

VA SUSTAINABLE BUILDINGS PROGRAM

1. **REASON FOR ISSUE:** This handbook establishes Department of Veterans Affairs (VA) policies for establishing sustainable buildings based on VA Directive 0056.
2. **SUMMARY OF CONTENTS/MAJOR CHANGES:**
 - a. Reorganized contents into prescribed handbook format.
 - b. Added new high performance sustainable building guidance from Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," released October 5, 2009.
 - c. Changed the requirement for annual sustainability assessments from all buildings over 50,000 square feet to the main hospital building at each VA medical center and other buildings selected by the VA Green Building Advisory Council.
 - d. Updated reporting and calculation to reflect the current, more efficient process.
 - e. Added additional references and resources for further information.
3. **RESPONSIBLE OFFICE:** Assistant Secretary for Management (004), Office of Asset Enterprise Management (044), Green Management Programs Service (044E)
4. **RELATED DIRECTIVES:** Executive Order 13423: Strengthening Federal Environmental, Energy and Transportation Management, and Executive Order 13514: Federal Leadership in Environmental, Energy, and Economic Performance.
5. **RECISSIONS:** None.

CERTIFIED BY:

/s/
Roger W. Baker
Assistant Secretary for
Information and Technology

**BY DIRECTION OF THE SECRETARY
OF VETERANS AFFAIRS:**

/s/
W. Todd Grams
Executive in Charge,
Office of Management, and
Chief Financial Officer

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SUSTAINABLE BUILDINGS HANDBOOK

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VA SUSTAINABLE BUILDINGS

1. PURPOSE

- a. The Department of Veterans Affairs Sustainable Building Program (VASBP) was established in VA Directive 0056 for the purpose of developing a comprehensive Department-wide sustainable building policy. The VASBP goals and requirements provide a common basis for all administrations and staff offices to comply with federal sustainable building mandates and internal VA goals.
- b. This handbook prescribes the objectives, targets, strategies and tools, and resources for the VA administrations and staff offices to implement and maintain sustainable and high performance buildings.

2. SCOPE

- a. This handbook applies to all facilities included in the VA capital asset building inventory and the administrations and staff offices that manage them. This includes all VA-owned and leased buildings. This handbook also applies to new building construction, major renovations, major construction, minor construction, non-recurring maintenance (NRM) projects, and existing buildings.
- b. This handbook focuses on sustainable buildings, which covers many different areas including energy, water, indoor environmental quality, and materials. VA Energy, Environmental, and Fleet Management handbooks also address the areas referenced above.

3. DEFINITIONS

- a. **Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (MOU).** A voluntary agreement among Federal agencies to establish and follow a common set of guiding principles for sustainable integrated design, energy performance, water conservation, indoor environmental quality, and materials management for agencies in order to accomplish the following goals:
 - (1) Reduce the total ownership cost of facilities;
 - (2) Improve energy efficiency and water conservation;
 - (3) Provide safe, healthy, and productive building environments; and
 - (4) Promote sustainable environmental stewardship.
- b. **Sustainable Building.** Any new or existing building that meets all requirements of the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (See Appendix A and B).

- c. **Third Party Green Building Certification.** Independent verification that a building meets sustainable design and construction requirements.
- d. **Direct-Leased Spaces.** Space leased by VA using its leasing authority.
- e. **Bio-based Materials.** Materials made from substances derived from living matter.
- f. **High-Performance Building.** A building that integrates and optimizes, on a life cycle basis, all major high performance attributes, including energy conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality, and operational considerations.
- g. **Integrated Design Process.** A method of building design planning where all facility stakeholders participate in the design, construction, maintenance, commissioning, and deconstruction phases in order to properly integrate sustainable practices into design.
- h. **Life-cycle Analysis.** A “cradle to grave” analysis of costs and environmental impacts of a product, system, or initiative from inception to disposal.
- i. **New Construction.** Any projects including lease, major construction (\$10 million or higher), minor construction, non-recurring maintenance, and other classes of projects that have any new building construction in the work scope.
- j. **Major Renovation.** Changes to the building that provide significant opportunities for substantial improvement in energy and/or water efficiency. This may include, but is not limited to, replacement of the HVAC system, the lighting system, the building envelope, and other components of the building that have a major impact on energy usage. Major renovation also includes a renovation of any kind with a cost exceeding 25 percent of the replacement value of the building.
- k. **Gross Square Footage (GSF).** The measurement reported in the Federal Real Property Profile (FRPP) for existing buildings and to the Office of Management and Budget (OMB) for major construction projects.

