Maryland Avenue corridors located south of the National Mall in Southwest Washington. This initiative seeks to create a model sustainability showcase of innovative technologies and sustainable urban development and infrastructure practices in the Nation's capital.

- Fermilab operates an on-site program that assists local communities in disposing leaf litter. The litter is added to Fermilab agricultural farm fields as a soil amendment. The program avoids hundreds of miles of transportation that communities would otherwise have to travel to dispose of leaves. In FY 2010 approximately 15,000 cubic yards of leaves were brought to Fermilab.

- PPPL is an active member of the World Water Monitoring Day (WWMD) program, monitoring two locations on Bee Brook, the receiving water body for the Laboratory's retention basin discharge. Employees from PPPL also helped a local high school environmental club collected their samples on WWMD. Water sampling results are posted at: http://www.worldwatermonitoringday.org/.

- BNL participates in and co-authored the strategic vision of the New York Smart Grid Consortium. The Consortium is a group encompassing all the New York utilities and the New York Independent System Operator. A major new BNL initiative is the development of the Advanced Electric Grid Innovation Support Center (AEGIS). This Center will integrate BNL's technological work in generating, transmitting, and storing electricity, enhancing the site's interaction with the electric-grid industry and addressing the challenges of the electric grid identified by the Consortium.

- The Community Reuse Organization of East Tennessee (CROET), a regional economic development entity, has taken a leadership role in evolving DOE's Asset Revitalization Initiative and identifying the concept of an "Oak Ridge Energy Corridor" (OREC). ORNL is an OREC partner working to create a national demonstration area for deploying new technologies and solutions addressing the Nation's energy challenges. During the first year of operation, the Energy Corridor launched two major energy initiatives dealing with transportation and energy generation. At the 2010 Tennessee Valley Corridor National Technology Summit in Washington, D.C., members officially unveiled the plan to make Oak Ridge the first carbon neutral city and region in the U.S. by 2030 with an integrated clean power project.

  The integrated electricity generation plan is designed to support the DOE goals in cutting its carbon emissions. In order to achieve these goals, Corridor partners have set regional goals to increase the net output of energy produced from carbon neutral sources by 2020 with investments in solar thermal hybrid gas turbines and solar photovoltaic arrays. The Corridor is also seeking the installation of a 125 MW small modular nuclear reactor (SMR), a 10 MW solar thermal hybrid gas turbine project, and 10 MW of distributed solar photovoltaic power. These installations could be potentially sited for deployment on East Tennessee Technology Park property, the former K-25 location.

- The GFO and NREL developed a partnership with GSA, the City of Lakewood, and the U.S. EPA Region 8 office to increase awareness of sustainability throughout the partnership community. Every month, educational opportunities are offered to help increase conservation awareness, save natural resources and reduce GHG emissions. In addition, employees of both organizations are encouraged to participate in a sustainability challenge pilot program to reduce their individual carbon footprint over a six-month period.

- ORNL hosted a sustainability summit to advance sustainability across the southeastern United States and continue regional collaboration and coordination of sustainable practices. The themes discussed during the summit included low-carbon power generation, the electric grid, transportation strategies, building-energy efficiency, and financing strategies. In attendance were representatives from state and local governments, universities, power providers, and members of the DOE community.

Goal 3 DOE Planning Table

SUSTAINABLE HIGH PERFORMANCE BUILDINGS (Buildings Meeting Guiding Principles)	Units	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	…	FY 20
Owned Buildings	%	0.9	6.0	7.5	9.0	11.0	12.5	…	17.0
FRPP-Reported Leased Buildings	%	0.3	1.0	1.5	2.0	2.0	2.5	…	3.0
Total Buildings	%	1.2	7.0	9.0	11.0	13.0	15.0	…	20.0
Other, as defined by agency	?	?	?	?	?	?	?	…	?

GOAL 4: 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 SPR uses water to pump oil from its caverns and to maintain cavern operability.

Water recycling and reuse strategies are important for reducing water consumption. This is especially important at remote sites where water must be trucked in to support facilities, and on sites where water is scarce and excess use may have an adverse effect on neighboring down-stream areas, watersheds and underground aquifers. Opportunities exist to convert once-through cooling water systems to systems designed to reuse cooling water, or use gray water and/or storm water runoff for cooling.

Infrastructure projects may also save significant amounts of potable water. These projects are often initiated for reasons other than water conservation; however, opportunities exist to leverage these projects to realize water conservation benefits through careful planning. During standard facility maintenance or upgrades, opportunities might also exist to replace old fixtures, or water conveyance systems, or HVAC components with water efficient technologies. It is also possible to add water efficiency improvements to a maintenance or construction contract or ESPC at reduced cost. For new construction, water-efficient technologies can be incorporated into the building design and construction for meeting the DOE high performance sustainable design goals.

a. Goal Description

The Department is working to meet the following goals:

- Reducing potable water consumption intensity 2 percent annually through FY 2020 for at least 26 percent total reduction by FY 2020, relative to a FY 2007 baseline
- Reducing industrial, landscaping, and agricultural (ILA) water consumption 2 percent annually (or 20 percent total by the end of FY 2020), relative to a FY 2010 baseline

- Identifying, promoting, and implementing water reuse strategies that reduce potable water consumption consistent with State law
- Achieving objectives established by EPA in storm water guidance for Federal facilities
- Incorporating appropriate reduction strategies for non-potable water use into agency policy and planning

b. Agency Lead for Goal

The three Under Secretaries, PMAs and the Headquarters facility manager are responsible for meeting the target to include the planning, budgeting, development, implementation and oversight within their respective portfolios. The SPO, Under Secretary sustainability points of contact and site offices provide technical assistance.

c. Implementation Methods

DOE will identify projects to meet its water use efficiency goals through water conservation efforts consisting of six 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 and its impact on local environments
- Modifying and updating water management plans to include efficiency, stormwater management, and conservation measures

DOE will also work to repair or replace broken water meters and install new water meters where feasible. DOE strives to identify and monitor all water it uses and consumes.
The Department is identifying and prioritizing water-saving opportunities across the complex, disseminating best practices, and conducting assessments at sites to identify water conservation opportunities and facilitate improvements. Efforts will first focus on DOE sites in the most drought-prone regions, with the highest rates of consumption, and/or thought to be most susceptible to leakage (e.g., due to age, incongruent meter readings, etc.). In addition, DOE will conduct audits and benchmark as required by EISA Section 432.

A review of process water practices during site assessments will serve to identify which processes might successfully use ground, gray, or storm water for cooling, and once-through cooling systems that might be modified to reuse the cooling water. Additionally, these site assessments will result in the identification of best practices and appropriate technologies and this information will be shared throughout DOE.

If not already completed, sites will prepare a water efficiency policy and water management plan addressing potable and ILA (non-potable) water use. Older plans will be updated as necessary to sufficiently address all the water use efficiency and management goals. Communication of DOE's commitment to water conservation efforts, water reuse and recycling, and the benefits of these projects on local and regional water supplies will be made. These plans will be integrated into each site's EMS, and periodically updated as appropriate.

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

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 green infrastructure or low impact development technologies such as bio-retention areas, porous pavements, and rainwater collection systems.

d. Positions

At least two permanent Federal staff in the SPO are accountable (part-time) for assessing and reporting performance on this goal, as well as facilitating its achievement by engaging and working with those sustainability points of contact of Departmental Elements.

e. Planning Tables

For more information on DOE's efforts to reduce water intensity usage, refer to the planning table at the end of this section.

f. Agency Status

In FY 2010, DOE reported a 12 percent decrease in water intensity from FY 2007. DOE used 62 gallons per gross square foot (gal/GSF) in its facilities during FY 2010, compared to 70.5 gal/GSF in FY 2007. DOE's updated its water baseline due to the completion of a comprehensive water audit at one of the largest water consuming sites. DOE expects the water baseline to continue to change, as a small number of sites with previous metering problems are still analyzing their baselines.

Intensity reductions in water are partially attributable to reduced mission-related activities, implementation of best management practices and water conservation measures (e.g., leak detection and repair). As awareness of the importance of water conservation has increased, so too has the practice of water audits and assessments, which may change the DOE baseline.

