

# Closing the Circle News

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**W**ow. In just six years, since the signing of the 2003 Memorandum of Understanding, “Federal Leadership in High Performance and Sustainable Buildings,” the Federal community has made significant strides in implementing sustainable design principles across the range of buildings that we own, manage, and lease. The new goals and objectives established in E.O. 13423, “Strengthening Federal Environmental, Energy, and Transportation Management,” the Energy Policy Act of 2005, and now the Energy Independence and Security Act of 2007 (EISA) further refined the role of the Federal government in advancing sustainable design and green building practices. As a result, we continue to change the way we plan, build, and operate our buildings.

In a special 2007 edition of the Closing the Circle News, “Where We Are... Reflecting on OFEE’s 2003 Recommendations,” we reviewed how agencies had responded over the past few years to the Federal commitment to sustainable design and green building practices. This edition of the newsletter highlights resources available to Federal agencies subject to the changing terrain of green building requirements and provides examples of how the Federal government is responding to the new requirements.

We are now moving forward with important EISA and E.O. new initiatives. For example, the General Services Administration’s newly created Office of High-Performance Green Buildings was tasked by EISA with identifying and developing new technical standards for high-performance green buildings and also identifying incentives to encourage high-performance green buildings and technologies. This past year, the Department of Energy issued guidance for meeting renewable

energy and water efficiency requirements and for strategic energy and water resource planning. These resources will help the Federal government meet the increasingly demanding green building requirements in effective and innovative ways.

A valuable indicator of the progress of Federal green building is certification through the U.S. Green Building Council under its Leadership in Energy and Environmental Design Green Building Rating System™, the chosen certification program for many Federal agencies. As of March, 2008, 82 Federal facilities had achieved LEED certification. It is estimated that another 600 Federal building projects registered for LEED certification.

The scope of green building practices within the Federal government goes beyond the standards and expectations of LEED. DOE is looking at opportunities for net zero energy buildings for small family homes or buildings for which LEED standards do not traditionally apply, yet large strides in energy savings and environmental benefits can be attained. Federal agencies are also using new technologies to meet the many green building requirements, including hybrid solar lighting and green infrastructure.

The Federal government — the largest real estate owner in the world – continues its fast pace in meeting its green building commitments. The E.O. 13423 mandates and EISA are the new driving forces behind the Federal green building movement. Agencies continue to respond with great leadership and innovation to address the new directives, thanks to the effort of the many individuals truly committed to position the Federal government as one of the world leaders in sustainable design and green buildings. ■



# Fostering a Federal Community of Green Building Leaders

The green building movement is expanding rapidly in the United States, and much of its momentum can be attributed to the Federal government's leadership by example. As the largest "landlord" in the world, the Federal government oversees about 500,000 buildings, covering more than 3 billion square feet! This represents an enormous opportunity to transfer sustainable building technologies and practices on a large scale, thereby transforming the marketplace. To ensure the practice of sustainable building design across the Federal government, the Department of Energy (DOE) established the Interagency Sustainability Working Group (ISWG) in September 2001 as a working group under the existing Interagency Energy Management Task Force; both the Task Force and ISWG

are coordinated by DOE's Federal Energy Management Program (FEMP).

Making this building stock as sustainable as possible is a huge undertaking. Many Federal agencies have independently developed policies to promote sustainable design and operation at their facilities. The ISWG recognized however, that in order for the Federal sector to fully embrace sustainability in the built environment, a coordinated policy among agencies was crucial. The ISWG has representation from all the major Federal agencies and a number of smaller independent agencies, as well as key members from the private and non-profit sectors.

By acting as a forum for information exchange and policy development with Federal agencies that support sustainable buildings, the

buildings. The MOU commits agencies to meet five Guiding Principles for integrated design, energy performance, water conservation, indoor environmental quality, and materials. The signing of the MOU marked the first interagency effort supporting sustainable design practices in Federal facilities. These Guiding Principles have since been integrated into Executive Order 13423, with the added requirement that 15 percent of each agency's building inventory meet the Guiding Principles by 2015.

In recognition of this leadership, the DOE, on behalf of the ISWG, received a 2007 Closing the Circle Award for its performance in innovatively implementing sustainable building design practices in Federal facilities.

## 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*

ISWG successfully developed the Guiding Principles that serve as the foundation of the Memorandum of Understanding (MOU) for Federal Leadership in High-Performance and Sustainable Buildings. The 19 signatory agencies to the MOU committed to Federal leadership in the design, construction, and operation of high-performance and sustainable

## Tools and Resources

One of the primary functions of the ISWG is to help develop the tools and resources necessary to knock down barriers to the widespread adoption of sustainable design within the Federal sector. Most importantly, the ISWG provides continued leadership by developing technical guidance for implementing the MOU and E.O. 13423, including a Model Implementation Plan. The technical guidance provides a compilation of resources that offer practical advice for designing, operating, commissioning, and monitoring sustainable new buildings and major renovations, especially in the Federal sector. Technical guidance can be found on the Whole Building Design Guide ([http://www.wbdg.org/references/sustainable\\_eo.php](http://www.wbdg.org/references/sustainable_eo.php)).

Working subgroups examine specific sustainability issues and provide recommendations to > > >

## Other Sustainable Building Rating Systems

### **B**uilding Research Establishment's Environmental Assessment Method (BREEAM)

is a building rating system used to assess the environmental performance of new and existing buildings for categories in management, health and well being, energy, transportation, water use, materials and waste, land use and ecology, and pollution. The system is extensively used in the United Kingdom but is rarely used in the United States. Information on BREEAM is available at: [www.breeam.org/index.jsp](http://www.breeam.org/index.jsp).

### Comprehensive Assessment System for Building Environmental Efficiency

(CASBEE) is a Japanese developed building rating tool based on the environmental performance of buildings. CASBEE is available in English but has not been tested in the United States. CASBEE consists of four certification levels, CASBEE for pre-design, new construction, existing buildings, and renovation. For more information on CASBEE, visit: [www.ibec.or.jp/CASBEE/english/index.htm](http://www.ibec.or.jp/CASBEE/english/index.htm).

GBTool is software developed by the Natural Resources of Canada for the Green Building Challenge process. The Green Building Challenge is an international endeavor between 20 countries to establish common definitions to describe "green buildings." The GBTool addresses site

selection and planning, energy and resource consumption, environmental loadings, indoor environmental quality, functionality, long term performance and adaptability, and social and economic factors. To download the GBTool, visit: [www.sbc.nrcan.gc.ca/software\\_and\\_tools/gbtool\\_e.asp](http://www.sbc.nrcan.gc.ca/software_and_tools/gbtool_e.asp).

Green Globes™ System is a green management tool with an assessment protocol, rating system, and guide for integrating environmentally friendly design into commercial buildings. The tool facilitates recognition of a project through third-party verification and provides an interactive, flexible, and affordable approach to environmental design. The tool is available at: [www.thegbi.org/greenglobes/Default.asp](http://www.thegbi.org/greenglobes/Default.asp). ■

>>> the full ISWG. The ISWG has successfully supported the implementation of sustainable practices in Federal facilities through the development of other resources, which can be found on FEMP's Sustainable Design and Operations web site (<http://www1.eere.energy.gov/femp/sustainable/>). Examples include the Business Case for Sustainable Design in Federal Facilities, the Data Collection Protocol for Building Cost and Performance Metrics, and the High Performance Buildings Database. As of March 2008, this database contains 40 Federal case studies that highlight the sustainable, high-performing features of these buildings.

ISWG members gain additional value through hands-on experience, as meetings are often conducted at Federal green buildings in the Washington, DC area. This allows for facility tours in conjunction with the meeting, giving Federal representatives valuable first-hand insight into innovative sustainable design practices. For example, tours have been provided at the Chesapeake Bay Foundation's Philip Merrill

Environmental Center in Annapolis, MD and the U.S. Green Building Council's LEED®-Platinum headquarters.

### The Current State of Sustainable Federal Buildings

One indicator of the Federal government's leadership on sustainability lies with the number of Federal buildings that have been certified through the U.S. Green Building Council (USGBC). The USGBC provides independent, third-party certification for green buildings after construction, an important step to ensure that building designs have been implemented. Agencies are then encouraged to continue monitoring and validating building performance once the building has been occupied.

As of March of 2008, 82 Federal buildings have been certified under USGBC's LEED Green Building Rating System™, an increase of 32 since this time last year. Fifteen agencies are represented in three countries and 30 states across the U.S., with a variety of LEED-New Construction/Major Renovation, -Existing Building, -Core

and Shell, and -Commercial Interior projects. The General Services Administration (GSA), Department of Defense (DoD), and DOE are the leading agencies in the LEED-certified building count. Taken together, the 82 buildings account for 9.7 million gross square feet. Approximately one-fourth of the buildings are build-to-suit facilities leased from the private sector. Nearly 600 Federal building projects are estimated to be registered for LEED certification, although it is unknown how many of these buildings plan to go ahead with actual certification.

