Leading By Example

A Report to the President on Federal Environmental and Energy Management

(2004-2006)

October 2007

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PROMOTING SUSTAINABLE ENVIRONMENTAL STEWARDSHIP THROUGHOUT THE FEDERAL GOVERNMENT

October 17, 2007

The Honorable George W. Bush
President of the United States
The White House
Washington, DC 20500

Dear Mr. President:

On behalf of the Office of the Federal Environmental Executive and the White House Council on Environmental Quality, I am pleased to submit to you the biennial Report on Federal Environmental and Energy Management for 2004–2006.

You have called on the Federal government to lead by example, be a good neighbor, and be a good environmental steward — while at the same time meeting our missions in an efficient and reliable manner. In other words, you have challenged the Federal community to manage our environmental and energy footprint in a sustainable manner. This report highlights the activities and accomplishments of the Federal community in meeting your charge.

As noted in the report, and as the few highlights below reflect, much progress continues to be made. You will be pleased to know that:

- By the close of 2005, 2,378 facilities from 18 Federal agencies had either implemented or initiated implementation of an Environmental Management System to more effectively manage environmental issues while at the same time efficiently meeting their missions. The distribution and number of facilities included in this effort represent a significant portion of the environmental footprint of the Federal community across the nation.

- In FY 2005, the agencies reduced energy consumption by 29.6 percent, and reduced their energy usage in energy intensive buildings by 17.6 percent. At the same time, their usage of renewable energy in FY 2005 was equivalent to 6.9 percent of the Federal government's electricity use, well above the 2.5 percent goal. They also reduced their use of fuel oil and liquefied petroleum gas/propane 70 percent compared to the FY 1985 baseline. The result — during FY 2005, Federal agencies achieved a greenhouse gas emission reduction of 22.1 percent, from 14.9 million metric tons of carbon equivalent (MTCE) in FY 1990 to 11.6 million MTCE in FY 2005. Carbon emissions decreased by 411,221 MTCE or 3.4 percent from FY 2004.

- Agencies are using their purchasing power to help create larger markets for renewable energy. As of the end of 2005, agencies reported purchasing almost 2,866 gigawatt hours (million kilowatt hours) of green power, enough renewable electricity to service more than 280,000 average households annually. In many cases, agencies have found innovative ways of applying their energy cost savings from efficiency improvements and competitive electricity contracts to pay for the incremental cost of renewable energy purchases.

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- Covered Federal agencies consumed 4.4, 6.26, and 5.75 million gasoline gallon equivalent (GGE) of alternative fuels in FY 2004, 2005, and 2006, respectively. In FY 2006 alone, they used 5.7 million GGE of alternative fuels, including 1.6 million GGE of biodiesel and 3 million GGE of E85 ethanol.
- By the end of FY 2006, most executive agencies had developed or were developing comprehensive, integrated, green purchasing programs covering a range of products from recycled content to energy efficient to biobased to those containing lesser or no toxic or hazardous constituents.
- Redesign of certain computer products to meet E.O. 13221 stand-by power requirements products to reduce standby power will save consumers more than $500 million in annual energy costs over the next six years, which is enough energy to power approximately 630,000 homes for one year.
- Federal agencies are using or testing nearly three dozen types of biobased products, including lubricants, personal and institutional cleaning products, construction products, fleet maintenance products, solvents, and landscaping products.
- In FY 2006, 12 Federal agencies recycled more than 35 percent of the solid waste they generated, meeting or exceeding EPA's national 35 percent recycling goal. Federal agencies recycle construction and demolition debris, metals, household hazardous waste, used cooking grease, tires and other difficult-to-handle wastes, in addition to traditional municipal recyclables.
- During FY 2004 through 2006, GSA successfully transferred 41,973 computers and 6,230 printers to schools and educational non-profit organizations, representing an original acquisition cost of more than $81 million.
- In January of 2006, 19 Federal agencies, controlling more than 80 percent of the total Federal facility square footage, joined to minimize the environmental footprint of their buildings by signing the "Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (MOU)" and adopting the MOU's five Guiding Principles: employ integrated design principles; optimize energy performance; protect and conserve water; enhance indoor environmental quality; and reduce the environmental impact of materials. The MOU was subsequently adopted into Executive Order 13423.
- The July 2006 quarterly release of the Unified Facilities Guide Specifications (UFGS) — used by the Navy, Army, NASA, and other Federal agencies to develop their project-specific construction specifications — includes updates of more than 50 specifications based on the sustainability approaches in the Federal Green Construction Guide for Specifiers.

We continue to work diligently to ensure the Federal government does its part to use our resources wisely so that we can make our communities more livable, our businesses more competitive, and our world a cleaner place for future generations.

Sincerely,

Edwin Piñero
Federal Environmental Executive

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Preface

Defense installations hosting endangered species? Law enforcement officials training with "greener" ammunition? Federal vehicles operating on large volumes of alternative fuel? Federal office buildings designed and constructed for sustainability? Surprising, but true.

Americans look to the Federal community to lead by example towards fulfilling our national goals of supporting a strong economy, ensuring energy security, protecting our environment and natural resources, and promoting technology transfer. Part of this role includes how we manage our environmental, energy, and transportation footprint in the process of meeting our respective agency missions. The Federal government is one of the world's largest organizations – in number of buildings, in number of fleet vehicles, and in sheer purchasing power. We are the single largest buyers and users of energy, spend billions of dollars on information technology equipment, and manage or own nearly 1 in every 5 acres of land in America. Our size provides us with the ability to transform markets. It is imperative that we be good stewards of our natural resources and the environment, yet at the same time operate efficiently, economically, and successfully to meet our missions.

While we can establish national policies that lead to this goal, it is the Federal workforce, in its daily activities located throughout the country and the world, which makes sustainable environmental stewardship happen. How we manage and integrate environmental and energy aspects into our operations is key to success in meeting our mission and at the same time achieving our environmental and energy vision.

With the highlights encompassed in this Biennial Report to the President, we continue to demonstrate the very successful efforts of the Federal community. Examples of waste reduction, energy efficiency, and affirmative procurement are plentiful across the entire landscape of Federal operations. More importantly, we continue to see the evolution of a strategic, holistic approach to environmental and energy management, where more integrated practices are replacing the outdated, isolated efforts approach. In addition, we have seen growth in the areas of cooperative conservation and environmental management systems, representing management philosophies and frameworks within which we perform the many sustainable practices discussed in this report.

This 2007 report highlights accomplishments in the areas of energy efficiency, renewable energy, waste reduction and recycling, high performance buildings, environmentally smart procurement, electronics stewardship, and fleet management. The report also highlights advancement in the area of environmental management system implementation, and how that framework is being used to

maximize efforts in the practice areas.

This report covers three fiscal years — 2004-2006 — rather than the two year period covered in prior Reports to the President, in order to cover Federal activities prior to the issuance of Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, in January of 2007. The Office of the Federal Environmental Executive (OFEE) will resume biennial reporting for fiscal years 2007 – 2008.

We encourage you to read the accomplishments in this report not only as demonstrations of the great accomplishments already realized, but as a source of ideas and innovations for future successes. ■

Environmental Management Systems

2007 Environmental Stewardship Scorecard Metrics for EMS

At least 70 percent of facilities are green and no more than 5 percent of facilities are red on Executive Order (E.O.) 13148 facility metrics.

Status

An environmental management system (EMS) is a strategic approach to ensuring that an organization's environmental priorities are integrated into operational, planning, and management decisions. An EMS provides a mechanism to address environmental issues through measured problem identification and response, rather than crisis management, and requires periodic senior management review and a formal commitment to continual improvement. A well-implemented EMS can improve regulatory compliance and environmental performance; increase efficiency; enhance accountability; reduce costs, risks, and potential liability; and enhance employee morale and community relations.

Executive Order 13148, *Greening the Government through Leadership in Environmental Management*, required that an EMS be implemented at all appropriate Federal facilities by the end of 2005. The determination of which facilities are "appropriate," was left to each agency and was based on a facility's size, complexity, and potential to impact the environment. In addition, agencies were required to develop and deploy compliance management programs, including formal facility level compliance audits and agency level planning to address results of those audits.

Progress

By the close of 2005, 2,378 facilities from 18 Federal agencies had either implemented or initiated implementation of an EMS. During that same timeframe, more than half of these facilities had in place all procedures necessary to fully implement their EMS, well over one-third had declared successful conformance to the EMS goals of the E.O., and 47 facilities had successfully achieved registration under the ISO 14001 EMS standard. The distribution and number of facilities included in this effort represent a significant portion of the environmental footprint of the Federal community across the nation.

EMS implementation has provided unique opportunities for the Federal community to work collectively to improve environmental performance beyond benefits that would occur with only individual facility efforts. One example is the Chesapeake Bay-Focused EMS. This effort provides Federal facilities with EMS implementation tools to address many of the major stressors to the Chesapeake Bay environment. Under this effort, the scope of each Federal EMS across the Chesapeake Bay watershed is encouraged

to consider activities, products and services that contribute pollutants to the watershed and/or diminish the quality of habitat for the living resources of the Bay. Likewise, affected Federal facility's EMS objectives and targets will have an opportunity to link facility improvement activities to Executive-level Chesapeake Bay strategy documents such as *Chesapeake 2000* and *Toxics 2000* as well as *Tributary Strategies* that are being developed by states in the Bay watershed. This effort will prompt the approximately 170 Federal facilities in the Bay watershed to work together and realize the potential of collective environmental improvement efforts that could benefit more than 3 million acres of the 64,000 square mile Bay watershed.

EMS implementation across the Federal community has allowed the development of guidance documents that can effectively and clearly communicate government-wide environmental stewardship goals. Prior to the development of EMSs, the 18 Federal implementing agencies rarely shared assistance tools because most materials were prepared for specific agencies and therefore used unique terms and language. With the advent of EMS and the common usage of terminology found in the 17 elements of the ISO 14001 EMS standard, assistance tools can be developed that are easily understood by all agencies at all levels and provide transferable applications and examples. A number of such assistance tools have been developed and in each case, the assistance document provides a "crosswalk" between the goals and actions required to support a given goal or initiative and the elements of the ISO 14001 EMS standard. These tools have been well received by the Federal community and have allowed those in the earlier stages of EMS implementation to realize how various requirements and objectives fit within the EMS framework. This approach has also been useful to educate those who understand the programmatic aspects of the practice in question to become more familiar with EMS concepts and how the EMS framework can advance the objectives of a practice. The crosswalks have been used to promote the Environmentally Preferable Products initiative and the Federal Electronics Challenge and are the format selected by the White House Council on Environmental Quality for proposing methods to streamline the National Environmental Policy Act (NEPA) review process. Examples of these documents can be found at http://www.epa.gov/oppt/epp/pubs/grn-pur/green-pur-ems1a3a.pdf, http://www.fedcenter.gov/Announcements/index.cfm?id=2663&pge_id=1606, and http://ceq.eh.doe.gov/ntf/Proposed_NEPA_EMS_Guide_for_FR.pdf

The deployment of EMS across the Federal community also has resulted in common metrics for measuring the progress and impact of EMS implementation. Beginning in 2006, all of the more than 2,300 Federal facilities that have implemented an EMS

reported both their progress towards recognized milestones in EMS development, implementation, and maintenance and the impact that EMS implementation has had on a variety of indicators designed to determine EMS effectiveness and performance. These latter metrics address effects of EMS on the facility mission and operations, such as improved community relations and improved fiscal efficiency, as well as impacts of the EMS on environmental issues at the facility, such as improved energy management and reduced number of permits needed to operate. Collection and review of this information will not only provide an indication of how well EMS implementation is progressing in the Federal government, but will also result in information on where implementing facilities have focused their environmental improvement efforts and how well the EMS is accepted into the facilities' day-to-day operations. Because the information can be sorted by location and facility type, it will provide a view of how regional issues are addressed as well as how certain classes of facilities respond to specific environmental areas. The metrics will remain the same through 2008 and will allow facilities and agencies to benchmark both internally over time and externally across the entire Federal community.

On-Line Data Collection

The collection of reporting data from more than 2,300 facilities on 31 multiple choice questions and 4 written response questions was a daunting task made easier by electronic reporting. Ultimately, Interagency Environmental Leadership Workgroup members that had endorsed the EMS progress and performance metrics agreed that the most effective forum for data collection would be an electronic, web-based reporting tool. Working with FedCenter.gov, a website dedicated to comprehensive environmental stewardship and compliance assistance information for Federal facilities, a reporting template was developed which allowed facilities from several agencies to respond to the metrics and have that information summarized for the parent agency's review. Not only did this process facilitate reporting by the facilities, it permitted the parent agency to more quickly summarize the responses. The FedCenter EMS reporting procedure will be available to agencies for future reports and will benefit other efforts to analyze the reporting information from such a large pool of facilities.

Accomplishments

The **Defense Supply Center Richmond** (DSCR), in Richmond, VA, partnered with the Virginia Department of Environmental Quality, the City of Richmond and Chesterfield County to pursue joint, concurrent EMS implementation. Termed V-REMS, for Virginia Regional Environmental Management System, this effort has not only improved communication with stakeholders, it has opened many doors to cooperation and improved environmental and mission performance of not only the individual partners but the partnership as a whole. By meeting together to jointly work on EMS issues, the partnership promoted identification of regional environmental issues that could be most effectively addressed through joint, cooperative efforts. An example of this cooperation is reflected in efforts to respond to Richmond's status as an ozone non-attainment area. Each partner within V-REMS is voluntarily looking at ways that each can reduce its air emissions to capture the benefits of a combined partnership. DSCR has seen tremendous benefits from an improved working relationship with stakeholders and plans to continue partnering efforts. New opportunities are being explored to add additional partners, including both state and local governments and members of the private sector.

Fort Bragg implemented a Sustainability Management System (SMS) that combines the ISO 14001 EMS framework with the base's Integrated Strategic Sustainability Plan. This approach focuses on Fort Bragg's theme of: "Sustainable Fort Bragg . . . The Right Way – The Green Way – All the Way" – meaning that the SMS policy directs compliance with environmental laws and regulations (The Right Way), incorporates pollution prevention measures (The Green Way), and continually improves environmental practices (All the

Way). Base Commanders recognized that sustainability planning offers a possible solution to reduce the risk of threats to the installation's preparedness, such as incompatible land use and limited natural resources. Fort Bragg used its overall vision as a guide when developing the SMS, and the "Plan-Do-Check-Act" model has been implemented to assure its continual improvement.

Three of the **Department of Energy** (DOE) laboratories have EMSs that focus on environmental hazard identification, control, and monitoring. These EMSs go beyond ISO 14001 by placing additional emphasis on achievement of full compliance, pollution prevention, and effective and focused communications and community outreach. The **Brookhaven National Laboratory**, **Pacific Northwest National Laboratory**, and **Oak Ridge National Laboratory** EMSs are ISO 14001 registered. Brookhaven and Pacific Northwest National Laboratories have shown $6.8 million and $9.8 million, respectively, in cost savings/avoidance from pollution prevention within a four-year period.

The **Centers for Disease Control and Prevention** (CDC) was an early EMS adopter within the **Department of Health and Human Services** (HHS). CDC's EMS not only laid the foundation to incorporate environmental considerations into its daily operations, it served as a model for the EMS framework used throughout HHS. After conducting a gap analysis, CDC focused on four areas and three goals. The four areas are environmental training and awareness, document control, improved communication, and compliance with environmental requirements. The three environmental goals are:

- Reduce waste and depletion of resources
- Reduce the release of pollutants into the environment
- Minimize environmental impact of infrastructure construction and development

CDC used several electronic tools to address these issue areas and goals, including an electronic records management system, a hazardous waste ticketing system to track hazardous waste, and a chemical hazard tracking system. The latter two tools, in particular, have enabled CDC to identify waste minimization opportunities.

Robins Air Force Base adopted an innovative and evolving EMS that focuses on retaining an environmentally sustainable "green" base for the future. The EMS structure allows fluid information exchange across programs enabling efficient management of base-wide compliance; it is designed to keep the base and public informed about EMS activities, serve as a document control point, and provide a location for information exchange and feedback. The site also includes the Robins AFB EMS General Awareness Training, which

was made web-based for easy access for all personnel. Like Fort Bragg, Robins' EMS integrates safety and occupational health principles. Environmental achievements include a 94 percent reduction in methylene chloride emissions, installation of revolutionary propane fuel cells, and the opening of a compost facility. Robins is greening the design for new processes and facilities to minimize environmental impact during both construction and operation. In one new facility, 99 percent of the construction waste was recycled or reused, resulting in $2.4 million savings in disposal cost. Robins is also highly involved in the community through participation in a number of outreach programs, including illustrative newspaper articles, informative museum displays, diverse educational events, and participation on community boards and development committees.

As early as 1998, the **United States Mint** created an EMS through which environmental staff were appointed, Pollution Prevention and Waste Management Plans were developed, a Self-Inspection Program was implemented, and procedures were developed to meet the requirements of the National Environmental Policy Act. The U.S. Mint's EMS framework was derived from the ISO 14001: 2004, Standard. The Mint's Denver, Philadelphia, and West Point facilities led the way in EMS implementation and received ISO 14001 certification in 2005. Through their EMSs, these facilities reduced hazardous and solid waste generation, reduced carbon dioxide emissions, increased recycling, reduced water consumption, and discontinued the use of Class I and Class II ozone depleting substances.

The **Department of Veterans Affairs** (VA) **Veterans Health Administration** (VHA) established a professional advisory group, including representatives from the Environmental Protection Agency (EPA), to develop its Green Environmental Management Systems (GEMS) Guidebook. The guidebook provides a nine-step process, based on the plan-do-check model of ISO 14001, to assist VA medical centers in developing a GEMS program. Since its publication in March 2004, the GEMS Guidebook has been heralded as a model and shared widely across the federal government.

VHA also developed E-SAFE (Environmental-Safety Automated Facility Evaluation)—an electronic approach to conducting EMS audits. Using this system, VHA environmental professionals will be able to perform EMS audits consistently across the country. E-SAFE is based on the criteria of ISO 14001 and was developed in-house by VHA. It is managed by a professional advisory group that provides direction in upgrading E-SAFE, as needed to better meet EMS auditors' expectations.

The Future

Building on the EMS accomplishments and successes of the past six years, E.O. 13423

requires each Federal agency to implement EMSs at all appropriate organization levels and ensure the use of EMSs as the primary management approach for addressing environmental, energy, and transportation aspects of agency operations and activities. The EMS framework established in the new E.O. ensures that additional crosswalks will be prepared to support effective implementation of the sustainable practices set forth in the Order. The E.O. 13423 implementing instructions specify that the activities of tenants, contractors, and concessionaires must be addressed in the development, implementation, and maintenance of EMSs. In addition, the implementing instructions set a schedule for assuring that EMSs previously initiated are completed and fully implemented by December of 2008. Additionally, agency implementation of "new" EMSs will likely occur once agencies recognize the benefits of the management framework. Finally, the implementing instructions state that the EMS should include a commitment to proactive communications with interested parties. This approach will allow the federal community an opportunity to show that they are a "good neighbor" to the community where they work and live. ■

Market Development Through Acquisition

Status

Since 1976, it has been Federal policy to use the government's purchasing power to create and sustain markets for products with specific environmental and energy attributes. The Federal green purchasing program is one of the most extensive programs in the world. It has seven components:

- Recycled content products
- Energy Star®/Federal Energy Management Program (FEMP)-designated products and renewable energy
- Alternative fuel vehicles/alternative fuels
- Biobased products
- Environmentally preferable products and services
- Non-ozone depleting substances
- Low or non-toxic and hazardous chemicals

Three statutes and five executive orders govern these components (see box), and three agencies — EPA, DOE, and the U.S. Department of Agriculture (USDA) manage the various components.

During FY 2004-2006, the **Office of Federal Procurement Policy** (OFPP) and **OFEE** encouraged agencies to implement the seven components as a comprehensive, coordinated single program. Program implementation efforts focused on five areas:

- Development of coordinated green purchasing programs
- Training for contracting officials, purchase card holders, and specifiers
- Development of tools
- Coordination with other Federal purchasing requirements
- Reporting

2007 Environmental Stewardship Scorecard Metrics for Acquisition

- Comprehensive, written green purchasing plan that includes recycled content products, Energy Star®/energy efficient products, biobased products, and environmentally preferable products and services.
- Demonstrated compliance in representative acquisitions.
- Annual compliance auditing.
- Corrective action.

Legal Bases of the Federal Green Purchasing Requirements

Recycled content products: Resource Conservation and Recovery Act (RCRA), E.O.s 13101, 13148, and 13149

Energy Star®/FEMP-designated products: Energy Policy Act of 2005 (EPAct 2005), E.O.s 13123 and 13221

Alternative fuel vehicles/alternative fuels: Energy Policy Act of 1992, Energy Policy Act of 2005, and E.O. 13149

Biobased products: Farm Security and Rural Investment Act of 2002 (FSRIA), E.O. 13101

Environmentally preferable products and services: E.O. 13101

Non-ozone depleting substances: Clean Air Act and E.O. 13148

Toxic and hazardous chemicals: Pollution Prevention Act and E.O. 13148

Progress

By the end of FY 2006, most of the largest purchasing agencies, as well as many of the other executive agencies, had developed or were developing comprehensive, integrated, green purchasing programs. Agencies used several approaches to creating programs, from the **Department of Defense's** (DoD) creation of an EMS-based, department-wide green purchasing plan to **DOE** and **VA's** use of web-based programs, to several agencies' preparation of detailed, written plans.

OFEE and the agencies created several tools to assist with program implementation. With generous support from the **Office of Personnel Management** (OPM), and in coordination with **EPA**, **DOE**, and **USDA**, OFEE created an on-line green purchasing course that is hosted on OPM's GoLearn e-training web site. To date, more than 15,000 Federal employees have accessed the training program. Other training opportunities included:

- **OFEE** provided classroom style training to hundreds of Federal contracting officials and purchase card holders at individual agency acquisition meetings, the GSAExpo, and the Joint Services Environmental Management conference.
- Green purchasing elements were integrated into courses offered by the **Defense Acquisition University**.
- Both the **Defense Logistics Agency** (DLA) and the **US Army Center for Health Promotion and Preventive Medicine** offered green purchasing training courses.
- **DOE** provided telecourse training on purchasing energy efficient products.
- **Defense Energy Support Center** provided training on purchasing alternative fuels.

- The **General Services Administration** (GSA) integrated "green purchasing" requirements into its SmartPay Web-based training for purchase card holders. **VA** and **OFEE** worked with GSA to incorporate these requirements into the training.
- In FY 2004, 2005, and 2006, **HHS** and the **National Institutes of Health** hosted a three-day **OFEE**-sponsored environmental symposium that included green purchasing presentations.

In addition to training, other implementation tools used by the agencies included periodic conference calls among field offices, listservs, educational brochures, working with office supply vendors to create green product catalogs, and stocking of recycled content and environmentally preferable products in supply stores.