4. ROLES AND RESPONSIBILITIES

- a. The VA Green Building Advisory Council’s responsibilities are as follows:
 - (1) Ensuring that the VA Sustainable Building Implementation Plan complies with all Federal sustainable building requirements and internal VA goals.
 - (2) Ensuring the VA Sustainable Design and Energy Reduction Manual and the VA Sustainability Guidebook for Existing Buildings (under development) comply with all Federal sustainable building requirements and internal VA goals.
 - (3) Prioritizing the list of existing owned facilities to obtain third-party certifications based on available information (e.g., ENERGY STAR[®] ratings, sustainability survey results).
 - (4) Performing annual sustainability surveys.

- b. Each administration and staff office is responsible for compliance with sustainability requirements and standards, as outlined in VA Directive 0056.

5. OBJECTIVES AND TARGETS

- a. **New Construction, Major Renovations, and Leases.** Administrations and staff offices shall ensure that all new construction, major renovations, minor construction, and direct-leased spaces comply with the following five principles described in Appendix A, Guiding Principles for New Construction and Major Renovations (mandated by Executive Orders 13423 and 13514):

- (1) Employ Integrated Design Principles;
- (2) Optimize Energy Performance;
- (3) Protect and Conserve Water;
- (4) Enhance Indoor Environmental Quality; and
- (5) Reduce Environmental Impact of Materials.

- b. **Existing Buildings.** By the end of fiscal year 2015, at least 15 percent of existing VA owned buildings and direct-leases (both by square footage and by number of buildings) larger than 5,000 gross square feet shall incorporate the following five principles described in Appendix B, Guiding Principles for Existing Buildings:

- (1) Employ Integrated Assessment, Operation, and Management Principles;
- (2) Optimize Energy Performance;
- (3) Protect and Conserve Water;
- (4) Enhance Indoor Environmental Quality; and
- (5) Reduce Environmental Impact of Materials.

- c. **Compliance with VA Sustainability Manuals.** All major and minor construction projects shall comply with VA Sustainable Building Design Manuals and the VA Sustainability Guidebook for Existing Buildings. (Internal VA objective)

- d. **Sustainable Building Assessment.** A sustainable building assessment shall be performed annually for the main hospital building at each VA medical center and other selected buildings. (Internal VA objective)

- e. **Benchmarking with the ENERGY STAR™ Portfolio Manager Program.** All “covered facilities” under the Energy Independence and Security Act of 2007 (EISA) Section 432 shall update the ENERGY STAR™ ratings quarterly. This requirement includes all VA

medical centers and VA Direct-Leased Space with a minimum of 5,000 GSF where the electric bills are paid directly by VA. (Internal VA objective)

- f. Reporting.** VA administrations or staff offices that manage the major construction projects or existing spaces shall provide to OAEM all sustainable building data requested by the Department of Energy, the President, Congress, and other entities. Data elements, formats, schedules, and systems for sustainable building related reports should be coordinated with OAEM. (Internal VA objective)

6. STRATEGIES AND TOOLS

a. Sustainability Report on the FRPP

(1) The sustainable building inventory for VA is based on sustainable building data reported in the FRPP. The data reported to the FRPP is provided by the VA administrations and staff offices in response to OAEM's annual Capital Asset Inventory (CAI) data call.

(2) FRPP sustainable building data reporting is required for building assets greater than or equal to 5,000 GSF. Reporting is optional for buildings under 5,000 GSF and structure assets. Sustainability is not reported for land assets.

(3) Sustainability reflects whether or not a real property asset meets the sustainability goals set forth in Section 2 (g) (iii) of Executive Order 13514.

Valid FRPP codes are defined below with their respective numerical codes:

(a) Yes - 1: The asset has been assessed and meets the sustainability goals set forth in Section 2 (g) (iii) of Executive Order 13514.

