

HIGH PERFORMANCE and SUSTAINABLE BUILDINGS GUIDANCE

Final (12/1/08)

PURPOSE

The Interagency Sustainability Working Group (ISWG), as a subcommittee of the Steering Committee established by Executive Order (E.O.) 13423, initiated development of the following guidance to assist agencies in meeting the high performance and sustainable buildings goals of E.O. 13423, section 2(f).¹

E.O. 13423, sec. 2(f) states “In implementing the policy set forth in section 1 of this order, the head of each agency shall: ensure that (i) new construction and major renovations 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)², 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*.”

This guidance accomplishes the following: (1) Updates the *Guiding Principles for Sustainable New Construction and Major Renovations*, (2) establishes a separate *Guiding Principles for Sustainable Existing Buildings*, (3) clarifies reporting guidelines for entering information on Sustainability Data Element #25 in the Federal Real Property Profile (FRPP) database, and (4) explains how to calculate the percentage of buildings/square footage that are compliant with the *Guiding Principles*.

Legislation enacted subsequent to the issuance of E.O. 13423 was considered in drafting both sets of *Guiding Principles* described herein. This guidance shall be reviewed every two years, at a minimum, for potential revisions to keep pace with evolving sustainable building practices and new regulations and/or legislation.

For a set of answers to frequently asked questions (FAQs) on this guidance, please visit: <www.wbdg.org/references/sustainable_eo.php>. These FAQs are based on comments received during the development of this guidance, and will be updated as necessary.

¹ Additional Federal guidance on the sustainability aspects of Executive Order 13423 can be found at: http://www1.eere.energy.gov/femp/controlledaccess/sustainable_E.O.13423.html

Additional Technical Guidance on requirements and strategies for meeting the *Guiding Principles* is available at www.wbdg.org/sustainableE.O.

² In 2006, the Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding outlined *Guiding Principles* for Federal Leadership in High Performance and Sustainable Buildings. http://www.wbdg.org/pdfs/sustainable_mou.pdf

REPORTING REQUIREMENTS

To ensure accuracy and consistency in reporting across agencies and to leverage existing resources dedicated to agency real property management, data on compliance with E.O. 13423, sec. 2(f), is to be reported to the Federal Real Property Profile (FRPP) database managed by the Federal Real Property Council (FRPC).³ All Executive agencies are already required to report annual inventory and performance data at the individual asset level on all real property assets: including land, buildings, and structures.

As part of the Fiscal Year 2008 reporting, the FRPC, in consultation with ISWG, established a “sustainability” data element to be reported on all building assets (optional for land assets and structures) to capture agency progress toward meeting the Executive Order goal in section 2(f). The guidance issued by the FRPC reads as follows:

Sustainability Data Element (#25)	Required Information
Sustainability	<p>Reflects whether or not an asset meets the sustainability goals set forth in Section 2 (f) of Executive Order 13423.</p> <p>Options are:</p> <ul style="list-style-type: none"> • Yes (1) – asset has been assessed and meets guidelines set forth in Section 2 (f) of Executive Order 13423 • No (2) – asset has been assessed and does not meet guidelines set forth in Section 2 (f) of Executive Order 13423 • Not yet evaluated (3) – asset has not yet been evaluated on whether or not it meets guidelines set forth in Section 2 (f) of Executive Order 13423 • Not applicable (4) – guidelines set forth in Section 2 (f) of Executive Order 13423 do not apply to the asset

The FRPC issued the Fiscal Year 2008 reporting instructions on June 23, 2008.⁴ All agency data is to be reported to the FRPP database no later than December 15th of each year. Reporting of all inventory and performance data is to be coordinated with the agency’s Senior Real Property Officer. The reporting of data for the “sustainability” data element is **optional** for FY 2008 and **required** for FY 2009 and beyond.

³ The Federal Real Property Council was established under EO 13327, Federal Real Property Asset Managed, issued February 4, 2004.