Tracking purchasing activities in order to monitor compliance and take corrective action is difficult because of limitations in the existing Federal procurement tracking systems. **DLA** established a system that flags positive environmental characteristics of National Stock Number items in the Federal Catalog, such as conserving water, energy efficiency, and having recycled content. In addition to facilitating green shopping, this approach also made it possible to create an online Green Procurement Report to track requisitions for environmental products. Using this web-based system, customers can track green transactions for DLA-managed and GSA stock items from an individual purchasing unit up to service/agency wide levels.

Successful implementation of the Federal green purchasing program also requires integration with other Federal procurement requirements, including the requirements to purchase from the blind and severely disabled, service-disabled veterans, Federal Prison Industries, and small, minority-, and women-owned businesses. **OFEE** and the agencies continue to work with these supply sources to increase the range of green products available. For example, OFEE is working with **VA** on a "Go Green!" initiative to enhance "VetBiz," a database of veteran-owned and service-disabled veteran-owned businesses. The "Go Green!" initiative will highlight those vendors supplying green products or services. The **Department of the Interior** (DOI) has worked with the **National Industries for the Blind** (NIB) and **NISH** to increase the supply of recycled content, environmentally preferable, and biobased products available from NIB and NISH affiliate organizations.

Data collection and reporting remain challenges to successful program implementation. The Federal government's acquisition tracking systems do not collect data on the purchases of individual products. In order to track and show progress in meeting the green purchasing requirements, agency annual reporting focuses on evidence of program implementation, including

implementation of policies, training, compliance reviews, corrective action, goals, product testing, and pilot purchases. For the FY 2004-2006 reporting cycle, all executive agencies reported to OFPP and OFEE on their purchases of recycled content, biobased, and environmentally preferable products and services. This was the first time in a decade that all of the agencies reported, rather than the top six procuring agencies only.

Accomplishments

FAR Revisions. **OFPP**, **OFEE**, **DOE**, **USDA**, and **EPA** developed and submitted proposed revisions to the Federal Acquisition Regulation (FAR) to implement the biobased products purchasing requirements of FSRIA, Energy Star® and FEMP-designated product purchasing requirements of EPAct 2005, and the Memorandum of Understanding (MOU) for electronics stewardship agreement to purchase Electronic Product Environmental Assessment Tool (EPEAT)-registered products. In addition, OFEE and DOE developed a proposed revision to make clear that the requirements to purchase green products apply to products that are supplied or used in the performance of support services contracts, including construction contracts. As of the end of 2006, the Energy Star® and biobased product FAR cases were proposed for public comment, while the two other cases were under consideration by the Federal Acquisition Councils.

Recycled Content Products. More than 20 years ago, **EPA** issued the first set of procurement guidelines for recycled content products. EPA's Comprehensive Procurement Guidelines list now contains more than 60 products, including seven products added in 2004. All "major procuring agencies" — that is, executive agencies that procure more than $50 million per year of goods and services – are required to establish affirmative procurement programs and purchase the EPA-designated products.

Agency implementation of the requirement to purchase these products varies across the Federal community. The **National Aeronautics and Space Administration** (NASA**)** and **DOE** have advanced programs to implement the purchasing requirements. Smaller agencies such as the **Nuclear Regulatory Commission** (NRC) have been leaders in creating distribution networks for products such as re-refined oil. The **Internal Revenue Service** continues to print the annual income tax forms on recycled content paper. Other agencies have been purchasing recycled content office products, particularly copier paper, but might not purchase other designated products. E.O. 13423 clarifies for agencies that the requirement to purchase the EPA-designated products – as well as all other green products — applies to all types of support services contracts, including construction contracts. This should help to increase purchases of recycled content products.

In FY 2006, the largest procuring agencies

reported an increase in contracting actions involving recycled content products. For example, **DOE**, which uses an internal data collection system, reported that 63 percent of all DOE purchases in the categories in which EPA designates products contained recycled materials. When contracts for which products did not meet performance, price, or availability constraints are deducted, 92 percent of all DOE purchases of EPA-designated products contained recycled materials.

To track implementation, **OFPP** added questions to the Federal Procurement Data System (FPDS) intended to record data on the number of agency contracting actions that require the supply or use of the EPA-designated products. Initial data indicated that most contracts did not require the use of these products. Agencies will provide additional training to contracting officials to educate them both about the types of contracts for which a recycled content product requirement is appropriate and about how to correctly enter the data in FPDS. These steps should improve our ability to track our implementation progress.

To help fulfill its mission to protect human health and the environment within its own buildings, **EPA** initiated a blanket purchase agreement (BPA) with Corporate Express for green, non-electronic office products. EPA estimates that it spends about $5 million annually on office supplies, or 14 percent of the $35 million it spends on all purchase card transactions. The BPA, which is mandatory EPA-wide, provides an on-line catalog of green products offered by a large number of suppliers through Corporate Express. There is a special emphasis on recycled content, environmentally preferable, and biobased products, including items available from the blind or severely handicapped under the Javits-Wagner-O'Day program. The BPA also requires the contractor to track and report on purchases of these products.

To make it easier to find green products, the environmental department and base supply store at **Homestead Air Reserve Base**, FL, partnered to create an "Environmentally Friendly Products Section" at the store. The store stocks recycled content and biobased products, as well as products with other environmental attributes. The environmentally friendly products section helps customers to identify products and helps them meet requirements to purchase products from the blind and severely disabled. The green products section has been so successful that it already has expanded three times!

As part of renovation of its 2 million gross square foot headquarters South Building, **USDA** required the use of recycled content acoustic ceiling tile, gypsum dry wall, insulation, carpet, and steel building components. In an innovative move, USDA also initiated a pilot program for automatic substitution of recycled toner cartridges when toner cartridges are ordered. This led to the

purchase of more than $42,000 worth of remanufactured toner cartridges and $25,000 worth of recycled content toner cartridges.

Energy Star® and FEMP-Designated Products. The Energy Star® labeling program is a joint effort between **EPA** and **DOE** to encourage manufacturers (and some retailers) to identify energy efficient products with the easily recognizable Energy Star® logo. Since this is a nationwide labeling program covering multiple products, it is very simple for commercial customers to identify the most efficient models among those offered. Presently, the program includes a wide variety of office equipment and home heating and cooling products, as well as many consumer audio and video products, appliances, and residential windows. Some commercial equipment also is covered, such as unitary ("rooftop") air conditioners, exit signs, low-voltage distribution transformers, and roof products.

Beginning in January, 2005, computer monitors were required to meet revised and expanded Energy Star® requirements. For the first time, the specification addresses energy consumption while monitors are in use, as well as while they are idle.

FEMP develops Product Energy Efficiency Recommendations that identify the upper 25 percent efficiency level for 50 product types, provide information about additional purchasing criteria and considerations, and present cost-effectiveness examples. Products fall under nine categories, including lighting, commercial and industrial equipment, food service equipment, office equipment, appliances, residential equipment, plumbing, and construction products.

Pursuant to E.O. 13221, *Energy-Efficient Standby Power Devices*, **FEMP**, in collaboration with **GSA**, **DLA**, and the Energy Star® program, developed a list of office, video, and audio products that use minimal standby power. DOE estimates that the Federal government will save an estimated $25 million in energy costs over the next six years from this program, which is enough electricity to power about 40,000 homes for one year.

The President's initiative has spurred major manufacturers in the U.S. and around the world to begin significantly redesigning their products to reduce standby power. For example, Dell Computer committed to manufacturing its desktop computers to consume less than 1 watt in standby power – a feature that will save energy for the Federal community and all Dell customers. According to DOE estimates, this effort alone will save consumers more than $200 million annually in five years and enough energy to power more than 270,000 homes each year. The overall effort by all manufacturers will save U.S. consumers alone more than $500

million in annual energy costs over the next six years, which is enough energy to power approximately 630,000 homes for one year.

In addition, Federal agencies began to purchase EPEAT-registered computers and laptops. This tool and agency purchases are discussed further in the Electronics Stewardship chapter of this report.

Renewable Energy. Agencies are using their purchasing power to help create larger markets for renewable energy. As of the end of 2005, agencies reported purchasing almost 2,866 gigawatt hours (million kilowatt hours) of green power, enough renewable electricity to service more than 280,000 average households annually. In many cases, agencies have found innovative ways of applying their energy cost savings from efficiency improvements and competitive electricity contracts to pay for the incremental cost of renewable energy purchases.

In 2006, the **Air Force** topped EPA's list of Top 25 Partners in the Green Power Partnership. "Top 25 Partners" are Partners whose annual green power purchase is the largest, and whose green power purchase has been completed. Their actions are helping drive the development of new renewable energy sources for electricity generation. The Air Force, the first Federal agency to join the EPA partnership program, purchases electricity generated by wind, biomass, and geothermal sources, purchasing more than 1 billion kilowatt-hours (kWh) annually. In FY 2005, the Air Force purchased more than 40 percent of the renewable power purchased by the Federal government. **Dyess Air Force Base** continues to obtain 100 percent of its electricity needs from renewable sources, primarily from wind. Both **Fairchild** and **Minot Air Force Bases** are now 100 percent powered by renewable energy.

EPA is number four on the list, purchasing more than 329 million kWh, accounting for 100 percent of EPA's electricity needs. EPA is the first Federal agency to use 100 percent renewable energy. **DOE** is number eight on the list, purchasing more than 165 million kWh, accounting for 3 percent of its electricity needs.

GSA's Region 2 purchased more than 76 million kWh for itself and a group of Federal and non-Federal facilities in New York and New Jersey. By aggregating green power purchases for other Federal and non-Federal facilities, GSA is now paying less at some locations for green electricity than for energy derived from non-renewable sources. These savings are helping to underwrite further green power procurements.

The **U.S. Naval Station Guantanamo Bay**, Cuba, also has pursued an aggressive energy conservation program since FY 2000. In FY 2005, the base completed the installation of four 950 kW wind turbines using an energy savings performance contract. The turbines were integrated into an existing electrical grid

– an independent grid powered by diesel generators – to form the world's largest wind/diesel hybrid power plant. With the turbines in operation for only part of FY 2005, the base still experienced its lowest energy use in the past five years. The increased mission at the base in recent years increased energy needs, and in FY 2003, energy consumption reached an all time high. Energy use has been reduced by 38 percent since FY 2003. The wind turbine project will produce more than 7 million kilowatt hours of electricity annually, reducing diesel fuel use by 650,000 gallons and saving $1.2 million annually.

Tennessee Valley Authority (TVA), working with local public power companies and with input from the environmental community, created a program called Green Power Switch® to produce electricity from cleaner, greener sources and add it to the Tennessee Valley's power mix. The power is generated from wind, solar, and methane gas sources, and the system has the capacity to provide as much as 97 million kWh of green power annually to residential and commercial customers. From just September to November, 2005, the system generated more than 19 million kWh of power.

Over the past four years, the **Bureau of Land Management** (BLM) has taken steps to increase the installation of renewable energy sources on its lands. In FY 2003, BLM worked with **FEMP** and **DOI** to publish "Assessing the Potential for Renewable Energy on Public Lands." The study concludes that there is high potential to develop one or more renewable solar, wind, biomass, and geothermal energy resources on public lands in eleven western states, and similarly high potential to develop three or more renewable resources in seven states. BLM will use the report's findings to prioritize land-use planning activities related to renewable energy resources and to increase the development and use of renewable

energy resources on public lands.

The cost of complying with NEPA is a key deterrent for wind development on Federal lands because of the resources and time needed to develop and obtain approval of environmental impact studies (EIS). In 2003, in partnership with **DOE**'s Argonne National Laboratory and National Renewable Energy Laboratory, BLM initiated the development of a wind programmatic EIS in the fall of 2003 for BLM lands in the eleven Western states included in the renewable resource assessment. The final wind programmatic EIS, issued in June 2005, conservatively projected that more than 3,200 megawatts (MW) could be developed on BLM lands by 2025. A principal outcome of this programmatic EIS was the development of best management practices, which address wind energy siting, construction, and operations mitigation activities to reduce adverse environmental impacts.

Alternative Fuels. Federal agencies continued to purchase significant quantities of alternative fuel vehicles (AFVs) and alternative fuels. The majority of the AFVs in the Federal fleet are flexible-fuel vehicles, with compressed natural gas vehicles comprising most of the balance. Federal agencies are substantial users of alternative fuels, using more than 1.2 million gasoline gallon equivalents (GGE) of ethanol and1.6 million GGE of biodiesel in FY 2005 alone. Agency purchases of alternative fuel vehicles and alternative fuels are discussed in more detail in the Transportation and Fleet Management section of this report.

Biobased Products. The Federal government made considerable progress in the implementation of the new biobased products purchasing program under FSRIA section 9002. **USDA** promulgated the framework guidelines for the program, setting out the purpose and scope, basic requirements for agency programs, and the procedures for USDA's designation of biobased products and guidance. USDA also proposed to designate the first six biobased items for Federal procurement, promulgating the final designations in 2006. USDA proposed an additional 30 item designations in 2006.

Additionally, USDA created tools for its own program implementation that are intended to serve as models for the agencies to use. These include a biobased products affirmative procurement program, draft web-based training, and language about biobased product purchasing to appear in contract solicitation advertisements in FedBizOpps. USDA also began reviewing its contract forecasts for opportunities to purchase biobased products and conducted a successful pilot of purchasing biobased cafeteriaware for one of its cafeterias. USDA purchased more than $18,000 worth of biobased cutlery, straws, hot and cold use cups, bowls, and other products.

A website for listing product designations

provides background information to the general public and Federal procuring agents. This background information includes technical information packages about the designated items, a product source catalogue, pilot testing opportunities, information posted by product manufacturers and vendors, and procurement tools.

OFEE and **OMB** continued to encourage Federal agencies to purchase, test, and use biobased products. In addition to increasing their usage of ethanol and biodiesel, Federal agencies increased the scope of biobased products purchased, adding antifreeze, solvents, sorbents, inks, detergents, carpet, and adhesives, as shown in the following box.

Agency Usage of Biobased Products in FY 2005

Products Purchased

- Absorbents
- Adhesives
- Biodegradable antifreeze
- Boiler fuel
- Brake cleaners
- Cellulose insulation
- Cleaning products
- Construction materials
- Detergent
- Fibers/paper/packaging
- Fuels and fuel additives
- Functional Fluids
- Hydraulic fluid
- Inks
- Landscaping materials
- Lubricants, including grease
- Packing peanuts
- Roof sealant
- Solvents and cleaners
- Stripper
- Windshield cleaner

Products Tested

- Brake pads
- Cafeteriaware
- Carpet
- Cleaning fluid
- Cutlery
- Foam insulation
- Grease enzymes
- Hydraulic fluids (combat equipment)
- Lubricant
- Paint strippers
- Roofing sealant
- Wheel cleaner

In a true example of purchasing green products consistent with its mission, the **National Oceanographic and Atmospheric Administration's** (NOAA) **Great Lakes Environmental Research Laboratory** (GLERL) researched, tested, and

purchased biobased fuels, lubricants, and other products in order to reduce impacts on the Great Lakes environment. GLERL converted 37 shipboard systems from petroleum-based to biobased products.

Environmentally Preferable Products and Services. Federal agencies continue to define, purchase, and test a variety of environmentally preferable products and services. **VA** used green chemicals and low toxic antifreeze. **NASA** facilities used trash bags impregnated with all natural insecticides, researched non-toxic water absorbing crystals for more efficient irrigation, and purchased environmentally preferable pesticides and cleaning products. **NRC** conducted a pilot program for incentive payments, which rewarded just-in-time, supply contractor for offering alternative, environmentally preferable supply items. The pilot was unsuccessful, possibly because the incentives payments were too low.

EPA investigated the use of alternatives to lead tire weights in order to reduce the amount of lead entering the environment from tire weights coming loose from tire wheels. EPA purchased alternative tire weights for use on its fleet vehicles and consulted with **GSA** about options for increasing the availability of alternative tire weights to the Federal fleet community.

The most significant usage of environmentally preferable products and services in the Federal government is the switch to green cleaning products and services. In FY 2004-2006, almost every agency reported the use of green cleaning products and services, whether purchased directly, required of janitorial services contractors, or integrated into lease provisions. Several agencies reported increases in the volume of facilities using the products: for example, more than 500 **Department of Commerce** (DOC) facilities and 58 percent of **Navy** installations used environmentally preferable cleaning products in 2006. Other agencies, such as **USDA**, are using both environmentally preferable and biobased cleaning products.

In addition, agencies expanded the contracting mechanisms through which they obtained environmentally preferable products and services. In FY 2005, **HHS** awarded a custodial products BPA that includes carpet care products, chemical management dispensers, a variety of cleaners, floor care products and equipment, and hand and body soap. The **Department of Homeland Security**'s (DHS) **Federal Law Enforcement Training Center** (FLETC) includes environmentally preferable cleaning products on its hazardous materials authorized use list.

Approximately 60 percent of the **U.S. Postal Services**' (USPS) facilities use a USPS web-based purchasing system called "eBUY" to identify product and service suppliers and make purchases. Two of the national suppliers in the "eBUY" system provide environmentally preferable cleaning products in their custodial products and maintenance

and repair & operating (MRO) supplies catalogs. Their offerings include environmentally preferable floor and surface cleaners, aqueous-based cleaners, and other environmentally preferable cleaning products. In addition, USPS has virtually eliminated the use of EPA's 17 targeted chemicals in its processes and facilities, including those found in cleaning products.

Agencies used environmentally preferable cleaning products not just to clean their bathrooms and carpets, but for equipment and other cleaning uses. **USDA's Beltsville Agricultural Research Center**, for example, used environmentally preferable cleaning products for a variety of personal, mechanical, and building cleaning uses. **Air Force** installations are increasing the use of biobased and other environmentally preferable cleaning products as part of their aircraft maintenance and other programs that clean machinery, equipment, and facilities. The **Department of the Treasury** (Treasury) uses green cleaning products in currency production when possible.

Non-Ozone Depleting Substances. Most Federal agencies have successfully developed a plan to phase out the purchase of Class 1 ozone depleting substances (ODS) by December 31, 2010. In several cases agencies have put systems in place to ensure goals are met.

DOE Order 450.1, published in late 2005, states that:

- DOE elements must, "reduce or eliminate the … use of class 1 ozone-depleting substances (ODS) …"
- the Assistant Secretary for Environment, Safety and Health in coordination with other DOE elements must "maximize the use of safe alternatives to, evaluate present and future uses of, and disseminate information regarding successful efforts to phase out ODS."
- DOE Operations/Field/Site Office Managers … must develop and implement a program and procedures to maximize the use of safe alternatives to ODS whereby procurement of Class 1 ODS for all nonexcepted uses is discontinued by December 31, 2010.

Under the Contractor Requirements Document of DOE Order 450.1, these requirements are also placed on DOE contractors.

The **Federal Aviation Administration's** (FAA) **Air Traffic Organization** created an Environmental Management Plan within its corporate EMS to address ozone depleting substances such as chlorofluorocarbons (CFC). The main objective of this plan is to "Ensure compliance with regulatory obligations for CFC-containing equipment." The EMS targets for the plan include:

- Verifying registration of CFC recovery equipment by FY2007

- Creating or updating inventory of CFC containing equipment
- Ensuring that FAA personnel using CFC recovery equipment are properly trained

The three FAA Service Areas and the Mike Maroney Aeronautical Center are actively pursuing actions and operational controls to achieve and maintain the FAA ODS objectives.

NASA's policy calls for the phase out of procurement of Class 1 ODS by the December 2010 deadline. To meet that goal, NASA program operations have eliminated the use of ODS in a number of cases and significantly reduced uses where mission critical applications must be used until alternatives are found. For example, NASA facilities have been able to use water-based alternatives to precision cleaning with CFC 113. The remaining NASA facilities reduced the use of CFC 113 by more than 95 percent through better management practices. NASA facility operations have also reduced ODS use through replacement as older HVAC and fire suppression systems are retired.

Toxic and Hazardous Chemicals. The acquisition and use of alternatives to toxic and hazardous chemicals are discussed in the Pollution Prevention and Recycling chapter.

Building Materials. As part of their sustainable building efforts, agencies required that buildings be designed and constructed with a variety of green materials. Examples are found in the High Performance and Sustainable Buildings chapter of this report.

The Future

Under E.O. 13423, Federal agencies will continue, and expand, their progress in implementing green purchasing programs. All of the major Federal agencies will have green purchasing plans incorporating the required program components by the end of calendar year 2007. Over the next several years, they will implement monitoring and corrective action programs to ensure that their operating entities and facilities comply with the statutory and executive order requirements.

There should be significant expansions of the biobased and environmentally preferable purchasing components of the program. In 2007, **USDA** should complete the designations of the 30 items it proposed to designate in 2006 and propose to designate additional items. By the end of June, 2007, **OFPP** will circulate a new draft policy letter to the agencies on Federal acquisition of green products. Updating its 1992 policy letter, the new policy letter will provide expanded guidance on the scope of the Federal green purchasing program and elaborate on the kinds of environmentally preferable products agencies should purchase. ■

Pollution Prevention and Recycling

Major Goals under E.O. 13101 and E.O. 13148

- Incorporate recycling and waste prevention practices in Federal agencies' daily operations.
- Establish waste diversion goals for 2005 and 2010, aiming toward EPA's national 35 percent diversion goal.
- Develop government-wide strategies to further implement recycling and waste prevention practices.
- Reduce chemical releases monitored by the Toxics Release Inventory (TRI) program.
- Reduce usage of priority chemicals in specific applications.

Status

According to EPA, the national percentage of municipal solid waste (MSW) recovered increased to 32 percent in 2005, approaching the national recycling goal of 35 percent. Recycling, including composting, diverted 79 million tons of material away from disposal, up from 15 million tons in 1980, when the recycling rate was just 10 percent. More importantly, the total amount of MSW generated in the U.S. decreased to 246 million tons, down by 2 million tons from 2004. Typical materials that are recycled at high rates include batteries (99 percent), paper and paperboard (50 percent), and yard trimmings (62 percent). These materials and others may be recycled through curbside programs, drop-off centers, buy-back programs, and deposit systems.

Federal agencies actively pursued pollution prevention, including waste prevention, recycling, and elimination or reduction of the use of toxic and hazardous chemicals. In FY 2004-2006, they engaged in new or substantially improved waste prevention practices involving both conventional components of the municipal waste stream, unusual materials, and industrial by-products.

E.O. 13148 called for Federal agency reductions of chemical releases monitored by the TRI program. TRI is a publicly available database maintained by EPA that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as Federal facilities. E.O. 13148 required a 40 percent reduction in reported Federal releases by December 31, 2006, from a baseline year of 2001. Similarly, the E.O. reflected on-going efforts to identify substitute chemicals or processes to reduce environmental damage, risk and liability. The language in the E.O. called for development of a list of priority chemicals used by the Federal government that may result in significant harm to human health or the environment and that have known, readily available, less harmful substitutes for identified applications and purposes.