Federal agencies have also sought and received the ENERGY STAR building label. Since 1999, approximately 175 Federal buildings have achieved the energy efficiency and other criteria of ENERGY STAR. Ten agencies are represented in 41 states across the country with general office, courthouse, hospital, and medical office building types. GSA and Department of Veterans Affairs (VA) facilities combine to make up 86 percent of the labeled buildings. Thirty-one Federal buildings achieved or renewed the ENERGY STAR >>>

# Federal Energy Star Buildings

**E**NERGY STAR is a joint voluntary labeling program between DOE and the Environmental Protection Agency (EPA) designed to identify and promote energy-efficient products and practices to reduce greenhouse gas emissions. ENERGY STAR qualified product categories include appliances, heating and cooling equipment, home-

envelope products, home electronics, office equipment, lighting products, commercial food service products, and other commercial products.

The ENERGY STAR label is also applied to new homes and commercial and industrial buildings. Buildings and facilities that earn the ENERGY STAR label are the top

performers for energy efficiency nationwide and utilize approximately 35 percent less energy than average buildings.

For the complete list of Federal ENERGY STAR-labeled facilities, visit the ENERGY STAR website at: [www.energystar.gov/index.cfm?fuseaction=labeled\\_buildings.showRegionSearch&building\\_type\\_id=ALL&s\\_code=ALL&profiles=0&also\\_search\\_id=FEDERALBLDG](http://www.energystar.gov/index.cfm?fuseaction=labeled_buildings.showRegionSearch&building_type_id=ALL&s_code=ALL&profiles=0&also_search_id=FEDERALBLDG). ■

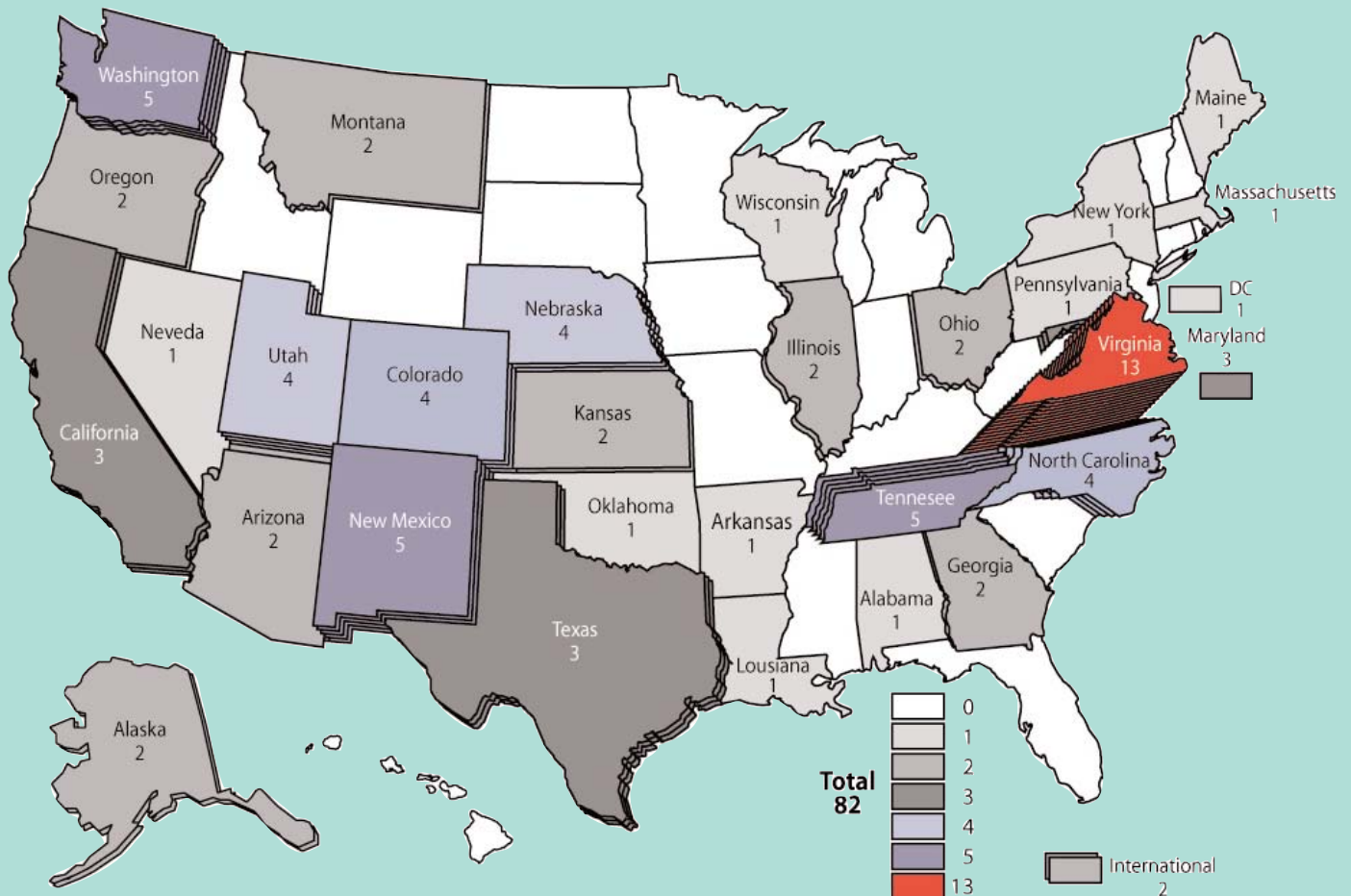
>>> label in 2007.

While these figures represent significant progress, meeting today's sustainability challenges requires ever greater resolve and leadership. As the practice of green building increases

momentum, we need to continue developing and promoting sustainable Federal facilities, such that green building becomes business as usual. The ISWG welcomes your participation in helping make this a reality.

For more information, please contact Matt Gray at 202-586-0067, [matthew.gray@ee.doe.gov](mailto:matthew.gray@ee.doe.gov). Visit the ISWG website at [http://www1.eere.energy.gov/femp/sustainable/sustainable\\_workinggroup.html](http://www1.eere.energy.gov/femp/sustainable/sustainable_workinggroup.html). ■

# Federal Buildings Awarded LEED Certification (as of 03-06-08)



# The Energy Independence and Security Act of 2007

**T**he Energy Independence and Security Act of 2007 (EISA) will improve vehicle fuel economy and help reduce U.S. dependence on oil. EISA represents a major step forward in increasing the availability of alternative fuels, reducing our dependence on oil, increasing energy security, confronting global climate change, and making America stronger, safer, and cleaner for future generations.

EISA includes provisions to improve energy efficiency in lighting and appliances, as well as requirements for Federal agency efficiency and renewable energy use that will help reduce greenhouse gas emissions. For example, EISA will require all general purpose lighting in Federal buildings to use ENERGY STAR products or FEMP-designated

products by the end of Fiscal Year 2013. It establishes an Office of High-Performance Green Buildings (OHPGB) in GSA. This office will promote green building technology implementation in Federal buildings. (See GSA article on page 22.)

Following is a summary of the major provisions pertaining to buildings:

## Title II: Energy Efficiency

### Subtitle A: Promoting Advanced Lighting Technologies

Sec. 211 requires all general purpose lighting in federal buildings to be ENERGY STAR products or products designated under the Federal Energy Management Program (FEMP) by the end of FY2013.

## Title III: Energy Savings Through Improved Standards for Appliances and Lighting

### Subtitle A, Appliance Energy Efficiency

Federal agencies are directed to purchase devices that limit standby power use.

### Subtitle B, Lighting Energy Efficiency

For Federal buildings, Section 323 sets energy efficiency requirements for GSA-leased space and for use of energy efficient lighting fixtures and bulbs in those leased spaces.

## Title IV: Energy Savings in Buildings and Industry

### Subtitle B, High-Performance Commercial Buildings

This subtitle encourages the development of more energy-efficient "green" commercial buildings.

Section 421 creates an Office of Commercial High Performance Green Buildings at DOE.

Section 422 establishes a zero-energy commercial buildings initiative. A national goal is set to achieve zero-net-energy use for new commercial buildings built after 2025. A further goal is to retrofit all pre-2025 buildings to zero-net-energy use by 2050.

Section 423 requires that DOE establish a national clearinghouse for information and public outreach about high-performance green buildings.

### Subtitle C, High-Performance Federal Buildings

Section 431 requires that >>>





>>> total energy use in Federal buildings, relative to the 2005 level, be reduced 30 percent by 2015.

Section 432 directs that Federal energy managers conduct a comprehensive energy and water evaluation for each facility at least once every four years.

For new Federal buildings and major renovations, Section 433 requires that fossil-fuel energy use — relative to the 2003 level — be reduced 55 percent by 2010 and be eliminated (100 percent reduction) by 2030.

Section 434 requires that each Federal agency ensure that major replacements of installed equipment (such as heating and cooling systems), or renovation or expansion of existing space, employ the most energy efficient designs, systems, equipment, and controls that are life-cycle cost effective.

Section 435 prohibits Federal agencies from leasing buildings that have not earned an EPA ENERGY STAR label.

Section 436 requires GSA to establish an Office of Federal High-Performance Green Buildings to coordinate green building information and activities within GSA and with other Federal agencies. The Office

must also develop standards for Federal facilities, establish green practices, review budget and life-cycle costing issues, and promote demonstration of innovative technologies.

Section 437 directs the Government Accountability Office (GAO) to audit the implementation of activities required under this subtitle. The audit must cover budget, life-cycle costing, contracting, best practices, and agency coordination.