⁴ The FRPC annual guidance and FRPP reporting instructions can be found at: http://www.whitehouse.gov/omb/financial/fia_asset.html

In order to select “Yes (1)” for a sustainable building, an agency must verify that it meets the sustainability requirements for new, existing, or leased buildings as defined in this document.

The “Not applicable (4)” option is only appropriate for structures and land assets. Information on the “sustainability” data element is required on all buildings reported to the FRPP.

CRITERIA FOR DETERMINING COMPLIANCE WITH THE GUIDING PRINCIPLES BASED UPON TYPE OF BUILDING

New construction and major renovations can be considered compliant with the Guiding Principles and reported ‘Yes (1)’ under the sustainability data element when either Option New Construction 1 (NC-1) or Option NC-2 is met:

OPTION NC-1

An agency can demonstrate that a building is compliant with each of the five *Guiding Principles for Sustainable New Construction and Major Renovations* (provided in this document), or

OPTION NC-2

A documented commitment to third-party certification was made (e.g., registering a project) for projects with a design contract that was awarded prior to October 1, 2008 **AND** the building has been third-party certified to meet the requirements of a multi-attribute green building standard or rating system developed by an ANSI-accredited organization.

Existing buildings can be considered compliant with the Guiding Principles and reported ‘Yes (1)’ under the sustainability data element when either Option Existing Buildings 1 (EB-1) or Option EB-2 is met:

OPTION EB-1

An agency can demonstrate that a building is compliant with each of the five *Guiding Principles for Sustainable Existing Buildings* (provided in this document), or

OPTION EB-2

A documented commitment to third-party existing building certification was made (e.g., registering a project) prior to October 1, 2008 **AND** the building is third-party certified to meet the requirements of a multi-attribute green building standard or rating system developed by an ANSI-accredited organization.

Agency-leased buildings can be considered compliant with the Guiding Principles and reported 'Yes (1)' under the sustainability data element when Option Leases 1 (L-1) or Option L-2 is met:

OPTION L-1

An agency can demonstrate that a building is compliant with the appropriate set of *Guiding Principles*, or

OPTION L-2

At any point, the building has been third-party certified to meet the requirements of a multi-attribute green building standard or rating system developed by an ANSI-accredited organization.

SUSTAINABLE BUILDING IMPLEMENTATION PLANS

Progress and status regarding compliance with E.O. 13423, sec. 2(f) shall be documented in the agency's Sustainable Building Implementation Plan (SBIP).

- Agencies should include a discussion of the independent validation and verification (IV&V) process established to ensure compliance with the *Guiding Principles* and accuracy of the data reported to the FRPP.
- If the previous version of the *Guiding Principles* (dated 1/24/06) was used to assess a building, document which version is applicable in the agency's SBIP.
- For sustainable buildings leased by another Federal entity (e.g., General Services Administration) on an agency's behalf, information and characterization of the buildings, or spaces within, may be identified in the annual SBIP of the agency occupying the building, even though it is not included in that Agency's FRPP submission.
- Agencies should describe the strategies (including disposition) and key milestones for evaluating buildings reported to the FRPP as "Not yet evaluated (3)".
- It is recognized that agency-owned and leased facilities have different challenges in meeting the *Guiding Principles*. Therefore, agencies are encouraged to separately analyze its agency-owned and leased buildings portfolio in the SBIP.
- Along with the total number of buildings and total square footage, agencies shall report their capital asset threshold⁵, and the percentage of buildings and square footage above and below the threshold.

⁵ OMB Circular A-11 Part 7 Supplemental & EO 13227 define what constitutes the capital asset building inventory.

CALCULATION OF PERCENTAGE OF EACH AGENCY'S BUILDING INVENTORY THAT COMPLIES WITH THE GUIDING PRINCIPLES

The percentage of each agency's building inventory meeting the Criteria for Compliance with the *Guiding Principles* shall be calculated in two ways: (1) by square footage of buildings and (2) by number of buildings. All buildings, including those below the agency's capital asset threshold, must be reported in the FRPP.