Progress

Federal agencies continued their efforts to meet or exceed EPA's national 35 percent

recycling goal by maintaining and expanding their recycling programs. Data reported by the three largest purchasing agencies – **DoD**, **DOE**, and **NASA** – indicate that in FY 2004 — 2006, all or nearly all of their offices, sites, and residential housing had recycling programs. Waste diversion rates for these three agencies varied from 25 percent to more than 75 percent. Because their facilities often recycle construction and demolition debris as well as municipal solid waste, the volume of materials diverted from landfills is more significant than the percentages indicate.

Agencies Exceeding the National 35% Recycling Goal (FY 2006)

Agency	Percentage	Agency	Percentage
Department of Commerce	35	General Services Administration	52
Office of Personnel Management	37	Army	59*
Department of Energy	37	National Institutes of Health	60
Environmental Protection Agency	39	Veterans Affairs	62
Department of the Treasury	42	Air Force	64*
Nuclear Regulatory Commission	51	NASA	64

*includes C&D

In FY 2004 — 2006, agencies recycled a broad range of materials and addressed significant challenges, including the debris left by hurricanes. Depending on the agency, facility, and markets, recyclables included office paper, corrugated containers, newspapers, beverage containers, toner cartridges, batteries, office electronic equipment, cell phones, fluorescent lamps, wooden pallets, construction and demolition debris (typically concrete, wood, and asphalt), scrap metal, aerosol cans, carpet, yard trimmings, food waste, oils and lubricants, spent solvents, and used ethanol. Agencies also diverted yard debris and other materials through composting programs, which further removes organics from the waste stream and, thereby, contributes to greater sequestration of carbon and reductions in the emission of greenhouse gases.

Accomplishments

Recycling. Agencies often achieve high rates while recycling more than municipal solid waste. **GSA** implemented construction waste recycling in its construction projects. Similarly, the **Army** now has a 50 percent

minimum diversion requirement for construction, renovation, and demolition projects. The **Navy** sells recovered wood to reduce the amount of scrap wood disposed in landfills. **TVA** recycles scrap metal. Several **VA** medical facilities implemented new or expanded recycling programs covering a broad range of materials such as kitchen grease from food services, mercury amalgam from dental services, and metals from maintenance and repair shops. **NOAA's National Marine Sanctuary Program** in Maine recycled refrigerants and scrap metal, while **GLERL** began recycling the biobased lubricants that it now uses in order to minimize environmental impacts on waterways. **EPA** expanded its recycling program to include oil wastes generated by its laboratories. In addition, several agencies reported recycling batteries, fluorescent lamps, office electronics, and ink jet and toner cartridges.

USPS manages extensive recycling programs at approximately 65 percent of its facilities. These programs collect both recyclables generated on-site and materials from the surrounding communities and recycled an estimated 1 million tons of materials in 2005.

Many of the **National Parks** and **National Forests** face unique challenges from the variety of materials left by visitors, materials dumped on the Federal lands, and the parks' distance from markets for recyclables. **Bighorn National Forest**, for example, developed a tool kit of methods for handling automobile batteries dumped on its lands.

Composting. **DoD** reported 126 facilities had composting programs, diverting 70,000 metric tons of material in FY 2005. In FY 2006, **DOE** reported 16 sites composting or chipping wood to divert more than 1,578 metric tons, an increase from 10 sites in 2004. While only one **NASA** facility reported composting, it diverted approximately 577 tons of material. In FY 2006, **VA** reported 62 facilities with composting programs, the **Department of Justice** (DOJ) reported 24 facilities composting 345 tons of material, the **Department of Transportation** (DOT) reported 21 facilities composting 31 tons of material, **EPA** reported composting at 6 sites, the **Coast Guard** composted at 10-15 sites, and **GSA** and **DOC** each reported 4 sites composted 344 tons and 154 tons, respectively.

Hurricanes. In the aftermath of Hurricane Katrina, huge volumes of materials required recycling or disposal. **EPA** managed the collection of more than 9.4 million pounds of household hazardous waste, along with more than 200,000 electronic goods, and the removal and recycling of more than 290,000 refrigerants from appliances. EPA's **National Health and Environmental Effects Research Laboratory** generated large amounts of clean-up debris from Hurricanes Ivan and Dennis and either recycled or used for fuel the wood debris that was collected.

Electronics. Electronics stewardship,

including donation or recycling of used electronic equipment, is one of the major new focus areas for agency recycling programs, and is addressed in depth in the Electronics Stewardship chapter of this report. Managing end-of-life electronics in an environmentally preferable manner requires the proper resources. The Federal Electronics Challenge (FEC) is a partnership program that encourages Federal agencies and facilities to address the life-cycle of electronics, from procurement to end-of-life donation, reuse, recycling, or disposal. The FEC provides personal technical assistance and an extensive library of documents and tools to assist.

EPA developed and awarded a Government-Wide Acquisition Contract (GWAC) for Recycling Electronics and Asset Disposition support in December, 2004. This GWAC provides recycling and disposal services for electronic equipment government-wide. More than 25 million pounds of electronic scrap have been recycled to date through the READ GWAC.

Treasury's offices and bureaus will encourage that 25 percent of excessed electronic equipment is reused or refurbished within or outside the department by the end of 2006.

Expanded programs. **Tinker Air Force Base** rejuvenated a declining recycling program by changing its collection system and increasing education and outreach. The decline in

recycling significantly increased the quantity of waste requiring disposal. To accomplish its goal for an improved recycling program, Tinker AFB switched responsibility for white paper collection to the Qualified Recycling Program and utilized innovative outreach activities to increase recycling awareness both on-base and throughout the community. By increased focus on regular pick-up, delivery, and proper placement of the new recycling containers, the base was able to significantly increase the amount of paper recycled. These efforts resulted in a 120 percent increase in recycling, with recycling revenues of more than $3,000 per month. It is now mandatory that all of the base's industrial facilities recycle white paper and corrugated. Overall, the solid waste diversion rate has increased from approximately 30 percent to more than 47 percent, which is well above the DOD mandated goal of 40 percent.

In order to maximize solid waste reduction and recycling, **Vandenberg Air Force Base**

implemented a management strategy that entails affirmative procurement initiatives, characterization of waste generation processes through waste audits, proactive application of recycling/reuse opportunities, and an aggressive community outreach program. This strategy ensures full support of the Air Force mission as well as maintaining important and essential relationships with the local community and addressing its needs through partnership with local organizations. The result – an astounding 92.9 percent diversion rate for calendar year 2003 and $2.2 million in avoided landfill disposal costs!

Community Partnerships. Although located in a rural region of Florida, **Federal Correctional Complex Coleman** established a comprehensive recycling program that diverts materials from disposal and created new, local markets for recyclables. Since the facility began using the recycling center four years ago, 2,540 tons of materials have been diverted from the waste stream — positively impacting the environment and the facility's bottom line by $300,000 in revenue and avoided costs. Because there were no readily available markets for its recyclables, FCC Coleman worked with local vendors to develop product markets. Recovered materials are marketed to these local vendors to support the local economy. The Bureau of Prisons is using this facility as a model in its continuous efforts to meet the challenges of increased inmate population, increased fiscal responsibility, and sustainable environmental stewardship.

Located on remote Kodiak Island, the **U.S. Coast Guard's Integrated Support Command (ISC) Kodiak** partnered with local, non-profit organizations to transfer materials off-island. One of these organizations employs physically and mentally disabled individuals, and the recycling partnership helps to create jobs for them. The non-profits arranged for free shipping from the island to the mainland, making recycling feasible. In FY 2004 alone, ISC Kodiak's program diverted roughly 5,500 cubic yards of cans, paper, and plastic from the island's landfill, saving more than $35,000 in tipping fees and earning more than $25,000 in revenue, which is used to support recycling operations for the entire island of Kodiak.

The **Little Rock Air Force Base** recycling center also takes advantage of resources provided by outside organizations. A toner cartridge remanufacturer provides shipping containers for spent toner cartridges and pays the shipping costs. The center also uses the free rechargeable battery collection boxes provided by the Rechargeable Battery Recycling Corporation. This initiative saved the base more than $18,000 in hazardous waste disposal costs. Additionally, the base partners with the City of North Little Rock for composting and maintains an active donation program that allows the state reclamation

office to use materials that otherwise would have been landfilled.

The **DOE Pantex Plant** initiated partnering with the City of Panhandle and a local industry to develop a self-sustaining community recycling program. Through this effort, Pantex eliminated 500 metric tons of waste from being disposed in landfills. As part of the partnership, Pantex and area community organizations sponsored a Children's Fair on Earth Day 2005 to promote environmental protection awareness.

RFID Tags. Federal agencies began to test and use radio frequency identification (RFID) tags for inventory and logistics control, tracking hazardous materials, managing the distribution chain for pharmaceuticals, storing passport information, and other uses. On September 14, 2004, **OFEE** and **EPA** co-hosted a meeting on the impact of RFID tags on packaging materials reuse and recycling. Participants included representatives of DoD, GSA, the industrial drum recyclers, the Institute of Scrap Recycling Industries, and the paper, steel, aluminum, glass, and plastic packaging industries. The intent of the meeting was to provide the potentially affected recyclers and users of recycled materials with an understanding of what RFID tags are, what constituents they contain, and how they are and will be used. As a result of this meeting and OFEE and EPA participation in the Interagency RFID Workgroup, awareness of the potential impacts on recycling increased. Agencies and industry groups are studying the potential impacts on specific recycling streams and ways to mitigate those impacts.

Waste Prevention. The scope of agency waste prevention activities runs the range from **NRC's** establishment of a pilot program for the reuse of moving boxes to **TVA**'s one ton elimination of paper by switching to on-line telephone directories to **Air Force** projects to reduce the toxic and hazardous constituents in aircraft paint coatings and paint preparation systems to **FLETC**'s protection of human health and the environment by developing lead-free ammunition.

Agencies engaged in the following practices: using electronic communication, publication, and recordkeeping systems; donation; use of EMSs; materials re-distribution; materials substitution; use of reduced hazard ammunition; and process changes.

Electronic communications and publications. **USDA** expanded and promoted to employees E-forms and E-printing services. **VA** was featured in an April 10, 2007 *Washington Post* article as the leader in "paperless medical care." Since 1999, VA's 155 hospitals, 881 clinics, 135 nursing homes, and 45 rehabilitation centers have been steadily reducing their use of paper medical reports and files in favor of a universal medical records network. Although President Bush set a goal of 2014 for most Americans having their medical information stored

electronically, as the article notes, VA "is today one of the few health systems — and by far the largest — that is virtually paperless."

Donation. In addition to donation of used electronics, agencies explored opportunities for donation or sale or other materials. **USDA**, for example found markets for the slate tiles removed from the headquarters south building during modernization.

Integrating Waste Diversion into EMSs. All **DOE** facilities are drafting and implementing site-specific EMSs as required by DOE Order 450.1, *Environmental Protection Program*. Among other elements, the DOE order requires the elimination or reduction of waste. Similarly, several of **EPA's**' facilities include solid waste prevention in their EMSs. In FY 2005, the **Drug Enforcement Administration** implemented EMSs with recycling objectives at four forensic laboratories, the Aviation Division, and headquarters; the Aviation Division recycles equipment maintenance fluids such as oils, cleaners, solvents, and batteries, as well as conventional municipal waste recyclables. **State Department** (DOS) used EMS-related facility audits to increase awareness of solid waste prevention practices. **DOT's Maritime Administration** established recycling standard operating procedures as part of its EMS for the James River Reserve Fleet.

Materials Re-distribution. Through the use of central supply areas, organizations within an agency can offer unused supplies to other organizations in need of those supplies. This saves the agency money both on procurement costs and on disposal costs. For example, an **FAA** facility used a "swap meet" for office supplies and saved $14,000 on avoided procurement and disposal costs.

Materials Substitution. A key element of pollution prevention efforts is finding alternatives that contain less or no toxic or hazardous constituents. These alternatives are often safer for facility personnel to use and often result in savings in operational costs or disposal fees. **Robins Air Force Base** tested an aircraft paint coating that could potentially save $75 million annually by eliminating 97 percent of hazardous waste, reducing the use of materials by 65 percent, and reducing labor hours. Robins AFB also successfully replaced methyl ethyl ketone in regulated sources, identified non-hazardous solvents for paint gun cleaning, and replaced hazardous air pollutants in aircraft integral fuel tank cleaning operations.

Similarly, **Luke Air Force Base** switched from the use of alodine in the F-16 aircraft painting process to the new PreKote® preparation system, thereby reducing paint preparation time and costs by up to 40 percent, eliminating hazardous waste generation, and improving corrosion prevention. **EPA**'s Design for the Environment (DfE) program recognized this product for its environmental and human health benefits. Luke AFB was one of the

first bases to test the PreKote® system and applied for a change to the Technical Order for aircraft painting in order to be able to switch from the older method.

By confirming that solvents were not needed for parts cleaning, **U.S. Coast Guard Air Station Borinquen** found that it could install a biobased aqueous parts cleaner in place of a solvent-based, contracted parts washer service. This resulted in reduced generation of hazardous waste and associated disposal costs.

Small Arms Firing Ranges. **FLETC** spearheaded the development of reduced hazard ammunition (RHA) for its own and other agencies' use. FLETC requested that manufacturers produce ammunition having the same performance characteristics as traditional ammunition without the associated health and safety risks for the students, staff, community, and environment. FLETC supported product development by establishing $43 million worth of contracts over a three-year period, which allowed manufacturers to invest large amounts of funding into product research and development. These efforts resulted in substantial reduction in contract prices upon their renewal in 2003. As of September, 2003, more than 30 agencies used the FLETC contracts to purchase RHA directly from the manufacturers without any added surcharge. Presently, only 25 percent of the training ammunition contains lead, and lead waste from the FLETC training sites has been reduced by more than 35 tons.

Robins AFB replaced dirt berms with traps using low angle steel plates to deflect the bullets fired on its small arms range into a cylindrical deceleration chamber. The system keeps the bullets intact while generating the lowest levels of lead particles and dust. It includes a vacuum dust collection system that draws air through the front of the trap into a filter unit to prevent any lead dust from

escaping. It also features a pneumatic system that moves the spent bullets from the trap to a drum for recycling. These two items greatly reduce exposure to lead for the workers at the range.

In order to remove lead from the small arms range soil, **Little Rock Air Force Base's** recycling center sifted out 10,920 pounds of lead and copper projectiles for recycling and reused more than 600,000 pounds of soil back into the firing range berm.

Process Changes. The **New Mexico VA Healthcare System** histopathology laboratory uses a process of continual examination of procedures to identify opportunities to substitute chemicals and reduce waste. An astounding 173,000 gallons of distilled water and 68 gallons of organic solvents are saved per year simply by using more efficient instrumentation. The lab has also been able to reduce its waste generation by recycling chemicals, reducing or eliminating mercury usage, and reducing packaging by buying chemicals in bulk.

DOE's Oak Ridge National Laboratory improved worker safety and eliminated the annual generation of 96 kilograms of hazardous waste and the use of one million gallons of once-through process water by replacing a plasma arc torch with a water jet cutter and a wet chemistry photographic process with an imaging plate system.

Toxic Chemical Releases. Under E.O. 13148, all Federal facilities, whether operated by Federal agencies or contractors, were required to report to EPA's TRI Program. Reported figures for Federal facilities in 2001 totaled about 79 million pounds. The reduction target for the entire Federal community is, therefore, approximately 32 million pounds.

For a number of reasons, Federal facility releases and transfers have remained static or increased over recent years. This has been attributed primarily to increased war-related activity and production and increased power generation by **TVA**. For calendar year 2004, 313 Federal facilities reported 90 million pounds of total on- and off-site disposal or other releases, an increase from the 286 facilities reporting in 2001. In 2005, a total of 304 Federal facilities reported total on- and off-site disposal or other releases of 98 million pounds. Disposal or other releases from Federal facilities increased by 13 million pounds (16 percent) from 2003 to 2004 and by 9 million pounds (10 percent) from 2004 to 2005.

At **NASA**, for example, all facilities are in compliance with the reporting requirements of the Emergency Planning and Community Right-to-Know Act (EPCRA). Through calendar year 2005, NASA has achieved a reduction of more than 50 percent on its total releases of toxic chemicals to the environment and off-site transfers of such chemicals for treatment and disposal. NASA efforts have specifically led to a 100 percent reduction in its EPCRA Section 313

reportable, total releases of toxic chemicals to the environment and off-site transfers for both methyl ethyl ketone and tetrachloroethylene.

Priority Chemical Reductions. E.O. 13148 also called for a 50 percent reduction in the use of certain chemicals for identified applications and purposes by the end of 2006. In May of 2004, **EPA**, in coordination with **OFEE**, affirmed that the following five chemicals and associated applications should be included for the purposes of this effort: mercury, lead, cadmium, naphthalene, and polychlorinated biphenyls (PCBs), with associated uses of switches and measuring devices, electroplating processes, soldering, pesticide use, and insulating materials (dielectric fluids).

While several agencies initiated efforts to implement toxic and hazardous chemical management programs, delays in the development of the chemical list and associated guidance precluded meaningful action across the Federal community. Agencies did not meet the E.O. 13148 requirement. In retrospect, the short list of five chemicals did not affect many of the agencies because the toxicity of those chemicals had precluded their use. Therefore, as discussed below, the approach to chemicals management has been changed.

The Future

Under E.O. 13423, agencies will continue their waste prevention, recycling, and toxic and hazardous chemicals efforts. Any agency that had not established a waste diversion goal to be achieved by 2010 will now establish a goal, and agencies that had established waste diversion goals under E.O. 13101 will reaffirm those goals or establish new ones. Also, agencies are incorporating waste prevention and recycling into their EMSs, and this trend should continue.

For toxic and hazardous chemicals management, the E.O. 13423 implementing instructions require agencies to continue reporting under the TRI program, as well as ensure that they reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed. The E.O. implementing instructions establish a new approach to chemicals management, requiring every agency to develop goals and support actions, by January of 2008, to identify and reduce the release and use of toxic and hazardous chemicals and materials. They can do this on an agency-wide basis or tailor their goals to varying chemical usage within their organizations and facilities. This new approach takes into account differences in mission, chemical use, and prior pollution prevention efforts.

As a result, even the non-industrial or non-land management agencies will need to assess their usage of chemicals and, where practicable, reduce or eliminate toxic and hazardous chemicals. ■

High Performance and Sustainable Buildings

2007 Environmental Stewardship Scorecard Metrics for Sustainable Buildings

- Implementation of a green buildings sustainability program that at a minimum requires sustainability design principles on all new construction and major renovations and is consistent EPAct 2005 and E.O. 13123, and/or
- Implementation of the January 24, 2006 Memorandum of Understanding on Federal Leadership in High Performance and Sustainable Buildings or equivalent.

Status

From court houses to research institutions to embassies, Federal buildings have been icons of architectural design throughout history. Faced with the new challenges and opportunities of today, Federal buildings are also symbols of our nation's priorities and values as members of the global community. The Federal Government's real property portfolio totals more than 1.2 million assets – which includes more than 505,000 buildings, both owned and leased. Controlling one of the world's largest real estate portfolios, the Federal government recognizes that its facilities have tremendous impact on the natural environment, the economy, and the thousands of people that occupy and visit these buildings every day.

Stepping up to this responsibility, the Federal government is rethinking how it builds today to secure and enhance the future. High performance and sustainable building involves maximizing environmental and human health benefits throughout the building's entire life cycle – from siting through design, specification, construction, operation, maintenance, renovation, and eventual disposal.

In FY 2004 - 2006, Federal agencies made tremendous strides in meeting this challenge through momentous commitments, far-reaching policies, improved planning, high performance buildings, and sophisticated technologies. These Federal efforts are also helping to transform markets toward more environmentally sustainable products, systems, and construction services—serving as powerful examples for American businesses and consumers.

The Federal government should provide leadership in environmental design and construction in order to ensure America's future prosperity and resource independence and lay the foundation for environmentally, socially, and economically sustainable development throughout the U.S. and the world.

Progress

Since the early 1990s, executive orders have directed Federal agencies to apply the principles of sustainable design to the siting, design, and construction of new facilities. These principles include energy efficiency, reduced consumption of land and other non-renewable resources, minimization of waste materials and water use, and creation of a livable, healthy, and productive work environment. Sustainable design mandates also incorporated a wide range of recycled content, energy and water efficient, biobased, and environmentally preferable materials, helping to promote markets for these products.

While far-reaching and holistic in scope, these directives did not define key sustainable building practices with measurable performance goals. Federal agencies, therefore, took it upon themselves to respond to this need. In January, 2006, more than 150 Federal facility managers and decision makers came together at the first-ever "White House Summit on Federal Sustainable Buildings" to witness the signing of the "*Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (MOU).*" The MOU is the flagship Federal effort to define guiding principles of green building and provide leadership in the design, construction, operation, and maintenance of high performance and sustainable buildings.

The Triple Bottom Line of Sustainable Building

Environmental benefits

Enhance and protect biodiversity and ecosystems

Improve air and water quality

Reduce waste streams

Conserve and restore natural resources

Reduce use of toxic constituents

Economic benefits

Reduce operating costs

Create, expand, and shape markets for sustainable products and services

Improve occupant productivity

Optimize life-cycle economic performance

Social benefits

Enhance occupant comfort and health

Heighten aesthetic qualities

Minimize strain on local infrastructure

Improve overall quality of life

Signatory Agencies

- Department of Defense
- Department of Energy
- General Services Administration
- Department of Veteran Affairs
- Department of the Interior
- Department of Justice
- Department of Agriculture
- National Aeronautics and Space Administration
- Department of Homeland Security
- Department of Health and Human Services
- Department of Transportation
- Tennessee Valley Authority
- Environmental Protection Agency
- Department of State
- Department of Housing and Urban Development
- Office of Personnel Management
- Department of Commerce
- Department of Labor
- Executive Office of President

Nineteen Federal agencies, controlling more than 80 percent of the total Federal facility square footage, joined to minimize the environmental footprint of their buildings by adopting the MOU's five Guiding Principles:

- *Employ integrated design principles*
- *Optimize energy performance*
- *Protect and conserve water*
- *Enhance indoor environmental quality*
- *Reduce the environmental impact of materials*

The Interagency Sustainability Working Group provides Technical Guidance—continually updated on the Whole Building Design Guide (WBDG), www.wbdg.org — to assist agencies in implementing the five Guiding Principles. Available resources include information on designing, operating, commissioning, and monitoring sustainable new buildings and renovations, as well as information on specific topics, such as moisture control, creative funding strategies, guidance for vendors, and managing construction waste. The Technical Guidance also provides clarification on Guiding Principle goals, related mandates, and direct links to model contract and specification language.