Many DOE facilities are located in regions where water is inexpensive; therefore, water projects may not be lifecycle cost effective. Some DOE sites implemented water conservation measures prior to the 2007 baseline, and now have limited options for additional improvement. Water use is also essential to conducting critical operations. These challenges will be addressed through an integrated approach, including water assessments, increased metering, identification of opportunities, consideration of social costs for water in project evaluation, as well as collaboration and sharing of best practices across the DOE complex.

g. Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant water projects or initiatives included in the 2010 SSPP, none have been cancelled or suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI.

h. Highlights

- In FY 2010, DOE completed a major water assessment at one of its largest water consuming sites, the Y-12 National Security Complex. The assessment led to the adjustment of Y-12's FY 2007 water consumption baseline (due to failed water meters) and also generated important lessons learned that are being shared with DOE sites. The findings of this assessment resulted in a 29 percent reduction to date.
- LLNL's Water Conservation Test Bed Project collects and transports 90,000 to 210,000 gallons of rainwater per year from a non-industrial rooftop to underground storage tanks, significantly decreasing the amount of potable water used for irrigation. The system's flexible design allows for future expansion and an anticipated 50 percent reduction in potable water use. The project received an Environmental Sustainability award from DOE in 2010.
- SNL reduced water intensity by 30 percent relative to the FY 2007 baseline, as a result of improvements to their reverse osmosis and deionized water systems, cooling towers, construction practices, leak repairs, and the implementation of a Centralized Irrigation Control System. In addition to progress already made, SNL will continue to evaluate opportunities for further improvements.
- In FY 2010, Lawrence Berkeley National Laboratory's (LBNL) closed-loop wastewater reuse for cooling tower began operations. Based on first quarter results, it is projected that over 500,000 gallons of potable water will be saved per year.
- The LANL Sanitary Effluent Reclamation Facility-Expansion (SERF-E) project will recycle up to 115 million gallons of water per year by treating sanitary effluent from LANL's domestic wastewater treatment facility. The water will be returned for reuse within the LANL complex.
- An Idaho Cleanup Project (ICP) pollution prevention opportunity assessment was performed on the INL Idaho Nuclear Technology Engineering Center (INTEC) water pumps. Historically, INTEC used approximately 500 million gal/yr, accounting for about 50 percent of total water

use at the INL Site. Numerous activities contribute to INTEC water use reductions, including the decommissioning and demolishing of several facilities which reduced water demand. Under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulation, ICP continues to eliminate and repair water sources that contribute to the perched aquifers, as well as move contaminants further down to the aquifer. Replacement of oversized water pumps, repair of multiple fire line leaks and disconnecting leaking water lines eliminated millions of gallons per year in water use and losses. These improvements reduced water use by more than 139 million gal/yr, a 35 percent reduction. The water pump replacement project cost approximately $250,000, for which a $162,000 efficiency rebate was received from the local utility provider. This project is expected to save INL $60,000 per year in electricity costs.

Goal 4 DOE Planning Table

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)	%	12%	14%	16%	18%	20%	21%	…	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%

GOAL 5: Pollution Prevention and Waste Reduction

In accordance with the hierarchy established in the Pollution Prevention Act of 1990, DOE will 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.

DOE is working to meet the following subgoals:

a. Increasing source reduction of pollutants and waste

b. Diverting at least 50% non-hazardous solid waste by FY 2015, excluding construction and demolition (C&D) debris
c. Implementing agency strategies to reduce municipal solid waste sent to landfills and assist the agency in achieving FY 2020 GHG reduction targets
d. Diverting at least 50% C&D materials and debris by FY 2015, and discuss methods used to monitor and track progress
e. Reducing printing paper use by setting printers and copiers to duplex print and copy by default and encouraging employees to reduce printing needs
f. Increasing use of uncoated printing and writing paper containing at least 30% post-consumer fiber
g. Reducing and minimizing the acquisition, use, and disposal of hazardous chemicals and materials to assist the agency in achieving FY 2020 GHG reduction targets
h. Increasing diversion of compostable and organic materials from the waste stream
i. Implementing integrated pest management and landscape management practices to reduce and eliminate the use of toxic and hazardous chemicals and materials
j. Increasing Departmental use of acceptable non-toxic or less toxic alternative chemicals and processes
k. Reporting in accordance with Sections (301-313) of the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986

These subgoals are arranged into two categories: 1) waste diversion and paper use and 2) toxic chemical reduction.

Waste Diversion and Paper Use

a. Goal Description

DOE is working to meet sustainability goals to divert, at a minimum, 50 percent of its non-hazardous solid waste and its non-hazardous, non-radioactively contaminated C&D materials and debris by FY 2015 and to reduce printing paper use while purchasing uncoated paper containing at least 30 percent post-consumer fiber. DOE is also working to meet non-quantitative goals of source reduction and increasing the diversion of compostable and organic material from the waste stream.

b. Agency Lead for Goal

The three Under Secretaries, PMAs, and the Headquarters facility manager are responsible for planning, budgeting, development, implementation and oversight associated with this goal within their respective portfolios. The SPO, Under Secretary sustainability points of contact, HSS and site offices provide technical assistance.

c. Implementation Methods

Preventing or reducing the amounts of pollutants and wastes at the source through operational and behavior change (product or process substitution and reuse, recycling, or composting materials rather than disposal) eliminates waste, reduces GHGs, 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 at various DOE sites.

To reduce pollution and increase reuse and recycling DOE will continue:

- Conducting sustainability assessments and improvement processes
- Reporting volumes and/or weight of waste streams
- Promoting higher recyclable content of procured items
- Providing awards and incentives for sustainable behavior
- Disseminating best practices

Sustainability assessments, such as pollution prevention opportunity assessments, will continue to be used to identify opportunities for operational process, product, or behavioral changes. They will also assist in the development of site EMS objectives and measurable targets to support these changes.

Sites and Headquarters report the following, as applicable, in metric ton units:

- Non-hazardous solid waste generated and diverted from disposal
- Compostable and organic materials diverted from the waste stream
- C&D material and debris generated and 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

DOE 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. Materials that cannot be cleared after this verification effort are not included in the 50 percent goal calculation. FY 2010 was the first year DOE collected data on the quantity of materials disposed of from these areas. DOE is using this data to identify areas where improved clearance of property procedures can lead to a significant reduction in waste storage, handling, and disposal costs.

For example, the recent demolition of the Bevatron accelerator at LBNL generated large amounts of metals that met the safety criteria for acceptable clearance of property. However, due to the Department's policy to suspend the recycle of scrap metal from radiological areas,

this metal waste was landfilled due to an inability to store material onsite until a time when the suspension could be resolved. DOE will use this example to influence waste diversion practices at other accelerator demolition projects.

A DOE assistance team recently visited the Fermi National Accelerator Laboratory (Fermilab) and provided suggested improvements to yield cost savings as well as increase efficiency of operations as a decommissioning plan for its Tevatron operations is developed. The result of this assistance work enhances safety and enables more recycling of clean metals from DOE activities. Similar assistance efforts at other sites resulted in the safe reuse and recycling of significant quantities of metal and other materials, reducing waste disposal quantities and associated costs.

Sites will continue to verify and improve the effectiveness and reliability of their clearance-of-property procedures to identify materials that cannot be cleared for unrestricted reuse or recycling and ensure the safe disposition of those materials that can be cleared. 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 on sustainability goals.

DOE sites are using the following methods to reduce the use of office paper:

- Setting printers and copiers to duplex print and copy by default
- Retiring printers incapable of duplex printing
- Using 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 “green meetings” and use of collaborative computing
- 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

DOE recognizes and incentivizes 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 through its awards programs. DOE received 185 nominations from its sites and programs for the following categories, and will recognize winners in a consolidated sustainability award ceremony in October 2011:

- Change Agents
- Community Collaboration and Engagement
- Comprehensive Energy and/or Fleet Management
- Cradle to Cradle
- EMSs

- GHG Management
- Health and the Environment
- Integrative Planning and Design
- Living Laboratory
- Water Resources

DOE encourages 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. 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. Many sites have mechanisms for charging waste generators for the costs associated with waste handling and disposal, which has incentivized generators to reduce the quantity and toxicity of their waste streams. Extending this model to other cost areas will be researched.

d. Positions

As of April 2011, tracking and assistance in support of this goal amounts to about 3 FTEs in HSS. SPO, Under Secretary sustainability points of contact, site offices and facility managers also provide assistance.

e. Planning Tables

For more information on DOE's waste reduction and pollution prevention efforts, refer to the planning table at the end of this section.

f. Agency Status

DOE sites currently divert non-hazardous solid waste and C&D debris on a regular basis. Performance to date indicates that DOE will achieve its 50 percent diversion goals before FY 2015. DOE will continue to improve its recycling and composting performance to achieve greater than 50 percent diversion rates for both non-hazardous solid waste and for C&D materials and debris.

Headquarters will use its internal award programs, working groups, and assistance networks to disseminate best practices for reducing pollution and waste generation across DOE.

DOE FY 2010 performance was:

- For non-hazardous solid waste (excluding C&D), DOE exceeded its targets by diverting 56.6% of these materials by weight from disposal.
- For C&D waste, DOE diverted 46.1% of debris from disposal.

Most sites reported efforts to improve data tracking or to increase diversion rates in one or both categories, which likely corresponds with the changes in DOE tracking and reporting of waste and recycling data in response to EO 13514. FY 2010 was the first year that DOE tracked diversion of C&D materials and debris separately from other non-hazardous solid waste.

The waste diversion goal also includes diversion of compostable and organic materials from the waste stream. FY 2010 was the first year that DOE collected data on this waste stream, and 16 sites supplied data on organic and compostable material diversion. One LM site participates in both on and off site composting programs. In FY 2010, 4.7 percent of the non-hazardous solid waste was diverted via composting. This will serve as the baseline for determining progress in future years. Five sites reported plans to improve or expand existing programs, and three sites indicated that they are evaluating opportunities to create new programs to divert compostable and organic materials. This will likely result in an increase in the number of sites reporting and the quantity of materials diverted in FY 2011. However, the quantity of materials may go down over time as a consequence of successful source reduction efforts.

Efforts to increase diversion of compostable and organic materials have led to zero-waste events at sites such as PNNL, NREL, and ORNL. Through planning including considering the menu (avoiding food items that cannot be composted), how food will be served (recycled content plates, large containers of condiments rather than individual packets), potential resulting wastes, and where recycling and composting containers will be located, such events can reduce waste, raise staff awareness of minimization efforts, and encourage behavior change on-site and off-site. At PNNL, seven zero-waste events hosting a total of more than 5,000 people achieved 91 percent waste avoidance. Both NREL and ORNL reached out to local businesses for recyclable products or containers for the events and opportunities to reuse waste generated at the event.

g. Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant pollution prevention or waste projects or initiatives included in the 2010 SSPP, none have been cancelled or suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI.