The equations to calculate the percentage (%) of buildings meeting the *Guiding Principles* based on the entries in the Sustainability Data Element are as follows:

By Square Feet

Sustainability % = [(square feet of buildings reporting "Yes (1)") / (square feet of buildings reporting "Yes (1)," "No (2)," and "Not yet evaluated (3)")] x 100

By Number of Buildings

Sustainability % = [(number of buildings reporting "Yes (1)") / (number of buildings reporting "Yes (1)," "No (2)," and "Not yet evaluated (3)")] x 100

NOTE: The total square footage of buildings reporting "Yes (1)," "No (2)," and "Not yet evaluated (3)" should be equal to the square footage of all buildings on which an agency reports in their FRPP submission.

GUIDING PRINCIPLES FOR SUSTAINABLE NEW CONSTRUCTION AND MAJOR RENOVATIONS

I. Employ Integrated Design Principles

Integrated Design. Use a collaborative, integrated planning and design process that

- Initiates and maintains an integrated project team as described on the Whole Building Design Guide <http://www.wbdg.org/design/engage_process.php> in all stages of a project's planning and delivery
- Integrates the use of OMB's A-11, Section 7, Exhibit 300: *Capital Asset Plan and Business Case Summary*
- Establishes performance goals for siting, energy, water, materials, and indoor environmental quality along with other comprehensive design goals and ensures incorporation of these goals throughout the design and lifecycle of the building
- Considers all stages of the building's lifecycle, including deconstruction.

Commissioning. Employ commissioning practices tailored to the size and complexity of the building and its system components in order to verify performance of building components and systems and help ensure that design requirements are met. This should include an experienced commissioning provider, inclusion of commissioning requirements in construction documents, a commissioning plan, verification of the installation and performance of systems to be commissioned, and a commissioning report.

II. Optimize Energy Performance

Energy Efficiency. Establish a whole building performance target that takes into account the intended use, occupancy, operations, plug loads, other energy demands, and design to earn the ENERGY STAR® targets for new construction and major renovation where applicable. For new construction, reduce the energy use by 30 percent compared to the baseline building performance rating per the American National Standards Institute (ANSI)/American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., (ASHRAE)/Illuminating Engineering Society of North America (IESNA) Standard 90.1-2007, Energy Standard for Buildings Except Low-Rise Residential. For major renovations, reduce the energy use by 20 percent below pre-renovations 2003 baseline. Laboratory spaces may use the Labs21 Laboratory Modeling Guidelines. Use ENERGY STAR® and FEMP-designated Energy Efficient Products, where available.

On-Site Renewable Energy. Per the Energy Independence and Security Act (EISA) Section 523, meet at least 30% of the hot water demand through the installation of solar hot water heaters, when lifecycle cost effective.

Per Executive Order 13423, implement renewable energy generation projects on agency property for agency use, when lifecycle cost effective.

Measurement and Verification. Per the Energy Policy Act of 2005 (EPAAct) Section 103, install building level electricity meters in new major construction and renovation projects to track and continuously optimize performance. Per EISA Section 434, include equivalent meters for natural gas and steam, where natural gas and steam are used.

Benchmarking. Compare actual performance data from the first year of operation with the energy design target, preferably by using ENERGY STAR® Portfolio Manager for building and space types covered by ENERGY STAR®. Verify that the building performance meets or exceeds the design target, or that actual energy use is within 10% of the design energy budget for all other building types. For other building and space types, use an equivalent benchmarking tool such as the Labs21 benchmarking tool for laboratory buildings.

III. Protect and Conserve Water

Indoor Water. Employ strategies that in aggregate use a minimum of 20 percent less potable water than the indoor water use baseline calculated for the building, after meeting the EPAAct 1992, Uniform Plumbing Codes 2006, and the International Plumbing Codes 2006 fixture performance requirements. The installation of water meters is encouraged to allow for the management of water use during occupancy. The use of harvested rainwater, treated wastewater, and air conditioner condensate should also be considered and used where feasible for nonpotable use and potable use where allowed.