MOU Commitments

- Integrated Design
- Commissioning
- Energy Efficiency
- Measurement & Verification
- Indoor Water
- Outdoor Water
- Ventilation & Thermal Comfort
- Moisture Control
- Daylighting
- Low-Emitting Materials
- Protecting Indoor Air Quality During Construction
- Recycled Content
- Biobased Content
- Ozone Depleting Compounds

Agency Policies. In addition to being subject to government-wide mandates and the MOU, many agencies and departments have implemented their own sustainable building policies to address unique criteria and articulate their own priorities.

Within many agencies, sustainability principles serve as the foundation for planning, programming, budgeting, contracting, constructing, commissioning, operating, maintaining, and decommissioning building projects. In particular, several agency policies emphasize energy efficiency, water conservation, and life cycle costing. An increasing number of agencies and departments are turning to the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) Green Building Rating System™ as the basis for their sustainable design and construction activities. LEED® is a sophisticated checklist covering five areas of environmental impact: energy and atmosphere, water efficiency, materials and resources, indoor environmental quality, and sustainable sites. A sixth category, innovation and design process, offers credit for creative approaches to sustainable design and construction. The more credits that a building earns based on its design and construction, the higher the rating, ranging from LEED®-Certified to LEED®-Silver, Gold, or Platinum.

Reporting success stories and lessons learned into the DOE-led High Performance Federal Buildings Database is one of the commitments under the Guiding Principles. This will facilitate sharing lessons learned and best practices among stakeholders and should be instrumental in benchmarking facilities across the Federal government. The case studies can be found at http://www.eere.energy.gov/femp/highperformance/.

The USGBC estimates that registered LEED® projects constitute 5 percent (pro-rated for the year) of all annual new commercial and institutional construction in the U.S. by floor space. In the Federal community, an estimated 320 buildings are currently registered for LEED® certification, and 51 have been certified (representing 6.4 million square feet of building space).

The following provides a snapshot of agency policies in order to illustrate the significance of Federal sustainable building commitments:

- **GSA** is the Federal government's landlord and the largest real estate organization in the country, with more than 340 million square feet of buildings and an additional 90 million square feet currently under construction. GSA requires that all building projects meet the LEED®-Certified level with a target of LEED®-Silver.
- In completing design-build contracts, the **Pentagon** strives to achieve the highest performance possible utilizing LEED® as a benchmark; the Pentagon Renovation Program's long-term goal is to obtain a LEED® rating for the entire Pentagon Reservation.
- The **Air Force** has committed to achieving 100 percent LEED® certifiable facilities by FY 2009.
- The **Army** requires that all military offices construct all vertical projects to the LEED®-Silver level, beginning in FY 2008.
- The Assistant Secretary of **Navy** for Installations and Environment directs the Department of Navy to plan, program, and budget to meet the requirements of the Energy Policy Act of 2005, the Federal Leadership in High Performance and Sustainable Buildings MOU, and earn a LEED®-Silver-level rating minimum, in new and replacement buildings, in a memorandum dated August 4, 2006.
- Beginning in FY 2006, **EPA** required all newly initiated major building construction projects achieve the LEED®-Gold level. EPA requires other sustainable features for its major new building acquisitions, including Energy Star® building certification; 30 percent better energy performance than ASHRAE 90.1-2004 requirements; specific water conservation measures; resource conservation, recycling, and use of sustainable building materials; and measures to protect indoor air quality. EPA also aims to use LEED® for new Commercial Interiors and Existing Building standards where space in an existing building is acquired.
- **HHS** requires that facilities costing $3 million or more obtain certification from LEED® or the Green Building Initiative's Green Globes™ green building rating system.
- Since FY 2006, **NASA** requires all new building construction and major building renovations with budgets greater than

$500,000 to meet the minimum of LEED®-Silver and to strive to meet LEED®-Gold.

In addition to USGBC's LEED®, agencies are assessing other building evaluation systems. The Green Building Initiative's Green Globes™ system is a suite of building environmental assessment tools that can be used over the entire life cycle of the building. Version 1 is being evaluated by Federal agencies, including, as noted above, **HHS**.

Accomplishments

Beyond policies and goals are the stories of individual building projects and the marketplace trends that they signify.

Sustainable Design. **EPA**'s 1 and 2 Potomac Yard Buildings, located in Arlington, VA, were completed in May of 2006 and contain office and retail spaces as well as a fitness center for use by building occupants. The building's indoor bicycle storage and shower facilities encourage occupants and visitors to use alternative means of transportation. Energy Star®, high-emissivity roofing was used to reduce both heat-island effect and internal heat loads. Utilizing immense daylighting and other strategies, the buildings are expected to use 20 percent less energy than comparable buildings. EPA purchased 100 percent green power for the first year of the buildings' occupancy. In order to conserve water, no permanent irrigation system was installed, and dual-flush and low-flow toilets, urinals, showerheads, and faucets were used throughout the facility. When possible, materials were selected for their recycled content, regional origin, and low chemical emissions. A construction waste management plan kept more than 70 percent of construction waste out of the landfill. An indoor air quality management plan was effectively implemented during construction, and pre-occupancy and permanent temperature and humidity monitoring systems were installed to ensure a comfortable indoor environment.

Sited on a former brownfield, the Carl T. Curtis Midwest Regional Headquarters of the **National Park Service** in Omaha, NE, is the first facility in Nebraska and one of about 50 buildings in the world to earn LEED®-Gold certification. The project promotes the use of alternative transportation with parking spaces for carpools, bike racks, and showers. The project uses water efficiently through the use of native, drought-tolerant plants that will not

require permanent irrigation and a retention pond that naturally filters rainwater on the site. Restroom facilities also use water-conserving systems. The building's east-west axis allows simpler mechanical controls, increases daylighting, reduces solar heat gain from the west, and gives 90 percent of the occupants views of the river or surrounding area. Materials selected for the project include insulated precast concrete, aluminum, Forest Stewardship Council-certified wood, low-emissivity insulated tinted glass, and limestone. Local materials were emphasized to reflect the Midwest region, and minimal finishes were used to support a healthy indoor environment.

DOS has committed to using LEED® in the construction of new embassies worldwide over the next 10 years. The **Sofia, Bulgaria Embassy** chancery building is the first U.S. embassy to achieve LEED® certification. The compound houses DOS offices, including the Executive Office and the General Administration, the Community Liaison, the cafeteria, and the health unit. The Embassy redeveloped a former hospital site for the building. The site was selected in part for its proximity to existing bus and rail lines in order to encourage mass transit. The design also includes shade and pervious paving materials to reduce the urban heat island effect. By relying on high efficiency landscape irrigation technology, water consumption for landscaping purposes was reduced by more than 50 percent from conventional techniques. The project achieved a 40 percent energy reduction over the baseline. Almost one-third of the materials used for the Sofia Embassy project were manufactured within a 500-mile radius of the project site, far greater than the 20 percent required by LEED®. In terms of indoor air quality, the use of a carbon monoxide monitoring system was incorporated in Sofia to provide the feedback necessary to maintain proper ventilation.

The **Navy's** Bremerton, WA Bachelor Enlisted Quarters (BEQ) Building 1044, was completed in December 2004 and provides 132 living units along with common areas and support spaces. Site restoration, porous pavement, and removal of hardscapes reduce stormwater flows by 25 percent compared to predevelopment conditions. Asphalt from the structures formerly on the site was recycled during demolition into aggregate for future paving on the site. Wood, asphalt, gypsum, steel, cardboard, and other construction debris recycling resulted in a greater than 90 percent diversion of construction waste from the landfill. Integrated energy efficiency strategies reduce the base building energy use by approximately 35 percent compared to the ASHRAE 90.1-1999 standard. Dual-sensor direct digital controls further contribute to energy savings by allowing power to each apartment unit to be turned off when the unit is unoccupied. In addition, the architects accounted for the future use of the building

in their plans. Apartment units are designed to house four occupants, with the ability to convert to two-occupant housing. Highly durable building materials with minimum maintenance requirements act as finishes throughout the building. An environmentally-responsible housekeeping plan for maintenance staff and residents will contribute to an improved indoor environment throughout the building's life.

The Bureau of Indian Affairs' Baca Dlo'ay azhi Community School, located on the Navajo Nation reservation in Prewitt, NM, incorporates Native American cultural concepts including an orientation that reflects the meanings associated with the four cardinal directions. A number of sustainability strategies contribute to the project's success and LEED® certification. Light-colored materials were used for the majority of the building site's impervious surfaces, reducing its contribution to the heat-island effect. Parking was kept to a minimum, and employees and visitors are encouraged to carpool or bicycle to the school. Through the use of daylighting, low-emissivity windows, shading, an efficient mechanical system, and a sophisticated energy-management system, energy use at the school is expected to be 20 percent lower than in a comparable, conventional facility. The school also purchases wind power for half of its energy use. Water use is kept low through the use of low-flow faucets and native, xeric landscaping; the school is

expected to use at least 30 percent less water than a comparable, conventional facility. Materials were selected for their recycled content and their proximity to the building site. More than 60 percent of the building materials, by cost, were sourced within 500 miles of the site. Factors such as daylighting, air filtration, a track-off entryway system, and an innovative housekeeping plan, contribute to a healthy indoor environment.

USGBC awarded LEED®-Gold Certification to the **DOT**'s Seattle Terminal Radar Approach Control (TRACON) facility in Renton, WA, in May 2004. The building incorporates the use of environmentally preferable materials, stormwater management techniques, energy efficient design, natural landscaping, and the use of a chemical-free treatment system for the cooling tower. More than 90 percent of the total building materials have a minimum weighted average of 20 percent postconsumer recycled content or 40 percent postindustrial recycled content.

Implementation of the facilities stormwater management plan resulted in a treatment system designed to remove 80 percent of the average annual post development total suspended solids and 40 percent of the average annual post development total phosphorus. Seattle TRACON's use of natural landscape vegetation and water efficient interior fixtures resulted in a combined annual reduction of 246,000 gallons of water, 30 percent over baseline calculations.

The Science & Technology Facility at **DOE**'s National Renewable Energy Laboratory (NREL), a 71,000-sq. ft., $22.7-million, state-of-the-art building completed in June 2006, in Golden, CO, is the first Federal building to receive a platinum rating, the highest in the LEED® rating system. Only 28 other buildings in the world have achieved the LEED®-Platinum designation. The multi-story building was designed to fit into the gently sloping side of a mesa, where care was taken to minimize disturbing the natural terrain and conserve and manage water resources. Architectural features such as daylighting, evaporative cooling and efficient motors, fans, windows and lighting reduce the building's energy requirements, saving 41 percent in energy costs. NREL staff worked with the architect and construction contractor to make certain that 11 percent of the building materials were from recycled materials, and 27 percent of the construction materials were manufactured within 500 miles of the building site. This minimized impact on land and air quality by reducing the amount of waste to landfills and vehicle emissions from transporting materials.

Sustainable building features are by no means limited to grand-scale projects. For example, employing its updated Sustainable Architecture Guideline and Check List, the **TVA** constructed a 6,000 sf yard crane storage building that incorporates passive solar heating, daylighting, and energy efficiency features.

GSA's Alfred A. Arraj U.S. Courthouse was highlighted at the 2005 World Sustainable Building Conference in Tokyo, Japan. The courthouse, completed in 2002, was the only submission of the 2005 U.S. Team for the Green Building Challenge, an international effort to evaluate and improve the performance of buildings worldwide.

The Green Building Challenge, started in 1996, is a collaborative effort among participating countries to develop approaches for measuring the environmental performance of buildings taking into account the importance of regional factors related to climatic, resource, economic and even cultural conditions. The Green Building Challenge is developing an internationally accepted generic framework that can compare existing green building assessment methods, facilitate comparisons of environmental performance of buildings and expand the scope beyond buildings to include environmental sustainability issues.

The new 208,000 gsf **NOAA** Satellite Operations Facility—containing the National Environmental Satellite, Data, and Information Services—is housed under one of the largest vegetated roofs in the country, totaling 140,000 sf. It is a self-sustained bed for local plant life that will change colors with the seasons. This improves the thermal efficiency of the roof structure, providing a non-absorptive or reflective surface for the roof, thus, not creating a heat island. Without this vegetative roof system, the facility would have required costly water retention and filtering solutions.

Waterless urinals are required for all new installations under **DOS**'s Overseas Buildings Operations, Standard Embassy Design requirements. Operating costs of waterless or no-flush urinals are about half the cost of flush urinals — $1 per 1000 uses compared to $2 per 1000 uses of a 1-gallon flush urinal. The payback on replacing existing flush urinals with waterless is 1 to 3 years depending on water and wastewater/sewer charges. Additional savings are realized in reduced maintenance costs.

In 2004, the **VA Pacific Islands Health Care System** (VAPIHCS) Ambulatory Care Clinic in Honolulu was VA's first outpatient clinic and Hawaii's first healthcare facility to receive an EPA Energy Star® label for the newly created category, "Medical Office Building." The VAPIHCS earned this distinction as well as a 2005 VA Environmental Excellence Award through original design components and ongoing energy reduction achievements. Energy conservation is one of this facility's objectives under its GEMS program.

Appendix I provides a list of select Federal building projects exemplifying sustainability principles. Appendix II contains descriptions of NASA buildings that received LEED®-Silver or LEED®-Certification.

Tools and Training

Construction specifications. Recognizing the need for a comprehensive and consistent approach to incorporating environmental sustainability requirements into Federal building projects, **EPA** and **OFEE** teamed with the WBDG to develop the *Federal Green Construction Guide for Specifiers*, http://fedgreenspecs.wbdg.org. Released in April 2006, the guide—written in the language of architects and building contractors—provides model sustainability language for more than 60 specification sections—from concrete to coatings to commissioning.

The July 2006 quarterly release of the Unified Facilities Guide Specifications (UFGS)—used by the Navy, Army, NASA, and other Federal agencies to develop their project-specific construction specifications—includes updates of more than 50 specifications based on the sustainability approaches in the Federal Green Construction Guide for Specifiers. To view the new, "greener" UFGS, visit www.wbdg.org/ccb/browse_org.php?o=70.

No matter how environmentally-sound the contract documents are, if construction workers in the field are not familiar with green practices, the practices often will not be implemented. Recognizing this, in 2004, the **Pentagon** Renovation and Construction Program partnered with the Pennsylvania State University to develop *The Field Guide for Sustainable Construction*. The pocket size booklet is intended to be a helpful, practical reference for construction personnel working on building sites. It guides decision-making that helps the project team achieve sustainable project goals for planned and ongoing projects.

Training. To promote and adopt sustainable design as agency-wide best practice, **GSA** and **NASA** have developed extensive training courses for their personnel. **GSA** presented its series of Sustainable Design Training Modules at each of its regional offices in FY 2006. The modular design of the training allows for flexibility in the selection of topics as needed for particular audiences and flexibility in the length of training sessions. **NASA** presented its Sustainable Design for Facilities Course at five locations, training

more than 195 employees, during FY 2004-2006. NASA's course encompasses not only the best practices of sustainable design, but also incorporates the best practices of design for maintainability and total building commissioning—the entire life cycle of facility projects.

Evaluating costs. In October 2004, **GSA** completed a *LEED® Cost Study* that defines costs associated with the various LEED® ratings. Two building types (new construction courthouses and Federal Building modernization) were modeled against two scenarios for LEED®-Certification, Silver, and Gold ratings, identifying differential costs of construction, design, and documentation/submission requirements. In February, 2005, GSA issued a companion document to the *GSA LEED® Cost Study*, the *GSA LEED® Applications Guide*; it outlines an evaluation process in which the predicted first cost impacts of individual LEED® prerequisites and credits (developed from the Cost Study) are used as a basis for structuring an overall LEED® project approach. The process also illustrates how LEED® criteria relate to existing GSA mandates, performance goals, and programmatic requirements. See http://www.wbdg.org/newsevents/news_040105.php.

Integrating sustainable design and anti-terrorism considerations. Released in 2005, the LEED® -DoD Antiterrorism Standards Tool addresses the security implications of strategies used to achieve each LEED® credit with regard to their inter-relationship (i.e., potential conflicts and synergies), from the DoD perspective. Information is presented within a color-coded matrix based on LEED® Version 2.1 cross-referenced with the applicable standards in Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings. As such, critical areas are easily identified, prompting the project team to work collaboratively, using a 'whole building' approach, to develop successful, efficient solutions for a high performance, secure buildings. The standard is available at http://www.wbdg.org/tools/leed_atfp.php?u=7.

Expanding approaches. In April, 2005, **GSA** sponsored a forum of architects, developers, engineers, scientists, educators, and writers to begin imagining a new understanding of sustainable design. The group discussed challenging ideas—place-based design, living systems, integral thinking—and other evolving approaches. The event was meant to stimulate dialog on the next steps for moving the built environment toward a more sustainable future. The resulting concepts and report http://gyre.buildinggreen.com/ can help both public and private sector project teams reexamine their goals and vision with a deeper systems thinking and new mental models. In turn, with this collaborative approach to the built environment, the Federal community can expand its approach to and reach new levels of sustainable design.

The Future

To build from this and other accomplishments, E.O. 13423 makes mandatory the five Guiding Principles of the MOU for all new construction and major renovations. The E.O. also sets an aggressive goal for applying these practices to at least 15 percent of existing capital building assets by the end of 2015.

With this E.O., the significance of the ISWG's Technical Guidance on the WBDG reaches a new level. The ISWG is responsible for reviewing the Guiding Principles and Technical Guidance periodically for updates and to consider adopting additional principles or goals addressing issues such as conservation plantings, integrated pest management, deconstruction, and siting. The ISWG is committed to the continual improvement of these resources to assist Federal agencies in developing strong sustainable building programs.

In 2007 and beyond, the Federal community will see exponential growth in the development and sharing of best practices, case studies and implementation guidance. OFEE will continue to work closely with the experts in the field to catalyze research and development, especially in the areas of life cycle assessment, worker productivity, and innovations. ■

Electronics Stewardship

Status

Rapid advances in information technology (IT) have led to increasing sales of new electronic devices in the U.S. and all over the world. According to the Consumer Electronics Association, Americans own some 2 billion electronic products – about 25 products per household. This rapid growth has increased energy consumption and created a significant stream of obsolete and discarded products needing appropriate response at end-of-life. Certain types of electronic equipment also contain lead, mercury, and other toxic constituents which assist in the performance of the products but which can have adverse effects on human health and the environment if improperly managed during manufacturing or disposal of these products.

Improving design, maximizing use, and increasing reuse and recycling of electronics at end-of-life are important ways to conserve resources and to minimize environmental harms involved in the extraction and manufacture of materials used in electronic products. Electronics are made with valuable resources such as precious metals, engineered plastics, glass, and other materials—all of which require energy to manufacture. When equipment is thrown away, these resources cannot be recovered, and additional pollution is generated to manufacture new products out of virgin materials. Therefore, recycling end-of-life electronic materials conserves natural resources and reduces pollution and the greenhouse gas emissions that are caused by manufacturing new products.

During FY 2004, 2005, and early 2006, OFEE and the Federal agencies established policies, tools, and challenge programs to enable agencies to manage their electronics more sustainably throughout their life cycle. One of the tools is a government-wide contract for recycling services, which the **Federal Emergency Management Agency** (FEMA) used to recycle more than 12.5 tons of electronics from Hurricane Katrina and Rita relief efforts.

2007 Environmental Stewardship Scorecard Metrics for Electronics Stewardship

- Implementation of a sustainability program for electronic stewardship that at a minimum promotes the purchase, operation, and use of end-of-life management strategies for electronic assets consistent with the November 15, 2004 MOU on electronics stewardship, or
- Participation in the Federal Electronics Challenge or equivalent.

Progress

Electronics Stewardship Memorandum of Understanding. In an effort to lead by example, 11 Federal agencies and the Executive Office of the President (EOP) signed a Memorandum of Understanding (MOU) on November 15, 2004, to demonstrate environmental stewardship in the management of their electronic assets. In signing the MOU on *"Promoting Sustainable Environmental Stewardship of Federal Electronics Assets,"* **EOP**, **USDA**, **DoD**, **DOE**, **HHS**, **DHS**, **DOI**, **DOJ**, **DOT**, **VA**, **EPA**, and **GSA**, committed to increase the demand for more environmentally preferable electronic products, promote best management practices within the Federal community, reduce the economic and environmental life cycle cost of electronics, and encourage the growth of the infrastructure for reuse, demanufacturing, and recycling of obsolete equipment. *In total, these agencies represent approximately 83 percent of the Federal government's IT purchasing power of more than $60 billion annually.*

*Federal Electronics Challenge***.** By signing the MOU, the agencies also became partners in the Federal Electronic Challenge (FEC). The FEC is a partnership program that encourages Federal agencies and facilities to procure and lease environmentally preferable electronics and reduce the impacts of the electronics during use and at disposal. In addition to the MOU agencies, 115 Federal facilities, covering more than 418,000 employees, have signed up for the challenge.

The FEC provides resources and technical assistance for improving electronics management practices and gives annual recognition to partners that have achieved specific goals. The FEC developed more than 40 resource documents for Federal agencies and facilities on the environmentally preferable management of electronics. These resource documents and tools cover all three phases of the electronics life cycle at a Federal agency: acquisitions, operations and maintenance, and end-of-life management.

The FEC partnership spans 17 agencies and includes small facilities such as the **USDA's Beltsville Service Center**, with 50 employees, as well as much larger organizations such as **HHS' Centers for Disease Control and Prevention**, with 7,000 employees. Agencies such as **DOE** strengthened their MOU commitments by establishing new pollution prevention and sustainable environmental stewardship goals and incorporating FEC strategies for achieving these goals —such as purchasing environmentally preferable electronics, enabling electronics power management capabilities, and recycling of surplus electronics.

Representatives of the signatory agencies from the environment, IT, personal property, and procurement communities meet monthly as the Federal Electronics Stewardship Working Group (FESWG). **OFEE** serves as

the Chair of the FESWG to help coordinate efforts to implement the MOU and to exchange information concerning existing and planned initiatives to improve Federal electronic equipment acquisition, management, and disposal practices.

Electronic Product Environmental Assessment Tool. The Federal government is one of the largest consumers of electronics in the world, purchasing in FY 2004-05 an estimated $122.4 billion in IT products and services. Realizing this tremendous purchasing power could be used to promote more sustainable electronics, **EPA** and various large government IT purchasers participated in a multi-stakeholder and consensus-based process, involving electronics manufacturers, NGOs and others, to develop the Electronic Product Environmental Assessment Tool. EPEAT is comprised of a set of environmental performance criteria that has been finalized into the IEEE American National Standard for the Environmental Assessment of Personal Computer Products (1680). A registry of products meeting these criteria can be found at www.epeat.net.

EPEAT was created to meet growing demand by large institutional purchasers for a means to readily distinguish environmentally preferable electronic products in the marketplace. EPEAT is modeled on other environmental rating tools, such as the USGBC's LEED® Green Building Rating™ system. The EPEAT rating system establishes performance criteria in eight categories of product performance, including reduction or elimination of materials sensitive to the environment, design for end-of-life, life cycle extension, energy conservation, and end-of-life management.

