



**U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION**

National Policy

**ORDER  
1053.1C**

Effective Date:  
10/26/17

**SUBJ: Energy and Water Management Program for FAA Buildings and Facilities**

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1. Consistent with its mission to provide the safest, most efficient air transportation system in the world, the Federal Aviation Administration (FAA) strives to manage the acquisition, consumption, and conservation of energy and water resources in a manner that minimizes both the expense and the impact of FAA operations on human health and the environment. This is done in a manner that is designed to meet the requirements of applicable laws, executive orders (EO), regulations and Department of Transportation (DOT) policies, while reducing life cycle cost expenditures.
2. This Order establishes policy, delegates authority, and assigns responsibility for ensuring that FAA's energy and water management goals are achieved. In addition, this Order sets forth procedures for the performance, management, and oversight of the Energy and Water Management Program by Agency personnel.
3. Each Line of Business (LOB) and Staff Office (SO) should supplement this Order with guidelines, instructions, or procedures specific to its needs in a manner that is consistent with this Order.
4. Recognizing that program improvement is a vital element in the Program's effectiveness and responsiveness to FAA's evolving needs, users are encouraged to offer suggestions to update and improve this Order through the use of FAA Form 1320-19, Directives Feedback Information.

  
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## Chapter 1. General Information

**1. Purpose of This Order.** This Order establishes Federal Aviation Administration (FAA) policies, procedures, and responsibilities for an Energy and Water Management Program consistent with the Acquisition Management System (AMS), and applicable Federal laws, regulations, Executive Orders (EO) and Department of Transportation (DOT) policies.

**2. Audience.** FAA employees and contractors are required to comply with this Order.

**3. Where Can I Find This Order.** This Order is available on the MyFAA employee website at [https://employees.faa.gov/tools\\_resources/orders\\_notices](https://employees.faa.gov/tools_resources/orders_notices) and on the public website at [http://www.faa.gov/regulations\\_policies/orders\\_notices/](http://www.faa.gov/regulations_policies/orders_notices/).

**4. Cancellation.** This Order cancels FAA Order 1053.1B, *Energy and Water Management Program for FAA Buildings and Facilities*, dated 04/08/13.

**5. Explanation of Policy Changes.** This Order addresses updated energy and water requirements resulting from EO 13693, *Planning for Federal Sustainability in the Next Decade* (EO 13693); DOT sustainability orders; and other revised legal and regulatory requirements. The previous version of the Order was published in 2013 and does not reflect current Federal requirements.

### 6. Scope.

**a. Covered Activities.** An energy or water management activity is covered by this Order if it meets either of the following requirements:

(1) The activity affects FAA building and facility operating costs; or

(2) The activity is required by applicable legal, regulatory, or policy-driven provisions (e.g., the Energy Policy Act of 2005 (EPAct 2005) (42 United States Code [USC] §15801 et seq.), the Energy Independence and Security Act of 2007 (EISA) (42 USC §17001 et seq.), and EO 13693).

**b. Excluded Activities.** Vehicle fleet efficiency and fuels are not included within the scope of this Order.

**7. Applicability.** This Order applies to internal FAA actions and activities that affect construction, renovation, acquisition, and operations and maintenance (O&M) of FAA-owned buildings and facilities, and FAA-leased buildings (direct lease and General Services Administration [GSA] lease). The sustainable federal buildings requirements detailed in Chapters 4 and 5 apply to FAA-owned buildings. This Order also applies to the purchase, operation, and disposal of FAA-procured products (e.g., computers) that require energy or water as part of their function. Energy and water management requirements associated with this Order will not restrict or inhibit the safe and efficient operation of the National Airspace System (NAS).

**8. Requirements Overview.** FAA must achieve the energy and water management requirements specified in the most current Federal laws, regulations, EOs, and DOT policies. The latest version of

referenced publications must be used in conjunction with this Order. Below is a sample of major, applicable requirements. These and other requirements are further covered in the chapters of this Order.

**a. Greenhouse Gas (GHG) Emissions.** FAA must reduce GHG emissions in accordance with DOT established requirements. In June 2015, DOT established a Scope 1 & 2 GHG emissions reduction requirement of 35 percent by fiscal year (FY) 2025, relative to a FY 2008 baseline. Scope 1 GHG emissions are direct GHG emissions from sources that are owned or controlled by FAA, and Scope 2 GHG emissions are indirect GHG emissions resulting from the generation of electricity, heat, or steam purchased by FAA. In June 2015, DOT also established a Scope 3 GHG emissions reduction requirements of 35 percent by FY 2025, relative to a FY 2008 baseline. Scope 3 GHG emissions are GHG emissions from sources not owned or directly controlled by FAA, but related to such Agency activities as vendor supply chains, delivery services, and employee travel and commuting.

**b. Energy.** FAA must reduce building energy intensity (i.e., British thermal units/square foot [Btu/sf]) in goal subject buildings by 2.5 percent annually through the end of FY 2025, relative to a FY 2015 baseline (EO 13693, Planning for Federal Sustainability in the Next Decade §3(a)(i)). Refer to Chapter 2 for annual energy intensity reduction requirements.

**c. Water.** FAA must reduce potable water intensity (i.e., gallons/square foot [gal/sf]) 2 percent annually, equal to a 36 percent total reduction, by FY 2025, relative to a FY 2007 baseline (EO 13693 §3(f)(i)). In addition, FAA must reduce industrial, landscaping, and agricultural (ILA) water consumption by 2 percent annually by FY 2025, relative to a FY 2010 baseline (EO 13693 §3(f)(iii)). Refer to Chapter 2 for the criteria for being considered on track with these requirements.

**d. Sustainable Federal Buildings.** FAA must ensure that all new major construction, renovation, or repair and alteration of existing owned buildings greater than 5,000 gross square feet (gsf) comply with the *Guiding Principles for Sustainable Federal Buildings (2016 Guiding Principles)* where cost effective (EO 13693 Implementing Instructions §III(D)(3)). In addition, FAA must ensure that 15 percent of the Agency's existing owned Federal capital asset building inventory greater than 5,000 gsf complies with the *2016 Guiding Principles* by FY 2025 and make annual progress towards 100 percent conformance for its building inventory thereafter (EO 13693 §3(h)(ii)).

**e. Net-Zero.** FAA must ensure, beginning in FY 2020, that all new construction of buildings greater than 5,000 gsf that enters the planning process is designed to achieve energy net-zero by FY 2030 (EO 13693 §3(h)(i)). In addition, as part of FAA's annual Strategic Sustainability Performance Plan (SSPP), FAA must identify a percentage of existing buildings over 5,000 gsf intended to be energy, waste, or water net-zero buildings by FY 2025 and implement actions that will allow those buildings to meet that target (EO 13693 §3(h)(iii)). Refer to Chapter 5 for additional information on net-zero buildings.

**f. Metering.** FAA must install advanced electric metering to the maximum extent practicable, or standard electric metering, in Agency buildings by October 1, 2012 (EPAAct 2005 §103, amending 42 USC §8253(e)). FAA must install equivalent meters for natural gas and steam utilities by October 1, 2016 (EISA §434(b), amending 42 USC §8253(e)(1)). FAA must also install water meters (standard or advanced meters), where life cycle cost effective, to collect and utilize building and

facility water balance data to improve water conservation and management (EO 13693 §3(f)(ii)). Refer to Chapter 4 for additional information on metering.

**9. Environmental Management System (EMS).** In accordance with the FAA Order 1050.21, *Environmental Management System (EMS)*, FAA established a higher-tier EMS and designated appropriate organizational EMSs. The EMS is the tool for managing environmental performance and risks throughout FAA. Achievement of FAA energy and water management goals will be executed through the energy and water environmental management programs (EMP) developed and implemented by each designated EMS as required by EO 13693 §7(i). Energy and water EMPs document objectives and goals, and how they will be accomplished, including roles, responsibilities, milestones and dates, metrics, and measurements of success. These EMPs are established and implemented by designated EMS organizations and should align with FAA higher-tier EMS energy and water EMPs, as necessary.

**10. Program Structure.** An effective Energy and Water Management Program requires Agency support, implementation throughout FAA service areas and centers, and support from LOB and SO. Each LOB and SO-designated energy manager (including Mike Monroney Aeronautical Center- or William J. Hughes Technical Center-designated energy managers) should have access to the necessary technical, managerial, and financial resources to maximize cost and energy savings. The Program should integrate the knowledge, skills, and technical manager and building operator expertise to maximize efficiency and achieve the most effective results. It is recognized that FAA organizational structure will continue to evolve during the course of implementing this Order, so that roles and responsibilities, as well as organizational units will change. This Order has been written to allow flexibility to accommodate future changes. Requirements established in this Order apply to the organizational unit responsible for that function (e.g., new construction, purchasing). Based on each organization's structure, some LOBs/SOs may not have a need for all of these roles.

**a. Senior FAA Official.** FAA designated the Deputy Assistant Administrator for Policy, International Affairs and Environment (APL-2) as its Chief Sustainability Officer (CSO). Each executive agency is required to designate a CSO, who is responsible for agency conformance with the requirements of EO 13693 (EO 13693 §7(a)). DOT extended this requirement to each operating administration (OA). APL-2 is responsible for working with DOT and other OAs to meet sustainability requirements across DOT. APL-2 provides the FAA senior level guidance, support, and accountability necessary to maximize the effectiveness of Agency sustainability efforts.

**b. Office of Environment and Energy (AEE).** AEE oversees and facilitates the Energy and Water Management Program. FAA energy and water policy is developed by AEE, with support from FAA LOBs and SOs. AEE is responsible for communicating FAA energy and water management requirements. In addition, AEE is responsible for specifying LOB and SO data collection and reporting requirements in support of FAA-wide energy and water reporting. Using the LOB and SO data provided, AEE externally reports FAA compliance with various requirements to DOT. AEE must:

- (1) Develop and update FAA energy and water policy;

- (2) Act as the primary point of contact (POC) and liaison with DOT, Department of Energy (DOE), and other external stakeholders;
- (3) Coordinate FAA response to required reports and data calls;
- (4) Evaluate the policy's effectiveness;
- (5) Develop and update FAA-wide energy and water requirements;
- (6) Set and communicate internal reporting requirements;
- (7) Develop and implement energy and water EMPs for the Agency through FAA's higher-tier EMS;
- (8) Disseminate information, such as best practices and training opportunities, to LOB and SO energy managers; and
- (9) Promote energy and water awareness activities.

**c. LOBs and SOs.** FAA LOBs and SOs responsible for facilities or actions and activities that affect construction, renovation, acquisition, and O&M covered by this Order should plan and implement organizational energy and water EMPs. These FAA organizational units should develop guidance, plans, and other documentation and tools, as needed, and include AEE in document review processes prior to issuance. The energy and water EMPs should be reviewed on an annual basis and coordinated with AEE.

(1) Each LOB/SO that operates and maintains a building is responsible for meeting the FAA GHG targets at the LOB/SO level and reporting progress toward meeting these targets to AEE for FAA compliance with Federal reporting requirements. Additionally, each LOB/SO that operates and maintains a building for which FAA pays the utilities separately from the lease is responsible for meeting the FAA energy, water, and other consumption targets at the LOB/SO level and reporting progress toward meeting these targets to AEE for FAA compliance with Federal reporting requirements.

(2) Each LOB/SO that operates and maintains FAA owned buildings is responsible for meeting the FAA Sustainable Federal Buildings targets at the LOB/SO level and reporting progress toward meeting these targets to AEE for FAA compliance with Federal reporting requirements. Any LOB/SO with a long-term leasing arrangement should consult with AEE to determine whether such buildings should be treated as owned buildings for reporting purposes.

(3) Each LOB and SO responsible for facilities must designate a LOB and SO energy manager. Each LOB and SO responsible for facilities should enlist a full-time energy manager or assign energy and water management as a primary responsibility for one or more facility managers.



(4) For the Air Traffic Organization (ATO), each service area responsible for facilities should enlist a full-time energy manager or assign energy and water management as a primary responsibility for one or more facility managers, as needed by the ATO Energy Program.

(5) Organizations not directly responsible for facilities must designate an energy POC. This POC will be responsible for coordinating and reporting on the organizational level program and responsibilities, program implementation, strategies, and plans for meeting Agency requirements.

(6) LOB and SO energy managers may further designate local energy managers, facility managers, and energy coordinators at the field organization level, as appropriate. EISA requires an energy manager for every facility, but one energy manager can be responsible for multiple facilities. The LOB energy manager can hold this responsibility for multiple facilities or delegate it to the facility or field organization level.

**d. LOB and SO Executives and Managers.** LOB and SO executives and managers must:

- (1) Designate LOB and SO energy managers;
- (2) Support funding requests for their organizations to implement their programs;
- (3) Identify available funding and alternative funding options for Energy and Water Management Program implementation;
- (4) Ensure organization-wide energy and water awareness activities occur;
- (5) Encourage employees to incorporate energy and water conservation into everyday activities;
- (6) Ensure that the accomplishment of energy and water management requirements are included in the performance standards of those individuals who have been assigned primary responsibility for meeting energy and water conservation requirements and of their immediate supervisors; and
- (7) Ensure energy and water management requirements are communicated and coordinated throughout the management chain through the use of energy and water EMPs.

**e. LOB and SO Energy Managers.** LOB and SO energy managers must:

- (1) Develop implementation orders and guidance and other tools, as needed;
- (2) Identify and develop energy and water conservation measures;
- (3) Communicate regularly with AEE and other energy managers;
- (4) Oversee program implementation activities, such as, but not limited to:

- (a) Assisting the organization in developing its energy and water EMPs to develop, document, and track goals that support FAA-wide energy and water requirements as specified by AEE;
  - (b) Conducting regular energy awareness and outreach activities;
  - (c) Providing guidance to project managers on facility and system designs to ensure compliance with energy and water efficiency mandates, and the *2016 Guiding Principles*;
  - (d) Establishing training programs and requirements, as needed;
  - (e) Nominating FAA personnel and projects for internal and external awards and program recognition;
  - (f) Providing data and regular reporting on energy and water performance, as requested by AEE; and
  - (g) Tracking and analyzing energy and resource cost and consumption; and
- (5) Identify incentive programs for FAA projects that may qualify;
  - (6) Control and track the use of retained savings, as needed;
  - (7) Initiate renewable energy projects that are feasible and cost effective;
  - (8) Participate in appropriate industry events and training programs; and
  - (9) Serve as or designate EISA energy managers, as defined and required by EISA §432, amending 42 USC §8253(f)(2)(A).

**f. Program Office Project Managers.** Program office project managers (e.g., Air Traffic Organization – Terminal Services [AJT], Technical Operations [AJW]) must budget, plan, design, and implement energy and water conservation measures, in coordination with appropriate stakeholders, as part of their construction or renovation projects and sustainment (i.e., O&M) activities.