Several DOE sites account for and recover pollution and waste management costs similar to the recovery of energy and water use savings, using these funds to invest in additional pollution prevention and waste reduction projects. For example, SNL utilized FY 2009 return revenues from recycling 2.85 million pounds of metals, papers, and plastics for funding additional projects, characterization studies, and a field technician in FY 2010.

h. Highlights

- The Department of Health and Human Services (HHS) adopted the DOE categories for its internal awards program.
- DOE exceeded its non-hazardous solid waste diversion goal and came close to 50 percent diversion of C&D materials and debris.

In addition**,** DOE sites reported several successful paper reduction programs, including:

- LLNL is moving many of its processes to paperless applications, which avoid 200 pounds of paper and save $500,000 each year.
- At Fermilab, the Design and Drafting Department changed its drawing circulation process from printed copies to PDF files, which results in an estimated 80 percent reduction in the printing and copying associated with circulation.
- The Safeguards and Security organization at Y-12 decreased its paper generation rate and reduced purchase costs by switching to electronic submissions of badge requests and streamlining the process for visitor badge accountability resulting in reduced paper use by over 15 percent.

Toxic Chemical Reduction

a. Goal Description

DOE is working to develop sustainable pollution prevention practices and to reduce using chemicals that are toxic, hazardous or contribute to GHG emissions.

b. Agency Lead for Goal

The three Under Secretaries, PMAs and the Headquarters facility manager are responsible for planning, budgeting, development, implementation and oversight associated with this goal within their respective portfolios. The SPO, Under Secretary sustainability points of contact, HSS and site offices provide technical assistance.

c. Implementation Methods

DOE addresses chemical usage reduction requirements focusing on toxic, hazardous and GHG-contributing chemical emissions with an EMS-focused approach. This approach requires sites to establish toxic chemical reduction or elimination efforts, including sustainability assessments of chemical using operations. Site-specific chemical reduction objectives and measurable targets take into account site operating conditions, life cycle cost effectiveness, mission parameters, GHG emission reduction potential, and other environmental, safety and health factors (e.g., toxicity).

To address Goals 5.g and 5.j, DOE sites identify chemicals of greatest concern for targeted reduction and elimination efforts. These chemicals of concern can be based on many factors including EPA or state chemical reduction program lists of chemicals; extremely toxic or hazardous chemicals; large quantity chemicals; or chemicals with expensive disposal costs. DOE gathers and analyzes information from its sites to promote complex-wide adoption of strategies, including best practices, which prove to be effective at reducing chemical usage. DOE, in collaboration with the Energy Facility Contractors Group (EFCOG), is also developing guidance on toxic, hazardous and GHG-contributing chemical reduction strategies for the complex, to be completed in FY 2011.

DOE addresses Goal 5.i by implementing integrated pest management (IPM) and other appropriate landscape management practices at the site level. While some sites have already implemented IPM practices into their EMS, not all have. DOE will modify its policies to require sites to employ IPM and appropriate landscaping management practices within the site's EMS framework. These policies will also help sites achieve the Federal Guiding Principles for High Performance Sustainable Buildings and LEED certifications.

In compliance with Goal 5.k, DOE sites will continue adherence with the inventory and reporting requirements of the Emergency Planning and Community Right-to-Know Act (Sections 301 through 313, including implementing regulations) and the Pollution Prevention Act of 1990 at DOE facilities.

d. Positions

As of April 2011, the tracking of this goal in support offices is a shared duty amounting to about 2 FTEs in HSS. SPO, Under Secretary sustainability points of contact, site offices and facility managers also provide assistance.

e. Planning Tables

For more information on DOE's toxic chemical reduction efforts, refer to the planning table at the end of this section.

f. Agency Status

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

Toxic chemical use and release reduction efforts include examination of numerous facilities and operations to inventory chemical stock and dispose of unneeded materials. These efforts resulted in several DOE sites no longer having to file EPCRA Section 313 Reports. Although there are no quantitative goals for toxic chemical reduction, DOE collects site-level data on

goals and performance on chemical reduction efforts and IPM. Thirty-three out of 46 sites reported that they have an IPM program, and 10 sites reported that they would create or expand IPM programs. Several sites reported successes in chemical reduction efforts in FY 2010 are identified below.

DOE toxic chemical reduction efforts focus on reducing fugitive emissions which contributes to reducing DOE's GHGs. Additional information is provided under Goal 1.

g. Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant pollution prevention or waste projects or initiatives included in the 2010 SSPP, none have been cancelled or suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI.

h. Highlights

- Pantex eliminated chlorine gas from its raw water treatment process by replacing it with a mixed oxide system. The system is more effective than chlorine, eliminates the risk of an accidental chlorine release, improves worker safety by eliminating the shipping and handling of a toxic gas, eliminates the risk of violating the Clean Air Act, and reduces the risk of exceeding drinking water limits for chlorine by-products.

- LANL significantly reduced the amount of plutonium material needed for sample requirements by implementing a new gas pressurized extraction chromatography system. This sample size reduction reduced worker exposure, reduced transuranic (TRU) liquid wastes by 90 percent, and completely eliminated TRU solid waste and low level waste from the process. LANL can now apply this process change to other laboratory activities where chromatographic separation of actinides is required.

- A long-term effort at LLNL focuses on reducing the use of beryllium, resulting in the long-term storage of a large amount of beryllium. In an effort to reduce storage volumes, LLNL diverted nearly one metric ton of beryllium materials for recycling or reuse, saving $28,000 in disposal costs in FY 2010.

Goal 5 DOE Planning Table

POLLUTION PREVENTION & WASTE ELIMINATION	Units	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	…	FY 20
Non-Hazardous Solid Waste Diversion Targets (non C&D)	%	10%	50%	hold	hold	hold	hold	…	hold
C&D Material & Debris Diversion Targets	%	10%	50%	hold	hold	hold	hold	…	hold
If agency uses on-site or off-site waste-to-energy, estimated total weight of materials managed through waste-to-energy	Tons	N/A	N/A	N/A	N/A	N/A	N/A	…	N/A
Number of sites or facilities with on-site composting programs	#	7	7	7	8	8	9	…	hold
Number of sites or facilities recycling through off-site composting programs	#	10	11	12	13	15	16	…	hold
If agency has on-site or off-site composting programs, estimated total weight of materials diverted to composting	Tons	3,228	3,300	3,500	3,750	4,000	4,000	…	hold
% of agency-operated offices/sites with a recycling program	%	100%	100%	100%	100%	100%	100%	…	100%
If agency offices located in multi-tenant buildings, % of those buildings with a recycling program	%	100%	100%	100%	100%	100%	100%	…	100%
% of agency-operated residential housing with recycling programs	%	N/A	N/A	N/A	N/A	N/A	N/A	…	N/A

*Diversion refers to source reduction and recycling and does not include waste-to-energy.

GOAL 6: Sustainable Acquisition

The Department has a foundation of policies, procedures, guidance and programs that will achieve the sustainable acquisition requirements and goals. The Federal Acquisition Regulation (FAR) establishes uniform acquisition policies at the Federal level, while the Department of Energy Acquisition Regulation (DEAR) establishes uniform acquisition policies that implement and supplement the FAR. The Department of Energy Acquisition Guide provides guidance material for our acquisition personnel which is more procedural in nature.

a. Goal Description

DOE is working to meet the following goals:

- Ensuring 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 (Water Sense), bio-based, environmentally preferable (including EPEAT-registered products), non-ozone depleting, contain recycled content, or are non-toxic or less toxic alternatives
- Updating Departmental sustainable acquisition plans (previously known as green purchasing plans or environmentally preferable purchasing plans), policies and programs to ensure that all Federally-mandated designated products and services are included in all relevant acquisitions

b. Agency Lead for Goal

The three Under Secretaries, PMAs and the Headquarters facility manager are responsible for planning, budgeting, development, implementation and oversight within their respective portfolios. The SPO, the Office of Procurement and Assistance Management, NNSA's Office of Acquisition and Supply Management, Under Secretary sustainability points of contact, site offices and contracting officers provide technical assistance.

c. Implementation Method

DOE will achieve the sustainable acquisition goals by:

- Modifying the Department's contract writing system to ensure that all solicitations and contracts contain the provisions and clauses necessary to ensure offerors and contractors are aware of the Federal government's sustainable acquisition goals and initiatives
- Modifying internal database to better track sustainable acquisition actions by the Department's M&O contractors
- Continuing to update master listings of environmentally preferred products on a routine basis
- Increasing awareness of procurement personnel and requisitioners through updated training and continued utilization of working groups

- Initiating a quarterly headquarters file review and continuing to utilize the Procurement Management Review (PMR) process to ensure compliance with sustainable acquisition requirements
- Purchasing environmentally preferred products including WaterSense, ENERGY STAR, FEMP designated and others
- Implementing policy guidance for the purchase of renewable energy or renewable energy by-products generated on Indian lands from Indian tribes or tribal enterprises

The Department is making enhancements in its Strategic Integrated Procurement Enterprise System (STRIPES) contract writing system to ensure that contracting personnel can easily select the appropriate green provisions and clauses for their instruments to make certain the Department's prospective contractors and successful competitors are fully aware of DOE's commitment to its sustainable acquisition initiatives.

