

“GREENING” EXISTING FEDERAL BUILDINGS:

**EXECUTIVE ORDERS, GUIDING PRINCIPLES AND ENERGY STAR’S
PORTFOLIO MANAGER**

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ABOUT THE AUTHOR



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Since joining FEA, Conrad Kelso has been involved with many Facility Condition Assessments, Energy Audits and Sustainability Assessments for buildings across the country. He has assessed building mechanical, plumbing, electrical, fire and life safety, and elevator systems. Mr. Kelso has also provided assistance for LEED point analysis and submitting buildings for LEED certification. Conrad has performed ENERGY STAR Statement of Energy Performance Validations for numerous buildings, which have all subsequently earned their ENERGY STAR.

Mr. Kelso has extensive knowledge of the Uniform and International Building, Fire, Mechanical, and Plumbing Codes, NFPA Standards 13, 14, 20, 72, and the California Energy Code.. He is member of the Association of Energy Engineers, ASHRAE & NFPA.

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By Conrad T. Kelso, PE, CEM, LEED AP O+M

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Executive Order (EO) 13423 dated January 24, 2007 Strengthening Federal Environmental, Energy, and Transportation Management directed all Federal Government Facilities to achieve measured reductions in their resource use. One of the goals set forth in EO 13423 directly is ***15 percent of the existing federal capital asset building inventory should incorporate sustainable practices by the end of fiscal year 2015.***

Executive Order (EO) 13514: Federal Leadership in Environmental, Energy and Economic Performance dated October 8, 2009 reiterated and clarified this goal for Federal Agencies. EO 13514 states, ***“at least 15 percent of the agency’s existing buildings (above 5,000 gross square feet) and building leases (above 5,000 gross square feet) meet the Guiding Principles by fiscal year 2015 and that the agency makes annual progress toward 100-percent conformance with the Guiding Principles for its building inventory.”***

With these goals in mind, it is important to understand what the Guiding Principles are and how to implement them in existing facilities. The Guiding Principles are sustainable practices to be incorporated by facility managers and were created as part of the *Federal Leadership in High Performance and Sustainable Buildings, Memorandum of Understanding*. The Guiding Principles focus on energy and sustainable practices that form a cohesive whole building approach and set forth a strategy for environmental stewardship. They outline sustainable practices to be employed in federal buildings in the areas of energy efficiency, renewable energy, water efficiency, purchasing, pollution prevention, waste prevention, recycling, construction/remodeling, and vehicle fleet management.

To assist in achieving the goals of EO’s 13423 and 13514, the EPA’s ENERGY STAR Portfolio Manager has a ‘Federal High Performance Sustainable Buildings Checklist’ that allows users to track sustainability goals and upload policy documents for each building. The sustainability paths that are available to federal buildings include the Guiding Principles, the US Green Building Council’s Leadership in Energy & Environmental Design (LEED®), and Green Globes. This article will focus on meeting the Guiding Principles.

The ‘Federal High Performance Sustainable Buildings Checklist’ has broken the Guiding Principles into five basic sections: Integrated Design, Energy Performance, Water Conservation, Indoor Air Quality and Environmental Impact of Materials. Each Section tab in Portfolio Manager contains multiple goals to be obtained and checkboxes to illustrate if a goal has been Attained, Not Attained, In Progress, or Not Assessed. Other checkboxes indicate if supporting documentation is on file. Supporting documentation can be uploaded to Portfolio Manager as a convenient place to store all electronic documents regarding compliance with the Guiding Principles.

The Guiding Principles



Employ Integrated Design

While the title ‘Employ Integrated Design’ may sound like it only applies to new construction, several of the policies are in-fact geared towards existing buildings. For existing buildings to comply with the Guiding Principles an integrated team should be assembled to help develop and direct facility policy. The team’s responsibilities include implementing the operational goals for energy, water, material use and recycling, and indoor environmental quality. The goals themselves are directed by the other sections of the Guiding Principles, but weaving the goals together with a building operation plans and providing tenant education are the main responsibilities of the “integrated design” team.

Another facet of the integrated design section is building commissioning, or rather re-commissioning or retro-commissioning. It is a requirement of the Guiding Principles that building commissioning is completed within 4 years prior to reporting the building as meeting the Guiding Principles. The commissioning should be performed by an experienced commissioning provider and tailored to the size and complexity of the building and its system components, in order to optimize and verify performance of fundamental building systems. The commissioning should help the facility meet its energy and water use reduction goals by ensuring proper building system operation.