**g. LOB and SO Energy Points of Contact (POC).** LOB and SO energy POCs must:

- (1) Document and report on organizational-level programs and responsibilities, program implementation, strategies, and plans for meeting Agency requirements;
- (2) Help identify energy and water conservation measures; and
- (3) Regularly communicate with AEE and energy managers.

**h. Local Energy Managers, Facility Managers, and Energy Coordinators.** Local energy managers, facility managers, and energy coordinators must:

- (1) Identify, advocate, and coordinate energy and water conservation measures;
- (2) Track, report, and analyze energy and resource cost and consumption;
- (3) Participate in facility design reviews, as needed;
- (4) Participate in training programs, as needed;
- (5) Advance building occupant energy awareness by organizing events and distributing information;
- (6) Implement O&M best practices that optimize building performance to support the FAA mission and improve energy and water efficiency; and
- (7) Ensure construction contractors follow energy and water best management practices.

**i. Procurement Team.** The procurement team is a group of relevant program offices, subject matter experts, and other technical specialists that develop the procedures, requirements, and specifications for a procurement to make recommendations to the contracting officer (CO)/real estate contracting officer (RECO). The team must:

- (1) Work with information specialists and LOBs/SOs to develop standardized procedures for procuring energy- and water-efficient products;
- (2) Ensure all participating organizations, as well as leases, contracts, and agreements entered into, comply with energy-efficient acquisition requirements;
- (3) Incorporate appropriate procurement language into equipment specifications that reflect updated energy- and water-efficiency requirements;
- (4) Use available guidance and life cycle cost analysis (LCCA) tools to support product procurement decisions; and
- (5) Provide acquisition training to designers, COs/RECOs, buyers, contractors, and others who purchase products on behalf of the Federal government.

**j. Contracting Officer (CO)/Real Estate Contracting Officer (RECO).** The CO/RECO will be a member of the procurement team. The CO/RECO must:

- (1) Work to incorporate the procurement team's requirements into any relevant contracts, orders, leases, or agreements;

(2) Enter into, administer, and terminate contracts/leases and make related decisions pursuant to FAA acquisition policy;

(3) Review every three years the electricity rate schedules with the utility companies for the highest electricity consuming facilities; and

(4) Manage FAA supplier relationships, and ensure the integrity and equity of the contracting process.

**k. FAA Fleet Manager.** The FAA Fleet Manager must:

(1) Oversee the FAA vehicle fleet's use of charging infrastructure; and

(2) Be consulted regarding the installation of charging infrastructure for the FAA vehicle fleet.

**l. FAA Employees.** All FAA employees should:

(1) Support Agency energy and water management requirements by taking appropriate actions to improve Agency efficiency through the course of their work;

(2) Limit use of portable heaters, fans, and other such devices, unless authorized by facility management (41 Code of Federal Regulations [CFR] Part 102-74.190);

(3) Turn off lights and equipment when not needed (41 CFR Part 102-74.160), except during scheduled maintenance or in instances where it could have a negative impact on mission objectives or bears associated risks;

(4) Close or tilt window blinds in warm months to block direct sunlight to the extent practicable, which reduces cooling needs;

(5) In the winter months, open blinds on south-facing windows during the day to allow sunlight to naturally heat workspaces, and, at night, close the blinds to reduce heat loss to the extent practicable;

(6) Photocopy only what is needed, and use double-sided and black and white printing to the extent practicable;

(7) Report leaking faucets and fixtures to building maintenance;

(8) Unplug equipment that drains energy when not in use; and

(9) Submit energy and water conservation measures and O&M suggestions to their local energy manager, facility manager, or energy POC.

## Chapter 2. Energy and Water Program Planning

**1. Introduction.** This chapter establishes planning requirements for the FAA Energy and Water Management Program. Program planning is an important step to ensuring compliance with Federal legislation, EOs, and DOT policy. LOBs and SOs are responsible for achieving annual energy and water requirements, developing EMPs, and conducting budget planning.

**2. Energy and Water Reductions.** FAA energy and water reduction requirements are based on mandates established by Federal legislation, EOs, and DOT policy. The primary program drivers are the energy and water requirements summarized below. Specific requirements and associated FAA policy and roles and responsibilities are discussed in the appropriate chapters of this Order.

**a. Energy Intensity.** FAA must reduce building energy intensity in goal subject buildings by 25 percent through the end of FY 2025 (i.e., 2.5 percent per year), relative to a FY 2015 baseline (EO 13693 §3(a)(i)). Annual energy intensity reductions, relative to a FY 2015 baseline, must be achieved in accordance with the percentages specified in Table 2-1. Each LOB and SO responsible for the O&M of buildings (FAA-owned buildings or leased buildings for which FAA pays the utility bill separately from the lease payment) is responsible for achieving the annual energy intensity reductions specified in Table 2-1, and working with AEE to clarify and refine the FY 2015 baseline in accordance with DOE guidance, as necessary.

**Table 2-1. Annual Energy Intensity Reduction Requirements**

Fiscal Year	% Reduction
2016	2.5
2017	5
2018	7.5
2019	10
2020	12.5
2021	15
2022	17.5
2023	20
2024	22.5
2025	25

**b. Greenhouse Gas (GHG) Emissions.** FAA must meet the FY 2025 GHG emissions reduction requirements established by DOT, relative to a FY 2008 baseline (EO 13693 §2). Reducing energy intensity in buildings and increasing use of renewable energy (both of which are covered in this Order) will help FAA meet this requirement. AEE is responsible for coordinating the development of the GHG reduction requirements across FAA LOBs and SOs, and with DOT. In June 2015, DOT established the Scope 1 & 2 GHG reduction requirement as 35 percent reduction by FY

2025, relative to a FY 2008 baseline, and the Scope 3 GHG emissions reduction requirement as 35 percent by FY 2025, relative to a FY 2008 baseline. FAA must also reduce fugitive emissions from buildings and equipment by at least 50 percent by FY 2020; and reduce emissions from industrial processes by at least 50 percent by FY 2020 (DOT Order 4352).

**c. Potable Water Intensity.** FAA must reduce potable water intensity 36 percent by FY 2025 (i.e., 2 percent per year), relative to a FY 2007 baseline (EO 13693 §3(f)(i)). In order to be considered on track with this requirement, annual potable water intensity reductions, relative to a FY 2007 baseline, must be achieved in accordance with the percentages specified in Table 2-2. FAA must also seek to identify, promote, and implement water reuse strategies that reduce potable water consumption. Each LOB and SO responsible for the O&M of facilities (FAA-owned facilities or leased facilities for which FAA pays the utility bill separately from the lease payment) is responsible for achieving the annual potable water intensity reductions specified in Table 2-2, and working with AEE to clarify and refine the baseline in accordance with DOE guidance, as necessary.

**Table 2-2. Annual Potable Water Intensity Reduction Requirements**

<b>Fiscal Year</b>	<b>% Reduction</b>
2015	16
2016	18
2017	20
2018	22
2019	24
2020	26
2021	28
2022	30
2023	32
2024	34
2025 & Onward	36

**d. Industrial, Landscaping, and Agricultural (ILA) Water.** FAA must reduce ILA water consumption by 30 percent (i.e., 2 percent per year) by FY 2025, relative to a FY 2010 baseline (EO 13693 §3(f)(iii)). In order to be considered on track with this requirement, annual ILA water consumption reductions, relative to a FY 2010 baseline, must be achieved in accordance with the percentages specified in Table 2-3. Each LOB and SO responsible for the O&M of facilities (FAA-owned facilities or leased facilities for which FAA pays the utility bill separately from the lease payment) will establish, validate, and maintain its ILA water consumption baseline; and is responsible for achieving the annual ILA water consumption reductions specified in Table 2-3. To eliminate overlap and preclude the need to change FY 2007 potable water use baselines, LOBs/SOs that included ILA water consumption in their 2007 potable water baseline should continue to measure and track progress against the overall water intensity measure (EO 13693 Implementing Instructions Sec.

III(B) citing Federal Agency Implementation of Water Efficiency and Management Provisions of EO 13514 Sec. 4.3). AEE and LOB and SO energy managers will work together to clarify and refine the baseline in accordance with DOE guidance, as necessary.

**Table 2-3. Annual Industrial, Landscaping, and Agricultural (ILA) Water Consumption Reduction Requirements**

<b>Fiscal Year</b>	<b>% Reduction</b>
2015	10
2016	12
2017	14
2018	16
2019	18
2020	20
2021	22
2022	24
2023	26
2024	28
2025 & Onward	30

**3. Annual Environmental Management Programs (EMP).** In accordance with EMS procedures, AEE will develop and annually update the higher-tier energy and water EMPs. LOBs and SOs will develop and annually update energy and water EMPs for their respective organizations. The programs will detail how each organization's portion of FAA's overall energy and water management requirements will be met. The programs should include and address the following points:

- a. Management and program strategies and timelines for achieving the stated objectives and targets;
- b. Organizational roles and responsibilities for program implementation;
- c. Methods to evaluate progress (progress indicators), consistent with the overall program metrics established by AEE;
- d. Facilities that will be audited;
- e. Energy and water conservation measures that will be implemented; and
- f. Planned outreach campaigns/themes and activities planned for the year.

**4. Budget Planning.** AEE, LOB and SO energy managers, program office project managers, and energy POCs will develop and submit budget requests for their respective organizations, consistent with processes established by DOT and FAA. In support of the National Energy Conservation Policy Act (NECPA) §8255, LOBs and SOs will identify funds requested for compliance with this Order, and all applicable legal and regulatory requirements, and submit to Financial Services (ABA) as requested to support the annual budget process. This identification of funds will be done in accordance with Office of Management and Budget (OMB) and DOT guidance. Additionally, LOB and SO budgets for proposed construction of Federal facilities are required to comply with EO 13693 and the EO 13693 Implementing Instructions to ensure adherence to Federal sustainable green building requirements.



### Chapter 3. Energy and Water Conservation and Efficiency Projects

**1. Introduction.** This chapter establishes requirements for identifying and implementing energy and water efficiency and conservation projects at FAA facilities. The primary method for identifying and assessing these projects is through facility evaluations, which are to be completed in accordance with Federal requirements. All projects, including those being pursued for reasons other than improving energy and water performance, should support the Agency's overarching program goals identified within this Order. LOBs and SOs should implement these projects using direct appropriations, as well as alternative funding methods to meet energy and water requirements.

**2. Facility Energy and Water Consumption Baseline.** Facility managers or local energy managers must establish energy and water baselines for each of their facilities to assist in identifying and prioritizing projects during the planning process and evaluating the impact of implemented projects. To meet FAA energy, water, and facility requirements, LOBs and SOs must appropriately baseline energy and water usage, and identify and plan projects that align with the requirements set forth in this Order.

**3. Energy-Efficient Building Equipment.** Any FAA large capital energy or water investment in an existing building that is not a major renovation but involves replacement of installed equipment (e.g., heating and cooling systems), or involves renovation, rehabilitation, expansion, or remodeling of existing space, must employ the most energy- and water-efficient designs, systems, equipment, and controls that are life cycle cost-effective (EISA §434(a), amending 42 USC 8253(f)).

**4. Covered Facilities and Energy and Water Evaluations.** FAA will use energy and water evaluations to help identify potential projects. FAA must conduct energy and water evaluations of facilities that meet DOE's most recent criteria for "covered facilities," as required by EISA or other prevailing legislation. Covered facilities include those that constitute at least 75 percent of an agency's facility energy use (EISA §432, amending 42 USC §8253(f)(3)). For the purposes of defining FAA's covered facilities, LOBs and SOs that are responsible for facilities (e.g., ANG-E, AMC, ATO, AVS, and AFN) must each identify facilities in their organization that account for 75 percent of their energy use and conduct evaluations of those facilities. Evaluations must be conducted by qualified personnel and include specific activities in accordance with DOE guidance.

**a. Evaluation Details.** FAA requires LOBs and SOs responsible for facilities to conduct energy and water evaluations of approximately 25 percent of their covered facilities annually in a manner that ensures an evaluation of each facility is performed every four years. Evaluations must be completed consistent with the requirements of EISA §432(f)(3), which includes identifying and assessing recommissioning measures (or, if the facility has never been commissioned, retro-commissioning measures) for each facility (EISA §432, amending 42 USC §8253(f)(3)). These evaluations enable effective project planning by identifying opportunities to improve energy and water performance through retrofits, O&M activities, and/or outreach/training to building occupants. Facility evaluations may be accomplished using a variety of mechanisms, such as, but not limited to:

(1) In conjunction with environmental assessments and other regularly scheduled plant or safety inspections, if conducted by qualified FAA personnel or contractors;

- (2) Independently by qualified FAA personnel or contractors;
- (3) Through an energy savings performance contract (ESPC) or a utility energy service contract (UESC); or
- (4) Through participation in utility energy efficiency programs.

**b. Energy and Water Conservation Measure Implementation.** Following the evaluation, each energy manager may implement any identified energy or water conservation measure that is life cycle cost-effective (EISA §432, amending 42 USC §8253(f)(4)(A)). If a life cycle cost-effective energy conservation measure (ECM) has a payback period of less than 10 years, it must be implemented (DOT Order 4353, 42 USC 8253(b)). In accordance with EISA requirements, energy managers must ensure the following for each implemented measure:

- (1) Equipment, including building and equipment controls, is fully commissioned at acceptance to be operating at design specifications;
- (2) A plan for appropriate O&M and repair of the equipment is in place at acceptance and is followed;
- (3) Equipment and system performance is measured during its entire life to ensure proper O&M and repair; and
- (4) Energy and water savings are measured and verified.

**c. Compliance Tracking System (CTS).** Federal agencies are required to use DOE's EISA 432 CTS to track and report EISA 432 compliance. LOB and SO energy managers must document their covered facilities in CTS, and ensure that these records are kept up-to-date. Updates should include, but are not be limited to:

- (1) The annual footprint, including energy consumption and gross square footage;
- (2) Completion of energy and water evaluations;
- (3) Implementation of identified energy and water conservation measures; and
- (4) Follow-up on implemented measures (EISA §432, amending 42 USC §8253(f)(7)(A)).