DOE will enhance the scope and types of questions for field reporting to more effectively measure the proportion of new contract actions by its M&O contractors that comply with the 95 percent goal. DOE will also continue to update master listings of environmentally preferable products to enable efficient access, and to better incorporate appropriate contract provisions, for services, commodities and technology. The Department draws its listings of EPPs, EPEAT and other sustainable products from external websites.[12]

DOE will provide updated training to Federal and contractor procurement staff and requisitioners in FY 2011 to build awareness of DOE sustainability goals and requirements. Additionally, the Department will continue to maintain its Sustainable Acquisition Working Group of over 200 members. Its activities include quarterly teleconferences for contractors and Federal employees, which informs sites on the latest reporting requirements, reviews new products and standards, and discusses issues directly related to day-to-day sustainable acquisition purchasing activities. This is supplemented by the activities of the DOE sustainable acquisition hotline, which is available to Federal and contractor employees with product-related questions. For example, in FY 2011 the hotline is assisting sites with the development of contract language in areas such as janitorial contracts, fielding questions and suggestions regarding tracking of purchase card transactions, and responding to site inquiries on the performance of biobased products.

DOE also conducts more focused teleconferences with Sustainable Acquisition Advocates, a group of Federal and contractor purchasing officials sponsored by the Office of Management. These discussions center on procurement activity and the accommodation of Federal sustainable acquisition requirements. These efforts fulfill the need for a continuing knowledge resource for both Federal procurement and contractor purchasing employees.

[12] 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

DOE will continue to emphasize compliance monitoring and reporting. Headquarters staff will initiate a quarterly file review of 5 percent of new contract actions to ensure compliance with the 95 percent goal. The PMR process will continue to be utilized to evaluate compliance of new contract actions with the EO goals, and will ensure 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.

d. Positions

Sustainable acquisition responsibilities are primarily assigned as collateral duties at both the Headquarters and field activities of procurement and contracting officers. The SPO, the Office of Procurement and Assistance Management, NNSA's Office of Acquisition and Supply Management, Under Secretary sustainability points of contact, site offices and contracting officers provide technical assistance.

e. Planning Tables

For more information on DOE's efforts to promote sustainable acquisition, refer to the planning table at the end of this section.

f. Agency Status

Updated Policy and Guidance

DOE's policies, procedures and green procurement language are contained within the FAR, DEAR, DOE Acquisition Guide and STRIPES.[13] Additionally, there are several government websites and other sources that contain listings of EPPs, EPEAT-registered, ENERGY STAR-qualified, WaterSense, FEMP-designated products, and other sustainable products.[14] DOE procurement and contractor purchasing personnel use these regulations and lists for all appropriate purchases and contracts. During the past year, DOE successfully published an interim rule which updated the DEAR treatment of sustainable acquisition by creating an all-inclusive sustainable acquisition clause and completed an extensive update of the sustainable acquisition chapter in the Acquisition Guide to reflect the requirements of EO 13514 (referred to as the megaclause).

[13] See http://www.management.energy.gov/policy_guidance/procurement_acquisition.htm
[14] 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

DOE Sites

These policies and procedures are followed throughout the DOE complex with all sites creating guidance and policies that track those at the Federal level. For example, sustainable acquisition is a central component of ORNL's Sustainable Campus Initiative, while other sites, such as LANL have detailed sustainable acquisition implementation plans in place.

Most sites comply with the requirement to purchase at least 30 percent post-consumer content paper. However, data shows 10 sites with less than 60 percent of their uncoated paper purchases that conform to the required recycled content. DOE will work with these sites to change this practice.

Training and Continuing Education

DOE provides Federal procurement and contractor purchasing staff with guidance and best practices on DOE's web site and access to external sites such as U.S. EPA's Environmentally Preferable Purchasing Training site and USDA's Bio preferred web site. Additionally, DOE facilities established mechanisms to maintain awareness and exchange of best practices around sustainable procurement (e.g., Sustainable Acquisition Advocates). DOE is currently updating its training materials to include information on the Sustainable Acquisition SSPP goal while offering new strategies and priority categories that will better align with DOE site activity and sustainable acquisition opportunities.

Assessment and Monitoring

DOE established mechanisms to monitor the effectiveness of its procurement and acquisition functions. The acquisition and financial assistance self-assessment checklist[15] 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 PMR process evaluates procurement practices at major DOE sites on a recurring cycle. The assessments address the effectiveness of the procurement organization, and compliance with procurement statutes, regulations, and procedures. In FY 2011, DOE will expand its assessment and monitoring effort by conducting a five percent file review of new contract awards on a quarterly basis.

Recognition

Starting in FY 2011, DOE will offer recognition for sites that meet sustainable acquisition goals, including tracking of contract actions and individual purchases of identified products. This approach will better ensure accurate reporting and highlight the sites that stand out in terms of

[15] See http://www.management.energy.gov/documents/FedComplianceCritChecklist.pdf

effort and tracking systems. Sites will be eligible for awards by documenting both effective performance and programmatic controls.

g. Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant sustainable acquisition projects or initiatives included in the 2010 SSPP, none have been cancelled or suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI.

DOE has long placed a priority on the purchase of sustainable products that offer cost savings over their alternatives. The current emphasis is on remanufactured toner cartridges, which cost 30 percent to 50 percent less than new toner cartridges; recycled paint, which costs approximately 50 percent less than non-recycled paint; and other products such as recycled content paper that carry little or no price premium. This approach is reinforced by emphasizing the purchase of used products and reusing existing products.

Further, many sites created their own contract and purchase activity tracking systems using in house technology and expertise. The SPR Buy it Green (BIG) website is an integrated tool to facilitate procurement of green products and services. It is an easily accessible intranet source of purchase requirements along with input forms for purchase documentation to allow for tracking and reporting for purchasing products with low or zero waste potential, high-recycled content, those produced and delivered in an environmentally sustainable manner, and which demonstrate maximum durability or biodegradability, reparability, energy-efficiency, non-toxicity, and recyclability. These approaches will be expanded in the updated training materials, reflected in the recognition program, and continue to be the focus of regular teleconference calls.

h. Highlights

- DOE issued an interim final Sustainable Acquisition Program rule on September 20, 2010. This important rule revised the DEAR by creating an all-inclusive sustainable acquisition program clause with variations for use in both management and operating contracts and other facility management type contracts performed within the DOE complex.

- In order to provide comprehensive guidance to the DOE Federal and contractor procurement communities, Acquisition Guide Chapter 2316 was issued in December 2010. Pursuant to the Sustainable Acquisition Program clause, this Guide chapter is followed by the contractors operating within the DOE complex.

[16] See http://management.energy.gov/documents/AttachmentFlash2011-25.pdf

- In FY 2010, 91 percent of paper purchases reported conformed with the 30 percent post consumer content papers goal. In the second quarter of FY 2011, DOE reports a total of 23 of 27 eligible contracts that include the sustainable acquisition clauses.

Goal 6 DOE Planning Table

SUSTAINABLE ACQUISITION	Units	FY 10	FY 11	FY 12	…	FY 20
New Contract Actions Meeting Sustainable Acquisition Requirements	%	75%	95%	95%	95%	95%
Energy Efficient Products[17] (Energy Star, FEMP-designated, and low standby power devices)	%	N/A	95%	95%	95%	95%
Water Efficient Products	%	N/A	95%	95%	95%	95%
Biobased Products	%	N/A	95%	95%	95%	95%
Recycled Content Products	%	N/A	95%	95%	95%	95%
Environmentally Preferable Products/ Services (excluding EPEAT)	%	N/A	95%	95%	95%	95%
SNAP/non-ozone depleting substances	%	N/A	95%	95%	95%	95%

Sustainable Acquisition Contract Reviews

SUSTAINABLE ACQUISITION CONTRACT REVIEW	1st QTR FY 11	2nd QTR FY 11	3rd QTR FY 11	4th QTR FY 11 (Planned)
Total # Agency Contracts	319	540	642	TBD
Total # Contracts Eligible for Review	319	540	642	TBD
Total Eligible Contracts Reviewed (i.e., 5% or more eligible based on previous OMB guidance)*	319	27	32	TBD
# of Compliant Contracts	2	23	31	TBD
Total % of Compliant Contracts	0.63%	85%	96.8%	TBD

* The second quarter review was based on a random sample of 5 percent of eligible new contract actions awarded in STRIPES during the given time period.

[17] The Federal Procurement Data System – Next Generation does not collect product information at sufficient detail to report on these subcategories of sustainable products. DOE will work with OMB and other agencies on a solution to this issue.

DOE continues to improve its sustainable acquisition contract reviews each quarter. Initially, DOE tested the use of the Contract Writing System (CWS) to collect the acquisition data, however, this did not meet the required needs. DOE is working on changes to the CWS which should make it possible to capture this data through the system in the future. In the second quarter of FY 2011, DOE attained 85 percent compliance, acquired through a randomized review of contract actions. In the third quarter, DOE is focusing on reviewing contracts more likely to contain sustainable attributes such as service contracts. DOE reached 95 percent compliance in the third quarter and continues to maintain this level.

DOE also continues to work closely with its field components. Attainment of the 95 percent procurement goal was a focus of the two most recent quarterly teleconferences on sustainable acquisition. A special presentation on sustainable contracts was also made to the DOE Procurement Policy Advisory Group. DOE is promoting the use of a priority sustainable products, services and attributes list throughout the complex.