(b) No - 2: The asset has been assessed and does not meet the sustainability goals.

(c) Not yet evaluated - 3: The asset has not yet been evaluated on sustainability goals.

(d) Not applicable - 4: The guidelines set forth in Section 2 (g) (iii) of Executive Order 13514 do not apply to the asset. This includes assets that will be disposed of by the end of FY 2015.

b. Sustainable Space Calculation

(1) OMB calculates the percent of building inventory that is sustainable by both square footage and by number of buildings. OAEM verifies the calculation using the FRPP data.

(2) In order to calculate the percent of building inventory that VA can consider sustainable by square feet, the following formula is used in accordance with the FRPP codes described above in Section 6a(3):

$$\text{Sustainability \%} = 100 \times$$

[square feet of buildings reporting “Yes (1)” (for buildings ≥ 5,000 GSF)] ÷
 [square feet of buildings reporting “Yes (1)”, “No (2)”, and “Not yet evaluated (3)” (for buildings ≥ 5,000 GSF)]

(3) In order to calculate the percent of building inventory that VA can consider sustainable by number of buildings, the following formula is used in accordance with the FRPP codes described above in Section 6a(3):

$$\text{Sustainability percent} = 100 \times \frac{\text{[number of buildings reporting “Yes (1)” (for buildings } \geq 5,000 \text{ GSF)]}}{\text{[number of buildings reporting “Yes (1)”, “No (2)”, and “Not yet evaluated (3)” (for buildings } \geq 5,000 \text{ GSF)]}}$$

c. Sustainable Spaces

(1) In order for a VA building to meet the sustainability goals (achieve a “Yes (1)” in the FRPP sustainable data element field listed above), the building must meet one of the following conditions:

(a) VA can demonstrate that the building is compliant with each of the five guiding principles (either for “New Construction and Major Renovations” [Appendix A] or “Existing Buildings” [Appendix B]).

(b) A documented commitment to third-party green building certification was made (must have been registered with the third-party certifying organization before October 1, 2008), and the building has received third-party green building certification.

(c) If the building was registered after October 1, 2008, with a third-party green building certification, it must meet all requirements in the “Guiding Principles for Existing Buildings” (Appendix A) and must have received third-party green building certification. If third-party certification does not cover all of the components described in the Guiding Principles for Existing Buildings (Appendix A), separate validation should be performed. The sustainable building design standards include guidance on the use of third-party certification. Obtaining third-party green building certification without meeting all the requirements in the guiding principles would not meet the sustainability goals.

(d) If the building is a lease, it must either (a) demonstrate that the lease is compliant with each of the Guiding Principles for Existing Buildings or (b) receive certification from an ANSI-accredited organization or rating system designated by the high performance and sustainable building guidance at any point in the last five years.

(2) For any project or building included in the sustainable building inventory that cannot meet a particular Guiding Principle, the administration or staff office shall submit a justification document to OEM for the principle that cannot be met.

- d. **Certification and Verification.** Independent verification that a building meets sustainable design and construction requirements.
- e. **Strategic Capital Investment Planning (SCIP).** All Administrations shall include plans to meet sustainability goals for their facilities in their SCIP submissions.
- f. **Integrated Teams**
 - (1) An integrated team should be assembled and used at the earliest phase of any major or minor construction project to develop and achieve sustainable building goals.
 - (2) Integrated team members should have expertise in the areas of sustainable design, energy, building materials, commissioning, measurement and verification (M&V), water efficiency, operations and maintenance, building materials, ventilation and thermal comfort, moisture control, day lighting, indoor air quality, construction waste, and other green building qualifications for the design, construction, and operation of the project.
 - (3) Integrated teams must set sustainability performance targets for the project.