**5. Historic Properties.** When a project could affect a historic property (i.e., a building, structure, object or site included in or eligible for the National Register of Historic Places), FAA has responsibilities under Section 106 of the National Historic Preservation Act (NHPA) to consider the effect of its actions on those historic resources (NHPA §106 (54 USC 306108)).<sup>1</sup> FAA review follows

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<sup>1</sup> Regulations implementing Section 106 of the NHPA define "effect" as "alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." 36 C.F.R. 800.16(i).

the process, as outlined in the implementing regulations at 36 CFR Part 800, and described in the *Section 106 Handbook: How to Assess the Effects of FAA Actions on Historic Properties under Section 106 of the National Historic Preservation Act* (June 2015), FAA Order 1050.1, *Environmental Impacts: Policies and Procedures*, and the *1050.1F Desk Reference* (July 2015). Because it is not always obvious whether a property meets the National Register criteria, the first step in this process is to initiate consultation with the State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officer (THPO) who can help to identify historic properties as well as other individuals or organizations who may have an interest in the affected property. In addition, FAA must ensure that any activity affecting a Federally-owned historic property is carried out in accordance with Section 110 of the NHPA (54 U.S.C. 306101) which requires Federal agencies to manage and maintain these properties in a way that considers the preservation of their historic, archeological, architectural and cultural values, and should utilize best practices and technologies in retrofitting to promote long-term viability of the buildings (EO 13693 Implementing Instructions §III(D)(3)). The Federal Preservation Officer in AEE-400 can provide additional guidance on this process.

#### **6. Project Scoping and Combining Energy and Water Conservation Measures into Projects.**

FAA LOBs and SOs may combine multiple energy and water conservation measures into one project at one or more facilities, as appropriate, to maximize overall project energy and water efficiency and economic savings. When bundling ECMs (e.g., in an ESPC or UESC), the entire bundle must be life-cycle cost-effective.

**a. Life Cycle Cost Analysis (LCCA).** The application of ECMs to existing Federal buildings must be made using life cycle cost methods and procedures (Federal Energy Management Improvement Act of 1988, (42 USC 8254)). LCCA must be conducted using the *National Institute of Standards and Technology (NIST) Life Cycle Costing Manual for Federal Energy Management Program (FEMP)*. FAA should consider energy cost savings and benefits while evaluating project options and opportunities. Potential savings categories to consider when conducting LCCA include, but are not limited to:

- (1) Reduced energy (in Btu) usage;
- (2) Reduced water (in thousands of gallons [kgal]) usage;
- (3) Avoided utility demand charges; and
- (4) Reduced O&M activities.

**b. Payback Period and Bundling.** Most facilities have the potential for energy and water conservation measures. Some of these opportunities may have payback periods of fewer than two years (e.g., lighting upgrades), while larger projects (e.g., chiller replacements) may have payback periods well over 10 years. If a life cycle cost-effective ECMs in a covered facility has a payback of less than 10 years, it must be implemented (DOT Order 4353, 42 USC 8253(b)).

LOB and SO energy managers or local energy managers may bundle energy and water conservation measures of varying paybacks into one project. More ECMs and greater facility improvements can be included when ECMs with longer term payback periods are bundled with and offset by ECMs with

shorter payoff terms. Energy managers should recognize that combining multiple measures into one project will minimize the disturbance time at the facility, may result in economies of scale, and may reduce contract and administrative burdens.

**7. Financing Options.** Projects can be financed through direct appropriations, alternative financing, or a combination of the two types.

**a. Budget Justification.** Funding and other resource requirements associated with the implementation of this Order must be justified and requested in accordance with existing FAA budgetary and fiscal processes.

**b. Alternative Financing.** LOB and SO energy managers may pursue the following alternative funding methods to meet energy and water requirements wherever such methods provide an appropriate financing mechanism. FAA must set annual targets for ESPC and UESC contracts to be implemented in FY 2017 and annually thereafter (EO 13693 §3(k)(iii)).

(1) An ESPC is a contracting vehicle that allows agencies to accomplish energy projects for their facilities with little or no upfront capital costs. Under an ESPC, a contractor finances the up-front cost of the project, guarantees that the project improvements will generate enough energy and water cost savings to pay for the project over the contract period, and is paid back from the resultant energy and water savings over the contract period.

ESPC ENABLE offers the same benefits as a conventional ESPC, but provides a standardized streamlined process for small, Federal facilities (less than approximately 200,000 gsf) to install targeted ECMs in six months or less. The program currently allows sites an opportunity to implement specific ECMs including lighting, water, simple heating, ventilation, and air conditioning (HVAC) controls, HVAC system replacement, and solar photovoltaic. Pricing is pre-negotiated, which allows for a faster selection process so that a project can be designed and installed quickly.

(2) Under a UESC, an agency contracts with a local servicing utility for technical services and/or upfront project financing for energy efficiency, water conservation, and renewable energy investments. The utility is repaid over the contract term from the cost savings generated by the energy and water efficiency measures. Because the UESC provides service through the local utility, different contracting regulations apply. Unlike an ESPC, these contracts are not required to include performance guarantees; however, it is highly recommended that performance guarantees or assurances of the savings to be generated by improvements be incorporated into these contracts, which cover the full cost of the Federal investment for the improvements, to reduce Agency risk. Performance assurances do not guarantee energy savings; however, they provide assurance that equipment installed will perform as expected. A UESC should include measurement and verification of savings through equipment commissioning, recommissioning or retro-commissioning. Competition or alternatives analysis should be considered as part of the selection process prior to entering into a UESC (DOT Order 4353).

(3) A power purchase agreement (PPA) enables an agency to fund on-site renewable energy projects with no up-front capital costs incurred. With a PPA, a developer installs a renewable energy system on agency property under an agreement that the agency will purchase the power generated by

the system. The agency pays for the system through these power payments over the life of the contract. After installation, the developer owns, operates, and maintains the system for the life of the contract.

**c. Incentive Programs.** Whenever possible, FAA should participate in incentive programs offered by states, utilities, or other organizations (e.g., regional energy and water efficiency programs). These incentive programs include rebates or grants given for installing energy- or water-saving equipment or systems. FAA may retain the full amount of energy and water incentives obtained from utility programs (EISA §516, amending 42 USC §8256(c)). Local energy managers, facility managers, and energy coordinators are responsible for tracking these programs and identifying FAA projects that may qualify for incentives. In cases where FAA does not directly receive the incentive, the service provider may receive it, resulting in reduced cost to FAA.

**d. Tax Credits.** FAA should work with vendors and contractors to capitalize on tax incentives, where appropriate. The applicability of the tax credits to specific FAA projects will require analysis by tax law experts.

**8. Retained Savings.** Cost savings generated by alternative financing (including incentives) should be reinvested back into the FAA Energy and Water Management Program as allowed by prevailing legislation. LOBs and SOs are responsible for controlling and tracking the use of retained savings and working with FAA financial services to ensure that savings are tracked in compliance with FAA financial requirements. FAA may retain the savings generated from alternative financing provided that such funds may be used only for energy efficiency, water conservation, or unconventional and renewable energy resources projects (EPAAct 2005 §102(f), amending 42 USC §8256(e)). In addition, FAA may retain the full amount of energy and water incentives obtained from utility programs (EISA §516, amending 42 USC §8256(c)).

## Chapter 4. Energy and Water Aspects of Operations & Maintenance (O&M) and Energy Information

**1. Introduction.** FAA must use available energy and water management tools, information, and procedures to operate and maintain FAA facilities and equipment in a manner that enhances reliability and extends useful life. These activities are the responsibility of LOBs and SOs responsible for operating and maintaining facilities. This chapter establishes policy for preventive maintenance and the use of energy information to support O&M and achieve the *2016 Guiding Principles*.

**2. Performance-Based Maintenance.** Proper O&M goes beyond repairing equipment after it breaks. Performance-based maintenance seeks to detect equipment degradation and address problems to prevent failure, optimize efficiency, and ensure the life of the system.

**a. Activities.** Management equipment, information, and procedures can be used to support performance-based maintenance activities to increase energy and water efficiency. Performance-based maintenance activities include:

(1) Reviewing and updating, as needed, maintenance procedures, equipment and system maintenance schedules, and building control set points and schedules;

(2) Working with maintenance managers and key stakeholders to update and, if necessary, redefine specific maintenance procedures aimed at improving the efficiency of operations;

(3) Developing training for the operations staff in the principles and technologies applicable to their buildings or systems, and integrating that training into existing courses;

(4) Requiring vendors to provide training for new equipment;

(5) Providing regular technical assistance to the operations staff by completing periodic reviews of the facility's energy performance;

(6) Keeping staff informed of new energy and water maintenance technologies and practices;

(7) Monitoring energy and water consumption costs regularly (usually monthly) and comparing them to a base period, the prior period, or with other similar facilities; and

(8) Installing advanced metering systems that provide local energy managers and facility managers and other stakeholders with data and decision-making tools to support energy and water management and facility operations.

**b. Sustainable Practices.** FAA must implement sustainable practices, including the reduction of electricity consumption, for the O&M of its buildings (EPA Act 2005 §104(a), amending 42 USC §8259(b)). This includes ensuring equipment is replaced with the most energy- and water-efficient option that is life cycle cost-effective.

**3. Commissioning.** Commissioning, recommissioning, and retro-commissioning ensure that buildings are operated and maintained optimally, and are an important aspect of energy-efficient O&M. Recommissioning refers to commissioning a building that was previously commissioned, while retro-commissioning means commissioning an existing building that has never been commissioned. Energy and water evaluations must identify and assess re/retro-commissioning measures (EISA §432, amending 42 USC §8253(f)(3)). In addition, commissioning reports for certification purposes must be completed within two years prior to the certification date, and re/retro-commissioning should be completed at least every four years thereafter to be in compliance with the *2016 Guiding Principles* (refer to the Sustainable Federal Buildings Guiding Principles in Existing Buildings section below).

**4. Metering.** Metering is essential to an effective FAA Energy and Water Management Program. When properly deployed, metering provides building specific data that enables building staff to make informed decisions on how to efficiently operate building systems and equipment. Metering data will enable a local energy manager or facility manager to verify utility bills, optimize equipment performance, diagnose equipment and systems operations, and manage energy use. Thus, metering should improve O&M activities and reduce costs (EPAAct 2005 §103, amending 42 USC §8253(e)(2)(B)) through energy and water savings. The extent to which these savings are realized is highly dependent on the attention paid by building staff to metering data. Every effort should be made to ensure that staff receive training specific to their metering system.

**a. Installation.** FAA must install advanced electric metering, to the maximum extent practicable, or standard electric metering, in Agency buildings by October 1, 2012 (EPAAct 2005 §103, amending 42 USC §8253(e)). By October 1, 2016, FAA must install equivalent metering of natural gas and steam (EISA §434(b)(42 USC §8253(e)(1))). Advanced meters or standard meters must be installed, where life-cycle cost-effective, to collect potable and ILA water balance data to improve water conservation and management (EO 13693 §3(f)(ii)). Electric, natural gas, steam, and water metering must be installed at the building or sub-metering level in accordance with the current DOE metering guidance. LOBs and SOs must assess their inventory of facilities for meter installation, and must deploy advanced metering systems, in accordance with the current DOE metering guidance. ATO, AMC, ANG-E, and other LOBs and SOs responsible for meter installation must report on metering progress as part of annual energy reporting.

**b. Metering Plan.** FAA developed and submitted to DOT a metering plan (*2015 Metering and Benchmarking Plan*) in accordance with EPAAct 2005 §103, amending 42 USC §8253(e) requirements and DOE guidance. Each LOB and SO responsible for facilities is responsible for implementing and providing input to update the plan, as needed.

**5. Building Temperature Setpoints and Heating, Ventilation, and Air Conditioning (HVAC) Schedules.** Facility managers should operate occupied and unoccupied buildings in a manner that optimizes energy efficiency, while maintaining occupant comfort and meeting equipment specifications. This should include defining parameters, such as temperature ranges and equipment schedules (e.g., turning off or reducing ventilation after hours). Facility managers should operate buildings in accordance with temperature and humidity ranges and ventilation rates established by applicable LOB and SO guidance, building codes, or industry standards as appropriate for the specific building location and function. Facility managers should periodically assess temperature setpoints and

HVAC schedules using the most relevant LOB and SO guidance, building codes, and industry standards. Facility managers should provide established setpoints and HVAC schedules to LOB and SO energy managers, upon request.

**a. Temperature Setpoints.** The temperature at which a building is maintained affects how much energy it uses. For cooling, the goal is to keep the temperature setpoint as high as possible, while providing a reasonable comfort level for occupants. For heating, the goal is to keep the setpoint as low as possible, while providing a reasonable comfort level for occupants. Unless applicable LOB and SO guidance states otherwise:

(1) Facility managers are responsible for defining appropriate heating and cooling seasons and temperature and humidity setpoints for occupied spaces, based on local conditions. These setpoints should be consistent with the most recent publication of American Society for Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Standard 55, *Thermal Environmental Conditions for Human Occupancy*, unless another building code or industry standard applies to a building (e.g., laboratory, data center). Facility managers may authorize exceptions on a case-by-case basis, based on mission needs, climate, or other local circumstances.

(2) Setpoints should be no higher than 55° F during the heating season for warehouses and similar unoccupied spaces. Facility managers may authorize exceptions to this temperature requirement on a case-by-case basis, based on mission needs, climate, or other local circumstances.

(3) Cooling systems that support data centers, flight simulators, and other critical equipment (in both occupied and unoccupied buildings) should be operated in the highest third of the temperature range prescribed by the equipment manufacturer. Equipment rooms with particular temperature and/or humidity requirements should be separately-controlled HVAC zones or served by dedicated equipment that can be operated independently from the rest of the building.

**b. Building Schedules.** Developing strategies to minimize hours of equipment operation, while maintaining comfort levels, can reduce energy consumption. If a building is not occupied at night or on weekends, the HVAC system operating temperature should be turned down during the heating season and turned up during the cooling season, or completely turned off during these periods. Local circumstances, such as building pressurization requirements or the need for humidity control or freeze protection, may affect appropriate setbacks. Facility managers are responsible for establishing and implementing appropriate building schedules. When HVAC schedules are utilized, it is important to ensure proper start-up time is provided so that indoor environmental conditions can return to satisfactory levels by the desired time.

**6. Sustainable Federal Buildings Guiding Principles in Existing Buildings.** At least 15 percent (measured by gsf or number of existing buildings) of FAA's existing owned buildings that are greater than 5,000 gsf must meet the *2016 Guiding Principles* by FY 2025. FAA must make annual progress toward 100 percent conformance with the *2016 Guiding Principles* for its building inventory (EO 13693 §3(h)(ii)). Buildings that have a status of Report of Excess (ROE) submitted, ROE accepted, Determination to Dispose, or Surplus; or are rarely occupied and use de minimus energy and water are not considered part of the sustainable federal buildings baseline and cannot be in compliance with the *2016 Guiding Principles* (EO 13693 Implementing Instructions §III(D)(3)).