GOAL 7: Electronic Stewardship and Data Centers

This goal addresses energy management and optimization for information technology (IT) systems including equipment found in offices, laboratories, production environments and data centers. Activities supporting this goal will reduce DOE's GHG emissions, support environmental management goals, and achieve the sustainability objectives of the Federal Data Center Consolidation Initiative (FDCCI).

a. Goal Description

DOE is working to meet the following goals:

- Ensuring acquisition of EPEAT registered, ENERGY STAR qualified, and FEMP designated electronic office products when procuring electronics in eligible product categories
- Establishing and implementing policy and guidance to ensure use of power management, duplex printing, and other energy efficient or environmentally preferred options and features on all eligible agency electronic products
- Updating agency policy to reflect environmentally-sound practices for disposition of all excess or surplus electronic products
- Increasing the quantity of electronic assets disposed through sound disposition practices such as disposal through GSA Xcess, recycling through Unicor, donation through GSA's Computer for Learning (CFL) and other non-profit organizations, and/or recycling through a private recycler certified under the Responsible Recyclers (R2) guidance or equivalent certification
- Requiring IT planning / life cycle management to replace and or waive equipment that does not meet compliance requirements

- Updating agency policy to ensure implementation of best management practices for energy efficient management of servers and Federal data centers, including how the agency will meet data center reduction goals of the FDCCI
- Installing dedicated meters for data centers to monitor or report energy efficiency metrics

Agency Lead for Goal

The three Under Secretaries, PMAs and the Headquarters facility manager are responsible for meeting the target performance measures to include the planning, development, implementation and oversight within their respective portfolios. The SPO, OCIO, HSS, Under Secretary sustainability points of contact, site offices and IT managers provide technical assistance. OCIO will establish department-wide policy, identify target performance measures, deploy assessment tools and provide training programs to assist the Under Secretaries in meeting the goals. DOE subject matter experts in energy efficiency, green computing, and advanced technologies from EERE, FEMP and DOE National Laboratories actively participate in providing technical assistance and consultation.

b. Implementation Methods

DOE facilities are required to practice environmental and energy efficient lifecycle management of electronics equipment, including green procurement, energy efficient operations and maintenance, and safe disposition of end of life electronics. Through the SSPP and the FDCCI, DOE sites must also implement data center infrastructure and operations (I/O) best management practices, enhance energy efficiency, and reduce the electronic footprint of servers and data centers.

Acquisition of energy efficient electronics

The Department requires purchasing green IT and energy efficient electronics products such as ENERGY STAR, EPEAT, and FEMP designated equipment. DOE has been a leader in EPEAT purchasing within the Federal government and has served as Federal Representative on the EPEAT Board of Advisors. EPEAT FAR requirements are included in the DOE DEAR purchasing requirement system for DOE contractor compliance. Many DOE sites now require review processes for operational specifications and special requirements before any non-EPEAT equipment can be considered for purchase. DOE conducted training on procurement of imaging and wide screen equipment in anticipation of the creation of new EPEAT standards for those products in FY 2011 or FY 2012. DOE exceeded the 95 percent EPEAT purchasing requirement in three of the last four years and is striving to exceed it in FY 2011.

Compliance with electronic stewardship policies and sustainability performance measures for acquisition of qualified electronics are tracked in a variety ways including the annual agency wide reporting. Each site is required to report the amount of electronic units purchased for CRT

and LCD monitors, desktop units, and laptops. For FY 2011 data calls will include all electronics tracked for the Federal Electronics Challenge (FEC), including copiers, cell phones, and PDAs. Data is compiled and used to report Departmental electronics stewardship performance to the FEC as coordinated by the SPO.

Every DOE site has an electronics stewardship component in their facility EMS. Sites are expected to regularly update their goals, objectives, and targets to address requirements of new EOs and Department requirements. Headquarters and site personnel are educated through regular conference calls, conferences, special training programs, program office meetings, the FEC and other programs regarding their roles and responsibilities in meeting the latest EO and statutory requirements and their application to the acquisition of electronic products.

Energy efficient operation of eligible electronic products

DOE sites are also required to report implementation of power management features on personal computing equipment and duplex printing setting on printers, copiers and multi-function devices. During the past three years DOE has made significant progress in implementing energy efficient and environmentally preferred options and features on eligible electronic equipment. At the end of FY 2010, all but four DOE facilities were using automated power management services. DOE worked with these four sites to implement power management practices during FY 2011. The Department will achieve power management at 95 percent of its sites by December 31, 2011.

At the same time, DOE is committed to promoting best practices and upgrading power management performance among other sites. For example, SNL, which currently practices policy based power management, is now implementing advanced automated power management software for more than 15,000 workstations. Projected savings include an annual reduction of 797 metric tons of CO_2e (from avoiding 4,193,839 kWh of electricity use) and estimated cost savings of $396,737 versus baseline. [18]

The majority of DOE sites report implementing duplex printing through FY 2010. DOE is promoting printer consolidation to save money, energy, and paper while supporting duplex printing practices. For example, DOE Headquarters is committed to fully implementing consolidated printing with default duplex settings by FY 2012. DOE sites also support and encourage duplex printing through training, special events, and other activities such as Earth Week events, email pop-ups, etc.

[18] Estimates based on EPA/FEC Electronics Environmental Benefits Calculator (v.2) http://www.federalelectronicschallenge.net/resources/bencalc.htm

Environmental disposition of electronic products

Per DOE's 2010 SSPP, a review of DOE orders, directives, policies and procedures was conducted to ensure disposition of DOE electronics assets, both commercial and non-commercial, including special items such as supercomputers was sufficiently addressed. DOE found its policies, procedures, and contract language in full compliance with disposition and cyber security requirements, covering both conventional and non-conventional electronic products. Some examples of recent findings:

- Requirements for certified recyclers, CFL, UNICOR, GSA, and other appropriate disposal are in place
- Educational programs, training, and consultation are provided to field staff for the evaluation and selection of certified recyclers
- EPEAT manufacturer take back requirements are included in DOE purchase agreements for EPEAT certified equipment
- Under direction of DOE cyber security authorities, secure and classified electronics materials are appropriately decommissioned and recycled as a standard operating procedure, including hard drives and other systems
- Rigorous protocols and procedures govern the transfer or disposition of surplus and end-of-life advanced computing systems

DOE has a strong track record in the disposition of end of life electronics assets and has consistently exceeded the 95 percent standard. DOE has achieved an average reuse and recycling rate of more than 98 percent for surplus electronics such as computers, monitors, and printers over the last three years with almost 99 percent recycled in FY 2010.

DOE will work with its M&O contractors to to ensure that acquisition plans continue to address emerging best practices in electronics disposition, including the use of R2 and E-Steward certified recyclers and manufacturer take back of equipment. DOE will also continue to improve its disposition procedures to support advanced decommissioning and disposal practices for equipment inappropriate for conventional recycling services.

In 2011, DOE was awarded 15 Federal Electronics Challenge (FEC) awards for green procurement, recycling, and power management of electronics equipment, which represented 44% of all 2011 agency FEC awards.

Replacement of non-compliant electronic equipment

With an average life cycle of four years, almost all DOE current computers and monitors were purchased as EPEAT certified and ENERGY STAR rated systems. Similarly, DOE will implement EPEAT purchasing requirements for all imaging equipment (copiers, printers, faxes, etc.) and widescreens (including televisions) as soon as the new standards are approved. Currently, DOE is actively encouraging adoption of consolidated printing systems (workgroup printers) throughout the complex to replace aging or energy-inefficient individual printers and to

promote the use of duplex printing. Despite complex, multi-year development and acquisition of advanced computing systems such as supercomputers, DOE is a global leader (per the Green 100 list of the world's most efficient supercomputers) in energy efficient High Performance Computing (HPC).

Data center best management practices and data center optimization

The reduction of GHG emissions and energy consumption is a major goal for DOE data centers. However, most of the energy load is consumed by HPC data centers, many of which are accomplishing valuable science in climate change and energy research for the Federal government, universities and a broad range of researchers. While DOE anticipates continued use of HPC to perform its vital mission, it commits to ensuring all of its data centers, including HPC, implement data center best practices for energy efficiency.

Each of the DOE sites, PMAs, and National Laboratories have accomplished many improvements in the modernization and optimization of their data centers and IT infrastructure resulting in significant energy efficiencies. To assist sites in their continuing pursuit of sustainable data centers, DOE will enhance their capability by providing the training and assessment tools to better identify the high-value energy-savings opportunities in DOE's data centers.

The DOE "Save Energy Now" program has partnered with industry to develop a certification program that trains and qualifies practitioners to evaluate the energy status and efficiency opportunities in data centers. As a best practice, DOE will assign a certified Data Center Energy Practitioner (DCEP) to each DOE data center. The DCEP will conduct energy assessments of their assigned data centers and assist the facilities and IT staff in the identification of energy efficiency improvement opportunities, implementing best management I/O practices and measuring the Power Utilization Effectiveness (PUE) for assigned data centers.

Using the DOE Data Center Energy Profiler Software Tool Suite (DC Pro), the DCEP will conduct an annual energy assessment of assigned data centers. The tool suite, developed by the DOE Industrial Technologies Program (ITP), is comprised of an energy profiling web based tool and a set of system assessment worksheets that provide diagnostics on specific areas within a data center. DC Pro generates data center energy profiles that give a general idea of where energy is being used, as well as detailed energy assessments on critical data center systems, such as air flow and electrical use. By using DC Pro, the DCEP will determine how energy is being used in a data center, identify energy-savings opportunities and calculate potential energy savings (and associated environmental emissions reductions) with proposed data center I/O best practices and projects. In coordination with the Facility Manager and Data Center or IT Director, the DCEP will define Energy Conservation Measure (ECM) projects to be included in annual DOE SSPs.