In a relatively short time, EPEAT has gained wide acceptance by Federal, state, and other large institutional purchasers of IT equipment. To date, there are more than 400 EPEAT-registered products listed on the EPEAT Registry and available in the marketplace, from brands such as Apple, Dell, HP, Lenovo, NEC, Sony, Toshiba, and CTL Corporation. EPEAT has been integrated into IT procurement contracts or requests for proposals by Federal agencies such as **GSA**, **DOI**, **DHS**, **NASA**, the **Army**, **EPA**, **DOE**, **DOT**, and **EOP**.

Designing Environmentally Preferable Electronics. **EPA**'s DfE Program has worked closely with the electronics industry to help reduce the environmental impacts of the manufacturing of electronics. DfE worked with the industry on ways to change the manufacture of printed wiring boards, assessed the life cycle impacts of cathode ray tubes (CRTs) and flat panel displays, and assessed the life cycle impacts of tin-lead and lead-free solders used in electronics. DfE also is working in a multi-stakeholder partnership with the electronics industry, chemical manufacturers, environmental groups, and others to evaluate flame retardant options in printed circuit boards.

The ongoing IT revolution presents a particular challenge with regard to escalating energy use and costs. For example, the U.S. has more than 180 million computers in use, which consume nearly 58 billion kWh per year, or about 2 percent of the annual electricity consumption in the nation. Personal computers (PCs) and their monitors consume between 5 to 13 percent of all the electricity consumed in an office environment. In the year 2000, personal computers and monitors consumed over 36 Terawatt-hours of electricity, and it is estimated that 66 percent of that electricity is wasted.

Power management of PCs and monitors to reduce their energy consumption when not in use has the potential to save significant amounts of electricity as well as deliver substantial economic and environmental benefits. However, only about 6 percent of users enable power management functions on their PCs.

The **EPA** and **DOE** Energy Star® program is making great strides to transform the computer and electronics market so that products are more efficient while they are in use (through on mode, and power supply efficiency requirements) and that they move quickly to low power states when in not in use through implementation of power management. In 2006, EPA revised the Energy Star® specifications for desktop and notebook computers, workstations, integrated computers, desktop-derived servers, and game consoles. Among other things, the new specifications apply to external power adapters, which will lead to further energy savings. When the new specifications go into effect in July 2007, Federal agencies buying Energy Star® will garner big savings. If the government sector buys only computers that meet the new Energy Star® requirements, it could potentially save nearly 1.4 billion kWh and reduce greenhouse gas emissions by one million tons annually.

*Promoting Environmentally Sound End-of-Life Management Practices***.** The Federal government disposes of an estimated 10,000 computers a week. Since many electronic devices contain toxic constituents that are important for the proper functioning of these products, but could cause problems if not properly managed during disposal, it becomes necessary to have in place proper end-of-life management practices. Federal agencies have implemented several innovative initiatives to promote donation, reuse, and recycling of used electronics in an environmentally sound manner.

The Federal government encourages extending the useful life of electronic equipment by promoting reuse or "second use" of the used equipment or components. While the computers hardware is generally expected to last 7 years, the equipment is normally used for an average of 3 years prior to disposal. Therefore, maximizing the 3 R's (reuse, refurbish and recycle) hierarchy is encouraged.

Accomplishments

Donation Programs. **GSA**'s Computers for Learning (CFL) places computers in classrooms and prepares children to contribute and compete in the 21st century. The program transfers excess Federal computer equipment to schools and educational nonprofit organizations, giving special consideration to those with the greatest need. CFL also plays an important role in ensuring that computer systems are reused and recycled so that they do not end up in landfills.

During FY 2004 through 2006, GSA successfully transferred 41,973 computers and 6,230 printers to schools and educational non-profit organizations, representing an original acquisition cost of over $81 million. Arrangements are made through www.computers.fed.gov, which has proved to be an excellent tool to match schools' needs with excess Federal computers.

GSA recognized **DHS** with a Gold Star of Excellence Award, for DHS' innovative implementation of E.O. 12999 on Computers for Learning. GSA's goal in presenting the award is to publicly recognize and draw attention to the Federal government's commitment to improving access to computer technology in American education. **FLETC** alone donated 600 items to educational systems, including computers and computer related equipment.

Computer Recycling. As part of America Recycles Day (ARD) 2005, **OFEE**, **EPA**, **DOJ**, and several other Federal partners launched the Federal Electronics Reuse and Recycling Challenge (ERRC), to encourage all Federal facilities to recycle, or donate their used computers and other electronic equipment to local schools or Hurricanes Katrina and Rita relief efforts.

In its first year, 15 winners were selected from 11 agencies and 70 facilities that participated in the Challenge. In the second year, there were 14 winners from 12 agencies and 124 facilities – several of which won for the second time. In the first year alone, the program resulted in the successful reuse and recycling of approximately 2 million pounds of electronics during the five-month period between November 11, 2005 (ARD) and April 22, 2006 (Earth Day). **DOE** received the top honors by winning the ERRC Agency Award, as 11 DOE facilities reused and recycled more than a half million pounds of surplus and obsolete electronics. **DOE**'s Kansas City Plant and the Waste Isolation Pilot Plant in Carlsbad, NM, won regional facility awards as well.

In FY 2005, **EPA** awarded a government-wide acquisition contract (GWAC) for electronics recycling services. Known as the Recycling Electronics and Asset Disposition (READ) services program, the GWAC provides all Federal agencies with a procurement tool to properly manage electronics and recycle and properly dispose of excess or obsolete electronics in a

responsible manner. The READ GWAC consists of five-year multiple awards contracts to seven small businesses. The READ contractors offer logistical and inventory support, testing, auditing, and tracking, data security, valuation process, recycling, management and technical support services.

To date, READ has issued more than 15 task orders to seven agencies, including **FEMA**, the **Bureau of Alcohol, Tobacco and Firearms**, the **National Park Service**, the **Department of Education**, and **DOE**. FEMA allotted $5 million to READ to recycle electronic equipment from the regions affected by Hurricanes Katrina and Rita. READ contractors removed two to four truckloads of electronic equipment per day for recycling, weighing approximately 30,000 pounds each. More than 25 million pounds of electronic scrap have been recycled to date through the READ GWAC.

Federal Prison Industries, under its trade name **UNICOR**, recycles computers and other electronic items in a safe manner, while fulfilling the Agency's mission to train prison inmates. UNICOR processes computers and electronic equipment from anywhere in the country, refurbishes equipment for resale, and recycles millions of tons of electronics material annually that cannot be reused or resold. Several Federal agencies, including the **DoD**, **DOI**, **DOL**, **VA**, **DOJ**, and the **Treasury** are using UNICOR to recycle or demanufacture surplus computers and electronics. UNICOR also works with many other Federal agencies and State agencies in developing recycling partnerships.

UNICOR's recycling program gives more than 1,000 Federal inmates at eight computer/electronics recycling locations in the U.S. an opportunity to voluntarily participate in a work program. While developing job skills, these inmates improve their self-worth and prepare for release. Inmates use their earnings to pay victim restitution and court-ordered fines, as well as to meet family and child support obligations.

CRTs. On July 28, 2006, **EPA** issued a CRT rule providing conditional exclusions from the Federal hazardous waste management standards for CRTs and CRT glass destined for recycling. The glass in CRTs — the video display components of televisions and computer monitors — typically contains enough lead to require managing it as hazardous waste under certain circumstances. EPA set simpler, more manageable standards

for unbroken CRTs because the risk of lead releases from them is very low. By streamlining the management of CRTs, EPA is making it easier to collect and recycle them, thus saving energy, conserving resources, allowing the recovered lead to be reused in other ways, and reducing the amount of lead in landfills.

Model Electronics Stewardship Programs. The following are a few of the many electronics stewardship programs being implemented by Federal agencies to incorporate sustainable strategies and practices that improve the quality, performance, and environmental management of Federal electronic assets throughout their life cycle.

VA received White House recognition as a Gold Level Federal Electronics Challenge Partner in June 2006. VA's electronics stewardship efforts began prior to joining the MOU on November 15, 2004. The Department initially focused its efforts on ensuring the sound disposition of electronics, donating excess computers to authorized schools, entering into an MOU with UNICOR for recycling of obsolete electronics, and partnering in local electronics recycling events. After signing the MOU and becoming an FEC partner, VA decided to "Go for the Gold" by addressing all three electronics life cycle phases.

The VA FEC Team expanded on VA's existing "green" standards for the acquisition of computer hardware by incorporating the new EPEAT purchasing criteria. On the operations side, VA maximized the useful life of its electronic assets by expanding the average life span of its computers to 4 years. The Energy Star® stand-by-power function is also enabled on an estimated 97 to 100 percent of VA computer monitors. In addition, during FY 2005, VA donated 1,751 computers to schools through the **GSA's** CFL Program, representing an original acquisition cost of more than $2 million. VA also recycled 1.4 million pounds of outmoded electronics in FY 2005, thus keeping a total of 700 tons of solid and hazardous waste out of landfills.

Through a campaign of electronics reduction, reuse, and recycle, **DOE**'s Pacific Northwest Laboratory (PNNL) reduced the amount of equipment purchased and disposed by extending the life of its computers from 3 to 6 years with initiatives such as installing larger hard drives, updating video capabilities, and adding more memory to older computers. When the computers can no longer be used within PNNL, they are donated to local schools. In the past six years, PNNL has donated 1,000 pieces of electronic equipment, which would have cost $2.5 million to purchase new. PNNL also collects and donates cell phones to Donate-A-Phone, which refurbishes and redistributes them to charitable agencies.

EPA's Region 4 office has consistently demonstrated excellence in executing its mission of protecting human health and the environment. The Region's commitment to

the FEC serves as a true testament of its strategic pollution prevention goals. In 2004, the Region institutionalized a new policy that transformed its business processes to further promote environmentally preferable procurement, maintenance, recycling, and the donation of 100 percent of its electronic equipment. The region enabled Energy Star® power management on 100 percent of network monitors, resulting in an estimated energy cost savings of approximately $18,000 per year. Over the FY 2004-05 period, EPA Region 4 recycled approximately 400 computer devices by using the READ Contract and donated approximately 1,200 computer devices, many of which were provided to schools impacted by the devastations of Hurricane Katrina and Rita.

The Future

E.O. 13423 establishes in the Federal sector, for the first time ever, specific goals in the area of sustainable electronics. Specifically, agencies will ensure that when acquiring an electronic product to meet their requirements, they meet at least 95 percent of those requirements with an EPEAT-registered electronic product, unless there is no EPEAT standard for such product; enable the Energy Star® feature on agency computers and monitors; establish and implement policies to extend the useful life of agency electronic equipment; and use environmentally sound practices with respect to disposition of agency electronic equipment that has reached the end of its useful life. Agencies have begun developing plans to put in place electronics stewardship practices for all eligible owned or leased electronic equipment that will support the goals of the new E.O. They have also begun to purchase EPEAT-registered electronics. The acquisition of environmentally preferable electronics, coupled with the on-going donation, recycling, and reuse of equipment at end-of-life, will contribute to advancing the management of Federal electronic assets in an environmentally sound and energy efficient manner. ■

Energy Efficiency and Renewable Energy

Status

The Federal government is the largest energy consumer in the U.S., spending more than $3.5 billion annually for energy for its facilities. By implementing energy efficiency practices, Federal agencies can not only reduce their energy bills, but help to reduce the emission of greenhouse gases by using less energy, more electricity from renewable energy sources, and alternatives to petroleum-based fuels. Since 2000, Federal agencies have been increasing the energy efficiency of their buildings and reducing their energy usage, as required by the National Energy Conservation Policy Act, the Energy Policy Act, and E.O. 13123.

These efforts focus on:

- Reducing energy consumption in standard buildings and buildings, such as laboratories, that are energy intensive.
- Increasing the use of electricity from renewable energy sources.
- Reducing the use of petroleum-based fuels in buildings and facilities.
- Reducing greenhouse gas emissions attributed to facility energy use.

During FY 2004-2006, Federal agencies continued to make significant progress in reducing their facility energy usage and increasing their usage of renewable energy. For standard buildings, the E.O. 13123 goal was to reduce energy consumption per gross square foot by 30 percent by 2005 and 35 percent by 2010 relative to a 1985 baseline. In FY 2005, the agencies reduced energy consumption by 29.6 percent, just shy of the 30 percent goal, and are on track to meet the 35 percent goal. Overall, the agencies reduced their energy usage in energy intensive buildings by 17.6 percent in FY 2005, close to the E.O. 13123 goal of a 20 percent reduction. At the same time, their usage of renewable energy in FY 2005 was equivalent to 6.9 percent of the Federal government's electricity use, well above the 2.5 percent goal approved by DOE under E.O. 13123. They also reduced their use of fuel oil and liquefied petroleum gas/propane

2007 Energy Scorecard Metrics for Energy Efficiency

- Reduce building energy use per square foot by 20 percent by 2015 compared to 2003.
- Use at least 2.5 percent renewable energy as a percentage of facility electricity use.
- Metering plan approved by DOE and on track to be completed by 2012.
- Demonstrate that 100 percent of new building designs beginning October 1, 2006, are 30 percent more efficient than the 2004 International Energy Conservation Code (residential buildings) or the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2004 (non-residential buildings), if life-cycle cost effective.

70 percent compared to the FY 1985 baseline.

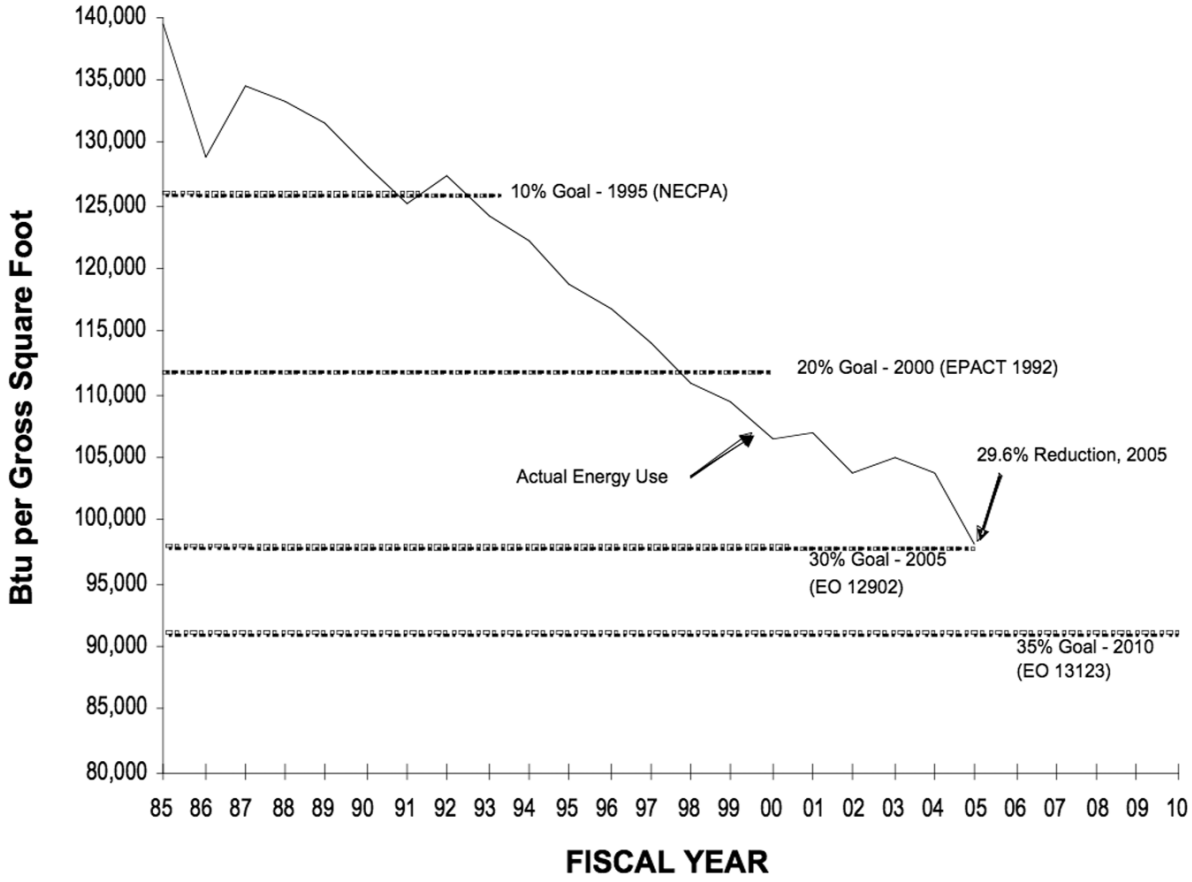
The result — during FY 2005, Federal agencies achieved a greenhouse gas emission reduction of 22.1 percent, from 14.9 million metric tons of carbon equivalent (MTCE) in FY 1990 to 11.6 million MTCE in FY 2005. Carbon emissions decreased by 411,221 MTCE or 3.4 percent from FY 2004. Additional detail is provided in the following sections.

Progress

President Bush signed EPAct 2005 on August 8, 2005. It amends portions of the National Energy Conservation Policy Act and reestablishes a number of goals for Federal agencies. E.O. 13123 remained in effect in the FY 2004-2006 period, with many goals having important milestones in FY 2005.

Reduction Goals for Federal Standard

Overall Government Progress Toward the Energy Efficiency Goals for Standard Buildings, FY 1985 through FY 2005



*Buildings***.** Section 202 of E.O. 13123 requires each agency to reduce energy consumption per gross square foot of its standard buildings by 30 percent by 2005 and 35 percent by 2010, relative to 1985. Agencies' FY 2005 data indicated a decrease in energy consumption per gross square foot of 29.6 percent relative to FY 1985, and the government is well on track to meet the 35 percent goal for 2010. The government's performance for each year since FY 1985 is illustrated in the graph opposite this page.

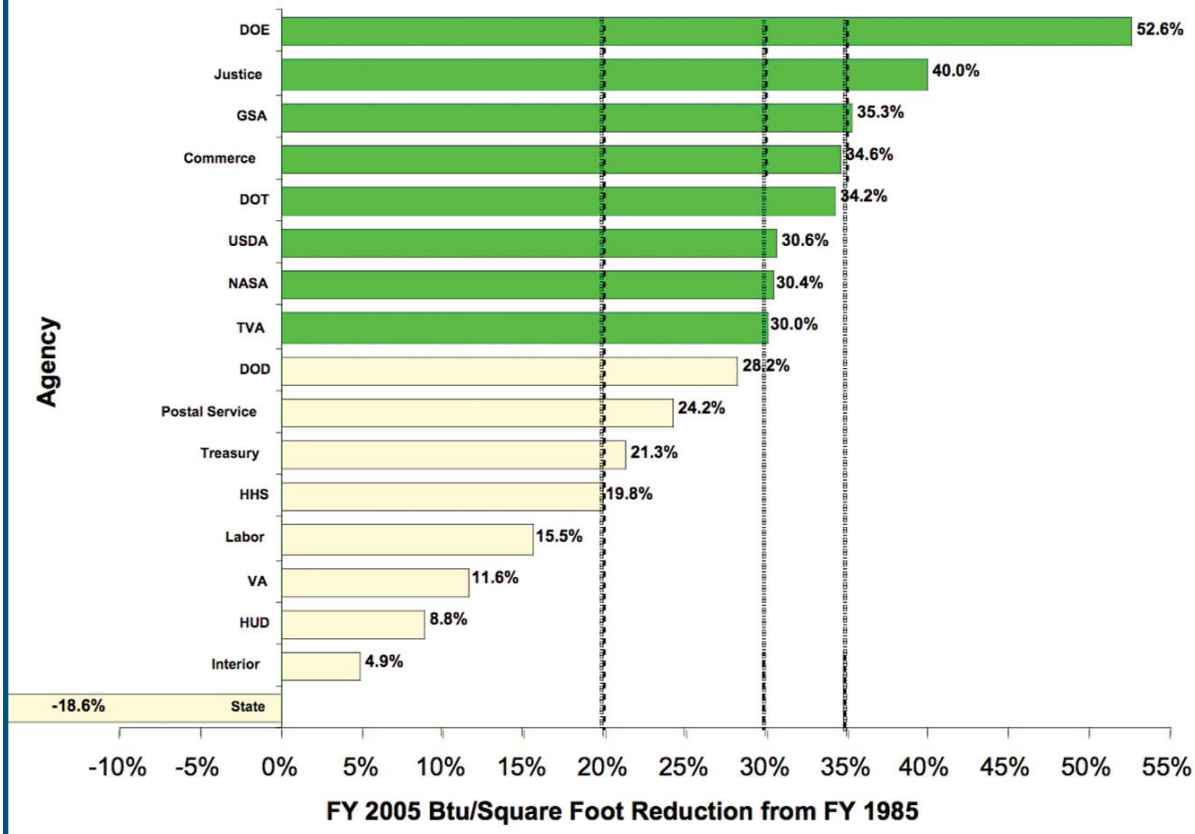
Individual agency performance in FY 2005 compared to FY 1985 is illustrated in the next graph. ***USDA***, ***DOC***, ***DOE***, ***DOJ***, ***DOT***, ***GSA***, ***NASA***, *and* ***TVA*** *have reduced energy use per gross square foot in standard buildings by more than 30 percent from 1985.* **DoD** is on track to meet the 35 percent reduction goal for 2010 with a reduction of greater than 28 percent.

Small Federal agencies are an integral partner in the Federal community, contributing to active energy conservation efforts and adopting new energy technologies and innovative approaches to support this Administration's energy program. For example, although fully serviced government leases do not receive financial benefit from reducing energy consumption, **Federal Energy Regulatory Commission** (FERC) has actively pursued energy savings throughout its headquarters building, including:

- Changing incandescent lighting fixtures to fluorescent fixtures.
- Replacing a 120 gallon hot water heater with a 50 gallon water heater.
- Installing photovoltaic rooftop panels.
- Installing the most energy efficient fluorescent lighting package at the time with digital addressable lighting interface (DALI) smart ballast technology, to provide lighting for monthly FERC Commission Meeting broadcast and webcasts, allowing for light to be used more efficiently.
- Installing low-E glass to help reduce heat loss in the winter and solar loss in the summer.

*Reduction Goals for Energy Intensive Facilities***.** Section 203 of E.O. 13123 requires each agency to reduce energy consumption per square foot, per unit of production, or per other unit as applicable, by 20 percent by 2005 and 25 percent by 2010, relative to 1990, in industrial, laboratory, and other energy intensive facilities. During FY 2005, **DOC, DoD, DOE, EPA, GSA,** the **International Broadcasting Bureau, USDA**, and **TVA** achieved reductions greater than 20 percent compared to FY 1990. **HHS**, the **Treasury**, and **SSA** achieved reductions between 10 and 20 percent. *As a whole, Federal agencies achieved a reduction of 17.6 percent in Btu per gross square foot in its industrial, laboratory, and other energy intensive facilities compared to FY 1990.*

Individual Agency Reductions in Btu per Square Foot of Standard Building Space in FY 2005 Compared to FY 1985



Note: Dark shaded bars indicate that agencies have met the reduction goal for FY 2005.