**a. FAA-Owned Buildings.** Existing FAA-owned buildings are considered compliant with the *Guiding Principles* and can be counted towards the FY 2025 goal if:

(1) They meet the *2016 Guiding Principles for Existing Buildings*; or

(2) They meet the *Guiding Principles for Federal Leadership with High Performance and Sustainable Buildings (2008 Guiding Principles)* if they had completed project design and/or the issuance of contracts that will result in meeting at least half of the required guiding principles, elements and sub-elements before the issuance of the *2016 Guiding Principles* and are certified as meeting the *2008 Guiding Principles* by September 30, 2017.

Buildings that were determined to have met the *2008 Guiding Principles* are considered to meet the *Guiding Principles* through FY 2025 as long as they continue to meet ongoing requirements such as EISA 432 requirements including quadrennial evaluations, ongoing commissioning, benchmarking, and operating and maintenance requirements. Also, for these buildings, FAA should add the sixth *Guiding Principle on Resilience* as the ongoing requirements for a four-year evaluation are implemented.

**b. FAA-Leased Buildings.** FAA-leased buildings are encouraged to be compliant with the *2016 Guiding Principles*.

## Chapter 5. Energy and Water Aspects of New Construction, Major Renovations, and Leases

**1. Introduction.** FAA must implement life cycle cost-effective sustainable practices for the design, construction, lease, and O&M of FAA buildings and spaces. This chapter covers energy and water efficiency and conservation in new construction, major renovation, and leased buildings. The new construction and major renovation requirements apply to FAA-owned buildings and built to suit (lease construction) leases. The program office responsible for construction or major renovation is responsible for meeting these requirements. The CO/RECO is responsible for making sure appropriate requirements are included in owned and leased building documentation (e.g., lease). While construction and renovation requirements, policies, and procedures are included in the FAA AMS, this chapter focuses on the energy aspects of FAA's new construction and renovation policy, and is intended to clarify roles and responsibilities in the context of FAA's Energy and Water Management Program. For any conflicts with AMS, the AMS will govern.

**2. Life Cycle Cost Analysis (LCCA).** The design of new buildings must be made using life cycle cost methods and procedures (Federal Energy Management Improvement Act of 1988 (42 USC §8254)). FAA LOBs and SOs must utilize LCCA that appropriately values the operational, energy, and water efficiency gains and cost savings of high-performance facility design to evaluate options during the planning and development of major renovation and alteration projects. LCCA is the responsibility of the organization developing the requirements and preparing the budget justification for the asset. LCCA must be conducted using the most recent version of the *NIST Life Cycle Costing Manual for the Federal Energy Management Program*.

**3. Federal Performance Standards.** All new FAA construction and major renovation projects must be completed in accordance with the most recent Federal sustainability/energy efficiency requirements. These standards have been promulgated by various legislation and EOs (e.g., EISA, EPAct 2005 and EO 13693), and address multiple aspects of sustainability, including energy and water management. In the Annual GHG and Sustainability Data Report, LOBs and SOs must identify new buildings and specify those that will meet or exceed Federal building performance standards.

**a. Sustainable Federal Buildings Guiding Principles for New Construction and Modernization.** FAA must construct high performance, efficient buildings. All new major construction, renovation, or repair and alteration of existing owned buildings above 5,000 gsf must comply with the *2016 Guiding Principles* where cost effective (EO 13693 Implementing Instructions §III(D)(3)). The new construction and modernization criteria (as referred to in the *2016 Guiding Principles*) should be applied for all new construction and when the project that FAA is undertaking in an existing building is essentially a comprehensive replacement or restoration of virtually all major systems, interior work (such as ceilings, partitions, doors, floor finishes, etc.), and building elements and features (*2016 Guiding Principles* and Associated Instructions). It is the responsibility of the program office that is planning, designing, and constructing the building to ensure implementation of the *Guiding Principles*. New buildings or modernization projects are considered compliant with the *Guiding Principles* and can be counted towards the FY 2025 goal if:

- (1) They meet the *2016 Guiding Principles for New Construction and Modernization*; or

(2) They meet the *2008 Guiding Principles* if project design had been completed before the issuance of the *2016 Guiding Principles*.

**b. Energy Efficiency.** All FAA new construction projects must be completed in accordance with the Federal building design standards most recently published by DOE (10 CFR Part 433). New and replacement FAA buildings must be designed to achieve energy consumption levels that are at least 30 percent below the levels established in the version of ASHRAE Standard 90.1 or International Energy Code required in the most recently published 10 CFR 433, if life cycle cost-effective (EPA Act 2005 §109(2), amending 42 USC §6834(a)). FAA must incorporate these requirements into standard design criteria, statements of work, and construction documents, and consider them when defining siting requirements. If a 30 percent reduction is not life cycle cost-effective, the design of the proposed building must achieve the maximum level of energy efficiency that is life cycle cost-effective.

**c. Fossil Fuel Reduction.** New construction and major renovation projects must be designed so that the fossil fuel-generated energy consumption of the buildings is reduced, as compared with such energy consumption by a similar building in FY 2003 (as measured by Commercial Buildings Energy Consumption Survey or Residential Energy Consumption Survey data from the Energy Information Agency), by the percentage specified in Table 5-1 (EISA §433(a), amending 42 USC §6834 (a)(3)(D)(i)). If an LOB or SO determines that the mandated level of energy reduction is technically impracticable for a building to achieve, the LOB and SO energy manager is responsible for developing an exemption request and coordinating it with AEE. AEE will coordinate with the Office of the Secretary of Transportation (OST) to request the exemption from the Secretary of Energy.

**Table 5-1. Fossil Fuel Reduction Requirements**

<b>Fiscal Year</b>	<b>% Reduction</b>
2010	55
2015	65
2020	80
2025	90
2030	100

**d. Net-Zero.** All new FAA buildings greater than 5,000 gsf that enter the planning process starting in FY 2020 must be designed to achieve energy net-zero and, where feasible, water or waste net-zero by FY 2030 (EO 13693 §3(h)(i)). This will assist in achieving the EISA §433 mandate to eliminate fossil fuel-generate energy use by FY 2030. An energy net-zero building is designed, constructed or renovated and operated such that the actual annual source energy consumption is balanced by on-site renewable energy. FAA must also identify a percentage of the Agency's existing owned buildings over 5,000 gsf intended to be energy, water or waste net-zero by FY 2025 and implement actions that will allow those building to meet that target (EO 13693 §3(h)(iii)).

**e. Solar Hot Water Heaters.** FAA must meet 30 percent of hot water demand in new construction and major renovations through installation and use of solar hot water heaters, where life cycle cost-effective (EISA §523, amending 42 USC §6834(a)(3)(A)).

**4. Energy Modeling.** To measure the energy performance of proposed new facilities or facilities undergoing renovation, LOBs and SOs should use energy modeling to evaluate technology opportunities and trade-offs among options. The modeling should be completed and evaluated by in-house or contract personnel with appropriate experience and qualifications, such as an ASHRAE Building Energy Modeling Professional certification or equivalent. The analysis should consider each building's function, major systems and components, thermal characteristics, materials of the building envelope, the size and orientation of the building, how the building is occupied and operated, and the local climate. The level of detail included in the model should be appropriate for the building's size and function.

**5. Energy and Water Meters.** All new construction and major renovation projects at FAA buildings must include installation of advanced meters for electricity to the maximum extent practicable or standard electric metering (EPA Act 2005 §103, amending 42 USC §8253(e)). Equivalent gas and steam meters are required by October 1, 2016 (EISA §434(b), amending 42 USC §8253(e)(1)). Advanced meters or standard meters must be installed to collect potable and ILA water balance data to improve water conservation and management, where life-cycle cost effective (EO 13693 §3(f)(ii)). Electric, natural gas, steam, and water metering must be installed at the building or sub-metering level in accordance with the current DOE metering guidance. For new construction and major renovations, or new acquisitions of FAA owned space, FAA must connect all energy and water meters to management systems in order to streamline and optimize measurement, management, and reporting of consumption, to the maximum extent possible, where cost effective (DOT Order 4353 and 4355). FAA facilities that produce their own water from local wells or surface water, such as lakes or streams, must quantify water use of these sources by having production meters installed at the source, to the maximum extent possible (DOT Order 4355).

**6. Stormwater Management.** Any development or redevelopment project involving a FAA facility with a footprint that exceeds 5,000 sf must use site planning, design, construction, and maintenance strategies to maintain or restore, to the maximum extent technically feasible, the pre-development hydrology of the property with regard to the temperature, rate, volume, and duration of flow (EISA §438 (42 USC 17094)). FAA must install appropriate green infrastructure features on Federally owned property under its jurisdiction to help with stormwater and wastewater management (EO 13693 §3(f)(iv)). Stormwater management activities should be performed in accordance with the Environmental Protection Agency's (EPA) stormwater guidance, *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*. As defined within EPA's guidance, the term "footprint" includes all land areas that are disturbed as part of the project. When pursuing stormwater management projects, FAA must give higher priority for retrofits to existing sites without stormwater management plans where cost effective (DOT Order 4355). State and local stormwater best management practices may be more stringent than federal requirements. FAA must follow the requirements that are most stringent.

**7. Historic Properties.** When construction or renovation could affect a historic property (i.e., a building, structure, object or site included in or eligible for the National Register of Historic Places [National Register]), FAA has responsibilities under Section 106 of the National Historic Preservation Act (NHPA) to consider the effect of its actions on those historic resources (NHPA §106 (54 USC 306108)).<sup>2</sup> FAA review follows the process outlined in the implementing regulations at 36 CFR Part 800, and described in the *Section 106 Handbook: How to Assess the Effects of FAA Actions on Historic Properties under Section 106 of the National Historic Preservation Act* (June 2015), FAA Order 1050.1, Environmental Impacts: Policies and Procedures and the *1050.1F Desk Reference* (July 2015). Since it is not always obvious whether a property meets the National Register criteria, the first step in this process is to initiate consultation with the SHPO and/or THPO who can help to identify historic properties as well as other individuals or organizations who may have an interest in the affected property. In addition, FAA must ensure that any activity affecting a Federally-owned historic property is carried out in accordance with Section 110 of the NHPA (54 U.S.C. 306101), which requires Federal agencies to manage and maintain these properties in a way that considers the preservation of their historic, archeological, architectural and cultural values, and should utilize best practices and technologies in retrofitting to promote long-term viability of the buildings (EO 13693 Implementing Instructions §III(D)(3)). The Federal Preservation Officer in AEE-400 can provide additional guidance on this process.

**8. Fleet Charging Infrastructure.** All new construction, major renovation, repair, and alteration of FAA buildings must include appropriate design and deployment of fleet charging infrastructure (EO 13693 §3(h)(vii)). LOBs/SOs should consult with the FAA Fleet Manager before beginning design and deployment charging stations. New leases should consider including charging stations for fleet use in consultation with FAA Fleet Manager.

**9. Leases.** The RECO is responsible for ensuring AMS required provisions pertaining to ENERGY STAR<sup>®</sup>, energy efficiency, energy consumption are included in all solicitations and lease contracts. Refer to AMS policy and guidance for more information on entering into contracts and leases.

**a. ENERGY STAR<sup>®</sup> Buildings.** FAA must lease space that complies with current AMS provisions on the ENERGY STAR<sup>®</sup> requirements.

**b. Sustainable Federal Buildings Guiding Principles in Leases.** For FAA leased buildings, FAA should strive to incorporate as many of the *2016 Guiding Principles* as possible in new lease actions, where life-cycle cost-effective. A RECO may pay a premium for sustainable leased spaces to the extent that funds are available in collaboration with an LOB or SO. The space acquisition will be considered financially feasible if the rental offer for space in a conforming building is no more than 10 percent greater than the market rate for a comparable conventional building in the same rental market.

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<sup>2</sup> Regulations implementing Section 106 of the NHPA define “effect” as “alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register.” 36 C.F.R. 800.16(i).

**c. Energy and Emissions Reporting for Lease Solicitations.** In accordance with AMS policy and guidance, FAA should ensure, to the maximum extent practicable, that all new lease solicitations for fully serviced leases greater than 10,000 rentable square feet (RSF) will:

(1) Include criteria for energy efficiency either as a required performance specification or as a source selection evaluation factor in best-value tradeoff procurements (EO 13693 §3(h)(iv));

(2) Require lessors to disclose energy consumption data for that portion of the building occupied by FAA through sub-metering or estimation from pro-rated occupancy data, whichever is more cost effective (EO 13693 §3(h)(iv)); and

(3) Require energy data reporting and carbon emissions reporting beginning in FY 2016, as part of the FAA's scope 3 GHG emissions (EO 13693 §3(h)(v)).

**d. Built-to-Suit (Lease Construction) Leasing.** Built-to-suit lease solicitations must incorporate criteria for sustainable design and development, energy efficiency, and verification of building performance.

## Chapter 6. Clean Energy

**1. Introduction.** This chapter establishes requirements for FAA clean energy use. LOB and SO energy managers, program office project managers, local energy managers, and facility managers are responsible for identifying opportunities to increase clean energy consumption. Clean energy is energy generated from either renewable electric energy sources or alternative energy sources, and defined as:

(1) Renewable electric energy is renewable energy produced by solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal, geothermal heat pumps, microturbines, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project (EO 13693 §19(v)).

(2) Alternative energy is energy generated from technologies and approaches that advance renewable heat sources, including biomass, solar thermal, geothermal, waste heat, and renewable combined heat and power processes; combined heat and power; small modular nuclear reactor technologies; fuel cell energy systems; and energy generation, where active capture and storage of carbon dioxide emissions associated with that energy generation is verified (EO 13693 §19(c)).

**2. Clean Energy Consumption.** Each LOB and SO responsible for the O&M of buildings (i.e., FAA-owned buildings or leased buildings for which FAA pays the utility bill separately from the lease payment), including goal subject and excluded buildings, is responsible for achieving the clean energy requirements specified in Table 6-1 (EO 13693 §3(b)).

**Table 6-1. Clean Energy Consumption Requirements**

Fiscal Year	Percentage of Clean Energy
2016 and 2017	10
2018 and 2019	13
2020 and 2021	16
2022 and 2023	20
2025 and Thereafter	25

**a. Identifying Clean Energy Projects.** LOB and SO energy managers and program office project managers are responsible for identifying opportunities for increasing clean energy projects, working with appropriate internal and external stakeholders to develop and submit budget requests, and assisting in coordinating projects within their organizations as funding allows. The local energy manager and facility manager are responsible for identifying potential projects and facilitating completion of appropriate technical and economic feasibility studies.