Section 438 requires Federal facility development projects with a footprint exceeding 5,000 square feet to use site planning, design, construction, and maintenance strategies to control storm water runoff.

Section 439 directs GSA to review the current use of, and design a strategy for increased use of, cost-effective lighting, ground source heat pumps, and other technologies in GSA facilities.

For the purpose of conducting life-cycle cost calculations, Section 441 increases the time period from 25 years, in prior law, to 40 years.

#### **Subtitle H, General Provisions**

Section 491 calls for the DOE Office of Commercial High Performance Buildings and the GSA

Office of Federal High Performance Buildings to jointly develop guidelines for demonstration projects. In accordance with the guidelines, one Federal project must be undertaken annually over a five-year period, supported by a \$10 million funding authorization. Also, a total of four projects are to be undertaken at different universities over the five-year period, supported by an additional \$10 million funding authorization.

Section 492 calls for these two offices to undertake a joint survey of research on green buildings, coordinate efforts to develop a research plan, and identify potential benefits of green buildings for security, natural disasters, and emergency needs of the federal government.

Section 494 directs the Office of Commercial High Performance Buildings and the Office of Federal High Performance Buildings to jointly appoint a Green Building Advisory Committee with representatives from a variety of backgrounds, including Federal agencies, state and local governments, building industry experts, security advisors, and environmental health experts.

## **Title V: Energy Savings in Government and Public Institutions**

### **Subtitle B, Energy Savings Performance Contracting**

Section 511 eliminates the advance reporting requirement for Energy Savings Performance Contracts (ESPCs) that have a cancellation ceiling exceeding \$10 million.

Section 512 increases ESPC funding flexibility by allowing a combination of appropriated funds and private financing.

Section 513 restricts Federal agencies from limiting the duration of ESPCs to less than 25 years or limiting the total amount of obligations. Further, this section permits the criteria for savings verification to satisfy the requirement for energy audits. Also, it directs Federal agencies to modify existing ESPCs to >>>

# Water Guidance for E.O. 13423 Released

The newly released guidance for implementing the water efficiency requirements of E.O. 13423 provides clarification and guidance to achieve the water reduction goals of section 2(c) of the E.O. and E.O. Implementing Instructions. Beginning in 2008, Federal agencies must reduce water consumption intensity through life-cycle cost-effective measures, relative to the baseline of the agency's water consumption in FY 2007 by 2 percent annually through the end of FY 2015 or 16 percent by the end of FY 2015.

The guidance was developed to assist in the interpretation of, and ultimate compliance with, E.O. 13423. The guidance addresses three key elements of compliance: baseline development, efficiency opportunity

identification/implementation, and reporting. For each key area, the document provides E.O. 13423 interpretation, suggests a path forward, and provides resources for

additional information.

The guidance is posted on the OFEE website at

[www.ofee.gov/eo/eo13423](http://www.ofee.gov/eo/eo13423)

[\\_WaterGuidance200801.pdf](#). ■



>>> conform with the requirements of this subtitle.

Section 514 permanently authorizes ESPCs.

Section 515 extends the definition of energy savings reduction to include increased use of an existing energy source by cogeneration or heat recovery, use of excess electrical or thermal energy generated from onsite renewable sources or cogeneration, and increased energy-efficient use of water resources.

Section 516 permits agencies to retain the full amount of energy and water cost savings obtained from utility incentive programs. Section 517 authorizes \$750,000 per year over five years for a program to train contract officers in negotiating ESPCs.

Section 518 directs DOD and DOE to study the potential use of ESPCs in non-building applications, which is defined to include vehicles and Federally owned equipment to

generate electricity or transport water.

## **Subtitle C, Energy Efficiency in Federal Agencies**

Under Section 521, GSA is directed to use up to \$30 million — subject to appropriation — from FY2007 and prior years' unobligated balances of the Federal Buildings Fund to support the installation of a solar photovoltaic system for the DOE headquarters building in Washington, DC.

Section 522 prohibits, except under certain circumstances, the purchase of incandescent light bulbs for use in Coast Guard office buildings.

Section 523 requires 30 percent of the hot water demand in new Federal buildings (and major renovations) to be met with solar hot water equipment, provided it is life-cycle cost-effective.

Section 524 requires Federal agencies to minimize standby energy use in purchases of energy-using equipment.

Section 525 requires Federal procurement to focus on the use of ENERGY STAR and FEMP-designated products.

Section 526 prohibits Federal agencies from procuring synfuel unless its life cycle GHG emissions are less than those for conventional petroleum sources.

Section 527 directs each Federal agency subject to any requirements under this title to issue an annual report that describes the status of initiatives to improve energy efficiency, reduce energy costs, and reduce GHG emissions.

Section 528 requires the Office of Management and Budget (OMB) to submit an annual report to Congress that summarizes the information reported under Section 527, evaluates overall progress toward the goals of Section 527, and recommends additional actions needed to meet those goals. ■

# GSA Opens New Office of Federal High-Performance Green Buildings

**A**s required by EISA, GSA established an Office of Federal High-Performance Green Buildings to ensure full coordination of high-performance green building information and activities within the Federal government. The office will work in conjunction with the DOE office that will have a similar responsibility for commercial buildings.

GSA Director of Expert Services Kevin Kampschroer, who has been leading GSA's efforts in sustainable design, will serve as acting head of the office, which will reside in GSA's Public Buildings Service (PBS).

"GSA has been leading by example in the areas of energy conservation and sustainable design since the early 1970s," said Administrator Lurita Doan. "Enactment of the new energy bill provides us with an enormous and exciting challenge to take energy conservation and sustainable design in federal buildings to the next level."

The duties of the office outlined in the legislation are to:

- Establish a Federal Green Building Advisory Committee;
- Identify and develop technical standards for high-performance green buildings;
- Establish green practices for operations and maintenance of facilities;
- Provide information and disseminate research results;
- Identify practices and tools to achieve high-performance green buildings through budgeting and contracting;
- Identify opportunities to demonstrate innovative technologies and concepts; and,
- Identify incentives to encourage high-performance green buildings and technologies.



**G**SA provides a centralized delivery system of products and services to the federal government, leveraging its enormous buying power to get the best value for taxpayers. Founded in 1949, GSA manages more than one-fourth of the government's total procurement dollars and influences the management of \$500 billion in federal assets, including 8,600 government-owned or leased buildings and 208,000 vehicles.

GSA helps preserve our past and define our future, as a steward of more than 420 historic properties, and as manager of USA.gov, the official portal to federal government information and services. GSA's mission to provide superior workplaces, expert technology solutions, acquisition services, purchasing and E-Gov travel solutions and management policies, at best value, allows federal agencies to focus on their core missions.

Currently, GSA has earned LEED certification for 24 buildings. LEED—Leadership in Energy and Environmental Design—is a green building rating system used by GSA to evaluate and measure its achievements in sustainable design. ■

"I am pleased that this new office will reside in PBS," said GSA's Commissioner for Public Buildings David Winstead. "Green building practices are rapidly moving into the mainstream. GSA's commitment to sustainable design principles is enabling this market transformation."

To learn more about GSA's sustainable design program, visit [www.GSA.gov/sustainabledesign](http://www.GSA.gov/sustainabledesign). ■



# Renewable Energy Guidance Released

**O**n February 6, 2008, DOE released its Renewable Energy Requirement Guidance for the Energy Policy Act of 2005 (EPAct 2005) and E.O. 13423. The guidance outlines the requirements of EPAct 2005 and E.O. 13423 as they relate to renewable energy. It includes updated definitions of qualified renewable energy sources, provides information on how to deal with Renewable Energy Certificates (RECs), and describes under which circumstances new and old sources can be counted towards requirements.

Section 1 explains the authority for the guidance and the renewable energy goal. It includes the mandate under E.O. 13423 that at least half of the renewable energy requirement must be met with energy from renewable sources placed in service after January 1, 1999.

Section 2 defines the renewable energy technologies and products agencies can use to meet the goals. It includes sections on biomass, waste to

energy (including municipal solid waste and refuse-derived fuels), landfill gas, geothermal, solar, wind, incremental hydropower, and hydrokinetic energy and RECs. EPAct 2005's wording dictates that only electricity from renewable energy counts towards meeting the EPAct 2005 goal. However, progress toward meeting the E.O. requirement that 50 percent of the required renewable energy must come from new renewable sources may be shown using non-electric sources of renewable energy.