Outdoor Water. Use water efficient landscape and irrigation strategies, such as water reuse, recycling, and the use of harvested rainwater, to reduce outdoor potable water consumption by a minimum of 50 percent over that consumed by conventional means (plant species and plant densities). The installation of water meters for locations with significant outdoor water use is encouraged.

Employ design and construction strategies that reduce storm water runoff and discharges of polluted water offsite. Per EISA Section 438, to the maximum extent technically feasible, maintain or restore the predevelopment hydrology of the site with regard to temperature, rate, volume, and duration of flow using site planning, design, construction, and maintenance strategies.

Process Water. Per the Energy Policy Act of 2005 Section 109, when potable water is used to improve a building's energy efficiency, deploy lifecycle cost effective water conservation measures.

Water-Efficient Products. Specify EPA's WaterSense-labeled products or other water conserving products, where available. Choose irrigation contractors who are certified through a WaterSense labeled program.

IV. Enhance Indoor Environmental Quality

Ventilation and Thermal Comfort. Meet ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy, including continuous humidity control within established ranges per climate zone, and ASHRAE Standard 62.1-2007, Ventilation for Acceptable Indoor Air Quality.

Moisture Control. Establish and implement a moisture control strategy for controlling moisture flows and condensation to prevent building damage, minimize mold contamination, and reduce health risks related to moisture.

Daylighting. Achieve a minimum daylight factor of 2 percent (excluding all direct sunlight penetration) in 75 percent of all space occupied for critical visual tasks. Provide automatic dimming controls or accessible manual lighting controls, and appropriate glare control.

Low-Emitting Materials. Specify materials and products with low pollutant emissions, including composite wood products, adhesives, sealants, interior paints and finishes, carpet systems, and furnishings.

Protect Indoor Air Quality during Construction. Follow the recommended approach of the Sheet Metal and Air Conditioning Contractor's National Association Indoor Air Quality Guidelines for Occupied Buildings under Construction, 2007. After construction and prior to occupancy, conduct a minimum 72-hour flush-out with maximum outdoor air consistent with achieving relative humidity no greater than 60 percent. After occupancy, continue flush-out as necessary to minimize exposure to contaminants from new building materials.

Environmental Tobacco Smoke Control. Implement a policy and post signage indicating that smoking is prohibited within the building and within 25 feet of all building entrances, operable windows, and building ventilation intakes during building occupancy.

V. Reduce Environmental Impact of Materials

Recycled Content. Per Section 6002 of the Resource Conservation and Recovery Act (RCRA), for EPA-designated products, specify products meeting or exceeding EPA's recycled content recommendations. For other products, specify materials with recycled content when practicable. If EPA-designated products meet performance requirements and are available at a reasonable cost, a preference for purchasing them shall be included in all solicitations relevant to construction, operation, maintenance of or use in the building. EPA's recycled content product designations and recycled content recommendations are available on EPA's Comprehensive Procurement Guideline web site at <www.epa.gov/cpg>.

Biobased Content. Per Section 9002 of the Farm Security and Rural Investment Act (FSRIA), for USDA-designated products, specify products with the highest content level per USDA's biobased content recommendations. For other products, specify biobased products made from rapidly renewable resources and certified sustainable wood products. If these designated products meet performance requirements and are available at a reasonable cost, a preference for purchasing them shall be included in all solicitations relevant to construction, operation, maintenance of or use in the building. USDA's biobased product designations and biobased content recommendations are available on USDA's BioPreferred web site at <www.usda.gov/biopREFERRED>.

Environmentally Preferable Products. 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>.

Waste and Materials Management. Incorporate adequate space, equipment, and transport accommodations for recycling in the building design. During a project's planning stage, identify local recycling and salvage operations that could process site-related construction and demolition materials. During construction, recycle or salvage at least 50 percent of the non-hazardous construction, demolition and land clearing materials, excluding soil, where markets or onsite recycling opportunities exist. Provide salvage, reuse and recycling services for waste generated from major renovations, where markets or onsite recycling opportunities exist.