**b. Financing Clean Energy Projects.** LOB and SO energy managers, program office project managers, local energy managers, and facility managers are all responsible for identifying and arranging appropriate financing, and serving as members of the procurement team. LOB and SO energy managers are encouraged to leverage available resources, which may include, but are not necessarily limited to:

- (1) Appropriations;
- (2) State and utility grants, rebates, and other incentives;
- (3) Third-party arrangements, such as PPAs; and
- (4) Performance contracts, including ESPCs and UESCs.

**3. Renewable Electric Energy Supply.** Each LOB and SO responsible for the O&M of buildings (i.e., FAA-owned buildings or leased buildings for which FAA pays the utility bill separately from the lease payment), including goal subject and excluded buildings, is responsible for achieving the renewable energy requirements specified in Table 6-2 (EO 13693 §3(c)). Renewable electric energy consumed in excess of the renewable electric target is counted toward the clean energy target and reduces the amount of alternative energy needed.

**Table 6-2. Renewable Electric Energy Consumption Requirements**

<b>Fiscal Year</b>	<b>Percentage of Renewable Electric Energy</b>
2016 and 2017	10
2018 and 2019	15
2020 and 2021	20
2022 and 2023	25
2025 and Thereafter	30

**4. On-Site Renewable Electric Energy.** FAA must implement renewable electric energy generation projects on FAA property for FAA use to the extent feasible. Specifically, FAA should seek to obtain renewable electric energy through the following actions, which are listed in order of priority: 1) Installing FAA-funded renewable energy on site at FAA facilities and retaining corresponding renewable energy certificates (REC) or obtaining equal value replacement; 2) contracting for the purchase of energy that includes the installation of renewable energy on site at a FAA facility or off site and the retention of corresponding RECs or obtaining equal value replacement RECs for the term of the contract; 3) purchasing electricity and corresponding RECs; or 4) obtaining equal value replacement RECs; and purchasing RECs (EO 13693 §3(d)). FAA should give preference to renewable energy investments that enhance or improve the operation of the NAS, for example, by improving reliability.



**a. On-site Bonus.** The amount of renewable electric energy can be doubled for Federal counting and reporting purposes if the renewable electric energy is (EPAAct §203(c)(42 USC §15852)):

- (1) Produced and used on-site at a Federal facility,
- (2) Produced on Federal lands and used at a Federal facility, or
- (3) Produced on Indian land, as defined by Federal law.

To ensure that projects qualify for the bonus, they should be implemented in a manner consistent with the most recent DOE guidance.

**5. Renewable Electric Energy Purchases from a Utility.** Renewable electric energy can be purchased from a utility that provides a product that includes some percentage of renewable power. This purchase includes both the electricity and the environmental attributes associated with that power; whereas RECs (as described in the RECs section below) represent only the environmental attributes of power produced and used elsewhere. DOE provides guidance that addresses considerations and specifications that must be included in purchase contracts to ensure these purchases meet Federal renewable energy requirements and can be counted toward FAA's goals.

**6. Renewable Energy Certificates (REC).** FAA has the option of purchasing RECs to help meet renewable energy requirements. FAA should give preference to on-site energy project investments that improve FAA facilities and infrastructure over REC purchases. Purchase and application of these credits toward meeting requirements will be consistent with the most recent guidance from DOE and DOT. In accordance with Federal legislation, REC purchases are the equivalent of renewable electricity purchases in meeting the requirements of EPAAct 2005 and EO 13693. Each REC represents the environmental and other non-power attributes from one megawatt hour of electricity from an eligible source. Each REC purchase should identify the underlying generation energy source, location of the generation, date the generation facility was placed in service, quantity of megawatt hour purchased, date of generation (i.e., vintage), environmental emissions, and other characteristics associated with the generator. This information is necessary for Federal reporting and accounting. Purchase contracts should be explicit about which attributes are conveyed. Certificate tracking systems in states and regions issue and record RECs. In order to count a REC toward the renewable electric target in EO 13693, the electricity must have been generated by a renewable generator that was placed into service within 10 years prior to the start of the fiscal year in which FAA intends to count the REC toward the renewable electric target. The date of generation of a REC for a given fiscal year must be within a time window that starts six months before the start of the fiscal year and ends three months after the end of the fiscal year (e.g., the vintage of RECs intended to count in FY 2017 should specify a period of generation anywhere between April 1, 2016 to December 31, 2017) or consistent with the most current DOE guidance. REC purchases made to meet the renewable electric energy requirement can be applied to FAA's clean energy goal.

## Chapter 7. Energy and Water Aspects of Product Procurement and Operations

**1. Introduction.** This chapter addresses the procurement and operation of products affecting FAA energy and water consumption. Product purchases (e.g., HVAC systems, light fixtures, water fixtures, personal computers) and the operation of these products have important direct and indirect impacts on the energy and water consumption of FAA facilities. Without compromising safety and operations of the NAS, it is the responsibility of LOBs and SOs, and the appropriate procurement teams, to ensure that products purchased are energy- and water-efficient, environmentally preferable, and life cycle cost-effective.

**2. Federal Product Procurement Standards.** FAA must purchase the most energy- and water-efficient products available, where life cycle cost-effective and consistent with the mission need. Procurement teams must incorporate the appropriate language into equipment specifications in solicitations and evaluations. This language should reflect updated energy- and water-efficiency standards, and use of available guidance and LCCA tools to support product procurement decisions.

**a. Contracts.** FAA must promote sustainable acquisition and procurement by ensuring that the environmental performance and sustainability factors are included to the maximum extent practicable for all applicable procurements in the planning, award, and execution phases of the acquisition (EO 13693 §3(i)). An allowable exception is available if any of the following conditions exist:

(1) Product or service cannot be acquired competitively within a reasonable performance schedule.

(2) Product or service cannot be acquired that meets reasonable performance requirements.

(3) Product or service cannot be acquired at a reasonable price.

(4) An exception is provided by statute, such as the exception to procuring ENERGY STAR or FEMP-designated products under 42 U.S.C. § 8259b(b)(2).

If a product meets any of these exceptions, FAA should strive to purchase a comparable product that is still environmentally sustainable (e.g., if a WaterSense® product is not available at a reasonable price, FAA should purchase a similar product that is water efficient and available at a reasonable price).

**b. Environmentally Sustainable Electronic Products.** FAA must promote electronics stewardship throughout the acquisition life cycle and ensure a procurement preference for environmentally sustainable electronic products, such as the Electronic Product Environmental Assessment Tool (EPEAT) (EO 13693 §3(l)). EPEAT is a procurement tool designed to help purchasers evaluate, compare, and select products (e.g., computer desktops, laptops, and monitors) on the basis of their environmental attributes. FAA must purchase electronic products or services that meet or exceed specifications, standards, or labels recommended by EPA (e.g., EPEAT certified products are the only electronic products in FY 2016 that meet the requirements) and follow the latest

version of EPA's Recommendation of Specifications, Standards and Ecolabels for electronics. Note that all EPEAT-registered products are ENERGY STAR®-labeled.

**c. ENERGY STAR®-Labeled/Federal Energy Management Program (FEMP)-Designated Products.** FAA must purchase or lease ENERGY STAR®-labeled products or products designated by DOE as being among the top 25 percent of their class in energy efficiency. This requirement applies to all product categories in which ENERGY STAR®-labeled or FEMP-designated products are available, unless LOBs and SOs document that an ENERGY STAR®-labeled or FEMP-designated product was not reasonably available, or the product would not have been cost effective over its lifetime, taking energy cost savings into account (EPA Act 2005 §104(a), amending 42 USC §8259b. In making a determination that a product would not be lifecycle cost-effective, FAA should rely on the lifecycle cost analysis method in part 436, subpart A, of title 10 of the CFR (10 CFR Part 436.42).

**d. Low Standby Power Products.** FAA must purchase products that use no more than one watt of standby power. If suitable products are not available, FAA should purchase products with the lowest wattage available (EISA §524, amending 42 USC §8259b). This requirement applies only to commercially available, off-the-shelf products, where life cycle cost-effective and practicable.

**e. WaterSense®-Labeled Products and Services.** FAA must purchase WaterSense®-labeled products. FAA should choose irrigation contractors that are certified through a WaterSense®-labeled program.

**3. Product Operations.** The organizations responsible for information technology (IT) are responsible for ensuring that the equipment is operated in a manner that is energy-efficient and environmentally preferable, as described herein. The requirements contained within this section apply to FAA-owned equipment that is non-NAS and/or non-mission critical. These requirements pertain primarily to administrative desktops, laptops, and monitors; however, environmentally sound practices should be used when operating other Agency computer systems. Any references to "eligible" IT equipment refer to non-NAS and/or non-mission critical IT equipment.

**a. Enabling Environmentally Preferable Features on Products.** FAA must establish and implement policies to enable power management, duplex printing, and other energy-efficient or environmentally sustainable features on all eligible FAA electronic products (EO 13693 §3(1)(ii)).

**b. Extending Useful Life of Products.** FAA must extend the useful life of electronic equipment through reuse, donation, and sales (GSA Bulletin FMR B-34 §6(A)(1)).

**c. Properly Disposing of Products.** FAA must implement environmentally sound practices, such as recycling, with respect to the disposition of electronic equipment that has reached the end of its useful life (EO 13693 §3(1)(iii)). This also applies to other products, such as appliances.

**d. Operation of Servers and Data Centers.** FAA must improve data center efficiency by promoting data center energy optimization, efficiency and performance; installing and promoting advanced energy meters; and meeting power usage effectiveness targets (EO 13693 §3(a)(ii)). All core data centers must have at least one certified Data Center Energy Practitioner (DCEP), either on-

site or centralized, assigned to manage data center performance and continued optimization. A single DCEP can manage multiple data centers (EO 13693 Implementing Instructions §III(A)(2)).

(1) LOBs and SOs must install and promote advanced energy meters on all data centers by FY 2018 (EO 13693 §3(a)(ii)). New data centers must be designed and built with advanced energy and water meters, as applicable. Meters must enable the active tracking of power usage effectiveness for the data center, as well as promote implementation of Data Center Infrastructure Management. In order to maintain consistency with the policies of the Energy Star program for data centers, to the maximum extent practicable, meters to measure the IT energy use of the data center should be installed at the output of the Uninterruptible Power Supply. For data centers undergoing or planned for consolidation prior to FY 2018, LOBs and SOs may defer installation of advanced energy meters until consolidation activities are complete, but no later than the end of FY 2018. For data centers undergoing or planned for closure prior to FY 2018, installation of advanced energy meters is not required (EO 13693 Implementing Instructions §III(A)(2)).

(2) New data centers must meet a PUE target of 1.2 to 1.4 and existing data centers must have a PUE target of less than 1.5 (EO 13693 §3(a)(ii)). For existing data centers that are unable to cost effectively achieve a power usage effectiveness of less than 1.5, LOBs and SOs must evaluate alternatives that will allow consolidation and/or closure of these data centers (EO 13693 Implementing Instructions §III(A)(2)).

(3) To increase the speed of cloud adoption, LOBs and SOs must adopt a cloud-first or cloud-by-default policy when developing or purchasing new systems. When contracting for a data center, LOBs and SOs must demonstrate procurement preference for data centers with the lowest demonstrated power usage effectiveness to the extent practicable and in accordance with applicable acquisition laws and policies. In addition, any new data center contract must require the contractor to regularly report power usage effectiveness data to FAA. LOBs and SOs may also include procurement preference for data centers and cloud service providers that use green power (EO 13693 Implementing Instructions §III(A)(2)).

**e. Equipment Power Management.** FAA must ensure that all computer central processing units, monitors, dedicated printers, copiers, and other peripheral equipment in dedicated FAA workspace have power management settings enabled to reduce electricity consumption, especially during non-working hours, except in instances where it could have a negative impact on mission objectives or bears associated risks. Fax machines may be left on 24 hours a day, but users should determine whether continuous operation is cost effective. If leaving a fax machine on is not mission essential and adds little value, it should be turned off.

## Chapter 8. Energy and Water Awareness and Training

**1. Introduction.** Energy and water awareness programs inform and motivate employees to understand and consider the energy and water impacts of their daily activities, and how they can reduce those impacts. These programs also help establish energy and water conservation as a core value in FAA culture. Raising awareness and encouraging employees to reduce their energy and water use is a key component of a successful energy and water program, and is a low/no-cost conservation measure. Training is closely related to awareness, and ensures that appropriate FAA employees have the skills needed to successfully implement FAA's Energy and Water Management Program (as established by this Order). This chapter includes training requirements for specific positions, as appropriate (e.g., for energy managers). This chapter also provides guidance on award programs, which recognize successful energy and water projects, help raise awareness, and encourage replication and institutionalization of successful best practices. FAA will take advantage of existing internal and external awards program to recognize energy and water achievements.

**2. Energy and Water Awareness Programs.** FAA energy and water awareness programs should be designed to engage and educate personnel at all levels of the Agency. They should communicate FAA's goals for reducing energy and water consumption, as well as daily opportunities for employees to reduce energy and water use, and the associated environmental, economic, and social benefits. Awareness programs should also enlist top management support for the Energy and Water Management Program, and foster a culture of continuous improvement. LOB and SO energy managers are responsible for planning and coordinating organizational-wide energy and water awareness activities. AEE should coordinate with LOB and SO energy managers to document awareness activities in annual reports, and should optimize use of internal FAA employee communication channels to communicate energy and water awareness tips and activities.

**3. Energy Training.** FAA requires energy training for LOB and SO energy managers, local energy managers, and COs/RECOs responsible for negotiating energy contracts. LOBs and SOs may elect to have additional personnel with energy- and water-related duties participate in appropriate training. LOB and SO energy managers must ensure that appropriate FAA employees are familiar with the trainings, workshops, and other services offered by DOE. It is the responsibility of LOB and SO energy managers to develop training plans that will anticipate the training needs for FAA employees, identify the training that will occur over the next year, and encompass both internal and external training. The plan should identify the types of employees to be trained and the training subject areas; plans do not need to specify individuals and courses. LOB and SO energy managers should include the training plan in their organization's annual energy and water EMPs.

**a. Energy Manager Training.** FAA must establish and maintain programs to train energy managers, and encourage the appropriate employees to participate in energy manager training courses (EPAAct 1992 §157(a)(42 USC §8262c)). These training programs ensure that LOB and SO energy managers and local energy managers are "trained energy managers" as defined in EPAAct 1992 §151(3)(42 USC §8262). In addition, personnel performing building O&M, energy management, safety, and design functions must demonstrate core competencies and pursue continuing education as defined by GSA (Federal Buildings Personnel Training Act of 2010 (40 USC §581)). Training programs can be executed through internal courses, external resources, or a combination, as appropriate for the implementing LOB or SO. Each LOB and SO is responsible for ensuring that

energy managers are trained; energy managers are encouraged to take at least one relevant training each year.