Consistent with the objectives of the FDCCI, the DOE OCIO, in coordination with the IT Leads for the three Under Secretaries, is leading an initiative to develop and implement an IT architecture that offers Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a

Service (SaaS), to capitalize on industry best practices for cloud services. The result will be an IT infrastructure that meets DOE's sustainability goals, reduces total costs for IT infrastructure, increases physical and cyber security, and significantly improves the operational effectiveness of the DOE Federal workforce by leveraging cloud computing and "commodity" IT services. This includes a robust mobile and virtual-desktop computing capability. A key component of this initiative is the consolidation of three data centers and two server rooms at DOE Headquarters into single high-efficiency data center. The OCIO, in partnership with the Office of Management, SPO and FEMP will demonstrate DOE's expertise and innovation in developing a fixed price performance base contract for sustainability projects by using an ESPC for this consolidation effort. DOE will document this ESPC project as a potential best practice for other DOE sites and Federal agencies to use as a viable contracting vehicle for implementing data center consolidation and optimization plans.

c. Positions

In support of sustainability efforts, the OCIO has an FTE assigned to facilitate the long-term implementation, coordination and oversight of SSPP Goal 7. Additionally, HSS provides support through an FTE working on electronic stewardship. SPO, Under Secretary sustainability points of contact and site offices provide technical assistance. FEMP also partners with the OCIO in this effort.

DOE sites have full-time energy managers, IT specialists, procurement specialists and property specialists that ensure compliance with DOE orders, directives, and policies as they apply to the acquisition, operation, and disposal of eligible electronic products.

d. Planning Tables

For more information on DOE's sustainability efforts for electronic stewardship and data centers, refer to the planning table at the end of this section.

e. Agency Status

The implementation of virtualization technologies allowed many sites to facilitate effective consolidation projects. The sites below have consolidated (or have plans to consolidate) data centers / server rooms largely due to virtualization:

- ANL will consolidate a number of site legacy data centers to the Interim Scientific Supercomputing Facility (ISSF) in FY 2014.
- DOE HQ will consolidate three data centers and two server rooms into a single high-efficiency data center by FY 2013.
- NREL migrated more than 500 physical servers (and associated data centers and server rooms) to just 80 servers supporting 500 virtual servers. Virtual server farm was located to a new energy efficient data center (RSF) in FY 2010, achieving 81% energy savings and a PUE recently tracked at a 1.07.

- EM East Tennessee Park (ETTP) reduced the size and power of the site data center (5,500 SF to 1,500 SF / 250 kW to 40kW).
- LM consolidated the YMP Sahara data center to Hillshire data center in FY 2010 and plans to consolidate the YMP Hillshire data center to Morgantown data center in 2011.
- Kansas City Plant (KCP) decommissioned three data centers (SEL, EDSV and the Enterprise Computer Room)
- LLNL consolidated over 430 servers from 30 facilities to the B112 Enterprise data center since FY 2009.
- Hanford Site consolidated 12 of its data center and server rooms into three highly efficient data centers.
- Fermilab decommissioned one of 7 data centers.

In addition to server virtualization, sites are exploring and implementing storage consolidation and optimization to reduce the physical hardware needed, as well as associated energy costs. This includes sites like DOE HQ and KCP where significant storage resources have been reclaimed from deduplication services. SNL and BNL implemented tiered storage systems to further reduce energy demands in addition to deduplication. Sites will also evaluate storage area networks and other storage technologies to support continued virtualization efforts as well as support energy efficient backup and Continuity of Operations (COOP) services.

The use of public/private cloud services has been implemented at several DOE sites. LANL established an Infrastructure-on-Demand service where site staff can quickly provision server resources on demand. LBNL is using the Google Mail cloud service instead of standing up an internal email service. BNL and Fermi are exploring the use of HPC and community clouds (STAR) to supplement the HPC computing power at the sites. ANL and LBNL recently launched the Magellan cloud computing program to test the feasibility of cloud services to support advanced scientific computing and experimentation. Several other sites (DOE HQ, NREL and ORNL) will evaluate cloud services in FY 2011.

Thin clients and virtual desktop systems have been implemented in multiple Sites. NNSA sites installed 17,000 thin client workstations. PPPL implemented a pilot with plans to replace at least 60 percent of its windows clients. SPR, SRS, and the Office of Scientific and Technical Information (OSTI) are using thin clients for specific support operations or in pilot tests. Hanford recently installed 2,000 thin clients and plans to install 6,000 more workstations. The NNSA Nevada Site Office (NSO), PNNL, ANL, ORNL and Portsmouth will pilot or implement thin client systems in the next two years.

f. Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant electronic stewardship or data center consolidation projects or initiatives included in the 2010 SSPP, none have been cancelled or

suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI.

If the pilot data center consolidation ESPC project proves to be effective, the use of ESPCs to fund major data center consolidation efforts will enhance DOE's ability to implement data center optimization projects more expeditiously.

g. Highlights

Significant IT sustainability accomplishments have been and continue to be made at DOE sites and the National Laboratories:

- Hanford Site "Green in Three" Initiative implemented an advanced electronics modernization and footprint reduction program is nearing completion, consolidating twelve data centers and server while implementing thin client and VOIP technologies. As a result of DOE interagency leadership, three other Federal agencies have now consolidated their data centers into the Hanford central data center including the NRC and the TSA data center handling all non-commercial aviation data.
- WAPA reduced its central data center footprint by 75 percent and cut energy use in half in FY 2010 through virtualization and consolidation
- The National Training Center: reduced its electronic footprint and shrunk server rooms by 80 percent in FY 2010, while instituting sitewide wireless LAN and thin clients.
- LANL launched "Infrastructure on Demand," a private cloud culminating a four year virtualization and consolidation strategy. LANL closed three data centers, reduced its physical footprint by over 50 percent, and saved millions of dollars in energy costs.
- SNL and NREL worked to implement the Red Sky/Red Mesa supercomputer system. This system is among the fifteen fastest in the world and has demonstrated extraordinary performance in energy efficiency, including attaining a PUE of 1.27 while establishing new standards for green supercomputing.
- LLNL recently earned LEED Gold certification for its Terascale Simulation Facility, home to two of the world's fastest and greenest computers. The facility includes state of the art energy efficiencies including elevated air and water cooling temperatures and power management.
- Several Sites are powering their data centers with renewable energy. NREL is using solar, and PNNL is using an aquifer for cooling in two buildings
- LBNL and NREL are capturing waste heat from their data centers for reuse in their facilities
- An ultra energy efficiency data center at NREL's RSF was designed to minimize its energy footprint without compromising needed service quality. The energy design goal of 35 kBTU/ft2/year was met through its innovative design, which is 50 percent more energy efficient than a conventional building designed to the ASHRAE 90.1 (2004) standard. The PUE of the data center is extremely low and is unique among data centers worldwide.

Goal 7 DOE Planning Table

ELECTRONIC STEWARDHIP & DATA CENTERS	Unit	FY 10	FY 11	FY 12	FY 13	FY14	FY15
% of electronic product acquisition covered by current Energy Star specifications that must be energy-star qualified	%	100%	100%	100%	hold	hold	hold
% of covered electronic product acquisitions that are EPEAT- registered	%	92%	95%	95%	hold	hold	hold
% of covered electronic product acquisitions that are FEMP- designated	%	95%	95%	95%	hold	hold	hold
% of agency, eligible PC, Laptops, and Monitors with power management actively implemented and in use	%	92%	95%	100%	100%	hold	hold
% of agency, eligible electronic printing products with duplexing features in use	%	85%	95%	100%	100%	hold	hold
% of electronic assets covered by sound disposition practices	%	99%	100%	100%	100%	hold	hold
% of agency data centers independently metered, advanced metered, or sub-metered to determine monthly (or more frequently) Power Utilization Effectiveness (PUE)	%	18%	40%	60%	80%	90%	100%
Reduction in the number of agency data centers	#	1	1	2	0	1	1
% of agency data centers operating with an average CPU utilization greater than 65%	%	16%	50%	100%	hold	hold	hold
Maximum annual weighted average Power Utilization Effectiveness (PUE) for agency	#	1.82	1.8	1.7	1.6	1.5	1.4
% of agency data center assigned a certified Data Center Energy Practitioner	%	n/a	50%	100%	100%	100%	100%
% of agency data centers that have conducted annual DC-Pro energy assessment	%	n/a	50%	100%	100%	100%	100%

GOAL 8: Agency Innovation & Government-Wide Support

An increasingly complex, global environment has brought into sharp focus the relationships between energy security, climate change, and national security objectives—all against a backdrop of concerns about U.S. economic competitiveness. The Department's engine of innovation must now be directed toward that nexus, accelerating progress toward solutions with renewed purpose and vigor. – Steven Chu, Secretary of Energy, DOE Strategic Plan

DOE's vital and urgent mission will be fully leveraged to reduce GHG emissions and improve sustainability of not just the Federal government, but the entire Nation.

a. Goal Description

Implementation of overarching innovative projects can be found throughout the SSPP goals and the highlights of achievements already made at DOE sites. DOE strives to continue using these innovative mechanisms to meet and exceed its sustainability goals.