Preliminary FY 2006 Findings on EPAct Reduction Goal. Section 102 of EPAct 2005 establishes new statutory energy reduction goals for Federal buildings. The new goal uses a base year of FY 2003 and requires reductions of 2 percent per year in energy use per square foot, leading to a 20 percent reduction by FY 2015. The law allows agencies to exclude certain buildings from this goal under stringent criteria. **DOE** issued guidelines for these exclusions.

Unlike the E.O. 13123 goals, the EPAct 2005 facility energy reduction goals track the combined performance of standard buildings and energy intensive facilities. According to preliminary data submitted to DOE by Federal agencies, the government appears to have met the 2 percent facility energy reduction goal for FY 2006, with a reduction in energy intensity of 4.9 percent compared to FY 2003. Renewable energy credits can be used to meet both the renewable energy

and energy efficiency goals. Credits from renewable energy purchases contributed significantly to the achievement of the facility reduction goals.

At the agency level, the largest overall reductions are seen in those agencies taking advantage of purchased renewable energy credits. Even without the credits, many agencies have achieved remarkable success in reduction in energy intensity. Fourteen agencies achieved the 2 percent goals without additional credits. Two agencies, **EPA** and **DoD** used the credits to push past the goals.

Federal Building Energy Efficiency Standard. Section 109 of EPAct 2005 required DOE to issue a new Federal building energy efficiency standard. The standard must require that buildings be designed to achieve energy consumption levels that are at least 30 percent below the levels established in the ASHRAE standard of the International Energy Code, if life-cycle cost effective.

On December 4, 2006, **FEMP** published an interim final rule setting the minimum efficiency standard for new Federal residential buildings equal to the 2004 International Energy Conservation Code, and the minimum standard for new commercial and multi-family high-rise Federal buildings equal to a 2004 standard set by ASHRAE. The rule also requires new Federal buildings to be designed to be 30 percent more energy efficient than these standards, if doing so is found to be cost effective over the life of the building. If a 30 percent efficiency improvement is not cost effective, designers must successively evaluate incrementally lesser goals. DOE intends to issue a final rule in 2007, although the interim rule took effect on January 3, 2007.

Metering. EPAct 2005 requires all Federal agencies to install metering and advanced metering where found to be cost-effective, according to guidelines to be developed by DOE. **FEMP** issued the *Guidance for Electric Metering in Federal Buildings*, which required agencies to submit their implementation plan by August 3, 2006 and provided a template for agencies to use in developing their metering plans. Agencies are required to install standard or advance meters at all Federal buildings to the maximum extent practicable, by October 1, 2012, and must begin reporting on their progress as part of their FY 2007 input to the Annual Report to Congress on Federal Energy Management. The FEMP guidance can be found at: http://www1.eere.energy.gov/femp/pdfs/adv_metering.pdf.

Renewable Energy Goal. Section 503 of E.O. 13123 directed the Secretary of Energy, in collaboration with the heads of other agencies, to develop a goal for increased renewable energy use in the Federal government. The Secretary of Energy approved a goal that the equivalent of 2.5 percent of electricity consumption from Federal facilities should come from new

renewable energy sources by 2005. "New" renewable energy only includes energy from projects or purchases of renewable energy contracted or built after 1990.

Federal agencies reported purchasing or producing 13,003.8 billion Btu (3,811.2 GWh) of new renewable energy in FY 2005, equivalent to 6.9 percent of the Federal government's electricity use, and greatly surpassing the goal of 2.5 percent. Consumption of new renewable energy in FY 2005 nearly doubled the amount reported by the agencies in FY 2004. The main contributors to this increase were **DoD** and **GSA**. **DoD** reported more than two-and-a-half times the amount of self-generated and purchased renewable energy than the previous year's accounting. In FY 2005, **GSA** quadrupled its purchases of renewable energy over FY 2004.

Ten agencies have surpassed the goal of obtaining the equivalent of more than 2.5 percent of total electricity consumption from renewable sources:

- EPA (112.6 percent)
- DOC (27.4 percent)
- GSA (22.8 percent)
- NASA (8.4 percent)
- DoD (8.3 percent)
- USDA (4.7 percent)
- DOE (3.3 percent)
- Treasury (3.4 percent)
- DHS (3.0 percent)
- VA (2.9 percent)
- TVA (2.8 percent)

Preliminary data for FY 2006 indicates that performance toward the renewable energy goal is essentially unchanged from FY 2005, with the government purchasing and producing 12,500 billion Btu of new renewable energy in FY 2006, equivalent to 6.9 percent of the government's electricity use. On-site generation comprises approximately a third of total renewable energy use, with the other two-thirds from purchases of renewable energy and renewable energy certificates.

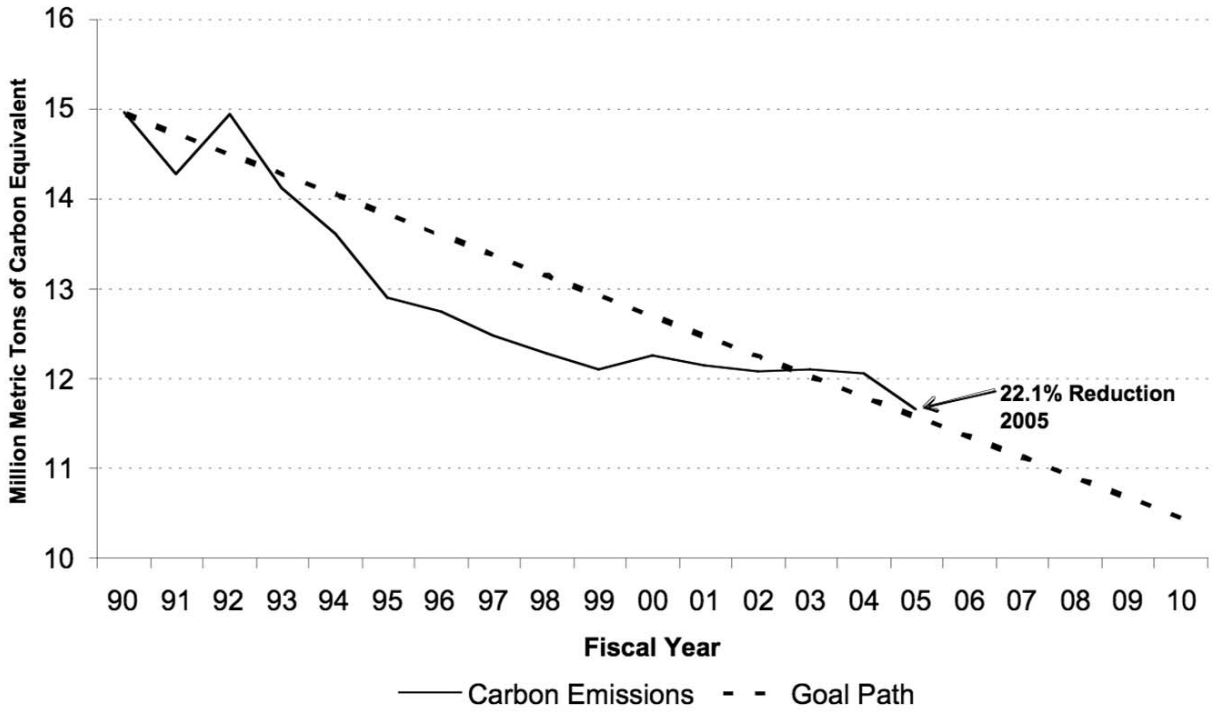
Petroleum Reduction in Buildings. Section 205 of E.O. 13123 directs agencies to minimize the use of petroleum-based fuels in buildings and facilities. Federal agencies have made significant progress in reducing their dependence on fuel oil and liquefied petroleum gas/propane in their standard buildings and energy intensive facilities, reducing petroleum-based fuels by 70 percent in FY 2005 compared to FY 1985, from 118.8 trillion Btu to 35.7 trillion Btu. Compared to the previous year, use of these fuels fell by 6.2 percent.

Greenhouse Gas Reduction Goal. E.O. 13123 establishes a greenhouse gas reduction goal for Federal facilities applicable to standard

buildings subject to the energy efficiency goals of Section 202 and industrial, laboratory, and other energy-intensive facilities subject to the goals of Section 203. The requirement states that each agency shall reduce its greenhouse gas emissions attributed to facility energy use by 30 percent by 2010 compared to such emissions levels in 1990.

During FY 2005, Federal agencies achieved a greenhouse gas reduction of 22.1 percent, from 14.9 million metric tons of carbon equivalent (MTCE) in FY 1990 to 11.6 million MTCE in FY 2005. Much of this decline is attributable to the 35.1 percent reduction of **DoD** during this period. Carbon emissions decreased by 411,221 MTCE or 3.4 percent from FY 2004, mainly as a result of renewable energy purchases. The figure below illustrates the trend from FY 1990 through FY 2005.

Progress Toward the Greenhouse Gas Reduction Goal



Accomplishments

On September 26, 2005, in response to Hurricanes Katrina and Rita, President Bush issued a memorandum to the heads of Executive departments and agencies to take appropriate actions to conserve fuel and energy use at Federal facilities. In particular, President Bush called on agencies to take appropriate actions to conserve natural gas, electricity, gasoline, and diesel fuel to the maximum extent consistent with the effective discharge of public responsibilities. The memorandum required agencies to report on their energy conservation actions within 30 days.

The agencies' reports show a tremendous response through the immediate implementation of a wide variety of energy-saving measures. Federal agencies estimated that the conservation actions undertaken in response to the President's Memorandum saved approximately 5.4 trillion Btu over the six-month period from November 2005 through April 2006.

Of the total savings of 5.4 trillion Btu, 4.7 trillion Btu were savings of electricity, natural gas, and fuel oil used in buildings and facilities. These facility energy savings are enough to meet the needs of approximately 112,000 typical households in the Gulf Coast region for six months (although the savings are widely dispersed throughout the country). Approximately 775.6 billion Btu were savings of fuels used for transportation purposes (gasoline and diesel). The savings from these transportation fuels is equivalent to removing approximately 4,300 vehicles from the road for six months.

Some of the energy saving measures included the following:

- Consolidating or shutting down facilities. **GSA** eliminated 24/7 operations at three sites.
- More efficient operations and maintenance. To conserve diesel fuel, **NASA** reduced its on-site power generation requirement for distant spacecraft communication operations.
- Maximizing boiler efficiency. **DHS** increased the operating efficiencies of its boiler plants.
- Conserving energy use for lighting. **DOC** reduced lighting use in common areas.

Savings were also achieved through optimizing energy management control systems and metering energy use. **FLETC** installed and upgraded direct digital controls in several buildings. **DoD** incorporated occupancy controllers in dorms and barracks to decrease heating oil consumption. **DoD** also performed night surveys to minimize off-hour electricity consumption. At **EPA**, meters were installed to track overall campus energy consumption and identify usage patterns. Sub-meters were also installed to track energy use within specific buildings.

Awards and Recognition. Each year, outstanding agency energy management efforts are recognized through a variety of award programs. The agencies recognized for their award-winning programs in 2004, 2005, and 2006 are presented in Appendix III.

Alternative Financing Tools for Energy and Water Improvements. Agencies continue to use alternative financing mechanisms, including energy savings performance contracts (ESPC) and utility energy service contracts (UESC), to implement energy efficiency and renewable energy improvements. With these innovative tools, agencies can use private financing to pay for energy and water improvements and then pay back the energy service company or utility through utility bill savings in the future.

Since 1985, Federal agencies have invested approximately $7.3 billion in energy efficiency. More than $3 billion of this investment has come from ESPCs and UESCs. During FY 2005, 20 ESPC contracts or delivery orders were awarded at five agencies. These include delivery orders awarded through the **DOE/FEMP** Super ESPC programs, as well as projects awarded by **DoD**. Project investment from these projects totaled approximately $96.8 million, providing the Federal government with an opportunity to save more than 726.4 billion Btu each year. Through a decentralized approach, DoD awarded the largest number of contracts/delivery orders with 15 ESPC projects in FY 2005.

In FY 2005, Federal agencies awarded 40 UESCs. Financed investment in the projects totaled approximately $75.6 million. The estimated annual energy savings from the 40 projects is 795.1 billion Btu. Of the 40 UESCs awarded in FY 2005, 32 were implemented by DoD. Contracts were put in place to perform infrastructure upgrades and purchase new equipment to help installations reduce energy and water consumption.

According to preliminary data for FY 2006, investment in energy efficiency is moving in the right direction, totaling $668 million from all sources. ESPCs were the primary contributor to an overall increase of $163 million from FY 2005, a 32 percent increase. While investment from appropriations and UESCs declined from FY 2005, investment from ESPCs grew by more than two and a half times.

High Performance Buildings. Buildings that are among the top 25 percent nationwide in terms of energy performance (earning a bench marking score of 75 or greater) and maintain an indoor environment that conforms to industry standards can qualify to receive the Energy Star® label for buildings. Federal agencies have earned the Energy Star® building label for 159 buildings. Following are **VA** examples of Federal Energy Star® buildings:

The Wilmington, DE, **VA** Medical & Regional Office Center, a member of Veterans

Integrated Service Network 4, combines a 58-bed hospital and 60-bed NHCU with a VBA Regional Office and two Vet Centers, offering veterans the unique opportunity to obtain health care, benefits services, and readjustment counseling at one location. Energy efficiency upgrades at the center have included the following:

- Replacing inefficient exit sign lamps with LEDs
- Replacing older electronic ballasts and more efficient lamps
- Installing variable frequency drives and high-efficiency motors on HVAC equipment

The Wilmington facility also extended the central plant high-pressure steam loop and expanded the energy management system to most of the campus outbuildings.

The **VA** Ann Arbor Healthcare System is a 1.17 million square foot campus in Ann Arbor, MI, that provides high-quality care to veterans residing in lower Michigan and northwestern Ohio. The energy team consists of the Facilities Management Officer and the design and construction team, under the Facilities Management Department. This team assists with the development and implementation of energy efficiency improvements. The team reviews projects to identify opportunities for incorporating energy efficiency; looks for opportunities to purchase energy-efficient equipment; starts at least one new energy efficiency or water efficiency project every year; and continues to expand utilization of energy saving capabilities of the building management system. Employees are encouraged to submit ideas to reduce energy and water use. All projects and initiatives for energy management fall under the purview of the facility's five year capital plan for construction, maintenance, and equipment purchases. The entire planning system for energy conservation, water conservation, non-routine maintenance, and site specific programming changes is maintained as a single integrated program.

Efforts to improve efficiency within the facilities include upgrades to lighting, fan and pump systems, and the HVAC systems. In addition, the purchase of Energy Star® qualified products is encouraged across the hospital and, in some situations, Energy Star® qualified products, such as computer monitors, are required. The facilities employ hot water recirculation and utilize flash hot water heaters to improve energy efficiency. Solar water heating for domestic hot water in one of the campus buildings is also utilized.

Eleven **VA** facilities received Energy Star® Labels from 2004 to 2006. VA is the first agency to automate energy benchmarking by creating a data link from VA's energy database to EPA's Energy Star® database without contracting an outside data service company. The system updates meter data and re-evaluates Energy Star® ratings

quarterly for over 150 VA hospitals.

Laboratories for the 21st Century. Laboratories and other high-tech buildings may present the greatest challenge for delivering energy efficient and environmentally responsible buildings. By the very nature of the work done in these buildings, the needs for diversity, flexibility, and safety, and many other concerns, must be balanced with Federal environmental and energy objectives. This dictates engineering and architectural solutions way beyond those typically confronted in more typical buildings such as offices, classrooms, and warehouses.

To address this unique challenge, **EPA** and **DOE** co-sponsor the Laboratories for the 21st Century program. EPA and DOE partner with private and Federal sector laboratory owners to better understand and assist in the partner's efforts to plan, budget, design, and engineer its laboratory. The program also is developing guidelines and a variety of technical tools, offering workshops, and sponsoring annual conferences on the design and engineering of high performance laboratories, clean-rooms, and data centers.

The Future

By implementing the new building energy efficiency and renewable energy usage goals and requirements in EPAct 2005 and E.O. 13423, Federal agencies will continue to decrease their building energy use and increase their use of renewable energy and energy-efficient and water-conserving products. E.O. 13423 accelerates the rate by which agencies must reduce their energy intensity for the period through 2015 compared to the EPAct 2005 requirements. Where EPAct 2005 calls for a 2 percent reduction per year leading to a 20 percent reduction in 2015, E.O. 13423 requires a 3 percent reduction per year leading to a 30 percent reduction in 2015.

With regard to EPAct 2005's goal for Federal renewable energy use, the E.O. limits the contribution of older, established sources of renewable energy toward EPAct 2005's statutory goal. At least half of the statutorily required renewable energy consumed by the agency in a fiscal year must come from renewable sources developed after January 1, 1999. ■

Transportation and Fleet Management

2007 Transportation Scorecard Metrics for Transportation and Fleet Management

- Demonstrate that 75 percent of new vehicle acquisitions are alternative fuel vehicles (AFVs).
- Ensure that alternative fuels comprise the majority (51 percent) of fuel used in AFVs.
- Achieve an increase in fuel economy of 3 mpg on average in the non-AFV light-duty vehicle (LDV) fleet compared with a 1999 baseline.
- Achieve a 20 percent reduction in petroleum used in the vehicle fleet compared with 1999.
- Have a strategy—approved by DOE and OMB—for meeting the requirements of E.O. 13149 and demonstrate that elements are being implemented.
- Incorporate successful implementation of E.O. 13149 in the position description and performance evaluation (or equivalent) of Senior Transportation Official (Assistant Secretary level or equivalent).

Status

In FY 2004, 2005, and 2006, the overall Federal fleet exceeded its EPAct AFV acquisition requirements. Agencies achieved a compliance rate of 96 percent in FY 2004, 109 percent in FY 2005 and 119 percent in FY 2006, all well above the 75 percent requirement.

Toward compliance with E.O. 13149, covered Federal agencies consumed 4.4, 6.26, and 5.75 million gasoline gallon equivalent (GGE) of alternative fuels in FY 2004, 2005, and 2006, respectively. In FY 2006, 10 of the 21 covered Federal agencies increased the average fleet fuel economy of their LDV acquisitions by at least 3 mpg, but none of the agencies demonstrated using alternative fuels in their AFVs a majority of the time. Although many agencies have implemented measures to reduce petroleum consumption, including acquisition of AFVs and installation of alternative fuel stations, the impact of these efforts was not sufficient enough to meet the petroleum reduction goal of E.O. 13149, primarily due to mission expansions in some of the larger agencies, and slow increases in the quantity and availability of alternative refueling sites.

A critical area for action is growth in alternative fueling infrastructure. Agencies and Federal employees are aware of the importance of using alternative fuels as a viable element of our energy independence initiative. The lack of infrastructure results in either the inability to obtain the fuel or the need to drive long distances to a fueling station. This is not only an inefficient use of time, but consumes fuel in the process. This situation presents an opportunity for agencies to work together to identify ways to promote the development of the infrastructure through partnerships with one another, state and local and non-profit organizations, repositioning of vehicles where station exists, and other approaches.

Despite these issues, the Federal fleets will continue to implement measures to ensure success in achieving the 20 percent petroleum reduction goal of E.O. 13149.

EPAct requirements apply to agency fleets of 20 or more LDVs (under 8,500 pounds) that are centrally fueled or capable of being centrally fueled and are primarily operated in Metropolitan Statistical Areas (MSAs) or Consolidated MSAs with populations of 250,000 or more according to 1980 census data. Vehicles that do not meet these requirements are considered geographically exempt from the EPAct requirements. On the other hand, E.O. 13149 applies to all Federal agencies with a fleet of 20 or more vehicles in the U.S. Both EPAct and the E.O. provide exemptions for law enforcement, emergency, and military tactical vehicles.

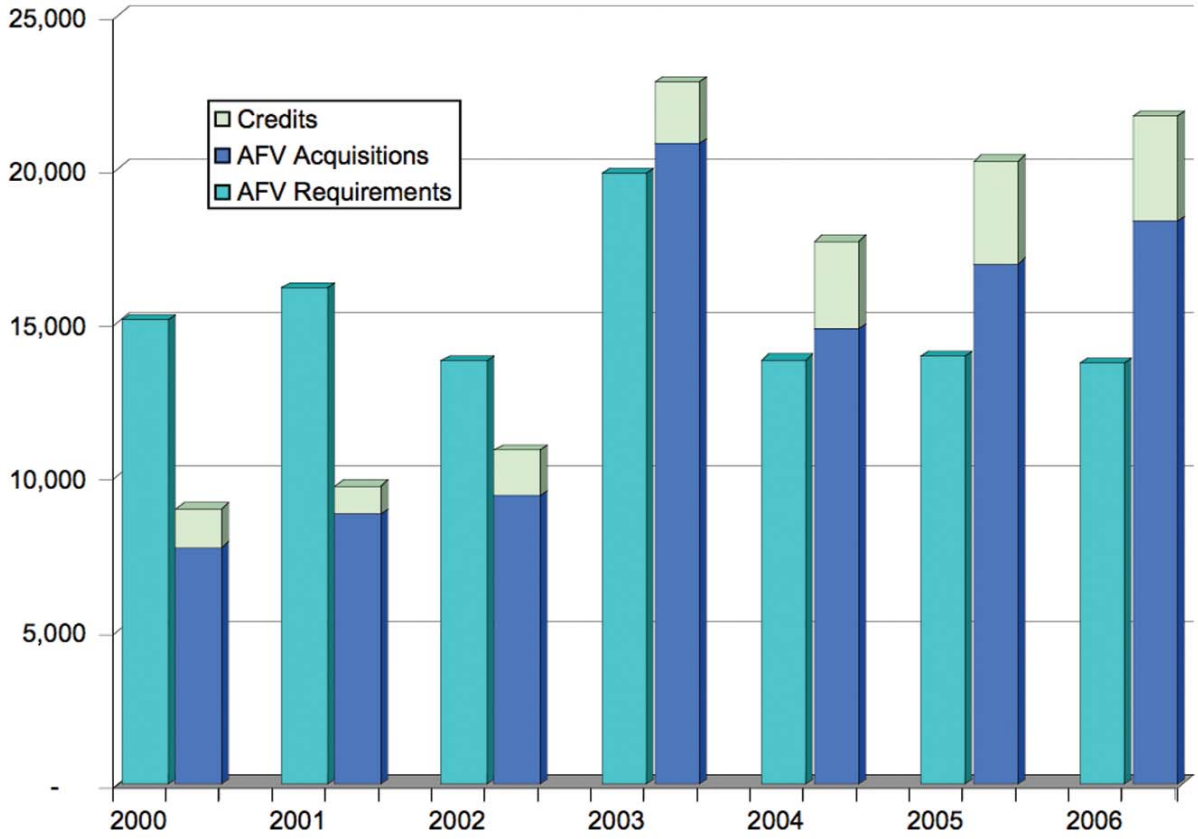
Progress

For the fourth consecutive year, the overall Federal fleet exceeded its EPAct AFV acquisition requirements in FY 2006. As a result of AFV acquisitions and biodiesel fuel use, covered Federal agencies achieved a 96 percent compliance rate in FY 2004, a 109 percent compliance rate in FY 2005, and a 119 percent compliance rate in FY 2006.