**b. Contracting Officer (CO) Training.** All COs responsible for negotiating energy efficiency contracts (e.g., ESPCs) must participate in FEMP-sponsored contract negotiation and contract management training (EISA §517(c)(42 USC §17131)). FEMP offers the required training, *ESPC Contracting and Negotiations Webinar*, for Federal employees and contractors located at Federal sites. FAA employees for whom this training is required are responsible for scheduling their own participation. The purpose of this training is to prepare COs to:

- (1) Negotiate ESPCs,
- (2) Conclude effective and timely contracts for energy efficiency services with all companies offering energy efficiency services, and
- (3) Review Federal contracts for all products and services for the potential energy efficiency opportunities and implications of the contracts.

**c. Energy Managers' Certifications.** Energy managers may seek professional certification to enhance their expertise. There are a variety of licenses and certifications that may be appropriate; some options include becoming a Certified Energy Manager (CEM<sup>®</sup>), LEED<sup>®</sup> Associate or Accredited Professional, and Professional Engineer. Each of these licenses and certifications has eligibility and examination requirements.

**4. Employee Recognition.** FAA should recognize employees for their contributions to reducing energy and water use through internal and external programs.

**a. Internal Recognition Programs.** FAA should annually recognize individual employees or teams for superior energy and water management, outreach and awareness, or energy and water performance. LOBs and SOs are encouraged to review employee incentive programs to ensure that these programs appropriately recognize exceptional performance in implementing this Order.

**b. External Awards.** DOT annually recognizes OA employees and teams who have significantly contributed to DOT's mission through energy conservation, transportation management, and environmental stewardship through the DOT Sustainability Achievement Awards Program. This program is managed by DOT's Office of the Secretary of Transportation (OST), and the Office of Human Resource Management (AHR) coordinates FAA nominations. In addition, DOE annually assists agencies in recognizing employees and teams for their outstanding contributions to saving energy at Federal facilities. The call for nominations is directed by OST in coordination with AHR and AEE. These award programs include, but are not limited to, annual FEMP Federal Energy and Water Management Awards and White House "GreenGov" awards.

## Chapter 9. Energy and Water Tracking and Reporting

**1. Introduction.** Timely energy and water performance tracking and reporting is essential to the FAA Energy and Water Management Program. Each LOB and SO responsible for operating and maintaining buildings and facilities must track and report energy and water performance data in accordance with guidance from AEE and specifications in the higher-tier EMS energy and water EMPs. Based on this information, AEE must annually report Agency-wide energy and water performance data to DOT. This chapter outlines the requirements for tracking, benchmarking, and reporting energy and water consumption; it also addresses requirements and procedures for excluding appropriate facilities from Federal requirements.

**2. Tracking and Performance Measures.** FAA must track and measure its facility energy and water performance and GHG emissions to comply with applicable legal and EO reporting requirements (e.g., EAct 2005, EISA, and EO 13693) and meet internal Energy and Water Management Program goals. In addition to measures required for Federal reporting, LOB and SO energy managers or local energy managers should develop measures customized to their organizations to better support program implementation. For example, it may be helpful for LOB and SO energy managers to categorize the different types of facilities by use for internal measurement and benchmarking purposes. Facility categorization will allow energy managers to compare the performance of similar structures, especially for NAS facilities with energy-intensive equipment.

**3. Benchmarking.** LOB and SO energy managers are responsible for benchmarking metered facilities that meet DOE's covered facilities criteria and for publicly disclosing this information as required by EISA, other prevailing legislation, and DOE guidance. See Chapter 3 for details on designating covered facilities. Some state and local governments have benchmarking and reporting requirements for buildings in their jurisdictions. FAA is expected to conform to benchmarking and reporting requirements, where feasible (EO 13693 Implementing Instructions §III(A)(1)).

**a. Data Entry.** LOB and SO energy managers must enter energy use data for each metered building that is (or is a part of) a facility that meets DOE's covered facility criteria into a building energy use benchmarking system (EISA §432, amending 42 USC §8253(f)(8)(A)). ENERGY STAR® Portfolio Manager is the designated building energy use benchmarking system for use in fulfilling Federal benchmarking requirements (Federal Building Energy Use Benchmarking Guidance §I(C)).

**b. Benchmarking Plan.** FAA developed and submitted to DOT a metering and benchmarking plan (*2015 Metering and Benchmarking Plan*). Each LOB and SO responsible for facilities is responsible for implementing and providing input to update the plan, as needed.

**c. Data Disclosure.** EISA requires public disclosure of the information entered into or generated by the benchmarking system through DOE's Compliance Tracking System (CTS) (EISA §432, amending 42 USC §8253(f)(8)(C)). For covered facilities, CTS tracks implementation of energy requirements, such as benchmarking, audits, identification of opportunities, and implementation of energy and water conservation measures. LOB and SO energy managers must update such information each year, in accordance with DOE's most recent guidance, and include in such reporting previous years' information to allow changes in building performance to be tracked

over time. AEE will coordinate and provide guidance for annual updates to CTS. Buildings in CTS can be normalized for weather if the weather-adjusted Btu consumption is lower than unadjusted consumption when tracking progress toward the energy intensity requirement (EO 13693 Implementing Instructions §(III)(A)(1)).

**4. Reporting.** AEE is responsible for annually reporting overall progress on energy and water management activities and requirements to DOT and DOE, in accordance with DOT and DOE guidance. LOB and SO energy managers should document objectives and goals for obtaining, using, and reporting baselines and progress in their EMS energy and water EMPs.

**a. Annual Energy Management Report Summary.** Federal agencies must annually submit a report to DOE on their activities to meet energy and water management requirements, including renewable energy. DOE compiles an annual government-wide report for the U.S. Congress. This report describes energy management activities and operations, and progress in implementing the requirements of NECPA, EPCA 2005, EISA, and EO 13693 (42 USC §8258(b)). For the purpose of these reporting activities, buildings that do not consume energy or water are not reported. To streamline reporting requirements, FEMP incorporated the Annual Energy and Water Management Data Report data collection spreadsheet (last used in FY 2009) into the Annual GHG and Sustainability Data Report. However, there is still additional narrative information required from agencies for their annual energy management that is not captured in this data report. Each LOB and SO must track and report progress to AEE in support of creating the Annual Energy Management Report Summary.

**b. Annual Greenhouse Gas (GHG) and Sustainability Data Report.** This report includes annual energy and water management data (e.g., facility energy consumption, aircraft fuel consumption, renewable energy purchases), as well as additional activity data (e.g., refrigerant use, municipal solid waste disposal) needed to calculate the GHG inventory for Scope 1 & 2 and specified Scope 3 emissions. DOT is required to continue annually report to the Council on Environmental Quality (CEQ) and OMB a comprehensive inventory of absolute GHG emissions (EO 13693 §9(c)). This report is usually due to DOT in December (for the previous FY). In accordance with guidance provided by CEQ, DOE, and DOT, AEE will coordinate and develop FAA input for this annual report, based on data provided by LOBs and SOs.

**c. Strategic Sustainability Performance Plan (SSPP).** FAA must provide input to the DOT SSPP, and submit an annual FAA SSPP as requested by DOT.

**5. Exclusions from Federal Performance Requirements.** An important consideration for LOB and SO energy managers or local energy managers tracking and reporting facility energy and water consumption is noting which buildings are excluded from the requirement for Federal buildings to reduce energy intensity 2.5 percent annually through the end of FY 2025. The annual energy and water management report must designate buildings as “goal subject” or “excluded.” Buildings that are granted exclusion from the energy performance requirements are referred to as “excluded,” rather than “goal subject.” Energy and water use at these buildings is still tracked and reported annually, and FAA is allowed to credit verified energy efficiency improvements in these excluded buildings toward the 2.5 percent annual reduction goal. Therefore, measured and verified annual Btus savings from an efficiency improvement in an excluded building are deducted from the total Btus consumed by the



Agency's goal subject buildings while holding gross square feet constant (EO 13693 Implementing Instructions §III(A)(1)). Each organization responsible for the operation and maintenance of facilities is responsible for designating and justifying excluded buildings.

**a. Four Findings for Exclusion.** FAA may exclude any building from the energy intensity reduction requirement by demonstrating all of the following four findings (EPA Act 2005 §102(c), amending 42 USC §8253(c)(1)(A)):

- (1) Energy requirements are impracticable (see subsection (b) below);
- (2) All Federally-required energy management reports have been completed and submitted;
- (3) The Agency has achieved compliance with all energy efficiency requirements; and
- (4) Implementation of all practicable, life cycle cost-effective projects has been achieved at the excluded building(s).

**b. Impracticability.** For the purpose of excluding facilities from the energy intensity reduction requirement, a finding of impracticability must be based on one of two criteria:

(1) The Federal building (or collection of Federal buildings) has energy intensive functions. This criterion applies to facilities with energy-intensive processes for which FAA can clearly demonstrate that process-dedicated energy overwhelms other building energy consumption, and the fluctuation in the operation of the process would significantly affect meeting the energy performance requirements. For example, with 35 percent or more of building energy dedicated to process equipment, only 65 percent of total building energy is left to be reduced. At this level of process energy, it is impracticable to achieve an overall 30 percent reduction.

(2) The Federal building (or collection of Federal buildings) is used in the performance of a national security function. This criterion applies to facilities in which national security is overwhelmingly the primary function and this either prevents the implementation of energy efficiency measures or prohibits the reporting of energy consumption data because it would pose a demonstrated security risk.

**c. Justification and Approval of Exclusions.** These exclusions must be completed in accordance with the most recent DOT/DOE guidance. AEE will review and consolidate exclusion requests proposed by the LOBs and SOs, and submit them to DOT, which in turn will submit them to DOE.

## Chapter 10. Administrative Information

- 1. Distribution.** This Order is distributed to all LOBs and SOs, regional offices, service areas, support centers, field offices, and facilities.
- 2. Background.** There are several statutory and policy drivers for this Order.
  - a. Energy Policy Act of 2005 (EPAAct 2005).** EPAAct 2005 (Public Law 109-58) was passed by the Congress and signed into law in August 2005. By amending NECPA (42 USC §8201 et seq.), EPAAct 2005 increased conservation and energy efficiency requirements for the Federal government.
  - b. Executive Order (EO) 13693 and Implementing Instructions.** On March 25, 2015, President Obama signed EO 13693. This EO expanded and updated sustainability goals with the overarching objective of reducing GHG emissions across Federal operations (by at least 40 percent within 10 years) and the Federal supply chain. EO 13693 revoked EO 13514 and EO 13423. The EO 13693 Implementing Instructions, released on June 10, 2015, provide clarifying instructions and guidance.
  - c. Energy Independence and Security Act of 2007 (EISA).** EISA was passed by the Congress on December 19, 2007 (Public Law 110-140). Like EPAAct 2005, it also amended NECPA (42 USC §8201 et seq.) and established additional energy management requirements for Federal facilities.
  - d. Other Statutory and Policy Drivers.** Other drivers include NECPA (42 USC §8201 et seq.), as amended, and the Energy Policy Act of 1992 (Public Law 102-486) (where not amended by EPAAct 2005), DOE policies, and any additional FAA and DOT policies (including DOT Orders 4351 through 4359). Moreover, FAA must comply with the provisions in EO 13221, Energy Efficient Standby Power Devices.
- 3. Authority to Change This Order.**
  - a. FAA Administrator.** The Administrator reserves the authority to establish or change policy, delegate authority, or assign responsibility as necessary.
  - b. Executive Director of the Office of Environment and Energy (AEE-1).** AEE-1 has the authority to add new chapters or appendices, or change existing chapters or appendices that are proposed by organizational elements of FAA, after appropriate coordination with internal stakeholder organizations.
  - c. Organizational Elements.** Changes proposed by an organizational element within FAA must be submitted to AEE-1, who will evaluate, or assign a designee to evaluate the changes for incorporation.
- 4. Acronyms.** Acronyms are provided in the Appendix A.
- 5. Definitions.** Definitions are provided in Appendix B.

**Appendix A. Acronyms List**

<b>ABA</b>	Financial Services
<b>AEE</b>	Office of Environment and Energy
<b>AEE-1</b>	Executive Director of the Office of Environment and Energy
<b>AHR</b>	Office of Human Resource Management
<b>AJW</b>	Technical Operations
<b>AJT</b>	Air Traffic Organization – Terminal Services
<b>AMC</b>	Mike Monroney Aeronautical Center, Oklahoma City, Oklahoma
<b>AMS</b>	Acquisition Management System
<b>ANG-E</b>	William J. Hughes Technical Center, Atlantic City, New Jersey
<b>ANSI</b>	American National Standards Institute
<b>APL-2</b>	Deputy Assistant Administrator for Policy, International Affairs and Environment
<b>ASHRAE</b>	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
<b>ATO</b>	Air Traffic Organization
<b>Btu</b>	British Thermal Unit
<b>Btu/sf</b>	British Thermal Unit per Square Foot)
<b>CEM®</b>	Certified Energy Manager
<b>CEQ</b>	Council on Environmental Quality
<b>CFR</b>	Code of Federal Regulations
<b>CO</b>	Contracting Officer
<b>CSO</b>	Chief Sustainability Officer
<b>CTS</b>	Compliance Tracking System
<b>DOE</b>	Department of Energy
<b>DOT</b>	Department of Transportation
<b>ECM</b>	Energy Conservation Measure
<b>EISA</b>	Energy Independence and Security Act of 2007
<b>EMP</b>	Environmental Management Program
<b>EMS</b>	Environmental Management System
<b>EO</b>	Executive Order
<b>EPA</b>	Environmental Protection Agency
<b>EPAct 2005</b>	Energy Policy Act of 2005
<b>EPEAT</b>	Electronic Product Environmental Assessment Tool
<b>ESPC</b>	Energy Savings Performance Contract
<b>FAA</b>	Federal Aviation Administration
<b>FEMP</b>	Federal Energy Management Program

<b>FY</b>	Fiscal Year
<b>GAL/SF</b>	Gallons per Square Foot
<b>GHG</b>	Greenhouse Gas
<b>GSA</b>	General Services Administration
<b>GSF</b>	Gross Square Feet
<b>HVAC</b>	Heating, Ventilation, and Air Conditioning
<b>ILA</b>	Industrial, Landscaping, and Agricultural
<b>ISO</b>	International Standards Organization
<b>IT</b>	Information Technology
<b>LCCA</b>	Life Cycle Cost Analysis
<b>LEED®</b>	Leadership in Energy and Environmental Design
<b>LOB</b>	Line of Business
<b>NAS</b>	National Airspace System
<b>NECPA</b>	National Energy Conservation Policy Act of 1978
<b>NHPA</b>	National Historic Preservation Act of 1966
<b>NIST</b>	National Institute of Standards and Technology
<b>O&amp;M</b>	Operations and Maintenance
<b>OA</b>	Operating Administration
<b>OMB</b>	Office of Management and Budget
<b>OST</b>	Office of the Secretary of Transportation
<b>POC</b>	Point of Contact
<b>PPA</b>	Power Purchase Agreement
<b>REC</b>	Renewable Energy Certificate
<b>RECO</b>	Real Estate Contracting Officer
<b>SF</b>	Square Feet/Square Foot
<b>SHPO</b>	State Historic Preservation Officer
<b>SO</b>	Staff Office
<b>SSO</b>	Senior Sustainability Officer
<b>SSPP</b>	Strategic Sustainability Performance Plan
<b>THPO</b>	Tribal Historic Preservation Officer
<b>UESC</b>	Utility Energy Service Contract
<b>USC</b>	United States Code