7. REFERENCES

- a. **Federal Laws, Regulations, and Goals.** Federal laws, regulations, and goals regarding sustainable and high performance buildings include the following:
 - (1) Energy Independence and Security Act of 2007 (Public Law 110-114, 121 Stat. 1492), <http://www1.eere.energy.gov/femp/regulations/eisa.html>
 - (2) Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding, <http://www1.eere.energy.gov/femp/pdfs/mouhighperfsustainfedfac.pdf>
 - (3) Executive Order 13423, "Strengthening Federal Environmental, Energy and Transportation Management," <http://www.fedcenter.gov/programs/eo13423/>
 - (4) Executive Order 13514, "Federal Leadership in Environmental, Energy, and Economic Performance," <http://www.fedcenter.gov/programs/eo13514/>
- b. **Internal VA documents.** Internal VA documents relating to sustainable and high performance buildings include the following:
 - (1) VA Sustainable Building Implementation Plan serves as a blueprint for VA actions to achieve sustainable buildings goals. <http://www.green.va.gov/>
 - (2) VA Sustainability Guidebook for Existing Buildings serves as a model for making existing buildings sustainable. <http://www.green.va.gov/>
 - (3) VA sustainable building design standards including the VA Sustainable Design and Energy Reduction Manual provide the architects, engineers, and others engaged in the design and renovation of VA facilities and VA Medical Centers with a guide to meeting

Department-wide energy and water mandates and is required for planning design and construction of all major, non-recurring maintenance (NRM), and minor construction projects. <http://www.cfm.va.gov/til/sustain.asp>

(4) “Strategic Sustainability Performance Plan,” originally issued June 2010 and revised annually, is a summary document that tracks approaches and progress towards Department-wide sustainability goals. <http://www.green.va.gov/docs/2011VAsspp.pdf>

- c. **Resources.** When determining strategies for achieving sustainable and high performance buildings, the following resources should be considered:

Interagency Sustainability Working Group,
http://www1.eere.energy.gov/femp/program/sustainable_workinggroup.html

Department of Energy (DOE)’s Commercial Building Initiative,
http://www.eere.energy.gov/buildings/commercial_initiative/

DOE’s Business Case for Sustainable Design in Federal Facilities,
<http://www1.eere.energy.gov/femp/pdfs/bcsddoc.pdf>

The General Service Administration (GSA)’s Sustainable Facilities Tool,
<http://www.sftool.org/>

Federal Green Construction Guide for Specifiers,
<http://www.wbdg.org/design/greenspec.php>

Environmental Protection Agency (EPA)’s ENERGY STAR™ Portfolio Manager,
<https://www.energystar.gov/istar/pmpam/index.cfm>

US Green Building Council (USGBC)’s LEED third-party green building certification,
<http://www.usgbc.org>

Green Building Initiative (GBI)’s Green Globes third-party green building certification,
<http://www.thegbi.org/>

Whole Building Design Guide, <http://www.wbdg.org/>

Technical Guidance for Implementing the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings,
http://www.wbdg.org/references/sustainable_eo.php

High Performance and Sustainable Building Guidance,
http://www.wbdg.org/pdfs/hpsb_guidance.pdf

APPENDIX A**GUIDING PRINCIPLES FOR SUSTAINABLE NEW CONSTRUCTION, NON-RECURRING MAINTENANCE, MAJOR RENOVATIONS, AND LEASES****1. Employ Integrated Design Principles****a. Integrated Design**

(1) 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.

(2) Integrate the use of OMB's A-11, Section 7, Exhibit 300: Capital Asset Plan and Business Case Summary.

- a) Establish performance goals for siting, energy, water, materials, and indoor environmental quality along with other comprehensive design goals and ensure incorporation of these goals throughout the design and lifecycle of the building.
- b) Consider all stages of the building's lifecycle, including deconstruction.

b. Commissioning

(1) 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 to help ensure that design requirements are met.

(2) This process 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.

2. Optimize Energy Performance**a. Energy Efficiency**

(1) 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.

(2) 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.

(3) For major renovations, reduce the energy use by 20 percent below pre-renovations 2003 baseline.

(4) Laboratory spaces may use the Labs21 Laboratory Modeling Guidelines.

(5) Use ENERGY STAR™ and Federal Energy Management Program (FEMP)-designated Energy Efficient Products where available.

b. On-Site Renewable Energy

(1) Per the Energy Independence and Security Act (EISA) Section 523, meet at least 30 percent of the hot water demand through the installation of solar hot water heaters, when life cycle cost effective.

(2) Per Executive Order 13423, implement renewable energy generation projects on agency property for agency use, when life cycle cost effective.

c. Measurement and Verification

(1) 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.