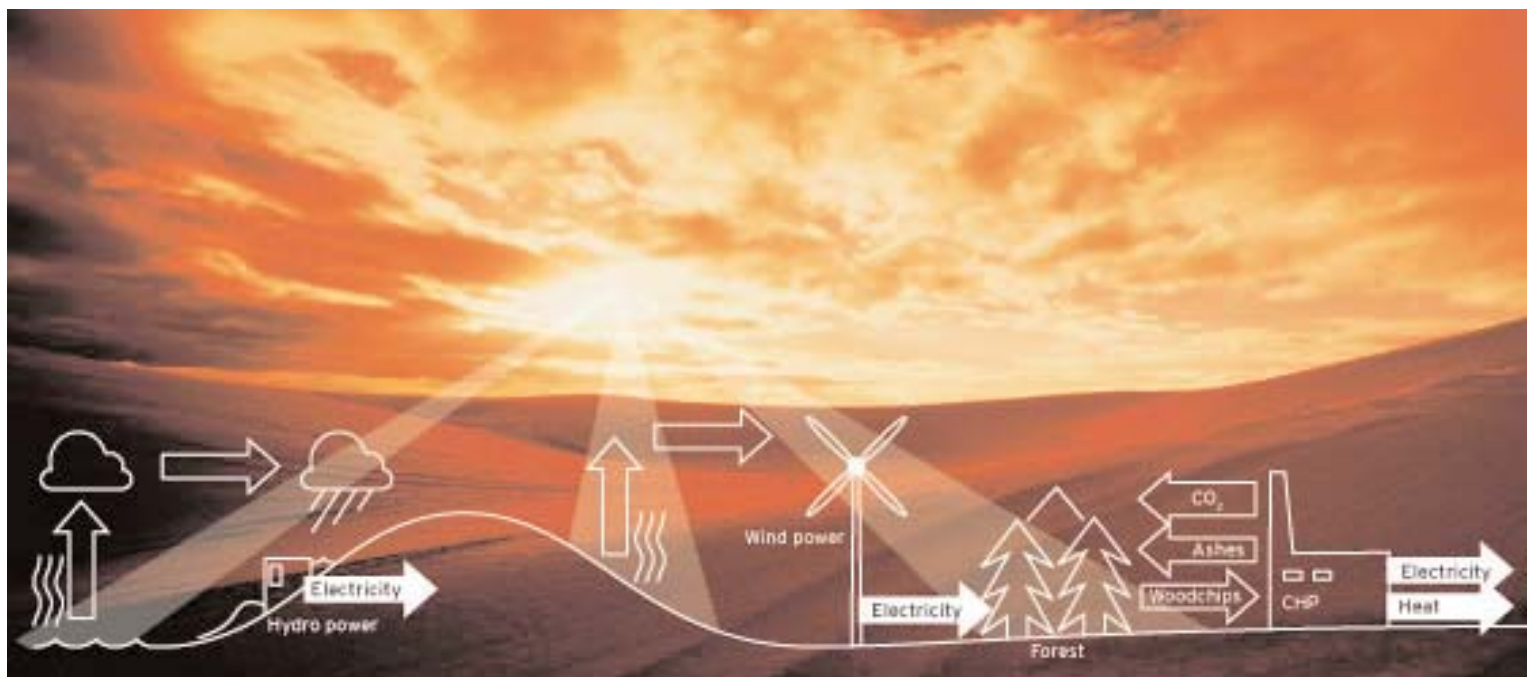
Section 3 explains requirements for qualifying projects or purchases, including:

- Renewable energy must be consumed by a Federal agency;
- Double counting of renewable energy attributes is prohibited, thus requiring care when RECs or state renewable portfolio standards are involved;

- Key attributes and requirements agencies must consider when using or trading RECs to meet the goal;
- Grandfathering provisions to help agencies transition to the new requirements;
- Bonuses agencies can receive for consuming electricity from projects that produce renewable energy on Federal or Indian lands;
- Non-electric renewable energy are not eligible for the bonus; and
- Provisions encouraging long-term contracts (10 years or longer).

Section 4 explains how the credit agencies currently receive toward their energy reduction goals from renewable energy purchases will gradually phase out. Finally, section 5 discusses reporting.

The guidance is available from FEMP at [www.eere.energy.gov/femp/renewable\\_energy/renewable\\_fedrequire.html](http://www.eere.energy.gov/femp/renewable_energy/renewable_fedrequire.html). ■



# Strategic Energy and Water Resource Planning for Federal Facilities

**F**EMP developed a review detailing how to conduct strategic planning, and how to create a plan that will best achieve desired results of energy and/or water use in Federal facilities.

A strategic plan is a written document that can be developed for any aspect of a facility's operation, which details the current operating environment, the desired results for the future, and defines the necessary responsibilities and actions to achieve those results. Contingency planning — preparing for unplanned problems — is a vital component of a strategic plan.

FEMP defines five elements shared by all strategic plans:

**Establishing where you are coming from.** An important part of making a strategic plan is understanding the context within which agency operations are working. This step includes identifying the legislation, regulations, and requirements that will have bearing on agency sites. In this stage, Federal agencies must look at the relevant legislation applicable to them and their sites in terms of energy and/or water use, such as the Energy Policy Act of 2005 and E.O. 13423. There may also be important history involving a facility, such as the energy and water use patterns in the area. If the site is in an area historically prone to blackouts, this factor will affect future planning.

**Establishing what your current operating environment is in terms of energy and/or water use.** To identify opportunities to make changes in current operating conditions, the current operating conditions must be clearly identified. Using metering data, agencies should build an idea of their current energy



and/or water use patterns. Examining the adequacy of the current infrastructure for future needs, quantifying current operating costs, and conducting self-audits for energy use are all parts of this stage. FEMP suggests benchmarking — grouping facilities with similar characteristics and then prioritizing buildings that will not meet future needs — as a technique for efficiently addressing identified concerns in current operating conditions.

**Deciding where you want to be.** By this step, agencies should have an idea of their baselines, and from step two, they should have an idea of the areas in which they can, and want to, improve. In deciding where they want to be, agencies should identify potential projects and set goals for both the short and long-term.

Agencies may want to make these decisions keeping in mind the context within which Federal agencies work, and using relevant legislation as a means to create goals. It is important to set goals that are both achievable and valuable, not necessarily ones that are easier but will not produce needed change. Agencies also should develop a mechanism to monitor progress as work proceeds towards these goals.

**Planning how to get where you want to be.** Through strategic planning, agencies can identify discrepancies between where they are and where they would like to be and determine how to fill this gap. It is important to note that the strategic plan is not just a document, but a living process that can change alongside a changing future and changing needs. When identifying the means to achieving their ends, agencies must remember to continually analyze current conditions compared to where they should be.

**Contingency planning.** The strategic plan should address foreseeable problems. Planning for problems, with prepared mitigation actions, allows quick responses to problems, ensuring that the right people and teams are quickly contacted to respond to situations such as natural disasters and energy outages. Contingency plans are nothing new, and FEMP emphasizes that organizations such as state and local government should be referenced when creating these plans.

The FEMP review provides >>>

# Forrestal Building Achieves ENERGY STAR Rating

**D**OE was recently awarded with an ENERGY STAR Label for superior energy performance for the Forrestal Building, its Headquarters facility in Washington, DC. The Forrestal Building is only the second Federally owned office building in the nation's capital to receive this award. DOE is leading by example by showing that energy efficiency is good stewardship of public resources, good public policy, and good for the environment.

The Forrestal Building uses 40



percent less energy than the average office building of its size. That translates to preventing more than 28.8 million pounds of carbon dioxide

emissions each year - the equivalent of taking more than 2726 cars off the road - all while saving taxpayers thousands of dollars in energy bills.

The ENERGY STAR label is awarded to buildings that demonstrate superior energy performance. ENERGY STAR's national performance rating system ranks building energy performance on a one-to-100 scale based on energy usage per square foot, normalized for weather, climate, occupancy and other factors. Buildings scoring 75 or higher that meet standards for indoor air quality, lighting, ventilation, and thermal comfort are eligible for the label. The Forrestal Building received a total score rating of 88, which means the building is in the top 12 percent of energy efficient buildings in the nation.

To find out more information about EPA's ENERGY STAR Label for Buildings visit: [http://www.energystar.gov/index.cfm?c=business.bus\\_bldgs](http://www.energystar.gov/index.cfm?c=business.bus_bldgs). ■

>>> examples of how other agencies have conducted strategic planning. In planning how to meet the goals of their strategic plan, agencies should note that people inside and outside of the Federal government have come up with many innovative ways to meet their energy and/or water use goals, and these models should be reviewed for their applicability to the agencies' sites. The FEMP review emphasizes the importance of identifying current energy and water use issues and creating a dynamic plan that will be considered a process rather than an end-result.

The full FEMP review can be found at: [http://www.eere.energy.gov/femp/pdfs/strategic\\_plan.pdf](http://www.eere.energy.gov/femp/pdfs/strategic_plan.pdf). ■



# Managing Wet Weather with Green Infrastructure

On January 17, 2008 EPA, in collaboration with the National Resources Defense Council, American Rivers, the Low Impact Development Center, the National Association of Clean Water Agencies, and the Association of State and Interstate Water Pollution Control Authorities, released *Managing Wet Weather with Green Infrastructure, Action Strategy 2008*. The partnership promoting the increased use of green infrastructure to manage wet-weather events.

Green infrastructure is a term that has been used in several, usually complementary, contexts. Benedict and McMahon, in their book, *Green Infrastructure*, (Island Press, 2006) define the term broadly as “an interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to people and wildlife.” In the context of wet-weather management, green

infrastructure refers to practices that use or mimic natural processes to infiltrate, evapotranspire, or capture and use stormwater on or near the site where it falls while potentially generating other environmental benefits.

In addition to providing cleaner water and enhancing water supplies, green infrastructure practices can provide some or all of the following benefits: cleaner air, reduced urban temperatures, moderating impacts of climate change, increased energy efficiency, source water protection, community benefits, and cost savings. Green roofs and walls are two technologies that have the potential to provide all of these benefits.