## Appendix B. Definitions

- 1. Absolute Greenhouse Gas (GHG) Emissions.** Total GHG emissions without normalization for activity levels and includes any allowable consideration of sequestration.
- 2. Advanced meter:** An advanced meter records energy or water consumption data hourly or more frequently and provides for daily or more frequent transmittal of measurements over a communication network to a central collection point. Features of advanced meters vary depending on the utility they are serving.
- 3. Alternative Energy.** Energy generated from technologies and approaches that advance renewable heat sources, including biomass, solar thermal, geothermal, waste heat, and renewable combined heat and power processes; combined heat and power; small modular nuclear reactor technologies; fuel cell energy systems; and energy generation, where active capture and storage of carbon dioxide emissions associated with that energy generation is verified.
- 4. Building.** A structure wholly or partially enclosed with exterior walls and a roof.
- 5. British Thermal Unit (Btu).** An energy unit of measurement. The quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit at the temperature at which water has its greatest density (approximately 39 degrees Fahrenheit).
- 6. Clean Energy.** Renewable electric energy and alternative energy.
- 7. Commissioning.** The systematic process of assuring by verification and documentation that all facility systems perform interactively in accordance with the design documentation, its intent, and the owner's operational needs, including preparation of O&M personnel.
- 8. Contracting Officer (CO).** A FAA employee who is issued a certificate of appointment and who can bind (subject to any delegated limitations) FAA to a contract. The CO enters into, administers, or terminates contracts, and makes related determinations and findings.
- 9. Covered Facility.** The EISA created this term to include Federal facilities that constitute at least 75 percent of facility energy use at each agency. EISA-established specific requirements that apply only to covered facilities. “
- 10. Data Center.** Rooms with at least one server that is providing services are considered data centers. Rooms containing only routing equipment, switches, security devices (such as firewalls), or other telecommunications components are not considered data centers.
- 11. Energy Consumption.** The use of energy as a source of heat or power or as a raw material input to a manufacturing process.
- 12. Energy Efficiency.** Measures, practices, or programs that reduce the energy used by specific devices and systems, typically without adversely affecting the services provided. Such savings are generally achieved by substituting technically more advanced equipment or by improving operating

procedures (e.g., O&M procedures) to produce the same level of end-use services (e.g., lighting, heating, motor drive) with less energy input.

**13. Energy Intensity.** The ratio of energy consumption measured in BTU per gross square foot of building space.

**14. Energy Manager.** With respect to a facility, the individual who is responsible for ensuring compliance with Federal mandates by the facility and reducing energy use at the facility. The term “energy manager” may include a contractor of a facility, a part-time employee of a facility, or an individual who is responsible for multiple facilities.

**15. Energy Modeling.** A physics-based calculation of building energy consumption used to help ensure building energy efficiency primarily for new construction and major renovation (may include use of software based tools).

**16. Energy Savings Performance Contract (ESPC).** With respect to FAA, an ESPC is a competitively awarded Task Order issued to one of several Energy Service Companies (ESCOs) that have been awarded IDIQ contracts by the Department of Energy (DOE) for designing, acquiring, financing, installing, testing, operating, and maintaining and repairing an identified energy, water conservation, or renewable energy measure or series of measures at one or more locations. Such contracts provide that the contractor must incur costs of implementing energy savings measures, including at least the cost (if any) incurred in making energy audits, acquiring and installing equipment, and training personnel in exchange for a predetermined share of the value of the energy savings directly resulting from implementation of such measures during the term of the contract. Payment to the contractor is contingent upon realizing a guaranteed stream of future energy and cost savings, with any savings in excess of that guaranteed by the contractor accruing to the Federal government.

**17. ENERGY STAR®.** A joint Environmental Protection Agency (EPA) and DOE program created to identify and promote energy-efficient products and practices. ENERGY STAR® labels appliances and buildings that represent the top 25 percent of the market, and offers benchmarking tools and assistance for buildings.

**18. Environmental Management System (EMS).** A set of processes and practices that enable an organization to increase its operating efficiency; continually improve overall environmental performance; and better manage and reduce its environmental impacts, including those environmental aspects related to energy and transportation functions. EMS implementation reflects accepted quality management principles based on the “Plan, Do, Check, Act” model found in the International Standards Organization (ISO) 14001:2004(E) International Standard. EMSs use a standard process to identify and prioritize current activities, establish goals, implement plans to meet the goals, evaluate progress, and make improvements to ensure continual improvement.

**19. Environmentally Preferable.** Products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, product,

manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service.

**20. Electronic Product Environmental Assessment Tool (EPEAT).** A system to help purchasers in the public and private sectors evaluate, compare, and select equipment such as desktop computers, notebooks, and monitors on the basis of their environmental attributes. EPEAT also provides a clear and consistent set of performance criteria for the design of products, and an opportunity for manufacturers to secure market recognition for efforts to reduce the environmental impact of their products. Note that the requirements for EPEAT include ENERGY STAR<sup>®</sup> labeling; therefore, all EPEAT products are also ENERGY STAR<sup>®</sup> products.

**21. FAA Contractor.** A contractor providing a service to FAA that would affect FAA's compliance with the requirements specified in this Order.

**22. Federal Energy Management Program (FEMP).** A DOE program that provides services, tools, and expertise to Federal agencies to help them achieve their legislated and executive-ordered energy, GHG, and water requirements. These are delivered through project, technical, and program services.

**23. Federal Energy Management Program (FEMP)-Designated Products.** Federal agencies use a wide variety of energy-consuming products, all of which are not covered by the ENERGY STAR<sup>®</sup> program. The Congress authorized FEMP to designate energy-efficient product efficiency levels for Federal purchases and requires Federal agencies to specify or select only products meeting these efficiency levels where applicable. FEMP product efficiency requirements set minimum efficiency levels for product categories that have the potential to generate significant Federal energy savings. FEMP's efficiency requirements ensure that the Federal government purchases products among the highest 25 percent of equivalent products for energy efficiency. FEMP determines this top 25 percent by analyzing the distribution of models and energy performance within a given product category.

**24. Federal Facility.** Any building, installation, structure, or other property (including any applicable fixtures) owned or operated by, or constructed or manufactured and leased to, the Federal government. This includes a group of facilities at a single location or multiple locations managed as an integrated operation, and contractor-operated facilities owned by the Federal government. The definition of facility excludes any land or site for which the cost of utilities is not directly paid by the Federal government (e.g., where utilities are included in the rent).

**25. Goal Subject Buildings.** Federal buildings subject to the requirement to reduce building energy intensity by 2.5 percent annually through the end of FY 2025, relative to a FY 2015 baseline (42 USC §8253 (a)). This includes all Federal buildings that do not meet exclusion criteria published by DOE (as stated in Chapter 9). Unless specifically excluded in the annual Energy & Water Management Report, a building is considered to be goal subject.

**26. Greenhouse Gas (GHG).** Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride.

**27. Fuel Cell.** A device capable of generating an electrical current by converting the chemical energy of a fuel (e.g., hydrogen) directly into electrical energy. Fuel cells differ from conventional electrical cells (i.e., batteries) in that the active materials, such as fuel and oxygen, are not contained within the cell, but are supplied from outside.

**28. Life Cycle Cost.** The total cost of owning, operating, and maintaining a building over its useful life (including its fuel and water, energy, labor, and replacement components), determined on the basis of a systematic evaluation and comparison of alternative building systems. In the case of leased buildings, the life cycle cost must be calculated over the effective remaining term of the lease. The life cycle cost is calculated as the sum of the present value of the: (a) investment cost (less salvage value), (b) non-fuel operation and maintenance cost, (c) replacement costs (less salvage cost of replaced building systems, and (d) energy and/or water costs (10 CFR Part 436.19).

**29. Life Cycle Cost Analysis (LCCA).** A general approach to economic evaluation that encompasses several related economic evaluation measures, all of which take into account all dollar costs related to owning, operating, maintain, and disposing of a project over the appropriate study period. LCCA must be conducted using the *National Institute of Standards and Technology (NIST) Life Cycle Costing Manual for Federal Energy Management Program (FEMP)*.

**30. Life Cycle Cost Effective.** The estimated savings of a measure that exceeds the estimated costs over the lifespan of the measure. Life cycle cost-effectiveness is determined using the *National Institute of Standards and Technology (NIST) Life Cycle Costing Manual for Federal Energy Management Program (FEMP)*.

**31. Natural Gas.** A gaseous mixture of hydrocarbon compounds, the primary one being methane.

**32. Net-Zero Energy Building.** A building that is designed, constructed, or renovated and operated such that the actual annual source energy consumption is balanced by on-site renewable energy.

**33. Net-Zero Water Building.** A building that is designed, constructed, or renovated and operated to greatly reduce total water consumption, use non-potable sources as much as possible, and recycle and reuse water in order to return the equivalent amount of water as was withdrawn from all sources, including municipal supply, without compromising groundwater and surface water quantity or quality.

**34. Net-Zero Waste Building.** A building that is operated to reduce, reuse, recycle, compost, or recover solid waste streams (with the exception of hazardous and medical waste) thereby resulting in zero waste disposal.

**35. Procurement Team.** A group of relevant program offices, subject matter experts, and other technical specialists who develop the procedures, requirements, and specifications for a procurement. The procurement team may rely on, among other tools, its technical experience, market research, stakeholder input, and life cycle analysis to form procurement specifications that reflect the latest energy- and water-efficiency standards. The CO will work to incorporate the procurement team's requirements into any resulting solicitations, contracts, orders, or agreements.



**36. Real Estate Contracting Officer (RECO).** An individual authorized by warrant acting on behalf of the Federal government in the preparation and execution of contractual agreements between the Federal government and other parties. A RECO's warrant covers the following: the acquisition, management and disposal of interests in real property, through the purchase, lease, outgrant, transfer or otherwise, and to such services that come within the scope of a particular real property acquisition or disposal.

**37. Recommissioning.** A process of commissioning a facility or system beyond the project development and warranty phases of the facility or system, the primary goal of which is to ensure optimum performance of a facility, in accordance with design or current operating needs, over the useful life of the facility, while meeting building occupancy requirements.

**38. Renewable Energy Certificates (REC).** The technology and environmental (non-energy) attributes that represent proof that 1 megawatt-hour (MWh) of electricity was generated from an eligible renewable energy resource, that can be sold separately from the underlying generic electricity with which they are associated, and that, for the purposes of section 3(d)(iii) and (iv) of EO 13693, were produced by sources of renewable energy placed into service within 10 years prior to the start of the fiscal year.

**39. Renewable Electric Energy Resources.** Energy produced by solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), hydrokinetic, geothermal, geothermal heat pump, microturbines, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project.

**40. Retro-commissioning.** A process of commissioning a facility or system that was not commissioned at the time of construction of the facility or system.

**41. Scope 1 Greenhouse Gas (GHG) Emissions.** Direct GHG emissions from sources that are owned or controlled by FAA.

**42. Scope 2 Greenhouse Gas (GHG) Emissions.** Indirect GHG emissions resulting from the generation of electricity, heat, or steam purchased by FAA.

**43. Scope 3 Greenhouse Gas (GHG) Emissions.** GHG emissions from sources not owned or directly controlled by FAA, but related to such Agency activities as vendor supply chains, delivery services, and employee travel and commuting.

**44. Stakeholder.** Any organization, governmental entity, or individual with an interest (or stake) that may be affected by a given approach or issue (e.g., environmental regulation, pollution prevention, energy conservation).

**45. Sustainable.** Creating and maintaining conditions under which humans and nature can exist in productive harmony.

**46. Trained Energy Manager.** A person who has demonstrated proficiency, or who has completed a course of study in the areas of fundamentals of building energy systems, building energy codes and

applicable professional standards, energy accounting and analysis, life cycle cost methodology, fuel supply and pricing, and instrumentation for energy surveys and audits.

**47. Utility Energy Service Contract (UESC).** A contract between a Federal agency and a local utility that provides energy, water, or sewage services, as well as technical services and/or upfront project financing for energy efficiency, water conservation, and renewable energy investments, and that allows Federal agencies to pay for the services over time, either on their utility bill, or through a separate agreement.

**48. Water Balance.** A comparison of the water supplied to a defined system to the water consumed by that system in order to identify the proportion of water consumed for specific end-uses and ensure potential water leaks in the system are addressed

**49. Water Consumption Intensity.** Water consumption measured in gallons per gross square foot of building space.

**50. WaterSense®.** A voluntary public-private partnership with EPA that identifies and promotes high-performance products and programs that help preserve the Nation's water supply.