Ozone Depleting Compounds. Eliminate the use of ozone depleting compounds during and after construction where alternative environmentally preferable products are available, consistent with either the Montreal Protocol and Title VI of the Clean Air Act Amendments of 1990, or equivalent overall air quality benefits that take into account lifecycle impacts.

GUIDING PRINCIPLES FOR SUSTAINABLE EXISTING BUILDINGS

I. Employ Integrated Assessment, Operation, and Management Principles

Integrated Assessment, Operation, and Management. Use an integrated team to develop and implement policy regarding sustainable operations and maintenance.

- Incorporate sustainable operations and maintenance practices within the appropriate Environmental Management System (EMS)
- Assess existing condition and operational procedures of the building and major building systems and identify areas for improvement
- Establish operational performance goals for energy, water, material use and recycling, and indoor environmental quality, and ensure incorporation of these goals throughout the remaining lifecycle of the building
- Incorporate a building management plan to ensure that operating decisions and tenant education are carried out with regard to integrated, sustainable building operations and maintenance
- Augment building operations and maintenance as needed using occupant feedback on work space satisfaction.

Commissioning. Employ recommissioning, tailored to the size and complexity of the building and its system components, in order to optimize and verify performance of fundamental building systems. Commissioning must be performed by an experienced commissioning provider. When building commissioning has been performed, the commissioning report, summary of actions taken, and schedule for recommissioning must be documented. In addition, meet the requirements of EISA 2007, Section 432 and associated FEMP guidance.

Building recommissioning must have been performed within four years prior to reporting a building as meeting the *Guiding Principles*.

II. Optimize Energy Performance

Energy Efficiency. Three options can be used to measure energy efficiency performance:

- Option 1: Receive an ENERGY STAR® rating of 75 or higher or an equivalent Labs21 Benchmarking Tool score for laboratory buildings,
- Option 2: Reduce measured building energy use by 20% compared to building energy use in 2003 or a year thereafter with quality energy use data, or

- Option 3: Reduce energy use by 20% compared to the ASHRAE 90.1-2007 baseline building design if design information is available.

Use ENERGY STAR® and FEMP-designated Energy Efficient Products, where available.

On-Site Renewable Energy. Per Executive Order 13423, implement renewable energy generation projects on agency property for agency use, when lifecycle cost effective.

Measurement and Verification. Per the Energy Policy Act of 2005 (EPAAct2005) Section 103, install building level electricity meters to track and continuously optimize performance. Per the Energy Independence and Security Act (EISA) 2007, the utility meters must also include natural gas and steam, where natural gas and steam are used.

Benchmarking. Compare annual performance data with previous years' performance data, preferably by entering annual performance data into the ENERGY STAR® Portfolio Manager. For building and space types not available in ENERGY STAR®, use an equivalent benchmarking tool such as the Labs21 benchmarking tool for laboratory buildings.

III. Protect and Conserve Water

Indoor Water. Two options can be used to measure indoor potable water use performance:

- Option 1: Reduce potable water use by 20% compared to a water baseline calculated for the building. The water baseline, for buildings with plumbing fixtures installed in 1994 or later, is 120% of the Uniform Plumbing Codes 2006 or the International Plumbing Codes 2006 fixture performance requirements. The water baseline for plumbing fixtures older than 1994 is 160% of the Uniform Plumbing Codes 2006 or the International Plumbing Codes 2006 fixture performance requirements, or
- Option 2: Reduce building measured potable water use by 20% compared to building water use in 2003 or a year thereafter with quality water data.

Outdoor Water. Three options can be used to measure outdoor potable water use performance:

- Option 1: Reduce potable irrigation water use by 50% compared to conventional methods, or
- Option 2: Reduce building related potable irrigation water use by 50% compared to measured irrigation water use in 2003 or a year thereafter with quality water data, or
- Option 3: Use no potable irrigation water.

Measurement of Water Use. The installation of water meters for building sites with significant indoor and outdoor water use is encouraged. If only one meter is installed,

reduce potable water use (indoor and outdoor combined) by at least 20% compared to building water use in 2003 or a year thereafter with quality water data.