Many stakeholders, including engineers, watershed managers, regulators, and those who are regulated lack familiarity with green infrastructure technology and, as a result, tend to favor traditional “grey infrastructure” approaches such as

tunnels, pipes, underground detention, and detention basins for managing run-off. This results in over-reliance on grey infrastructure when green infrastructure may provide greater environmental benefits.

The use of green infrastructure technologies is new in the U.S. As such, there are still questions about the performance,



longevity, and appropriateness of many green infrastructure approaches. Fortunately, many of these practices have already been proven to be reliable and capable of meeting performance goals when properly installed and maintained. In fact, many green infrastructure practices may perform their watershed protection functions better than their more established — and often more highly engineered — grey infrastructure cousins. In order to address these concerns, EPA is formally encouraging better research and more wide-scale implementation of green infrastructure. EPA is hopeful that green infrastructure technologies and strategies move from being “fringe” or “add-on” controls toward mainstream methods for managing wet weather. More information on managing wet weather with green infrastructure is available at [www.epa.gov/npdes/greeninfrastructure](http://www.epa.gov/npdes/greeninfrastructure). ■



# E.O. 13423 Implementing Instructions for Sustainable Design/High Performance Buildings

*E.O. 13423, sec. 2(f): In implementing the policy set forth in section 1 of this order, the head of each agency shall:*

*(f) ensure that (i) new construction and major renovation of agency buildings comply with the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings set forth in the Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (2006), and (ii) 15 percent of the existing Federal capital asset building inventory of the agency as of the end of fiscal year 2015 incorporates the sustainable practices in the Guiding Principles.*

*Sec. 3(a), excerpted, (e), and (f): In implementing the policy set forth in section 1 of this order, the head of each agency shall:*

*(a) implement within the agency sustainable practices for... (vii) high performance construction, lease, operation, and maintenance of buildings ....*

*(e) ensure that contracts entered into after the date of this order for contractor operation of government-owned facilities or vehicles require the contractor to comply with the provisions of this order with respect to such facilities or vehicles to the same extent as the agency would be required to comply if the agency operated the facilities or vehicles;*

*(f) ensure that agreements, permits, leases, licenses, or other legally-binding obligations between the agency and a tenant or concessionaire entered into after the date of this order require, to the extent the head of the agency determines appropriate, that the tenant or concessionaire take actions relating to matters within the scope of the contract that facilitate the agency's compliance with this order.*

*Technical Leads: DOE, GSA, EPA, and OFEE*

*Workgroup: Interagency Sustainability Working Group*

## A. Objectives

Each agency shall pursue the following objectives regarding high performance buildings:

- Reduction in life-cycle cost of facilities' environmental and energy attributes.
- Improvement in energy efficiency, water conservation, and utilization of renewable energy.
- Provision of safe, healthy, and productive built environments.
- Promotion of sustainable environmental stewardship.

To accomplish these objectives, each agency shall locate, design, construct, maintain, and operate its buildings and facilities in a resource-efficient, sustainable, and economically viable manner, consistent with its mission.

## B. Requirements

**(1) New construction and renovation.** Beginning with the FY 2007 funding cycle, when planning the funding and design for construction of buildings that meet the agency-defined capital asset threshold, each agency shall meet or exceed statutory goals and address

each of the five *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (Guiding Principles)*<sup>1</sup>.

Written justification must be provided to OFEE and OMB if an agency proposes not to comply.

In order to apply the *Guiding Principles* to building projects, all business cases for new building construction or major renovations, developed per OMB A-11, Part 7, Section 300, shall incorporate the *Guiding Principles* to the greatest extent practicable. These requirements apply to construction of new Federal buildings; new, renegotiation, or extension of leases for Federal occupancy, or major renovation projects.<sup>2</sup> >>>



>>> **(2) Existing buildings.** In addition, by the end of 2015, agencies shall meet the 15 percent goal in E.O. 13423 section 2(f)(ii) for incorporating the sustainable practices in the *Guiding Principles* into their Federal capital asset building inventory. The 15 percent goal for existing buildings applies to an agency's full building inventory as it exists in FY 2015, including any new buildings brought on line and excluding any unneeded buildings disposed of or sold prior to 2015. Therefore, agencies should strongly consider incorporating sustainable practices into projects underway and selling or disposing of unneeded assets.

**(3) High performance building plans.** By August 15, 2007, and annually thereafter, each agency shall submit a plan to OMB and OFEE that addresses how the agency will ensure that (1) all new facilities and renovation projects implement design, construction, and maintenance and operation practices in support of the sustainable design/high-performance



buildings goals of the E.O. and statutory requirements and (2) existing facilities' maintenance and operation practices in support of the goals of the E.O.

Within 45 days of the issuance of the implementing instructions, OMB will issue guidance identifying required components to be addressed in the agency plans. At a minimum, the plans shall address the following:

- Employment of integrated design principles, optimization of energy efficiency and use of renewable energy, protection and conservation of water, enhancement of indoor environmental quality, and reduction of environmental impacts of materials in accordance with the *Guiding Principles* and the other building and construction-related E.O. 13423 goals and instructions.
- An assessment of policy, criteria, contracts, and other areas, identifying gaps in the agency's sustainable building program.
- Key action items, including major milestones and responsible parties.

In addition, all government-owned military housing shall incorporate the sustainable design/high performance building goals/principles described in section 2(f) of the E.O.

### C. High Performance Federal Buildings Database

Each agency shall report its success stories and lessons learned for at least one major building project per year into the High Performance Federal Buildings Database, [www.eere.energy.gov/femp/highperformance/index.cfm](http://www.eere.energy.gov/femp/highperformance/index.cfm) unless the agency does not have an applicable project to report. The

ENERGY STAR rating of each facility's energy performance shall be included in each success story.

### D. Leased Facilities

To the greatest extent practicable, each agency shall include a preference for buildings that meet the goals of the *Guiding Principles* in the selection criteria for acquiring leased buildings. When entering into leases for Federal occupancy, including the renegotiation or extension of existing leases, agencies shall include criteria encouraging lease provisions that support the *Guiding Principles*. Build-to-suit lease solicitations shall incorporate criteria for sustainable design and development, energy efficiency, and verification of building performance in accordance with the *Guiding Principles*.

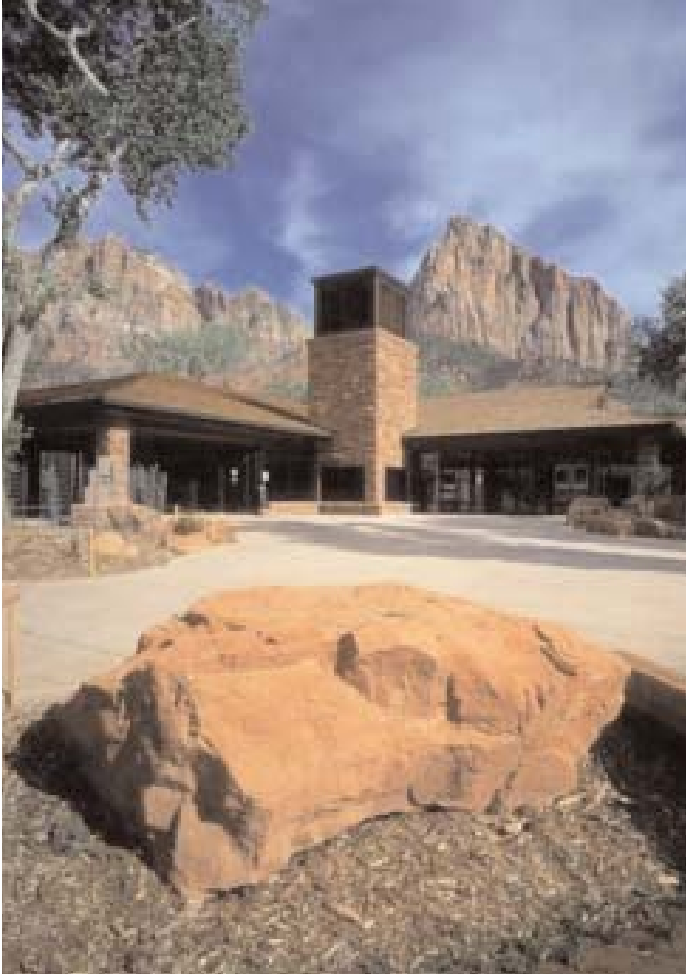
### E. Technical Guidance

Technical Guidance for implementing the *Guiding Principles* and other best practices developed by the Interagency Sustainability Working Group (ISWG) can be found in the Whole Building Design Guide, [www.wbdg.org](http://www.wbdg.org). Contents of the WBDG include clarification of requirements; related mandates; additional recommendations and considerations; and resources for implementation, including model contract and specification language per the *Federal Green Construction Guide for Specifiers*.

The ISWG shall review 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. ■

- 1 The *Guiding Principles* are set forth in the 2006 Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding.
- 2 The agency determines the threshold for major renovation projects.

# Energy Savings from Small Near-Net-Zero Energy Homes



**D**OE's Building Technology Office has set a goal of building a small-family home with net zero-energy use, a home that produces as much renewable energy on-site as it consumes on an annual basis. Near-net-zero-energy houses are being built across the U.S., but these are for the most part larger houses at the higher end of the housing market. The economic justification of net zero-energy housing is that renewable energy sold to a utility grid plus energy savings resulting from highly-efficient equipment will offset the premium of the installation costs of these technologies. A study

was conducted to assess whether this economic justification could work in small-family homes.