DOE will focus its innovation and government-wide support efforts on the four following principles:

- Enhancing Efficiency Gains
- Expanding Clean Energy
- Evolving Sustainable Campuses
- Engaging Employees and the DOE community

The synergies realized between the implementation of these principles, practices and methods will help DOE progress toward meeting numerous sustainability goals all at the lowest cost to DOE and the taxpayer.

Agency Lead for Goal

The three Under Secretaries, PMAs and the Headquarters facility manager are responsible for meeting the target performance measures to include the planning, development, implementation and oversight within their respective portfolios. SPO, FEMP, Under Secretary sustainability points of contact, and site offices provide technical assistance.

b. Implementation Methods

Agency Innovation

Enhancing Efficiency Gains. DOE will continue to enhance efficiencies at its sites through:

- Conducting continuous commissioning of buildings
- Installing cool roofs
- Conducting ongoing energy and water assessments
- Creating and operating the most energy efficient computer server facilities

Cross-functional teams already set up at DOE National laboratories will identify and develop methods to approach sustainability gap areas such as low cost means to achieve high performance sustainable buildings, reduce Scope 3 emissions and cost-effective energy solutions at high energy, mission specific-facilities. These teams will build on past successes for finding innovative solutions for reducing energy consumption and improving energy efficiency.

The Department controls about 90 diverse data centers that can be optimized and used as best practice models for other agencies, universities, and the private sector. DOE will target selected data centers to demonstrate the new data center infrastructure technologies and how they optimize data center energy efficiency. The data center ESPC at the Germantown headquarters facility will provide lessons learned for similar use throughout DOE and the Federal government.

In addition, DOE completed modification of its ESPC umbrella or multiple award IDIQ contract to allow all Federal agencies to use streamlined competition procedures as required by the National Defense Authorization Act of 2011. This modification will provide Federal agencies with the ability to better utilize ESPCs.

Expanding Clean Energy. DOE will expand its clean energy portfolio by:

- Demonstrating new renewable energy technologies on a large scale
- Installing additional on-site renewable generation equivalent to at least 7.5% of DOE electricity use
- Partnering with Tribal Nations to purchase clean energy generated on tribal lands
- Increasing the use of performance based contracting methods, including ESPCs, UESCs, PPAs, and other public-private partnerships, as authorized

DOE site proposed projects will be reviewed and considered for potential technical assistance from DOE renewable energy programs, including solar, biomass, wind, water and geothermal technologies. In addition, DOE will continue to work to develop public-private partnerships to secure renewable energy on its sites. DOE is also providing technical assistance to the General Services Administration's Public Building Service.

DOE will continue working with Tribal Governments to develop clean energy, as well as prefer to purchase renewable energy from Tribes for DOE use at its sites. This partnership not only adds to the domestic supply of clean energy, but also provides significant economic benefits for Tribes. DOE is working to demonstrate the use of an Energy Savings Agreement, which combines advantages of PPAs with ESPCs for utility scale renewable energy systems.

Evolving Sustainable Campuses. DOE continues to implement innovative building strategies, demonstrating a commitment to minimize energy, water, and materials consumption. Several DOE sites currently strive to create and maintain sustainable campuses that focus on the interaction of the triple bottom line sustainability principles—stewardship, responsibility and prosperity. These models will be shared as best practices with all DOE sites in order to sustainably evolve all of DOE's campuses.

DOE will consider the following methods:

- Installing gas turbine and fuel cell technology, and cogeneration plants to generate electricity and recapture waste heat

- Developing campus roadmaps and long term sustainability planning
- Using design-build contract mechanisms to optimize sustainable new building construction and major renovations
- Distributed Generation
- Utilizing nuclear energy and implementing small modular reactors as appropriate
- Revitalizing former nuclear weapons sites for reuse
- Conducting demonstration projects for co-firing or the outright replacement of coal with biomass, and carbon sequestration where feasible

DOE will use its campuses as laboratories to showcase its own innovative clean energy technologies. NREL's Campus of the Future, LBNL's SustainLBL, PNNL and ORNL's Sustainable Campus Initiative will be models for other DOE sites, and other Federal agencies, to create other campus-wide sustainability initiatives.

Engaging Employees and the DOE Community. Behavior and culture change are essential to meeting DOE's sustainability goals. DOE will rely on its employees as its greatest asset to affect these changes. DOE will engage its employees and community by:

- Increasing telework and developing hoteling space within existing occupied areas
- Educating new employees on sustainability practices, including commuting options
- Incentivizing employees through friendly competitions, sustainability pledges, and awards programs

DOE sites will cut across stove-piping and work with each other, as well as other agencies, to identify and implement sustainability engagement activities. Through employee engagement activities and organization behavior change, DOE will increase its waste reduction, recycling, composting, and purchase of sustainable products, and decrease energy and water use. Through employee engagement software programs, DOE will provide a mechanism for employees to pledge to reduce their footprints both at work and home.

DOE's Asset Revitalization Initiative will engage with communities around its sites, nonprofits, tribal governments, the private sector and other Federal agencies such as the Department of Defense, to identify reuse approaches as environmental cleanup efforts reach completion.

Government-Wide Support

The Department also provides significant support to other agencies through the 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.

FEMP delivers an array of products and services organized into four distinct service lines:

- ***Project transaction services*** facilitate the use of creative funding mechanisms across the Federal government by helping to identify investment, leveraging and financing opportunities, providing training, assisting with baseline audits, providing project facilitation, assisting in project evaluation and selection, providing full project life-cycle support, tracking results 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 interagency planning, reporting, and communication processes supporting legislative and other initiatives; publication of rules and guidance; energy awareness; and customer service support.
- ***Federal market development services*** accelerate the uptake of energy efficient and renewable energy technology, tools and techniques by the Federal market. The group will work collaboratively within the Department and with other Federal agencies to accomplish its mission by connecting technology demonstration and evaluation results with the processes that develop and implement Federal standards and specifications, and develop links to Federal acquisition systems, organizations and suppliers, utilizing principles of institutional change.

In addition, FEMP provides ongoing federal support to/for interagency coordination/working groups; the GHG Reporting Portal; the EISA 432 Facility Compliance Tracking Database and guidance; the FAST fleet reporting system; and other projects as necessary.

c. Positions

As the Department lead for sustainability, the SPO has six FTEs assigned to facilitate the long-term implementation, coordination and oversight of the SSPP. Additionally, 6 FTEs in HSS, 3 FTEs in OECM, 1 FTE in OCIO and staff in the Office of Management provide analytical support and technical assistance. FEMP has 22 FTEs that provide government-wide energy, water, GHG technical assistance and management for all Federal agencies. In addition, Under Secretary sustainability points of contact, site offices and facility managers provide technical assistance.

d. Planning Tables

For more information on DOE's efforts on agency innovation and government side support, refer to the planning table at the end of this section.

e. Agency Status

Agency Innovation

Enhancing Efficiency Gains

NSO is using several buildings at the Nevada National Security Site as testing facilities for low-cost energy saving initiatives. This includes testing the effectiveness of a technology to cool and heat buildings without the use of refrigerants or consumption of water, which was developed by a National Security Technologies (NSTec) employee. In addition, the energy usage of Building 550 is being monitored for a 12 month period after its exterior was painted with an insulated paint additive to increase its insulation factor.

J-Lab implemented several large-scale innovations to improve site sustainability. Its supercomputer, Hadron, receives close to 90 percent of its computing power from video game graphics processing units. This application of cutting-edge off the shelf components allows for increased computing power without increasing electricity usage. J-Lab also reconfigured a refrigeration plant to allow compressors to automatically scale back when full capacity is not needed. The facility operations were fully automated, eliminating the need for 24-hour staffing which reduced power requirements from 6 MW to 4.2 MW and created an average monthly savings of $33,000.

ANL is designing a co-located combined heat and power plant as part of its effort to extend the life of the existing steam plant. The new plant will consist of a gas combustion turbine and a heat recovery steam generator that will generate 110,000 pounds of steam per hour and produce 5.8 MW of electricity, providing approximately 65 percent of ANL's steam needs and 20 percent of the site's electric power needs. Advantages of the project include increased fuel conversion efficiency, lower utility costs, fewer greenhouse gas emissions, fewer NO_x and SO_2 emissions, and increased reliability.

Expanding Clean Energy

SRS and Savannah River National Laboratory (SRNL) are working with the Savannah River Community Reuse Organization and local economic development boards to implement the Energy Park Initiative. This initiative seeks to redeploy under-utilized DOE facilities to produce renewable energy. These energy parks would promote energy security, environmental sustainability, economic competitiveness and create energy sector jobs throughout the region.

Evolving Sustainable Campuses

NREL operates on the "Campus of the Future" concept by utilizing energy-efficient building design, sustainable transportation, environmental stewardship and generation of on-site renewable energy. NREL focuses on becoming a model of sustainability by demonstrating the

effectiveness and value of the cutting-edge renewable energy technology that the laboratory has played a key role in developing.

PNNL recently developed a comprehensive plan to make the site climate-neutral by 2020. This plan included a detailed analysis of GHG abatement and cost analysis of various conservation, energy efficiency, and on-site renewable opportunities. Feedback and data were sought from facilities and operations personnel throughout the process.

Engaging Employees and the DOE Community

Rocky Mountain Oilfield Testing Center focuses on employee involvement and recognition by awarding employees who bring innovative ideas to the energy management team and creates an environment where employees are intellectually challenged, supported in their work, and valued for their contributions to the mission.