Credits. Federal fleets earn one credit for every bi- or flexible-fuel AFV acquired. Fleets also earn a credit for every 450 gallons of neat biodiesel (B100) or 2,250 gallons of B20 (20 percent biodiesel and 80 percent petroleum diesel) used. Additional credits are also earned for dedicated AFVs because these vehicles operate exclusively on alternative fuels.

Agencies progressively demonstrated an increase in annual EPAct credits earned in the past three-year period. Agencies earned total annual AFV acquisition credits of 17,675 in FY 2004, 20,275 in FY 2005, and 21,753 in FY 2006. Specifically, in FY 2004, covered Federal agencies earned 14,811 credits for AFV acquisitions, 2,592 credits for biodiesel fuel use, and 272 additional credits for dedicated light-, medium-, and heavy-duty AFVs. In FY 2005, covered agencies earned 16,947 credits for AFV acquisitions, 3,226 credits for biodiesel use, and 102 additional credits for acquiring dedicated AFVs. In FY 2006, covered agencies earned 18,307 credits for AFV acquisitions, 3,310 credits for biodiesel use, and 136 additional credits for acquiring dedicated AFVs. As such, the Federal government exceeded its annual EPAct requirement though acquisition of AFVs alone in FY 2003, FY 2004, FY 2005, and FY 2006, as shown in the following graph.

EPAct AFV Acquisitions, Credits, and Requirements



Vehicles. Flexible-fuel vehicles (FFV) that can run on E85 (85 percent ethanol, 15 percent gasoline) or gasoline were the AFVs of choice in FY 2004, FY 2005, and FY 2006. Of the 18,307 AFVs acquired in FY 2006, 18,067 were FFVs. The other AFVs acquired were compressed natural gas (CNG) vehicles. Similar trends were evident in FY 2004 and FY 2005.

FFVs operating on E85 comprise the majority (90 percent) of the AFVs in the overall Federal fleet, with CNG vehicles making up most of the balance (10 percent). As the availability of gaseous fuel (CNG and LPG, liquefied petroleum gas) models continues to decrease, CNG and LPG vehicles will become less prevalent in the Federal fleet. Liquefied natural gas (LNG), electric (ELE), and LPG vehicles combined account for less than 1 percent of the 106,869 AFVs in the 21 EPAct-covered agencies' FY 2006 inventory, as shown in the opposite chart.

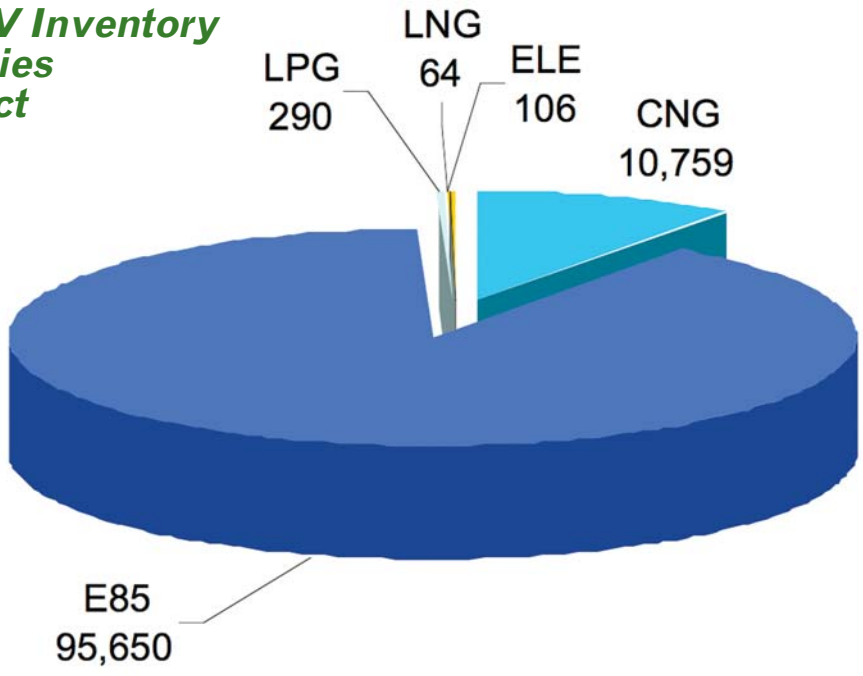
Exemptions. Of the 44,268 total LDVs acquired by covered Federal agencies in FY 2006, 26,010 vehicles (59 percent) were considered exempt from compliance with EPAct. The number of exemptions was similar in the previous two years, with 27,783 (60 percent) in FY 2004 and 25,934 (58 percent) in FY 2005. Exemptions are granted for fleet size, geographic location or use outside a MSA/CMSA, and use for law enforcement. Similar to prior years, exemptions were granted as follows in FY 2006:

- Fleet Size (2,209)
- Geographic (1,125)
- Law Enforcement (11,071)
- Non-MSA/CMSA Operation/Fleet (3,662)
- Non-MSA/CMSA Operation/Vehicles (7,943)

E.O. 13149 Compliance. E.O. 13149 calls for each agency to reduce vehicular petroleum consumption by 20 percent by the end of FY 2005, and thereafter, in comparison with a base year of FY 1999, and specifies three approaches agencies should take to achieve this goal:

- Comply with EPAct's annual AFV acquisition requirements (as previously discussed).
- Use alternative fuels in AFVs for a majority of the fuel used in those vehicles.

FY 2006 Total AFV Inventory of Federal Agencies Covered by EPAct



- Increase the fuel economy of light-duty acquisitions (excluding AFVs) by 3 mpg by the end of FY 2005, as compared to FY 1999 baseline acquisitions.

Use Alternative Fuels in AFVs. In FY 2004, FY 2005, and FY 2006, agencies fell short of the goal to use alternative fuels in AFVs for a majority of time. One reason for the relatively low alternative fuel use rate was the lack of sufficient alternative fuel infrastructure. To remedy this, several agencies have invested in approximately 200 alternative fuel pumps at locations throughout the U.S.

The following table compares fuel use by covered Federal agencies in FY 2004, FY 2005 and FY 2006.

Total Fuel Use of Federal Agencies Covered by E.O. 13149

Fuel Use	FY 2004 (GGE)	FY 2005 (GGE)	FY 2006 (GGE)	Change from FY 2005 to FY 2006 (%)
Alternative Fuels				
Biodiesel (B100)*	1,305,194	1,624,062	1,672,758	3.0
CNG	1,156,211	1,245,075	805,881	-35.3
E85	1,771,236	3,059,836	3,075,624	0.5
Electricity	3,369	5,540	4,450	-19.7
LNG	90,940	101,772	89,577	-12.0
LPG	107,847	230,735	104,867	-54.6
Total Alternative Fuel Use	4,434,797	6,267,020	5,753,157	-8.2
Petroleum				
Total Covered Petroleum Use	277,911,017	285,076,850	264,536,196	-7.2
Total Covered Fuel Use	282,345,814	291,343,870	270,289,353	-7.2
Alternative Fuel Use as a Percentage of Total Fuel Use	1.57	2.15	2.13	-1.0

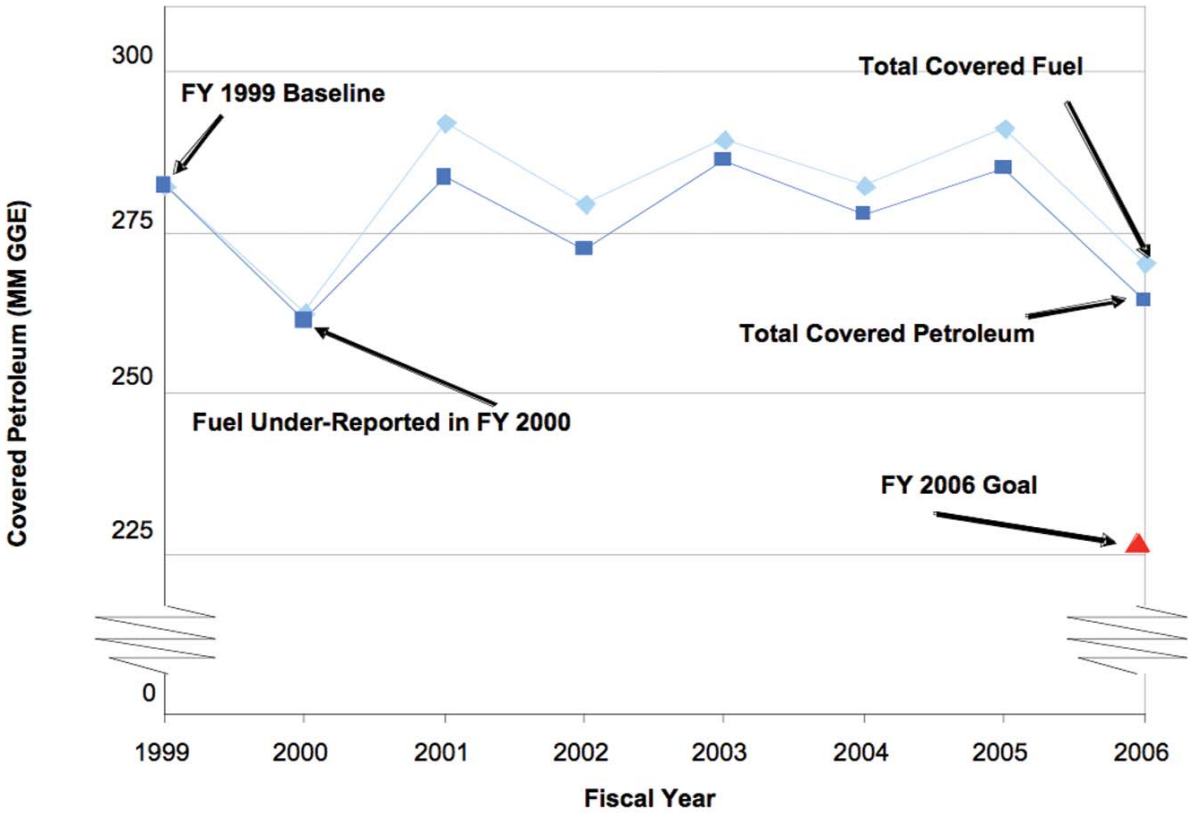
Alternative fuels represent 2.13 percent of the Federal fleet's covered fuel use in FY 2006. This number is slightly lower than the 2.15 percent usage reported the year before. For the first time in two years, alternative fuel use decreased 8.2 percent in FY 2006. By comparison, alternative fuel use between FY 2004 and FY 2005, actually increased 41 percent. In FY 2006, however, only the use of biodiesel and E85 increased whereas the use of all other alternative fuel types such as CNG, LNG, and LPG, decreased.

Improve Fuel Economy. Toward the 20 percent petroleum reduction goal, E.O. 13149 calls for each agency to increase the fuel economy of its LDV acquisitions (excluding AFVs). In FY 2006, 10 agencies increased the average fuel economy of these vehicles by at least 3 mpg in comparison to FY 1999.

Petroleum Consumption Progress Report. In FY 2006, covered Federal agencies consumed more than 5.7 million GGE of alternative fuels, thereby reducing gasoline and diesel fuel consumption in their vehicles. These agencies reported more than 265 million GGE of covered petroleum consumed in FY 2006, down slightly (7.2 percent) from more than 282 million GGE reported for FY 1999. Although most covered Federal agencies have not approached the 20 percent reduction goal set forth in E.O. 13149, they have been successful in displacing petroleum, as illustrated in the graph on the following page.

Without E.O. 13149, the transportation petroleum consumption of covered Federal agencies would be just over 270 million GGE in FY 2006. However, due to alternative fuel use, covered petroleum consumption in FY 2006 was less than 265 million GGE, resulting in a 6.3 percent decrease compared to FY 1999 consumption levels. The petroleum consumption data reported by covered Federal agencies are inconsistent. **DOE** is working with the Federal fleets to improve the quality of their data.

Vehicular Petroleum Consumption of Federal Agencies Covered by E.O. 13149



Accomplishments

In 2005, **OFEE** added a new category to the Closing the Circle Awards to promote the goals and objectives of E.O. 13149 and EPAct. Following are summaries of the FY 2005 and FY 2006 Closing the Circle Award winners in this new category.

The Garrison Mobile Equipment Team of the **U.S. Marine Corps** led DoD and other Federal agencies in the adoption of biodiesel as an alternative fuel and introduced and expanded the use of neighborhood electric vehicles. The Marine Corps exceeded EPAct requirements for 2000-2004. In FY 2004 alone, the Marine Corps achieved a 243 percent compliance rate with the EPAct requirements, reduced fuel usage by 27.5 percent, used more than 1.2 million gallons of biodiesel, and purchased an additional 28 NEVs. The Corps uses a variety of alternative fuels, including biodiesel, CNG, ethanol, and propane. The Corps also is taking active steps toward future use of hydrogen-powered fuel cell vehicles

and plans to assess its fleet management at all bases and stations in order to "right size" the fleet to meet current mission requirements and reduce annual consumption of petroleum.

By using a "One NASA" approach to managing the entire fleet, **NASA** headquarters worked through a collegial process with the NASA centers and contractor facilities to create a comprehensive strategy for meeting the EPAct and E.O. 13149 requirements. NASA prepared and is implementing a multi-pronged approach to reduce annual petroleum consumption, acquire alternative fuel vehicles, increase the usage of alternative fuels, and procure AFV fueling infrastructure. In FY 2004, NASA purchased 269 AFVs, exceeding the EPAct requirement, and reduced petroleum consumption by more than 200,000 GGE. NASA assessed the availability of alternative fueling stations at its facilities, committed to funding installation of fueling centers where needed, installed three ethanol fueling stations, and is converting existing diesel tanks to biodiesel.

Naval Station Great Lakes manages a fleet of more than 650 passenger cars, light trucks, and construction equipment. More than 40 percent of this fleet – 229 vehicles – is alternative fuel vehicles. NAVSTA Great Lakes' goal is to recapitalize its entire vehicle fleet by replacing traditional fueled vehicles with AFVs at a rate of at least 15 percent per year. In addition to purchasing new AFVs, NAVSTA Great Lakes acquires excess AFV vehicles disposed by other Federal agencies, enabling

the facility to expand its fleet at no additional investment cost. In 2005, NAVSTA Great Lakes installed a CNG fueling facility, purchased additional AFVs, began implementation of a biodiesel fuels program, and reduced overall fuel use by more than 31,000 gallons of fuel used.

DOE created a "Green Fleet" designation for its facility fleets using more than 45,000 gasoline gallon equivalents. In FY 2005, the Green Fleet Team was comprised of Idaho National Lab, Pantex Plant, Sandia National Lab, and Savannah River Site. The Green Fleet collectively consumed 62 percent of the total DOE alternative fuel use through AFVs and alternative fuel sources. The Green Fleet Team's efforts increased the use of E-85, biodiesel, and CNG. The Green Fleet Team has actively promoted alternative fuel consumption within their community as well as among the Federal, State, and commercial entities.

USPS is one of the first Federal agencies to use biodiesel. From FY 2000 to 2005, USPS' B20 consumption almost tripled, with a total usage of 1.1 million GGE in FY 2005 alone. It is estimated that between FY 2003 and 2005, USPS reduced emission of particulate matter by 2,262 pounds, hydrocarbons by 4,274 pounds, and carbon monoxide by 36,212 pounds through the use of B20. In addition, USPS has been conducting considerable research on the technical and operational implications of B20 use and shares the information with a variety of interested sectors.

The Future

E.O. 13423 and the implementing instructions require agencies with fleets of at least 20 motor vehicles to reduce the fleet's total consumption of petroleum products by 2 percent annually, relative to a 2005 baseline, through the end of FY 2015, increase the total fuel consumption that is non-petroleum-based by 10 percent annually, and use plug-in hybrid electric vehicles when they become commercially available at a reasonable price. In addition, agencies are encouraged to "right size" their fleets and use other strategies to reduce their petroleum usage.

Working to increase the availability of alternative fueling stations on their own facilities or within a reasonable proximity to their fleets, continuing to work on standards and testing to assure the quality of alternative fuels, and demonstrating the viability of alternative fuels through their continued successful usage, Federal agencies will continue to help expand and maintain markets for alternative fuels. They will, thereby, continue to reduce the emissions of air pollutants and help to reduce domestic consumption of petroleum fuels. ■

Appendix I

Select Federal Building Projects Exemplifying Sustainability Principles (since 2004)

Agency	Building Project Name	Location	Achievements
General Services Administration	Howard M. Metzenbaum United States Courthouse	Cleveland, OH	LEEDv2 Certified
General Services Administration/ Canada Border Services	US/Canada Shared Port of Entry	Sweetgrass, Montana/ Coutts, Alberta	LEEDv2 Certified; GSA Environmental Award
General Services Administration/ Canada Border Services	Scowcroft Building	Ogden, UT	LEEDv2 Silver
DOE - National Renewable Energy Laboratory (NREL)	Science and Technology Facility	Denver, CO	LEEDv2 Platinum
Department of Commerce / National Oceanic and Atmospheric Administration / National Weather Service	Weather Forecast Office	Caribou, ME	LEEDv2 Silver
Bonneville Power Administration	Ampere Annex	Vancouver, WA	LEEDv2 Silver
Federal Aviation Administration	Seattle Terminal Radar Approach Control	Burien, WA	LEEDv2 Gold

Agency	Building Project Name	Location	Achievements
Pentagon Renovation & Construction Program Office	Pentagon Athletic Center	Arlington, VA	LEEDv2 Certified
Department of Transportation	Department of Transportation building	Lakewood, CO	LEEDv2 Silver
Environmental Protection Agency	EPA National Computer Center	Research Triangle Park, NC	LEEDv2 Silver; GSA Achievement Award
Environmental Protection Agency	First Environments Early Learning Center	Research Triangle Park, NC	LEEDv2 Silver (pending)
Environmental Protection Agency	1 & 2 Potomac Yards	Arlington, VA	LEEDv2 Gold
Occupational Safety and Health Administration	Salt Lake Technical Center	Sandy, UT	LEEDv2 Silver
Naval Base Ventura County	Navy's Energy & Sustainable Design Demonstration Facility	Port Hueneme, CA	LEEDv2 Gold

Agency	Building Project Name	Location	Achievements
Naval Facilities Engineering Command	Personnel Support Facility	Virginia Beach, VA	LEEDv2 Silver
Naval Base Kitsap	Bremerton BEQ Building 1044	Bremerton, WA	LEEDv2 Certified
U. S. Navy	P-526, Aircraft Maintenance Hangar	Norfolk, VA	LEEDv2 Certified
Oak Ridge National Laboratory	Research Support Center	Oak Ridge, TN	LEEDv2 Certified
Pentagon Renovation & Construction Program Office and the Defense Facilities Directorate	Remote Delivery Facility	Arlington, VA	LEEDv2 Certified
National Park Service	Entrance Area Visitor Center	Denali National Park and Preserve, AK	LEEDv2 Silver
National Park Service	Carl T. Curtis Midwest Regional Headquarters	Omaha, NE	LEEDv2 Gold GSA Environmental Award

Agency	Building Project Name	Location	Achievements
National Park Service	Gateway NRA Visitor Contact Station	Staten Island, NY	LEEDv2 Gold (pending)
National Park Service	South Rim Maintenance & Warehouse Facility	Grand Canyon, AZ	LEEDv2 Certified
U.S. Fish and Wildlife Service	Missisquoi NWR Headquarters and Visitor Contact Station	Swanton, VT	2006 DOI Environmental Achievement Awards Recipient
U.S. Fish and Wildlife Service	Bozeman Fish Technology Center	Bozeman MT	2006 DOI Environmental Achievement Awards Honorable Mention
U.S. Fish and Wildlife Service	Rhode Island National Wildlife Complex Headquarters and Kettle Pond Visitor Center	Rhode Island	Energy Saver Showcase Award
Bureau of Land Management	Escalante Science Center	Escalante, UT	LEEDv2 Gold
NASA, Marshall Space Flight Center	NASA Building 4600	Huntsville (MSFC), AL	LEEDv2 Silver

Agency	Building Project Name	Location	Achievements
NASA, Johnson Space Center	Bldg. 27 Astronaut Quarantine Facility	Houston, TX	LEEDv2 Certified
NASA, White Sands Test Facility	Columbia Health and Fitness Center	Las Cruces, NM	LEEDv2 Silver
Bureau of Indian Affairs, Hopi Agency	First Mesa Elementary School	Polacca, AZ	LEEDv2 Certified
Bureau of Indian Affairs, Navajo Agency	Baca/Dlo'ay azhi Community School	Prewitt, NM	LEEDv2 Certified
State Department	Sofia Embassy Chancery Building	Sofia, Bulgaria	LEEDv2 Certified
Health and Human Services, Centers for Disease Control	National Center for Environmental Health (NCEH) building	Atlanta, GA	LEEDv2 Silver (pending)
Health and Human Services, Centers for Disease Control	National Centers for Infectious Disease lab tower	Atlanta, GA	LEEDv2 certified (pending)
Federal Bureau of Prisons	Butner FCI-3	Butner, NC	LEEDv2 Certified

Appendix II

NASA Sustainable Buildings

NASA's first LEED®-Silver building was completed at the NASA George C. Marshall Space Flight Center, located near Huntsville, AL. It is a 5-story, 139,000 square foot office building with the capacity of housing 392 employees. It was designed and constructed in accordance with LEED® 2.0 and its operational energy consumption was specified to be at least 20 percent below the 2010 energy-efficiency goals of E.O. 13123 based on the existing energy usage baseline. The building also has an open floor plan for maximized natural lighting; uses day-lighting sensors, photovoltaic roof panels providing 35 KWh directly to the electrical gird, photovoltaic parking lot lighting and a reflective Energy Star® roof membrane. More than 85 percent of all construction waste was re-used or recycled and 20 percent of the building material is made of recycling content. The building is presently operating at 47 percent of the electrical consumption of comparable multi-story office buildings throughout the campus.

Building 4600 *(shown in the caption)* was one of four buildings throughout the nation to receive the 2005 Federal Energy Showcase Award. It was designed and constructed to meet the LEED® Certified classification and it received the LEED®-Silver Certification in February 2006.