Four houses were built in Loudon, TN, through collaboration among the Loudon County affiliate of Habitat for Humanity, DOE's Building America program, Oak Ridge National Laboratory (ORNL), the Tennessee Valley Authority (TVA), the building industry, and the appliance industry. The four homes, named ZEH one

(1) through four (4), were built with different combinations of energy-efficient technologies so that no two test homes were alike, and were compared with a base home with more conventional levels of energy efficiency.

The experience from building these homes produced three general observations. First, it is essential to apply experience and knowledge gained from previous houses built with advanced equipment. The problems that arose during the construction of the homes were similar to those with the construction of conventional homes,

so with experience, contractor installation will improve with these high-efficiency technologies. Second, it is vital to continuously monitor the performance of the high-efficiency technologies, identifying problems early that will significantly reduce efficiency. Third, energy-efficient equipment may only truly save energy as long as it is functioning properly. Problems can occur with these advanced technologies just like with conventional equipment, which can lead to energy savings losses.

After construction, the economic justifications of the net zero-energy homes were put to the test. The energy savings were clear: the four home (ZEH4) utility bills averaged less than \$1 per day, compared to a conventionally built home of similar characteristics which would average around \$4 to \$5 per day for electricity. One of the homes, ZEH1, used about 40 percent less electricity than the base house over the course of the testing year, and supplied 20 percent of its own energy through the use of a photovoltaic (PV) system. A full review of the study can be found at [www.eere.energy.gov/femp/pdfs/tir\\_zeroenergyhouses.pdf](http://www.eere.energy.gov/femp/pdfs/tir_zeroenergyhouses.pdf).

Currently, without utility and government incentives, the economic justifications of net zero-energy housing are not yet strong enough to meet Federal procurement guidelines for payback periods. But, as incentives increase, PV systems become more cost-effective, and technology improves, there is a lot of potential for application of net zero-energy construction in the Federal sector. Military family housing, public housing, and Department of Housing and Urban Development-funded buildings are all areas where net zero-energy housing could be utilized. ■

# Zero-Energy Buildings: High-Performance Buildings Research Case Studies

**C**ommercial buildings account for 18 percent of U.S. energy consumption. This number continues to increase, primarily because the floor area continues to increase and the life span of buildings exceeds 30 years. Energy consumption will continue to increase until buildings can be designed to produce more energy than they consume. Based on this conclusion, DOE's Building Technologies Program has established a goal for marketable net zero-energy buildings by 2025.

A net zero-energy building produces as much energy as it uses over the course of a year. Net zero-energy buildings are designed to be extremely energy efficient and have low energy requirements. To meet the remaining energy needs, net zero-energy buildings typically use renewable energy generated on site. Despite the interest in zero-energy buildings, there is no common definition, or even a

common understanding, of what the term means. Net zero-energy buildings can be defined in a number of ways, depending on overall goals. Each type of building has merit and value in reducing energy impact. A building may meet multiple zero-energy building definitions. The more definitions it meets, the more merit it has as a zero-energy building.

Following are four ways in which net zero-energy buildings are described:

**Net Zero Site Energy.** A site zero energy building produces at least as much energy as it uses in a year, when accounted for at the site. Typically the measurement time frame is annual.

**Net Zero Source Energy.** A source zero energy building produces at least as much energy as it uses in a year, when accounted for at the source. Source energy refers to the primary energy required to generate and deliver the energy to the site. To

calculate a building's total source energy, imported and exported energy is multiplied by the appropriate site-to-source conversion multipliers.

**Net Zero Energy Costs.** In a net zero energy costs building, the amount of money the utility pays the building owner for the energy the building exports to the grid is at least equal to the amount the owner pays the utility for the energy services and energy used over the year.

**Net Zero Energy Emissions.** A net zero energy emissions building produces at least as much emissions-free renewable energy as it uses from emission-producing energy sources annually.

For more information on net zero energy buildings and other information on Building Technologies program research on High Performance Buildings, go to [www.eere.energy.gov/buildings/highperformance/](http://www.eere.energy.gov/buildings/highperformance/). ■

**T**he following reports summarize findings from research that was conducted at the National Renewable Energy Laboratory (NREL) to understand the issues related to the design, construction, and operation of the current generation of low-energy buildings, and use this information to recommend future research on commercial buildings to meet BT goal for creating marketable zero-energy buildings by 2025:

*Energy Design and Performance Analysis of the Big Horn Home Improvement Center* — [www.nrel.gov/docs/fy05osti/34930.pdf](http://www.nrel.gov/docs/fy05osti/34930.pdf)

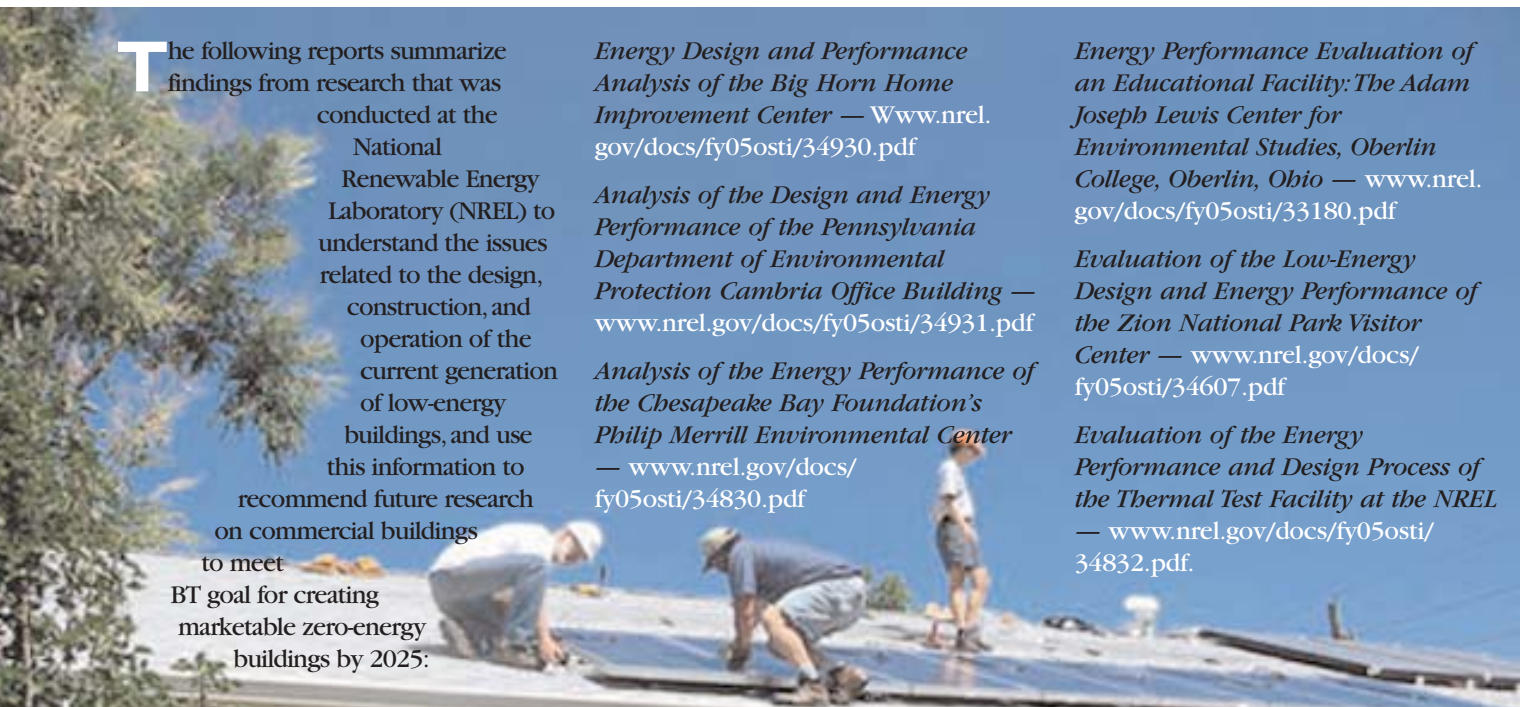
*Analysis of the Design and Energy Performance of the Pennsylvania Department of Environmental Protection Cambria Office Building* — [www.nrel.gov/docs/fy05osti/34931.pdf](http://www.nrel.gov/docs/fy05osti/34931.pdf)

*Analysis of the Energy Performance of the Chesapeake Bay Foundation's Philip Merrill Environmental Center* — [www.nrel.gov/docs/fy05osti/34830.pdf](http://www.nrel.gov/docs/fy05osti/34830.pdf)

*Energy Performance Evaluation of an Educational Facility: The Adam Joseph Lewis Center for Environmental Studies, Oberlin College, Oberlin, Ohio* — [www.nrel.gov/docs/fy05osti/33180.pdf](http://www.nrel.gov/docs/fy05osti/33180.pdf)

*Evaluation of the Low-Energy Design and Energy Performance of the Zion National Park Visitor Center* — [www.nrel.gov/docs/fy05osti/34607.pdf](http://www.nrel.gov/docs/fy05osti/34607.pdf)

*Evaluation of the Energy Performance and Design Process of the Thermal Test Facility at the NREL* — [www.nrel.gov/docs/fy05osti/34832.pdf](http://www.nrel.gov/docs/fy05osti/34832.pdf).