LANL established a Stimulus Office to bring together operations and research organizations to work jointly on sustainability issues in response to stimulus-funded proposal requests. These teams worked together to develop innovative solutions for sustainability and energy management challenges which could be replicated across the DOE complex and in local communities.

Y-12 has improved its Energy Management website to encourage employee interest in sustainability. Here, personnel will be able to access sustainability tools and share ideas on how to increase the site's energy efficiency.

Government-Wide Support

FEMP has a unique role under the EO 13514 in supporting OMB and CEQ in its implementation and is actively involved in the development of Federal guidance for implementing the EO, including GHG, fleet management, and water conservation activities. Below is a list of some of FEMP's services that help all Federal agencies meet their sustainability requirements and report their status and progress toward achieving goals and targets as efficiently and accurately as possible:

- An electronic accounting and reporting capability for annual Federal GHG reporting, as required by EO 13514, which also incorporates required data elements to track energy and water intensity goals for facilities, renewable energy goal performance, metering progress, and implementation of efficiency standards in new buildings.
- Development of a web-based Compliance Tracking System (CTS) to track agency progress in meeting the energy/water auditing, commissioning, benchmarking, and project implementation and follow-up requirements of Section 432 of EISA.

- The Federal Automotive Statistical Tool (FAST), which helps monitor, track and improve fleet performance.
- Recommendations for water efficiency guidance to assist Federal agencies in meeting their obligations under Section 2(d) of EO 13514.
- Regular online and live training sessions on a wide range of energy and water management topics, including a monthly "First Thursday" online training that attracts several hundred attendees each session.
- Coordination of the Federal Interagency Energy Management Task Force, created by the Federal Energy Management Improvement Act of 1988 to address energy issues affecting Federal facilities and operations. It also serves as a forum for sharing lessons learned across Federal agencies.
- Co-sponsoring and planning GovEnergy, an annual conference that fosters opportunities to educate and encourage the best application of practices, products, and services as they relate to Federal sector sustainability.
- Providing technical assistance on the ESPC umbrella or multiple award IDIQ contract.

In addition to continuing and improving its efforts to facilitate Federal sustainability practices and reporting, FEMP will complete the following in future years:

- Continue enhancement of the EISA Section 432 CTS, assist agencies with populating the system with audit and project data, and using the data to help inform sustainability project planning and GHG mitigation efforts.

f. Return on Investment

DOE will select projects or initiatives based on most optimal ROI, consisting of economic, environmental, and social benefits. Of those significant innovation or government wide support projects or initiatives included in the 2010 SSPP, none have been cancelled or suspended due to a lower than expected ROI, nor have any such projects or initiatives been expanded due to higher than expected ROI.

g. Highlights

Agency Innovation

- J-Lab developed an innovative way to reduce energy consumption associated with cryogenic cooling systems in particle accelerators. This method was passed onto two other DOE labs and all three were able to reduce their MW-scale demand by over a third, demonstrating that significant energy conservation measures can be found in high energy mission specific facilities.

- The new RSF at NREL consolidated several servers into one data center and leverages the local climate to provide "free cooling," using energy efficient fans and outdoor air to replace traditional computer room air conditioners. This innovative project reduced power consumption by 65 percent.
- New shuttle buses at LBNL provide approximately 58,500 rides per month to employees. These buses are equipped with engines that greatly reduce diesel particulate matter emissions in comparison to older models, and run on B20 diesel. In addition, the NextBus information system is utilized to provide riders with schedule information via smartphone, computer, phone, or digital kiosk.

Government-wide Support

DOE has a vast array of programs that will bring substantial change to the Nation's energy makeup:

- FEMP's ESPC program continues to bring record numbers of energy and water management projects to award. In FY 2010, FEMP helped Federal agencies award $550 million worth of ESPC projects, the second highest year on record.
- FEMP continues to provide training to more agencies in energy and water management. In its highly successful First Thursday seminar series, FEMP provided training to over 10,000 people.
- FEMP leveraged $13 million in Recovery Act funding to develop $74 million in Federal energy and water management projects.
- In a little over one year, six projects receiving a total of $23.6 million in seed funding from the Advanced Research Projects Agency – Energy (ARPA-E) generated more than $100 million in outside private capital investment. For example, 1366 Technologies is developing a new way to make silicon wafers for 80 percent less than current costs.
- DOE Energy Innovation Hubs are advancing highly promising areas of energy science and engineering from the early stage of research to the point where the technology can be handed off to the private sector. The Energy Efficient Building System Design Hub at the reclaimed Philadelphia Navy Yard is the first Energy Regional Innovation Cluster (E-RIC). This hub is supported by over 18 universities and private entities, DOE, PPPL, LLNL, the Small Business Administration and Department of Commerce's Economic Development Administration and National Institute of Standards and Technology. The E-RIC will bring together public and private sector resources to overcome institutional, technological, policy, market, educational and behavior barriers to the broad adoption of energy efficient technologies and practices. The hub will focus on the critical and often neglected middle stages of innovation - demonstration and commercialization. PPPL's Science Education program is the lead organization of the Education and Workforce Development component

of the Greater Philadelphia Innovation Cluster (GPIC). In addition, PPPL is involved in the "Policies, Markets and Behaviors" component of the GPIC and is positioned extremely well to demonstrate innovated energy efficient technologies, policies, and behavior drivers and to serve as a key interface between GPIC and the Office of Science.

- DOE initiated the "America's Next Top Energy Innovator" challenge, which gives start-up companies the opportunity to license groundbreaking technologies developed by DOE National Laboratories for $1,000. This program helps start-ups build successful businesses and reduces the cost and paperwork requirements to obtain an option agreement to license some of the 15,000 patents and patent applications available through the National labs.
- DOE's Loan Guarantee Program has issued over $26 billion in loan guarantees for clean energy projects that helped generate over 58,000 jobs. For example, DOE recently made a loan to support the development of a purpose-built wheelchair accessible vehicle that will run on compressed natural gas.

Goal 8 DOE Planning Table

AGENCY INNOVATION & Government-Wide Support	Units	FY 10	FY 11	FY 13	....	FY 20
Programs, Projects, Initiatives that support Gov-wide efforts		Complete	Ongoing	Ongoing		Ongoing
Other, as defined by agency						

SECTION 3: AGENCY SELF EVALUATION

Does your Sustainability Plan incorporate and align sustainability goals, GHG targets and overarching objectives for sustainability with the Agency Strategic Plan?	Yes
Does it provide annual targets, strategies and approaches for achieving the 2015 and 2020 goals?	Yes
Is the Sustainability Plan consistent with the FY2012 President's Budget?	Yes
Does the Sustainability Plan integrate all statutory and Executive Order requirements into a single implementation framework for advancing sustainability goals along with existing mission and management goals, making the best use of existing and available resources?	Yes
Does your plan include methods for obtaining data needed to measure progress, evaluate results, and improve performance?	Yes

Other Key Questions for 2011:

1. Did your agency meet by 12/30/10 due date and/or is it now able to demonstrate comprehensive implementation of the EO 13423 Electronic Stewardship goals?

DOE is successfully implementing the electronic stewardship goals and will continue to work towards meeting or exceeding these standards.

- Acquire at least 95% EPEAT-registered electronics: DOE met and exceeded this goal in three out of the last four years and expects to exceed it again in FY 2011 and beyond.

- Enable ENERGY STAR or power management features on 100% of eligible PCs: DOE enabled power management features on 92 percent of its eligible PCs and will strive to attain 100 percent in FY 2011 and FY 2012.

- Extends the life and/or uses sound disposition practices for its excess or surplus electronics: DOE met and exceeded this goal for the past four years, most recently reusing and recycling 99 percent of surplus and end of life electronics in FY 2010.

2. Is your agency tracking and monitoring all of its contract awards for inclusion of requirements for mandatory Federally-designated green products in 95% of relevant acquisitions?

DOE will continue to sample five percent of new contract actions on a quarterly basis to ensure compliance.

3. Has your agency completed energy evaluations on at least 75% of its facilities?
(If agency has not met this goal, then it should describe plans for catching up on this requirement in the next 6 months.)

As of June 2010, DOE completed energy evaluations at 46% of its sites. DOE is diligently working to meet the 75% mark by September 30th. Under Secretary sustainability points of contact are working with their sites to ensure a timely meeting of the goal. In addition, the SPO and FEMP are providing technical assistance to six sites in FY 2011 to assess and commission over 40 buildings. These assessments will be videotaped for best practice sharing and use at other DOE facilities

4. Will your agency meet the deadline of October 1, 2012 (EPACT'05 Sec 103) for metering of energy use?

DOE is currently planning to meet the FY 2012 statutory metering requirements of EPAct 2005. DOE issued metering guidance to its programs and sites, and is in the process of collecting improved data. DOE Program Offices are working with sites to meet both statutory requirements and its 2010 SSPP metering goals.

5. If your agency reports in the FRPP, will it be able to report by December 2011 that at least 7% of its inventory meets the High Performance Sustainable Guiding Principles?

By December 2011 DOE will finalize an integrated strategy for meeting the High Performance Sustainable Buildings Goal of 15 percent of building stock greater than 5,000 GSF meeting the Federal Guiding Principles by FY 2015. This strategy will identify the most cost-effective and viable means for meeting this goal within fiscal and operational constraints. This effort will also result in strategies for better integrating sustainable design asset management, construction and disposition considerations with DOE's budget, strategic planning, and day-to-day business processes.