Employ strategies that reduce storm water runoff and discharges of polluted water offsite. Per EISA Section 438, where redevelopment affects site hydrology, use site planning, design, construction, and maintenance strategies to maintain hydrologic conditions during development, or to restore hydrologic conditions following development, to the maximum extent that is technically feasible.

Process Water. Per EPA Act 2005 Section 109, when potable water is used to improve a building's energy efficiency, deploy lifecycle cost effective water conservation measures.

Water-Efficient Products. Where available, use EPA's WaterSense-labeled products or other water conserving products. Choose irrigation contractors who are certified through a WaterSense-labeled program.

IV. Enhance Indoor Environmental Quality

Ventilation and Thermal Comfort. Meet ASHRAE Standard 55-2004 Thermal Environmental Conditions for Human Occupancy and ASHRAE Standard 62.1-2007: Ventilation for Acceptable Indoor Air Quality.

Moisture Control. Provide policy and illustrate the use of an appropriate moisture control strategy to prevent building damage, minimize mold contamination, and reduce health risks related to moisture. For façade renovations, Dew Point analysis and a plan for cleanup or infiltration of moisture into building materials are required.

Daylighting and Lighting Controls. Automated lighting controls (occupancy/vacancy sensors with manual-off capability) are provided for appropriate spaces including restrooms, conference and meeting rooms, employee lunch and break rooms, training classrooms, and offices. Two options can be used to meet additional daylighting and lighting controls performance expectations:

- Option 1: Achieve a minimum daylight factor of 2 percent (excluding all direct sunlight penetration) in 50 percent of all space occupied for critical visual tasks, or
- Option 2: Provide occupant controlled lighting, allowing adjustments to suit individual task needs, for 50% of regularly occupied spaces.

Low-Emitting Materials. Use low emitting materials for building modifications, maintenance, and cleaning. In particular, specify the following materials and products to have low pollutant emissions: composite wood products, adhesives, sealants, interior paints and finishes, solvents, carpet systems, janitorial supplies, and furnishings.

Integrated Pest Management. Use integrated pest management techniques as appropriate to minimize pesticide usage. Use EPA-registered pesticides only when needed.

Environmental Tobacco Smoke Control. Prohibit smoking within the building and within 25 feet of all building entrances, operable windows, and building ventilation intakes.

V. Reduce Environmental Impact of Materials

Recycled Content. Per section 6002 of RCRA, for EPA-designated products, use products meeting or exceeding EPA's recycled content recommendations for building modifications, maintenance, and cleaning. For other products, use materials with recycled content such that the sum of postconsumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost or weight) of the total value of the materials in the project. If EPA-designated products meet performance requirements and are available at a reasonable cost, a preference for purchasing them shall be included in all solicitations relevant to construction, operation, maintenance of or use in the building. EPA's recycled content product designations and recycled content recommendations are available on EPA's Comprehensive Procurement Guideline web site at <www.epa.gov/cpg>.

Biobased Content. Per section 9002 of FSRIA, for USDA-designated products, use products with the highest content level per USDA's biobased content recommendations. For other products, use biobased products made from rapidly renewable resources and certified sustainable wood products. If these designated products meet performance requirements and are available at a reasonable cost, a preference for purchasing them should be included in all solicitations relevant to construction, operation, maintenance of or use in the building. USDA's biobased product designations and biobased content recommendations are available on USDA's BioPreferred web site at <www.usda.gov/biopreferred>.

Environmentally Preferable Products. 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>.

Waste and Materials Management. Provide reuse and recycling services for building occupants, where markets or on-site recycling exist. Provide salvage, reuse and recycling services for waste generated from building operations, maintenance, repair and minor renovations, and discarded furnishings, equipment and property. 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.

Ozone Depleting Compounds. Eliminate the use of ozone depleting compounds where alternative environmentally preferable products are available, consistent with either the Montreal Protocol and Title VI of the Clean Air Act Amendments of 1990, or equivalent overall air quality benefits that take into account lifecycle impacts.