NASA's second LEED®-Silver Building is constructed at the White Sands Test Facility, in New Mexico. The Columbia Health and Fitness Center demonstrates a commitment to sustainable design principles. The facility received a LEED®-Silver Certification in 2006.

The highlights of the facility that are related to optimizing site selection are:

- Installed bicycle storage and changing rooms
- Designated parking for alternative fuel vehicles and carpool vehicles
- Designated a space equal to the building footprint as a non-build area on-site
- Reduced storm water run-off by 25 percent
- Used Energy Star® compliant, highly reflective and high emissivity roofing. For water efficiency the building utilizes all desert landscape requiring no irrigation, and water usage is minimized by installing waterless urinals, low flow toilets, and low flow sink and shower fixtures.

The building had an independent commissioning agent perform the fundamental building commissioning. Also, the design performance is 20 percent better than the minimum energy performance per ASHRAE 90.1. The materials and resources used during the construction highlighted the following key points:

- The contractor diverted more than 98 percent of construction waste from landfills to recycle centers.
- 10 percent of all construction materials included recycled content.
- 20 percent of all the construction materials were manufactured within a 500 mile radius.

Additionally, the indoor environmental quality was enhanced in the facility by installing carbon dioxide monitoring devices, designing a ventilation system that meets ASHRAE 2001 Chapter 32 Space Air Diffusion, and maximizing day-lighting as much as possible. The contractor also met five of the requirements during construction of the SMACNA IAQ Guidelines for Building Construction as part of their IAQ Management Plan and used low VOC adhesives, sealants, and paints. Lastly the facility received a complete flush-out prior to occupancy.

On February 23, 2006, the Astronaut Quarantine Facility (AQF) at Johnson Space Center was recognized by USGBC as a LEED®-Certified building. The AQF met LEED® requirements in 7 prerequisite categories and 28 credit categories. The AQF was constructed to house astronauts prior to flight.

Among the green strategies employed at the AQF, one of the most challenging is optimizing energy performance. To reduce energy consumption for the building, the AQF was constructed with energy savings features that reduce annual energy consumption by 15.8 percent relative to energy code requirements. This accomplishment was challenging because astronauts begin adjusting their circadian rhythms prior to flight by being exposed to normal daylight conditions using artificial light that is turned on and off to coincide with the astronauts' mission work schedule. At the AQF, four rooms are constructed with high output fluorescent fixtures that occupy 90 percent of the ceiling space. The lights consume electricity and generate heat well above that of most buildings. This added heat must be removed by the building's air conditioning system, thus adding significantly to energy consumption compared to an average building. By utilizing energy savings techniques, the AQF meets this challenge 15.8 percent more efficiently than the energy code requires. The savings were accomplished by installing extra insulation in walls and roof, reducing solar heat gain through windows and using high efficiency HVAC equipment. The HVAC system

includes motors that operate at variable speeds to match heating and cooling loads, and variable flow control for chilled water pumps. In addition, heat and moisture is exchanged with air that is exhausted from the building through an "enthalpy" wheel. The wheel cools and dehumidifies incoming outside air during summer, and warms the outside air during winter thus reducing energy consumption.

Other green strategies included special landscaping to drastically minimize irrigation and runoff (permeable paving, retention pond, and extensive trees and native grasses), an energy efficient and highly reflective roofing system that reduces cooling requirements and heat buildup, recycled building materials such as 100 percent recycled steel in the structure and concrete reinforcing and flooring material made from used tires, and purchasing 100 percent wind-generated electricity for the first the building's first two years of operation. ■

Appendix III

2004 — 2006 Presidential Awards for Leadership in Federal Energy Management

U.S. Department of Energy *2004*

Pacific Northwest National Laboratory (PNNL)

Hanford, Washington

The award was presented to the PNNL for its outstanding efforts to efficiently manage energy use, including the use of alternative financing, energy conservation, renewable energy, and Energy Star® standards. PNNL's *Plug into Savings* energy conservation project saved almost 3.0 million kilowatt hours ($118,728) in 2003, which represents almost 3.6 percent of PNNL's total 2003 electricity use. PNNL has institutionalized its efforts in policies and practices by incorporating energy efficiency goals into the Facilities and Operation Directorate's long-term strategic plan and into the performance measures used to determine the operating contractor's annual award fee from the Department of Energy. To facilitate similar energy and water conservation efforts by others, PNNL has participated in local sustainability workshops, contributed energy conservation material to local schools, created a website and monthly newsletter to disseminate best practices, and presented elements of its energy conservation approach at three conferences. ■

U.S. Department of Health & Human Services (HHS)

Energy Program

Washington, DC

Awarded to HHS and Accent Designs Inc. (a Federal contractor) for their aggressive and continuing pursuit of greater energy conservation and savings over the last 10 years. Employing the tools of E.O. 13123, the HHS Energy Program used facility energy audits, highly efficient systems, alternative financing contracts, sustainable building design, and Energy Star® standards to implement energy conservation. In 2003, the National Institutes of Health's Bethesda Campus began receiving its power from a new 23-megawatt cogeneration unit with an efficiency rating of 85 percent that will save more than 640 billion Btu and $3.6 million per year. Two more Indian Health Service hospitals reached Energy Star® efficiency goals in 2003 and have submitted applications for official certification. Since its inception in 1990, the HHS Energy Program has cumulatively saved $166 million and 16 trillion Btu of energy. These savings translate into the elimination of 312,000 metric tons of greenhouse gas emissions, equivalent to removing 11,400 cars from the road for each of the 13 years of the program's existence. Outreach tools include seminars, newsletters, electronic mail notices, website and after-hours energy audits that notify individual employees of their energy saving performance. Operational division design policies and guidelines require life-cycle cost analyses, incorporation of sustainable design principles, procurement of Energy Star® equipment, and investigation of potential installation of renewable energy technologies. ■

U.S. Department of Defense

U.S. Air Force Renewable Energy Team

California, Colorado, Florida, Idaho, Oregon, Texas, Virginia

Awarded to the Air Force Renewable Energy Team for energy cost savings and reduced environmental impact attained by obtaining as much of its energy as possible from renewable sources. With the support of Air Force Commanders, the Air Force Renewable Energy Team procured renewable energy in 2003 that amounted to 207 million kilowatt hours, approximately 40 percent of the entire Federal government's renewable energy acquisitions. As a result of these renewable energy purchases by the Air Force, the environment benefited from reduced emissions of 41,000 metric tons of carbon equivalent, as well as 463 metric tons of sulfur dioxide and 454 metric tons of nitrous oxide. This is equivalent to removing almost 20,000 cars from the road for a year. A five-year renewable energy contract signed by Edwards Air Force Base in June 2001 will save approximately $46 million because the renewable electricity actually costs less than the conventional fossil fuel-generated electricity. Following a successful 900-kilowatt wind farm project on Ascension Island in 2001, the project was expanded to triple the energy production capacity in 2003. This expansion is projected to save 7 million kilowatt hours per year and $750,000 annually in fuel costs on top of the original 3.5 million kilowatt hours per year and $350,000 in annual savings from the initial phase. ■

U.S. General Services Administration New England

"Team Save"

Connecticut, Maine, Massachusetts

Awarded to GSA New England Team Save for its numerous successes in executing energy conservation plans across New England. In total, Team Save's efforts cut utility costs for the New England GSA by almost $676,000 or 5.5 percent from 2001 to 2003, even while market prices of utilities increased eight percent. At the J.J. Ribicoff Federal Building in Hartford, CT, GSA used highly efficient systems, such as a new steam-piping scheme, steam-condensate heat recovery system, and steam-trap maintenance program, to reduce the building's energy intensity by 23 percent, a decrease of 23,671 Btu per square foot and 709.8 metric tons of carbon (equivalent to the carbon emissions from 126 typical households). As a result, operating costs decreased from $3.00 per square foot in 2001 to $2.28 per square foot in 2003. Along with these successes, the GSA focused on creating greater awareness of energy conservation and savings by promoting conservation discussions at monthly tenant meetings, sending daily electronic bulletins, and encouraging further education and training for managers on best practices. ■

U.S. Environmental Protection Agency

Green Power Purchase Program

California, Colorado, Ohio, Massachusetts, New Jersey, New York, North Carolina, Texas, Washington, and Washington, DC

Awarded to EPA's Green Power Purchase Program for working aggressively to acquire electricity from renewable sources over the last five years. EPA's efforts were assisted by NREL, GSA, DoD's Defense Energy Support Center, FEMP, and the Western Area Power Administration. As a result of these partnerships, EPA purchases approximately 122 million kilowatt hours of green power per year, amounting to roughly 44 percent of its electricity needs-the highest percentage of any Federal agency. These purchases reduce EPA's greenhouse gas emissions by 28,700 metric tons of carbon per year, equivalent to the annual emissions of 5,100 typical households. In addition to the environmental benefits, the program also increased the green power procurement expertise of EPA and its partners through information sharing, which will facilitate future Federal purchases. By the end of 2003, EPA had secured sufficient renewable energy sources to provide nine of its facilities with 100 percent of their electricity needs. To get its message out to employees and visitors, EPA developed window "clings" that attach to windows and doors alerting people that they are entering a green-powered building. Further outreach efforts include an animated online presentation available on the EPA website and numerous articles in the *Energizing EPA* newsletter. ■

U.S. Department of Defense

Marine Corps Energy Management Team

Nationwide and Overseas

Awarded to the Marine Corps Energy Management Team for its impressive investments in energy efficiency both domestically and overseas. The Team employed water conservation audits, self-generation of electricity, Energy Star® standards, institutionalization of sustainable design, and alternative financing in realizing its goals. The Team used utility cost reports to set priorities for the bases that had the most to gain from a comprehensive audit on water use. The resulting audits and corresponding fixes to leaks reduced water use by 486.5 million gallons per year in 2003 and identified cost-effective projects worth $15 million for future implementation. In total, the Marine Corps' conservation efforts reduced energy use in 2003 by 341.8 billion Btu, realizing savings of $25.6 million. This annual savings provides enough energy for almost 3,400 typical households. The Team broadened its impact via its website, an annual awards program providing monetary awards, and continuing education. Perhaps the most innovative aspect of the outreach effort is the Energy Education Program for elementary and secondary students at Camp LeJeune's schools in North Carolina, where students, teachers, school administration, and base personnel work together to audit and implement energy conservation improvement projects. This program resulted in a 5.8 percent reduction in energy spending at Camp Lejeune schools from 2002 to 2003 or a savings of $34,555. ■

U.S. Department of Defense 2005

Headquarters Pacific Air Forces Facility Energy Conservation Program

Alaska, Guam, Hawaii, Japan, Korea, Wake Island, Singapore

Awarded to Pacific Air Forces (PACAF) for its energy cost savings and reduced environmental impact by executing a ten-year Energy Strategic Plan covering its 100 million square mile area of responsibility of 16 installations in the Pacific Region. A key component to the Energy Strategic Plan, initiated in 2004, is its creative innovation in the use of new technologies, management practices, and funding approaches. Innovative management practices include the deployment of Resource Efficiency Managers and the inclusion of incentive clauses for energy conservation. The PACAF energy projects and initiatives reduced consumption by 153 billion Btu and yielded net savings of $1.1 million in 2004, compared to 2003 levels. Some of the innovative technologies installed and used in PACAF bases in 2004 include light-emitting diode taxiway lights, photovoltaic bollard lighting, high-efficiency aerator pumps for sewage treatment, solar hot water heating, photovoltaic obstruction lights, refuse-derived fuels, and fuel cells. The 153 billion Btu savings translate into reductions of 42,000 tons of greenhouse gases, almost 3 tons of volatile organic compounds, 127 tons of nitrogen oxides, 19 tons of carbon monoxide, 111 tons of sulfur dioxide, 8 tons of particulates, and more than 34 grams of mercury. This is equivalent to removing almost 3,800 cars from the road for one year. Water management plans were completed for all bases and 102 water conservation projects were identified with potential yearly savings of $15 million. PACAF also trained more than 300 personnel, provided financial incentive awards totaling $225,000 to the energy efficiency performers, and developed an energy and water conservation Web site. ■

U.S. Department of Defense

U.S. Army Installation Management Agency

Southeast Region

Awarded to the U.S. Army Installation Management Agency, Southeast Region (IMA-SER) for its aggressive, continuous pursuit of greater energy conservation and savings since 1999. IMA-SER instituted a comprehensive energy management program by teaming with 16 Army installations; DOE's Southeast Regional Office; U.S. Army Corps of Engineers, Huntsville; and the Pacific Northwest National Laboratory. IMA-SER used alternative financing, facility energy audits, sustainable building design, and off-grid generation to reduce energy consumption and utility costs in 2004. IMA-SER achieved a net savings of more than $1.8 million in 2004, and 1.4 trillion Btu from energy savings performance contract and utility energy service contract projects implemented over a five-year period, beginning in 1999. This five-year savings would provide enough energy for more than 3,000 typical households annually. The IMA-SER has also incorporated sustainable building design in 30 out of 48 of its new construction projects to comply with the Army's Sustainable Building Design or SPiRiT rating, adopted from the USGBC's LEED™ rating program. IMA-SER also conducts an annual energy manager's forum, makes presentations at national and regional conferences, provides technical training, and maintains an energy program Web site. ■

U.S. General Services Administration

Great Lakes Region

Chicago, IL

Awarded to the GSA Great Lakes Region for working aggressively on its 2004 energy conservation program that resulted in energy savings of more than 106 billion Btu and $460,000 from the previous year. In terms of energy intensity, the region's buildings used 7 percent less Btu per square foot than in 2003. In addition, in 2004, the region purchased electricity generated from wind power for a 1.3 million square foot facility in Cincinnati, OH. This purchase is part of a two-year contract with Strategic Energy, Inc. that will save the region $60,000 over the contract period compared to the cost of purchasing conventional power from the local utility company. The region's Energy Strategic Plan incorporated E.O. 13123 energy management tools, such as use of alternative financing, purchasing energy-efficient products, using sustainable building design, developing model leasing and procuring renewable energy, and established a network of individuals to implement the plan. Using this strategy, energy and water conservation projects were identified using life-cycle analysis, audits, and renewable energy studies. The region reached out to members of the federal, state, and local government communities and communicated information about the E.O. 13123 tools through energy and water conservation workshops. The region partnered with the Department of Energy and Environmental Protection Agency in conducting this training. ■

U.S. Department of Defense

Marine Corps Base Camp Pendleton

Camp Pendleton, CA

Awarded to Marine Corps Base Camp Pendleton for surpassing the Federal government's mandated energy reduction goal of 35 percent by 2010 six years early by achieving a 44 percent reduction in 2004 compared to 1985 levels and a 16 percent reduction from 2003 levels. Projects focused on replacing inefficient heating and air conditioning units, replacing industrial lighting with high-efficiency lighting, and outfitting warehouses with natural day-lighting systems. The biggest accomplishment was the final decommissioning of a large central steam plant, which alone reduced energy consumption by 93 billion Btu, contributing to the total of almost 280 billion Btu of energy saved and $1.9 million in net energy costs saved in 2004. These savings occurred despite an increase in facility space by 2 million square feet in only a few years. As a result of these energy savings, the environment benefited from reduced emissions of almost 38 million pounds per year of greenhouse gases. This is equivalent to the annual emissions of more than 6,000 typical households. Camp Pendleton also incorporated USGBC's LEED™ standards into construction projects – in fact, all Camp Pendleton Military Construction projects require maximum effort in meeting the LEED™ program guidelines. Camp Pendleton shares its success in energy management through recognition programs, conference presentations, and Earth Day and Energy Awareness Day events. ■

U.S. Department of Defense

Navy Region Southwest

San Diego, CA

Awarded to Navy Region Southwest for its outstanding achievements in reducing energy and water usage through low- and no-cost measures. As Commander, Navy Region Southwest, Rear Admiral Betancourt (Ret.) challenged the 11 installations in the Navy Region Southwest to cut their utility costs by 10 percent in 2004. The installations successfully met the challenge. In meeting the Admiral's challenge, Navy Region Southwest installations implemented initiatives that saved almost $4.1 million in 2004, with another $1 million in savings to accrue in 2005. These savings included reductions of approximately 47.8 billion Btu of steam and chilled water, 17.0 billion Btu of natural gas, 16.8 billion Btu of electricity, and 40 million gallons of water in 2004. Navy Region Southwest's Building Tune-Up Program also achieved a significant savings of $1.4 million in 2004, through simple improvements to operating procedures, such as turning off redundant computer room air conditioning units, turning off unnecessary pumps, resetting controls, and optimizing air conditioning systems. As a result of the Region's ground-breaking work in saving energy in data centers, a list of common-sense measures was developed and disseminated to data center managers throughout the Navy and Marine Corps. ■

2006

U.S. Department of Defense

Naval Base Coronado

Contact: Michael Magee, 619-545-4648

Naval Base Coronado (NBC) has taken a comprehensive approach to energy management, saving substantial amounts of oil, electricity and water. Since 1985, NBC lowered its energy intensity by 45 percent to a remarkable 48,350 Btu per square foot in FY 2005. Since the previous year, NBC used 13.2 billion Btu less energy — savings equivalent to the energy use of 189 typical California households in a year. In 2005, NBC invested almost $7.5 million in new projects that will save 50.5 billion Btu, 11.9 million gallons of water, and $2.3 million each year. The annual energy savings from these projects is equivalent to the energy use of 720 typical households in the region. NBC's 2005 projects include decentralized steam plants, high-efficiency boilers, high-efficiency washers, solar power, and lighting and water conservation retrofits. To help accomplish energy savings, NBC uses Resource Efficiency Managers (REMs), who are wholly-dedicated specialists trained to improve energy efficiency. REMs helped identify cost effective energy improvements, surveyed water pressure on the distribution system, incorporated best practices for energy efficiency, and coordinated the efforts of individuals assigned as building energy monitors. NBC recognizes its leaders through employee incentive programs and presents awards to individuals making the greatest contributions to efficient energy management. The NBC team incorporates energy management practices into its mission, utilizing operational flight trainer aviation simulators to help reduce the cost of flight time and petroleum consumption. NBC publicizes its energy efficiency accomplishments and promotes energy awareness through print and broadcast media and solar-powered LED signage. ■

U.S. Department of Defense

Naval Undersea Warfare Center, Division Keyport

Contact: Phil Beste, 360-396-5170

The Naval Undersea Warfare Center, Division Keyport institutionalized energy efficiency and water conservation by building these principles into its standard practices and procedures. From those practices, overall energy intensity dropped 7.4 percent from the previous year — nearly 18.4 billion Btu, enough for 263 area households annually — and almost 33 percent from the 1985 baseline. Facility projects and designs are reviewed and tracked to maximize energy efficiency and water conservation throughout Keyport and at all detachments, laboratories, underwater ranges, and operations sites in Washington, Hawaii, California, and Nevada. Keyport is also making progress toward its energy efficiency goals by incorporating LEED™ criteria into construction of new buildings, replacing failing boilers, installing new climate control equipment, and retrofitting base-wide lighting systems. Keyport awarded a utility energy service contract to construct a sub-metering network to better track energy consumption and reduced its petroleum consumption by transitioning to more fuel-efficient vehicle models. Keyport has also enabled the Energy Star® energy-saving features on 98 percent of its personal computers. Keyport trains and uses personnel assigned as building energy monitors to promote energy awareness and make energy conservation and efficiency part of the routine business of all employees. ■

U.S. Department of Defense

Marine Corps Air Station Yuma

Continuous Energy Efficiency and Management Program

Contact: Ron Durfey, 928-269-2734

In 2005, Marine Corps Air Station (MCAS) Yuma reduced its energy use per square foot by 3.5 percent compared to 2004 and 40 percent compared to a 1985 baseline. This is a savings of 8.1 billion Btu from the previous year, enough energy for 116 typical area homes for a year. MCAS Yuma worked with its local utility and implemented most of its energy efficiency projects through a utility energy service contract (UESC), which will produce energy savings at no net cost to the taxpayers. UESC projects included use of highly efficient LED technologies in airfield aviation and safety applications, retrofitting low pressure sodium lighting with T-5 high output fluorescent fixtures, and water conservation projects such as desert landscaping, which introduces drought resistant vegetation to reduce water demand. MCAS Yuma highlights all new energy projects on its website and in the local newspaper. Energy conservation tips are distributed bi-weekly via email and reach about 15,000 personnel. Yuma is one of the Navy's busiest air stations and supports commercial operations, which enables a private and public access to the improved airfield lighting. It continues to expand outreach programs beyond the base and has become a role model for the military, the community, and the private sector. ■

Social Security Administration

Energy Initiatives Team

Contact: Scott Howard, 410-965-4980

The Social Security Administration (SSA) improved its energy efficiency and reduced its emissions by using many of the tools identified in E.O. 13123. Recently, SSA completed installation of the largest federal solar array in Chicago, which generates enough electricity in one day to power 100 homes and over its lifetime will save the equivalent of 1,400 tons of coal. SSA completed two other solar projects, a photovoltaic rooftop array at the Frank Hagel Federal Building, Richmond, CA, and a solar hot water system at the Mid-Atlantic Social Security Center in Philadelphia, PA. SSA uses UESCs and ESPCs, along with direct funding, to install high efficiency lighting improvements, water-conserving fixtures, HVAC upgrades, and cogeneration projects, and to purchase Energy Star® products and green power. SSA policies and guidelines incorporate and require life-cycle cost analyses for major retrofits, application of sustainable design principles for new buildings, procurement of Energy Star® equipment, and consideration of renewable energy technologies. SSA has two headquarters buildings that are certified using LEED™ criteria, which considers energy efficiency performance, among other sustainable design principles. SSA is working with GSA on two other building renovations that will incorporate building designs to incorporate LEED™ Silver building design criteria and enable an Energy Star® building designation (top 25 percent in terms of energy efficiency). ■

United States Postal Service

Pacific Area Energy Program Committee

Contact: Ray Levinson, 415-405-4886

The USPS Pacific Area Energy Program has become a model program for other USPS areas and Federal energy management programs to emulate. Since it received the 2003 Presidential Award for Leadership in Federal Energy Management for Institutionalization, the USPS Pacific Area has continued to employ a wide variety of techniques and implemented clean energy projects to reduce costs, air pollution, and demand on the California electrical grid, while increasing the use of renewables and clean technologies. In 2004 and 2005, energy audits were conducted at 322 postal sites, and 276 facilities initiated on-site generation projects to achieve greater energy efficiency. The actions of the Pacific Area Energy Team resulted in investment of $108 million and annual savings of approximately $9.4 million and nearly 340 billion Btu — enough for more than 4,800 typical households in the region for a year. Included in these efforts was the development of the largest civilian agency stock of solar photovoltaic systems. In FY 2005 alone, projects were initiated at 181 facilities with a total capital value of $84.3 million generating annual savings of $6.2 million and 220.7 billion Btu. Among these are on-site generation projects including a 1-megawatt combined heat and power system in San Bernardino and a 910-kilowatt photovoltaic project in Oakland, CA. ■

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