(2) Per EISA Section 434, include equivalent meters for natural gas and steam, where used.

d. Benchmarking

(1) 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™.

(2) Verify that the building performance meets or exceeds the design target or that actual energy use is within 10 percent of the design energy budget for all other building types.

(3) For other building and space types, use an equivalent benchmarking tool such as the Labs21 benchmarking tool for laboratory buildings.

3. Protect and Conserve Water

a. Indoor Water

(1) 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.

(2) The installation of water meters is encouraged to allow for the management of water use during occupancy.

(3) The use of harvested rainwater, treated wastewater, and air conditioner condensate should also be considered and used where feasible for non-potable use and potable use where allowed.

b. Outdoor Water

(1) Use water efficient landscape and irrigation strategies such as water reuse, recycling, and the use of harvested rainwater in order to reduce outdoor potable water consumption by a minimum of 50 percent over that consumed by conventional means (plant species and plant densities).

(2) The installation of water meters for locations with significant outdoor water use is encouraged.

(3) Employ design and construction strategies that reduce storm water runoff and discharges of polluted water offsite.

(4) 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.

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

d. Water-efficient Products

(1) Specify EPA's WaterSense-labeled products or other water conserving products where available.

(2) Choose irrigation contractors who are certified through a WaterSense labeled program.

4. Enhance Indoor Environmental Quality

a. 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.

b. 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.

5. Daylighting

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

6. 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.

7. Protect Indoor Air Quality during Construction.

- a. 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:
- b. 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.
- c. After occupancy, continue flush-out as necessary to minimize exposure to contaminants from new building materials.

8. 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.

9. Reduce Environmental Impact of Materials

a. Recycled Content

(1) 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.

(2) 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.¹

¹ 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.

b. Bio-based Content

(1) Per Section 9002 of the Farm Security and Rural Investment Act (FSRIA), for U.S. Department of Agriculture (USDA)-designated products, specify products with the highest content level per USDA's bio-based content recommendations. For other products, specify bio-based products made from rapidly renewable resources and certified sustainable wood products.

(2) 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.²

10. 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 eco-labels are available in the marketplace to assist specifiers in making environmentally preferable decisions.³

11. Waste and Materials Management

a. Incorporate adequate space, equipment, and transport accommodations for recycling in the building design.

b. During a project's planning stage, identify local recycling and salvage operations that could process site-related construction and demolition materials.

c. Recycle or salvage, at least 50 percent, of non-hazardous construction, demolition, and land clearing materials (excluding soil) where markets or onsite recycling opportunities exist.

d. Provide salvage, reuse, and recycling services for waste generated from major renovations, where markets or onsite recycling opportunities exist.

12. Ozone Depleting Compounds. The use of ozone depleting compounds should be eliminated where alternative environmentally preferable products are available, and the air quality benefits of the alternative products should be consistent with, or equivalent to, the air quality benefits stated in the Montreal Protocol and Title VI of the Clean Air Act Amendments of 1990.

² USDA's bio-based product designations and bio-based content recommendations are available on USDA's BioPreferred web site at www.usda.gov/biopreferred.

³ For recommendations, consult the Federal Green Construction Guide for Specifiers at www.wbdg.org/design/greenspec.php.

APPENDIX B

GUIDING PRINCIPLES FOR SUSTAINABLE EXISTING BUILDINGS

1. Employ Integrated Assessment, Operation, and Management Principles

- a. Integrated Assessment, Operation, and Management. Use an integrated team to develop and implement policy regarding sustainable operations and maintenance.
- b. Incorporate sustainable operations and maintenance practices within the appropriate Environmental Management System (EMS).
- c. Assess existing condition and operational procedures of the building and major building systems and identify areas for improvement.
- d. Establish operational performance goals for energy, water, material use and recycling, and indoor environmental quality; ensure incorporation of these goals throughout the remaining lifecycle of the building.
- e. 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.
- f. Augment building operations and maintenance as needed using occupant feedback on work space satisfaction.

2. Commissioning

- a. Employ recommissioning, tailored to the size and complexity of the building and its system components, to optimize and verify performance of fundamental building systems.
- b. Commissioning must be performed by an experienced commissioning provider.
 - (1) When building commissioning has been performed, the commissioning report, summary of actions taken, and schedule for recommissioning must be documented. In addition, the requirements of EISA 2007, Section 432 and associated FEMP guidance must be met.
- c. Building recommissioning must have been performed within four years prior to reporting a building as meeting the guiding principles.