# Hybrid Solar Lighting Illuminates Energy Savings for Government Facilities

*New technology provides high-quality lighting for facilities and reduces waste heat to lower energy loads*

Artificial lighting accounts for almost a quarter of the energy consumed in commercial buildings and 10–20 percent of energy consumed by industry. Solar lighting can significantly reduce artificial lighting requirements and energy costs in many commercial and industrial buildings and in institutional facilities such as schools, libraries, and hospitals.

Hybrid solar lighting provides an exciting new means of reducing energy consumption while also delivering significant benefits associated with natural lighting in commercial buildings. Hybrid solar lighting contributes to meeting the EAct 2005 requirements for renewable energy consumption by the Federal government to be not less than 3 percent in FY 2007–2009, 5 percent in FY 2010–2012, and 7.5 percent in 2013 and thereafter.

Hybrid lighting technology was

originally developed for fluorescent lighting applications but recently has been enhanced to work with incandescent accent-lighting sources, such as the parabolic aluminized reflector (PAR) lamps commonly used in retail spaces.

Commercial building owners — specifically retailers — use the low efficiency PAR lamps because of their desirable optical properties and positive impact on sales. Yet the use



of this inefficient lighting results in some retailers' spending 55–70 percent of their energy budgets on lighting and lighting-related energy costs.

Hybrid lighting has the potential to significantly reduce energy consumption while also maintaining or exceeding lighting quality requirements. Implementation of the hybrid solar lighting

technology across the U.S. would represent significant energy savings to the country and would provide building managers with a near-term, energy-efficient, higher quality, economically viable alternative to incandescent lamps.

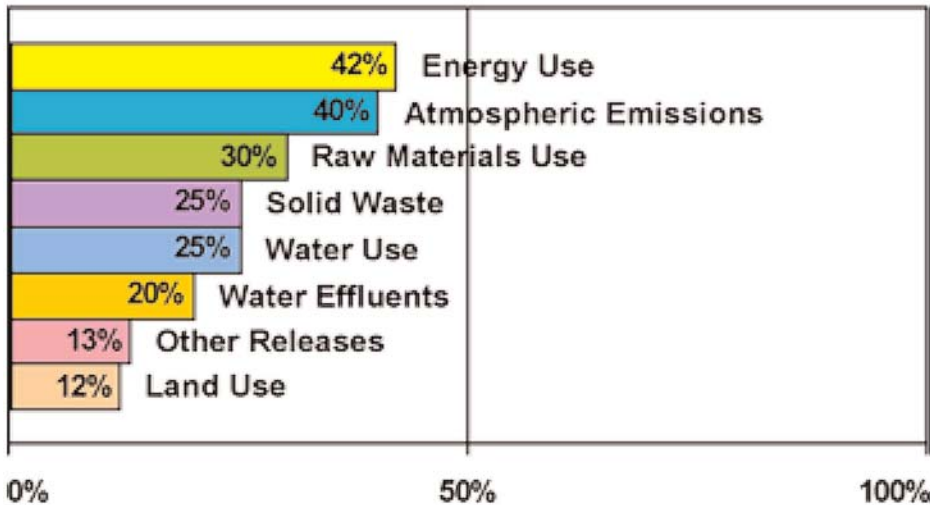
Future R&D is aimed at enhancing the performance and reliability of the technology as well as extending the application of the system to work with newly emerging solid-state lighting sources. The hybrid solar lighting technology delivers the benefits of natural lighting with the advantages of an electric lighting system — flexibility, convenience, reliability, and control — and overcomes the constraints that marginalized the use of day lighting in the 20th century.

To download a copy of Hybrid Solar Lighting Illuminates Energy Savings for Government Facilities, go to [http://www.eere.energy.gov/femp/pdfs/tf\\_hybridsolar.pdf](http://www.eere.energy.gov/femp/pdfs/tf_hybridsolar.pdf). ■



# Painting the Base Green: LEED-EB Helps the Navy Certify Sustainability of Existing Buildings

## Environmental Impact of Buildings Percentage of U.S., Annual Impact



*Systematic Evaluation and Assessment of Building Environmental Performance (SEABEP), paper for presentation to "Buildings and Environment", Paris, 9-12 June, 1997. Source: Levin, H. (1997)*

The Navy has registered and is on the way to having its first sustainable, LEED-certified existing building. That building is Naval Base Ventura County (NBVC) Building 1100 - the headquarters of Naval Facilities (NAVFAC) Engineering Service Center (ESC).

E.O. 13423 directs each agency to "ensure that ...15 percent of the existing Federal capital asset building inventory of the agency, as of the end of fiscal year 2015, incorporates the sustainable practices in the *Guiding Principles*."

It is appropriate that the E.O. gives attention to existing buildings because buildings use the lion's share of nonrenewable resources and greatly contribute to the emission of greenhouse gasses.

The Navy has put in place strong requirements that require all new

buildings to be at least LEED-New Construction-Silver certified. However, the Navy builds only about 100 new buildings each year. It operates and maintains more than 50,000 existing ones.

The Navy is using the LEED-Existing Buildings (EB) standard to certify Building 1100. LEED-EB is a method to assess existing buildings for their operations and maintenance with respect to sustainability criteria. Agencies can use it to document that the buildings are being operated and maintained in a sustainable manner. The MOU Guiding Principles align closely with the categories in LEED-EB. LEED-EB has prerequisites and credits in the categories of Sustainable Sites, Energy and Atmosphere, Materials and Resources, Water Efficiency, and Indoor Environmental Quality.

A cross-disciplinary team is conducting the LEED-EB certification. The team is headed by Bret Gean, an architect, and includes mechanical, electrical, and environmental engineers from multiple NAVFAC business lines. Each member contributes his or her expertise in an integrated approach. According to Bret, "This command is truly walking its talk and leading the efforts for increasing the sustainability and efficiencies of our inventory of existing building." Bret and his team have identified more than 40 LEED-EB credits the Navy can achieve by taking actions to improve the building and its operations in the LEED-EB categories.

There is a wide range of benefits available to the Navy through adopting the actions to meet requirements of the E.O. All have been well documented by organizations who have already taken action to increase the sustainability of their buildings. The benefits can be grouped into three categories: economic, environmental, and social.

**Economic benefits** come from several sources. The first, cost reductions from use of resources, is easy to quantify. They include reduction in energy and water use and other improvements in building operations. The quantifiable economic benefits for building 1100 are projected at a net benefit of more than \$19,000 per year, with a payback of implementation costs in 4.4 years. Other economic benefits, which are more difficult to quantify, include increased productivity and decreased absenteeism. Others are qualitative. They can be the hardest to measure but are potentially the most valuable. They include improved employee morale, lower turnover, improved recruiting, and improved >>>

>>> community relations.

**Social Benefits.** A sustainably operated building has healthier and more productive employee workspaces. Adopting the green practices available through LEED-EB can improve indoor air quality through reductions of particulate matter in the air and exposure to irritating and harmful chemicals. In addition, a demonstrated commitment to environmental responsibility through LEED-EB certification can serve as an effective recruiting tool in a competitive employment environment. LEED-EB can also demonstrate Navy bases' interest in being a "good neighbor" to the communities outside of their gates. Supervisors and senior managers of Ventura County have actively expressed their interest in sustainability and are looking for opportunities to partner with NBVC

and its tenants to adopt sustainable practices.

**Environmental Benefits.** Adoption of LEED-EB also brings numerous environmental benefits. These include reductions in energy and water use, pollution (both directly from the building and indirectly through its operation), and light pollution. A study of the cuts in water usage in Building 1100 estimates that the Navy will slice water use by two-thirds.

The Navy plans to have NAVFAC ESC headquarters, Building 1100, certified as LEED-EB silver by early fall 2008. The Navy plans to use that success as a springboard to apply the knowledge gained to the more than 7,500 buildings required to be certified to meet the E.O. requirements as well as increasing the sustainability of the entire Navy inventory of existing buildings.

Clearly, making just one building sustainable will not meet the E.O. requirements. So Building 1100 is just a start. The Navy is documenting the lessons learned through the certification of this first Navy building and will use the experience to develop the means to rapidly increase the sustainability of at least the required 15 percent of building inventory. Methods include creating and deploying standard contracting language for operating services to ensure sustainable methods are used across all Navy buildings. The Navy is working with the other military services to share the knowledge and methods required to meet the requirement.

For more information, contact Joseph A. Connett, P.E., Director, Facilities Systems Division, Code 64, NAVFAC Engineering Service Center, [joe.connett@navy.mil](mailto:joe.connett@navy.mil), phone: 805-982-1570. ■



# Federal Resources -- Selection of Guides, Reports, Studies, and Tools

**W**hole Building Design Guide (WBDG) is a web-based portal providing government and industry practitioners with up-to-date information on a wide range of building-related guidance, criteria, and technology from a 'whole buildings' perspective. The portal is organized into three major categories: design guidance, project management and operations and maintenance. A sample of resources available on the WBDG include: Federal Green Guide for Specifiers, Memorandum of Understanding for Federal Leadership in High Performance and Sustainable Buildings, Technical Guidance for the Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding, GSA's LEED Application Guide and LEED Cost Study, Building Envelope Design Guide, Federal Sustainable Buildings database, Construction Criteria Base database, and Construction Waste Management Database. To download a copy of these resources, visit the WBDG at: [www.wbdg.org](http://www.wbdg.org).