Optimize Energy Performance

To achieve the first Guiding Principle for energy efficiency, there are three options, (a) achieve an ENERGY STAR rating of 75 or higher, (b) reduce measured building energy use by 20% compared to building energy use in 2003 or a year thereafter with quality energy use data or (c) reduce energy use by 20% compared to the ASHRAE 90.1 2007 baseline building design, if design information is available. For those facilities that have been tracking energy use through the Portfolio Manager tool, the results are already populated in the checklist and any option may be selected as meeting the Guiding Principles. The second energy efficiency principle is a requirement to use ENERGY STAR and FEMP-designated energy efficient products, where available. This can be met by both amending and uploading a copy of the facility's purchasing policy or affirmative procurement reports to Portfolio Manager.

When it has been deemed lifecycle cost effective, renewable energy generation projects on agency property for agency use are to be implemented. If a project has been completed, and the energy generated has been inputted into Portfolio Manager, the results will be displayed and compliance can be demonstrated by selecting the appropriate checkbox. On the other hand, if no feasible onsite renewable energy project can be found then a report indicating no cost effective project could be implemented must be uploaded to Portfolio Manager.

As part of optimizing energy efficiency, the Guiding Principles dictate building level energy meters be installed to track and continually optimize the buildings energy performance. Per the Energy Policy Act of 2005 and the Energy Independence and Security Act (EISA) of 2007, electricity, natural gas and steam meters (where natural gas and steam are used) are to be installed to track building energy consumption. Complying with this Guiding Principle requires either the building achieve an ENERGY STAR Label (metering all building energy sources is a pre-requisite of obtaining the ENERGY STAR label) or that billing records or a statement of work indicating meter installation be uploaded into Portfolio Manager.

The last requirement involves benchmarking the facility. Facility managers are required to compare annual performance data with previous years' performance data, preferably by entering annual performance data into the ENERGY STAR Portfolio Manager and/or Labs 21 for laboratories.

Protect and Conserve Water

ENERGY STAR Portfolio Manager has expanded to allow the input of water consumption data. That data can be used to satisfy part of the Federal High Performance Sustainable Buildings Checklist. To comply with the guiding principle, a 20% reduction in water use from baseline is required. Two options are given to demonstrate a 20% reduction. Option 1: The baseline can be calculated from the code mandated fixture performance requirements of the Uniform Plumbing Codes (UPC) 2006 or the International Plumbing Codes (IPC) 2006. Buildings with the baseline should be calculated at 120% of the code fixture performance requirements for plumbing fixtures installed in 1994 or later and fixtures installed before 1994 is to be calculated at 160%. The calculations can be performed using the LEED provided spreadsheet or the Watergy spreadsheet provided by the US Department of Energy. Option 2 is to compare the building's current annual metered water consumption to annual water use in 2003 or a year thereafter with adequate data to prove a minimum 20% reduction.

The LEED and Watergy spreadsheets can also be used to comply with the next guiding principle which is a 50% reduction in water used for landscaping. There are three options for complying with this principle. The first option is to use the above spreadsheets to prove a 50% reduction. The second option is for a measured reduction of 50% based on an irrigation sub-meter. If a sub-meter is not provided for landscape water, the building's combined irrigation and indoor water use must have dropped by 20% as measured against the 2003 annual baseline or a year thereafter. The third option is to use no water for landscape irrigation and upload a site or landscape plan to Portfolio Manager to indicate compliance.

Strategies for achieving this water reduction target include using EPA's WaterSense labeled products or other water conserving products as well as selecting irrigation contractors who are certified through a WaterSense-labeled program.

Enhance Indoor Environmental Quality

In order to maintain a healthy work environment, buildings are required to meet ASHRAE Standard 55-2004 Thermal Environmental Conditions for Human Occupancy and ASHRAE Standard 62.1-2007: Ventilation for Acceptable Indoor Air Quality. Proving that these standards have been met is easy if the facility has already achieved an ENERGY STAR label. As part of the ENERGY STAR Statement of Energy Performance validation process, a registered Professional Engineer is required to oversee a visit to the building and verify proper ventilation and thermal comfort. Achieving the label and uploading the Statement of Energy performance to ENERGY STAR's Portfolio Manager indicates compliance with this Guiding Principle. If an ENERGY STAR Label has not been obtained for the building, a report from a Professional Engineer or architect indicating compliance with ASHRAE standards will suffice.

The Guiding Principles indicate buildings should achieve a minimum daylight factor of 2 percent (excluding all direct sunlight penetration) in 75 percent of all space occupied for critical visual tasks or to provide occupant controlled lighting, allowing adjustments to suit individual task needs, for 50% of regularly occupied spaces. In addition to the above options, the building should have automated lighting controls (occupancy/vacancy sensors with manual-off capability) for appropriate spaces including restrooms, conference and meeting rooms, employee lunch and break rooms, training classrooms, and offices. Compliance with this guiding principle includes uploading indoor light measurements and/or a schematic of floor layout showing occupant and automatic controlled lighting.