3. Optimize Energy Performance

a. Energy Efficiency

- (1) Three alternative methods can be used to measure energy efficiency performance:

(a) Option 1: Receive an ENERGY STAR™ rating of 75 or higher or an equivalent Labs21 Benchmarking Tool score for laboratory buildings.

(b) Option 2: Reduce measured building energy use by 20 percent compared to building energy use in 2003 or a year thereafter with quality energy use data.

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

(d) Use ENERGY STAR™ and FEMP-designated Energy Efficient Products, where available.

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

c. **Measurement and Verification**

(1) Per the Energy Policy Act of 2005 (EPAct2005) Section 103, install building level electricity meters to track and continuously optimize performance.

(2) 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.

d. **Benchmarking**

(1) Compare annual performance data with previous years' performance data, preferably by entering annual performance data into the ENERGY STAR™ Portfolio Manager.

(2) For building and space types not available in ENERGY STAR™, use an equivalent benchmarking tool such as the Labs21 benchmarking tool for laboratory buildings.

4. **Protect and Conserve Water**

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

(1) Option 1: Reduce potable water use by 20 percent compared to a water baseline calculated for the building. The water baseline, for buildings with plumbing fixtures installed in 1994 or later, is 120 percent 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 percent of the Uniform Plumbing Codes 2006 or the International Plumbing Codes 2006 fixture performance requirements.

(2) Option 2: Reduce building measured potable water use by 20 percent compared to building water use in 2003 or a year thereafter with quality water data.

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

(3) Option 1: Reduce potable irrigation water use by 50 percent compared to conventional methods.

(4) Option 2: Reduce building related potable irrigation water use by 50 percent compared to measured irrigation water use in 2003 or a year thereafter with quality water data.

(5) Option 3: Use no potable irrigation water.

c. **Measurement of Water Use**

(1) 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 percent compared to building water use in 2003 or a year thereafter with quality water data.

(2) Employ strategies that reduce storm water runoff and discharges of polluted water offsite.

(3) 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.

d. **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.

e. **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.

5. Enhance Indoor Environmental Quality

a. **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.

b. **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.

c. **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:

(1) 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

(2) Option 2: Provide occupant controlled lighting, allowing adjustments to suit individual task needs, for 50 percent of regularly occupied spaces.

d. **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.

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

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

6. Reduce Environmental Impact of Materials

a. Recycled Content

(1) 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.

(2) 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 and maintenance of or use in the building.⁴

b. Bio-based Content

(1) Per Section 9002 of the Farm Security and Rural Investment Act (FSRIA), for U.S. Department of Agriculture (USDA)-designated products, specify products with the highest content level per USDA's bio-based content recommendations. For other products, specify bio-based products made from rapidly renewable resources and certified sustainable wood products.

(2) 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, and maintenance of or use in the building.⁵

⁴ 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.

c. **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 eco-labels are available in the marketplace to assist specifiers in making environmentally preferable decisions.⁶

d. **Waste and Materials Management**

(1) Provide reuse and recycling⁷ services for building occupants where markets or on-site recycling exists.

(2) Provide salvage, reuse and recycling⁸ services for waste generated from building operations, maintenance, repair and minor renovations, and from discarded furnishings, equipment and property.

e. **Ozone Depleting Compounds.** The use of ozone depleting compounds should be eliminated where alternative environmental preferable products are available, and the air quality benefits of the alternative products should be consistent with, or equivalent to, the air quality benefits stated in the Montreal Protocol and Title VI of the Clean Air Act Amendments of 1990.

⁵ USDA's bio-based product designations and bio-based content recommendations are available on USDA's BioPreferred web site at www.usda.gov/biopreferred.

⁶ For recommendations, consult the Federal Green Construction Guide for Specifiers at www.wbdg.org/design/greenspec.php.

⁷ Recyclables may include beverage containers, paper, batteries, toner cartridges, outdated computers.

⁸ Recyclables may include construction materials from a minor renovation.