**FedCenter.gov** has seven categories of Federal and non-Federal sustainable design informational resources: regulation, guidance, and policy; supporting information and tools; directories, catalogues, and newsletters; libraries and repositories; Federal and non-Federal organizations; lessons learned; training, presentations, and briefings; and conferences and events. Some of the Federal resources and programs listed on FedCenter.gov include: Pentagon Field Guide for Sustainable Construction, Air Force Sustainable Facilities Guide, DOE Energy Plus software tool, EPA Indoor Environments Program, the Federal Network for Sustainability, United Nations Commission on Sustainable Development, Sustainability at NASA,

US Army Sustainability Program, and the USDA Sustainable Program. Visit: [www.fedcenter.gov/programs/sustainability/](http://www.fedcenter.gov/programs/sustainability/) for more information.

**FEMP** website contains links to sustainable design databases, guides, reports, and studies produced by DOE and national laboratories. Resources available on the FEMP website consist of:

- On-line Guide for Energy Management at Federal Data Centers
- Operations and Maintenance Best Practices Guide
- Procurement of Architectural and Engineering Services for Sustainable Buildings: A Guide for Federal Project Managers
- Business Case for Sustainable Design in Federal Facilities
- Building Cost and ISWG Newsletter - March 2007
- 8 Performance Metrics: Data Collection Protocol
- Securing Buildings and Saving Energy: Opportunities in the Federal Sector
- The High Performance Buildings Database

To view these resources, visit the FEMP website, at: [www1.eere.energy.gov/femp/sustainable/sustainable\\_resources.html#links](http://www1.eere.energy.gov/femp/sustainable/sustainable_resources.html#links).

**Federal Facility Council (FFC)**, its parent body, the Board on Infrastructure and the Constructed Environment, produce more 100 reports on a broad range of facilities-related topics. FFC publications are available on-line at: [www7.nationalacademies.org/ffc/FFC\\_Publications.html](http://www7.nationalacademies.org/ffc/FFC_Publications.html).

## Non-Federal Resources -- Selection of Guides, Reports, Studies, and Tools

**US Green Building Council (USGBC)** provides users access to obtain Leadership in Energy and Environmental Design (LEED) guides and resources. For more information, visit the USGBC website at: [www.usgbc.org](http://www.usgbc.org).

**Sustainable Buildings Industry Council (SBIC)** offers resources for designing Federal, commercial, residential and K-12 school buildings based on a 'whole building approach to design'. They include High Performance School Buildings Resource and Strategy Guide©; residential Green Building Guidelines©; ENERGY-10™ design tool; and live and web-based training courses. Visit [www.SBICouncil.org](http://www.SBICouncil.org).

**American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE)** publishes a monthly magazine, a quarterly journal, a quarterly magazine, and publications on research from ASHRAE about current heating ventilation, air-conditioning and refrigeration (HVAC&R) technology. More information is available at: [www.ashrae.org](http://www.ashrae.org).

**Building Design and Construction** produces a monthly magazine, Building Design + Construction Magazine, for architects, contractors, engineers, and owners/developers, a weekly newsletter, eeNews, and a list of building and construction publications. For more information, visit: [www.bdcnetwork.com](http://www.bdcnetwork.com).

**New Building Institute** develops a variety of guidelines for heating applications, lighting products, mechanical systems, and whole >>>

> > > buildings. To view the guidelines, visit: [www.newbuildings.org/guidelines.htm](http://www.newbuildings.org/guidelines.htm).

**Rocky Mountain Institute (RMI)** offers a library of resources and RMI publications with categories on energy, energy security, security, buildings and land, business, communities, climate, transportation, and other resources. View the publications at: [www.rmi.org](http://www.rmi.org).

**GreenBiz.com** has an online search criteria developed with Amazon.com to identify useful books on green business topics. GreenBiz.com also provides guides, reports, tools, and basic information on green buildings. For more information, visit [www.greenbiz.com](http://www.greenbiz.com).

**American Institute of Architects** features publications on architectural graphic standards, integrated practice of architecture, guidelines for design and cost for health care facilities, sustainable residential interiors, and various others at: [https://aia-timssnet.uapps.net/timssnet/products/tnt\\_showprdsplash.cfm](https://aia-timssnet.uapps.net/timssnet/products/tnt_showprdsplash.cfm).

**American Society of Civil Engineers** showcases a monthly newsletter, an online bookstore, a civil engineering magazine and a collection of journals. The publications are available at: [www.asce.org/products.cfm](http://www.asce.org/products.cfm). ■



# GSA High Performance Building Efforts Lead the Way

**G**SA leverages the buying power of the Federal government to acquire best value for taxpayers and our federal customers. This is particularly evident in the delivery of superior workplaces that achieve high-performance and sustainable building objectives.

By working with customer agencies, GSA can assist them in meeting their program needs as well as the requirements of Federal mandates for sustainable design and energy efficiency. GSA uses the LEED Green Building Rating System as a tool for meeting the MOU *Guiding Principles* and a measure of accomplishment in

applying sustainable design principles, as directed in EPAct 2005, E.O. 13423, and EISA. GSA standards address the sustainable design principles as a part of basic requirements.

In March, 2008, the GSA released a comprehensive post-occupancy evaluation of 12 recently constructed green buildings. The report compares measured building performance to a calculated industry standard performance for energy, water, maintenance and operations, waste, recycling, transportation, and occupant satisfaction.

Among the key findings: On

average, these buildings use 26 percent less energy than average U.S. commercial buildings constructed between 1990 and 2003, and 16 percent less than the average Federal building in 2003. Moreover, 11 out of 12 satisfied the criteria for the ENERGY STAR label (energy performance better than 75 percent of all other buildings). And, importantly, a University of California Berkeley survey found that these buildings demonstrate, on average, a 28 percent increase in occupant satisfaction compared to their baseline average. >>>

## Twenty-five GSA Projects Have Achieved LEED Certification

### EPA

- New England Regional Laboratory, Chelmsford, MA
- Science and Technology Center, Kansas City, KS
- Computer Center, Research Triangle Park, NC
- Potomac Yard I, Arlington, VA
- Potomac Yard II, Arlington, VA
- Region 8 Headquarters, Denver, CO

### SSA

- Building Renovation, Woodlawn, MD
- Child Care Center, Woodlawn, MD
- Teleservice Center, Auburn, WA

### DOT

- Office Building, Lakewood, CO

### OSHA

- Salt Lake Technical Center, Sandy, UT

### NPS

- Carl T. Curtis Midwest Regional Office

### IRS

- Scowcroft Building, Ogden, UT
- IRS Kansas City Campus, Kansas City, MO

### DHS

- DHS, Omaha, NE
- CIS, Lincoln, NE

### NOAA

- Satellite Operations Center, Suitland, MD

### VA

- Regional Office, Reno, NV

### USDA

- Service Center, Manhattan, KS

### Courthouses

- Nathaniel Jones Federal Building and U.S. Courthouse, Youngstown, OH
- Howard M. Metzenbaum U.S. Courthouse, Cleveland, OH
- Byron Rogers U.S. Courthouse, Denver, CO
- Wayne L. Morse U.S. Courthouse, Eugene, OR

### Ports of Entry

- Shared Land Port of Entry, Sweetgrass/Coutts, MT/AB

### Federal Office Building

- John J. Duncan Federal Building, Knoxville, TN

>>> From this database of experience it is interesting to note that energy modeling indicates that the buildings on average perform 32.4 percent better than buildings designed to meet ASHRAE Standard 90.1-1999. The number of points achieved for optimizing energy performance range from 0 to 10, the minimum and maximum. Two government-owned buildings would not be eligible for LEED certification with the USGBC requirement, beginning in 2007, that each project must achieve a minimum of 2 energy efficiency credits. Projects that meet the latest energy requirements of EAct 2005 will achieve 6 energy point for being 30 percent better than ASHRAE 90.1-2004. In addition, more than 33.7 million kWh of green power have been purchased as a result of the Green Power credit.

Every project met the following credits:

- Sustainable Sites credit 1: Site Selection
- Water Efficiency credit 1: Water Efficient Landscaping
  - The buildings averaged 83.5 percent reduction in water use for landscaping.
  - Twelve buildings totally eliminated irrigation through the use of native and adaptive plant species.
- Materials & Resources credit : Locally/Regionally Manufactured
  - An average of 42.3 percent of the materials used in the projects were manufactured within 500 miles of the project site.
- IEQ credit: Low Emitting Materials, Carpet
- IEQ credit: Thermal Comfort
- Innovation & Design credit 2: LEED Accredited Professional
 

Other credits achieved by almost every project -
- Materials & Resources credit 2: Construction Waste Management
  - On average 75.1 percent of all construction waste was recycled, reused or otherwise diverted from landfills.
- Materials & Resources credit 4: Recycled Content
  - An average of 24.7 percent of the value of the materials used on each project contained recycled content.
- IEQ credit :Thermal Comfort, permanent monitoring ■

## Office of the Federal Environmental Executive

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