Another aspect of proper indoor environmental quality is moisture control. The Guiding Principles indicate a policy should be provided and that the use of an appropriate moisture control strategy should be illustrated. Proper moisture control prevents building damage, minimizes mold contamination, and reduces health risks related to moisture. Any policy and strategy documents as well as any commissioning reports that include inspection driven moisture prevention should be uploaded to Portfolio Manager to indicate compliance with the Guiding Principles.

Other policies to implement include smoking prohibition, integrated pest management, and the use of low-emitting materials. Smoking should be prohibited within the building and within 25 feet of all building entrances, operable windows, and ventilation intakes. An integrated pest management policy should be implemented with techniques as appropriate to minimize pesticide usage. Pesticides should only be used when needed and must be EPA-registered. The facility purchasing policy should be updated to mandate the use of low emitting materials for building modifications, maintenance, and cleaning.

Reduce Environmental Impact of Materials

The final section of the Guiding Principles involves the facility's purchasing policies and implementation of a building wide recycling program in order to reduce the environmental impact of purchased materials. Purchasing policy should outline a preference for products meeting or exceeding EPA's recycled content recommendations for maintenance and cleaning. For non-EPA designated products, use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of the total value of the materials. These products should be selected over non-recycled content products if the products meet performance requirement and are available at reasonable cost. EPA's recycled content products designations and recycled content recommendations are available on EPA's Comprehensive Procurement Guideline web site at www.epa.gov/cpg.

Purchasing policies should also include preference for bio-based products. These products are designated by the USDA, and are commercial or industrial that are composed in whole, or in significant part, of biological products, renewable agricultural materials (including plant, animal, and marine materials), or forestry materials. Products with the highest biobased content levels should be selected if these designated products meet performance requirements and are available at a reasonable cost. USDA's biobased product designations and biobased content recommendations are available on USDA's BioPreferred web site at www.usda.gov/biopreferred.

Buildings should use products that have a lesser or reduced effect on human health and the environment over their lifecycle when compared with competing products or services that serve the same purpose. A number of standards and ecolabels are available in the marketplace to assist specifiers in making environmentally preferable decisions. For recommendations, consult the Federal Green Construction Guide for Specifiers at www.wbdg.org/design/greenspec.php

Another Guiding Principle is to provide reuse and recycling services for building occupants, where markets or on-site recycling exist. Salvage, reuse and recycling services for waste generated from building operations, maintenance, repair and minor renovations, and discarded furnishings, equipment and property should be provided. This could include such things as beverage containers and paper from building occupants, batteries, toner cartridges, outdated computers from an equipment update, and construction materials from a minor renovation.

Finally, the use of ozone depleting compounds (where alternative environmentally preferable products are available) should be eliminated. Use alternatives to ozone-depleting substances to the maximum extent possible, as identified by EPA's Significant New Alternatives Policy (SNAP) program. Do not purchase or use substances identified as unacceptable under SNAP and use alternatives consistent with SNAP regulatory requirements. In addition, do not purchase aerosols or foam products except for those permitted by 40 CFR part 82 subpart C, and do not use halons in fire suppression systems. Compliance can be documented by uploading an amended purchasing policy or affirmative procurement reports in Portfolio Manager.

Closing

At any time during the process, a report can be generated through Portfolio Manager's Federal High Performance Sustainable Buildings Checklist. This report indicates if action is required, compliance verification documents on file, the responsible team member and any comments or notes for every Guiding Principle to be met before 2015.

Establishing your baseline energy use, water use, and greenhouse gas emissions through tools such as ENERGY STAR Portfolio Manager identifies under-performing buildings as well as targeting buildings well-suited to meet the EO requirements. Further, tracking your consumption, particularly your energy consumption, allows you to directly see the impact the measures you are implementing are having on your operating efficiency and your bottom line. Federal government agencies and federal real property managers will undoubtedly face challenges when complying with EO 13423 and EO 13514, however, the sustainable practices outlined in the Guiding Principles are worthy of investigation. Prioritization of the practices by first implementing those that will produce a high financial payback combined with other sustainability projects that have a measurable environmental value, will lead to EO compliance and ultimately a more efficient building. By following these Guiding Principles, your facility will be part of the 15% of your agency's existing buildings required to be in compliance with EO 13423 and be working forwards the 100% of buildings goal highlighted in EO 13514.

References:

1. Executive Order 13423 Strengthening Federal Environmental, Energy, and Transportation Management; Federal Register Vol. 72, No. 17; Friday, January 26, 2007
2. Executive Order 13514 Federal Leadership in Environmental, Energy, and Economic Performance; Federal Register Vol. 74, No. 194; Thursday, October 8, 2009
3. Federal Leadership in High Performance and Sustainable Buildings, Memorandum of Understanding
4. US EPA's ENERGY STAR Portfolio Manager; <http://www.energystar.org>