**Appendix C. Summary of Requirements**

<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>	
Capital Energy Investments	EISA §434(a)	Ensure large capital energy investments in an existing building that is not a major renovation, but involves replacement of installed equipment, or involves renovation, rehabilitation, expansion, or remodeling of existing space, employ the most energy- and water-efficient designs, systems, equipment, and controls that are life cycle cost-effective.	Ch. 3 Sec. 3	
Clean Energy	EO 13693 §3(b)	Ensure that at a minimum, the following percentage of the total amount of building electric energy and thermal energy shall be clean energy, accounted for by renewable electric energy and alternative energy:	Ch. 6 Sec. 2	
		<b>Fiscal Year</b>		<b>% Clean Energy</b>
		2016 – 2017		10
		2018 – 2019		13
		2020 – 2021		16
		2022 – 2023		20
		2025 and Thereafter		25
Electronics Stewardship	EO 13693 §3(l)(i-iii)	Ensure procurement preference for environmentally sustainable electronic products.	Ch. 7 Sec. 2 Ch. 7 Sec. 3	

<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>
Electronics Stewardship – Data Centers	EO 13693 §3(a)(ii)	<p>Improve data center energy efficiency at agency facilities by:</p> <ul style="list-style-type: none"> <li>• ensuring the agency chief information officer promotes data center energy optimization, efficiency, and performance;</li> <li>• installing and monitoring advanced energy meters in all data centers by FY 2018; and</li> <li>• establishing a power usage effectiveness target of 1.2 to 1.4 for new data centers and less than 1.5 for existing data centers.</li> </ul>	Ch. 7 Sec. 3
Electronics Stewardship – Device Settings	EO 13693 §3(l)(ii)	Establish and implement policies to enable power management, duplex printing, and other energy-efficient or environmentally sustainable features on all eligible electronic products.	Ch. 7 Sec. 3
Electronics Stewardship – End of Life	EO 13693 §3(l)(iii)	Employ environmentally sound practices with respect to the agency's disposition of all agency excess or surplus electronic products.	Ch. 7 Sec. 2 Ch. 7 Sec. 3
Electronics Stewardship – Useful Life	GSA Bulletin FMR B-34 §6(A)(1))	Extend the useful life of electronic equipment through reuse, donation, and sales.	Ch. 7 Sec. 3
Energy Conservation – Lighting	41 CFR Part 102-74.160	<p>Federal agencies must:</p> <ul style="list-style-type: none"> <li>• Turn off lights and equipment when not needed;</li> <li>• Not block or impede ventilation; and</li> <li>• Keep windows and other building accesses closed during the heating and cooling seasons.</li> </ul>	Ch. 1 Sec. 10

<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>
Energy Consumption – Energy Net-Zero Existing Buildings	EO 13693 §3(h)(iii)	Identify a percentage of the agency's existing buildings above 5,000 gsf intended to be energy, waste, or water net-zero buildings by FY 2025 and implement actions that will allow those buildings to meet that target.	Ch. 5 Sec. 3
Energy Consumption – Energy Net-Zero New Construction	EO 13693 §3(h)(i)	Ensure that beginning in FY 2020 and thereafter, that all new construction of Federal buildings greater than 5,000 gsf that enters the planning process is designed to achieve energy net-zero and, where feasible, water or waste net-zero by FY 2030.	Ch. 5 Sec. 3
Energy Consumption Benchmarking	EISA §432(f)(8)(a)	Energy managers must enter energy use data for each metered building that is (or is part of) an EISA-covered facility into a building energy use benchmarking system, such as the ENERGY STAR® Portfolio Manager.	Ch. 9 Sec. 3
Energy Consumption Benchmarking – Compliance Tracking System	EISA §432(f)(8)(c)	Energy managers must disclose information entered into or generated by the energy use benchmarking system through the DOE web-based CTS, and update this information each year.	Ch. 9 Sec. 3

<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>
Energy Evaluations	EISA §432(f)(3)	Energy managers must complete, for each calendar year, a comprehensive energy and water evaluation for approximately 25 percent of EISA-covered facilities in a manner that ensures an evaluation of each facility is completed at least once every four years. Evaluations must identify and assess re/retro-commissioning measures.	Ch. 3 Sec. 4 Ch. 4 Sec. 3
Energy Evaluations – Compliance Tracking System (CTS)	EISA §432(f)(7)(a)	Energy managers must certify compliance for energy and water evaluations, implement identified energy and water measures, and follow-up on implemented measures through DOE's CTS.	Ch. 3 Sec. 4
Energy Intensity	EO 13693 §3(a)(i)	Reduce agency building energy intensity measured in Btu per gsft by 2.5 percent annually through the end of FY 2025, relative to a FY 2015 baseline and taking into account agency's progress to date.	Ch. 1 Sec. 8 Ch. 2 Sec. 2
Energy Managers	EISA §432(f)(2)(a)	Federal agencies shall designate an energy manager for each covered facility that is responsible for implementing EISA requirements and reducing energy use.	Ch. 1 Sec. 10
Environmental Management System (EMS)	EO 13693 §7(i)	Continue implementation of formal EMS where those systems have proven effective and deploy new EMSs where appropriate.	Ch. 1 Sec. 9

<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>
Exclusions from Energy and Water Performance Requirements	EPAAct 2005 §102(c)	<p>An agency may exclude any building from Energy Policy Act of 2005 (EPAAct) requirements by demonstrating all of the characteristics below:</p> <ul style="list-style-type: none"> <li>• Energy requirements are impracticable;</li> <li>• All Federally-required energy management reports have been completed and submitted;</li> <li>• The agency has achieved compliance with all energy efficiency requirements; and</li> <li>• The agency has implemented all practicable, life cycle cost-effective projects at the excluded building(s).</li> </ul>	Ch. 9 Sec. 5
Federal Building Performance Standards	10 CFR Part 433	Provides design standards for Federal buildings.	Ch. 5 Sec. 3
Federal Building Performance Standards	EPAAct 2005 §109(2)(i)	Design new Federal buildings to achieve energy consumption levels that are at least 30 percent below the levels established in the latest ASHRAE Standard 90.1 or International Energy Code, when life cycle cost-effective.	Ch. 5 Sec. 3
Federal Energy Management and Planning Programs	10 CFR Part 436	Provides methodology and procedures for LCCA; methods and procedures for ESPCs; information on agency procurement of energy efficiency products; and guidelines for general operations plans.	Ch. 7 Sec. 2

Requirement Area	Legislation/Mandate	Description of Requirement	Section in the Order												
Fossil Fuel Consumption Reduction	EISA §433(a)(D)(i)	Reduce the fossil fuel-generated energy consumption for new construction and major renovation projects, as compared with such energy consumption by a similar building in FY 2003 (as measured by Commercial Buildings Energy Consumption Survey or Residential Energy Consumption Survey data from the Environmental Protection Agency [EPA]), by the percentage specified in the following table:	Ch. 5 Sec. 3												
		<table border="1"> <thead> <tr> <th data-bbox="771 877 1003 926">Fiscal Year</th> <th data-bbox="1003 877 1213 926">% Reduction</th> </tr> </thead> <tbody> <tr> <td data-bbox="771 926 1003 982">2010</td> <td data-bbox="1003 926 1213 982">55</td> </tr> <tr> <td data-bbox="771 982 1003 1039">2015</td> <td data-bbox="1003 982 1213 1039">65</td> </tr> <tr> <td data-bbox="771 1039 1003 1096">2020</td> <td data-bbox="1003 1039 1213 1096">80</td> </tr> <tr> <td data-bbox="771 1096 1003 1152">2025</td> <td data-bbox="1003 1096 1213 1152">90</td> </tr> <tr> <td data-bbox="771 1152 1003 1209">2030</td> <td data-bbox="1003 1152 1213 1209">100</td> </tr> </tbody> </table>		Fiscal Year	% Reduction	2010	55	2015	65	2020	80	2025	90	2030	100
		Fiscal Year		% Reduction											
		2010		55											
		2015		65											
		2020		80											
		2025		90											
		2030		100											
Greenhouse Gas (GHG) Emissions – Inventory	EO 13693 §9(c)	Annually report to CEQ and OMB a comprehensive inventory of progress towards the GHG emissions goals.	Ch. 9 Sec. 4												
Greenhouse Gas (GHG) Emissions – Scope 1 & 2	EO 13693 §2	Establish an agency-wide Scope 1 & 2 GHG emissions reduction target in absolute terms to be achieved by FY 2025, relative to a FY 2008 baseline. In June 2015, the DOT reported its Scope 1 & 2 GHG emissions reduction requirements as 35 percent by FY 2025.	Ch. 2 Sec. 2												



<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>
Greenhouse Gas (GHG) Emissions – Scope 3	EO 13693 §2	Establish an agency-wide Scope 3 GHG emissions reduction target in absolute terms to be achieved by FY 2025, relative to a FY 2008 baseline. In June 2015, DOT reported its Scope 3 GHG emissions requirement as 35 percent.	Ch. 2 Sec. 2
Leases	EISA §435(a) EO 13693 §2	Prohibits Federal agencies, effective December 19, 2010, from leasing buildings that have not earned an ENERGY STAR label in the most recent year, unless exempt.	Ch. 5 Sec. 9

Requirement Area	Legislation/Mandate	Description of Requirement	Section in the Order
Leases (greater than 10,000 RSF))	EO 13693 §3(h)(iv) EO 13693 §3(h)(v)	Include in all new agency lease solicitations over 10,000 RSF: <ul style="list-style-type: none"> <li>• criteria for energy efficiency either as a required performance specification or as a source selection evaluation factor in best-value tradeoff procurements;</li> <li>• requirements for building lessor disclosure of carbon emission or energy consumption data for that portion of the building occupied by the agency that may be provided by the lessor through sub-metering or estimation from pro-rated occupancy data, whichever is more cost effective; and</li> <li>• requirements for energy data reporting and carbon emissions reporting beginning in FY 2016 as part of the agency's Scope 3 GHG emissions.</li> </ul>	Ch. 5 Sec. 8
Life Cycle Cost Effective	EO 13693 §3	All actions taken in accordance with EO 13693 will be implemented where life-cycle cost-effective.	All sections where EO 13693 applies

<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>
Metering	EPAAct 2005 §103(e)(1) EISA §434(b)	Install advanced electric metering to the maximum extent practicable, or standard electric metering, in agency buildings by October 1, 2012, to the maximum extent practicable. By October 1, 2016, install equivalent metering of natural gas and steam.	Ch. 1 Sec. 8 Ch. 4 Sec. 4 Ch. 5 Sec. 5
Preventative Maintenance	EPAAct §104(2)	Encourage the implementation of appropriate maintenance activities to reduce electric consumption.	Ch. 4 Sec. 2
Performance Based Contracting	EO 13693 §3(k)(i)	Utilize performance contracting as an important tool to help meet identified energy efficiency and management goals while deploying life-cycle cost effective energy efficiency and clean energy technology and water conservation measures.	Ch. 3 Sec. 7 Ch. 6 Sec. 3
Performance Based Contracting – Existing Goals	EO 13693 §3(k)(ii)	Fulfill existing agency performance contracting commitments towards the goal of \$4 billion in Federal performance-based contracts by the end of calendar year 2016.	Ch. 3 Sec. 7 Ch. 6 Sec. 3
Performance Based Contracting – Future Goals	EO 13693 §3(k)(iii)	Provide annual agency targets for performance contracting for energy savings to be implemented in FY 2017 and annually thereafter.	Ch. 3 Sec. 7 Ch. 6 Sec. 3

<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>	
Renewable Energy	EO 13693 §3(c)	Ensure that the percentage of the total amount of building electric energy consumed by the agency that is renewable electric energy is:	Ch. 6 Sec. 2	
		<b>Fiscal Year</b>		<b>% Renewable</b>
		2016 – 2017		10
		2018 – 2019		15
		2020 – 2021		20
		2022 – 2023		25
		2025 and Each Year Thereafter		30
Renewable Energy – Double Counting	EPAAct 2005 §203(c)	<p>The amount of renewable energy can be doubled for counting purposes if the renewable energy is either:</p> <ul style="list-style-type: none"> <li>• Produced and used on-site at a Federal facility;</li> <li>• Produced on Federal lands and used at a Federal facility; or</li> <li>• Produced on Indian land as defined by Federal law.</li> </ul>	Ch. 6 Sec. 4	
Renewable Energy – Placed in Service Date	EO 13693 Implementing Instructions §III(A)(4)	In order to count a REC toward the renewable electric target, the electricity must have been generated by a renewable generator that was placed into service within 10 years prior to the start of the fiscal year in which the Agency intends to count the REC toward the renewable electric target.	Ch. 6 Sec. 3	

<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>
Renewable Energy – Priority Actions	EO 13693 §3(d)	<p>Include in the renewable electric portion of the clean energy target renewable electric energy associated with the following actions, which are listed in order of priority:</p> <ul style="list-style-type: none"> <li>• installing agency-funded renewable energy on site at Federal facilities and retaining corresponding RECs or obtaining equal value replacement RECs;</li> <li>• contracting for the purchase of energy that includes the installation of renewable energy on site at a Federal facility or off site from a Federal facility and the retention of corresponding RECs or obtaining equal value replacement RECs for the term of the contract;</li> <li>• purchasing electricity and corresponding RECs or obtaining equal value replacement RECs; and</li> <li>• purchasing RECs.</li> </ul>	Ch. 6 Sec. 4
Retained Savings	EPAAct 2005 §102(f)	<p>An agency can retain any funds appropriated for energy, water, or wastewater treatment expenditures that are not spent due to energy and water savings at an EISA-covered facility. The retained savings may be used only for energy efficiency, water conservation, or unconventional and renewable energy resources projects.</p>	Ch. 3 Sec. 8

<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>
Retained Savings	EISA §516	An agency can retain the full amount of energy and water cost savings obtained from utility incentive programs.	Ch. 3 Sec. 7 Ch. 3 Sec. 8
Solar Hot Water	EISA §523(3)	Where life cycle cost-effective, 30 percent of hot water demand in Federal building new construction and major renovations be met through installation and use of solar hot water heaters.	Ch. 5 Sec. 3
Stormwater Management	EISA §438	Use site planning, design, construction, and maintenance strategies for the any development or redevelopment project involving a Federal facility with a footprint that exceed 5,000 gsf to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow.	Ch. 5 Sec. 5
Stormwater Management	EO 13693 §3(f)(iv)	Install appropriate green infrastructure features on federally -owned property to help with stormwater and wastewater management.	Ch. 5 Sec. 5

<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>
Sustainable Acquisition	EO 13693 §3(i)(i-iii) EO 13693 Implementing Instructions §III(E)	Agency must ensure that sustainable acquisition requirements are included to the maximum extent practicable for all applicable procurements in the planning, award, and execution phases of the acquisition. To achieve sustainable acquisition goals, agency must meet statutory mandates for purchasing preference. If statutory mandates do not exist, agency must give preference to purchasing sustainable products and services identified by EPA programs. Where no statutory mandates, EPA programs, or EPA recommended specifications, labels, or standards exist, agency must give preference to non-federal specifications, standards, or labels to further advance sustainable procurements.	Ch. 7 Sec. 2
Sustainable Acquisition/ Electronics Stewardship	EO 13693 §3(l)(i) EPAAct 2005 §104(b)	Procure energy consuming products that are energy and water efficient, such as ENERGY STAR <sup>®</sup> -labeled products or FEMP-designated products in all product categories in which an ENERGY STAR-labeled or FEMP-designated products are available.	Ch. 7 Sec. 2
Sustainable Acquisition/ Electronics Stewardship	EISA §524(e)(2)	Purchase products that use no more than one watt of standby power. If suitable products are not available, purchase products with the lowest wattage available.	Ch. 7 Sec. 2

<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>
Sustainable Federal Buildings – Existing Buildings	EO 13693 §3(h)(ii)	Identify, beginning in June 2016, at least 15 percent of existing buildings by number or square footage (above 5,000 gsf) that will meet the <i>2016 Guiding Principles</i> by the end of FY 2025; and that the Agency makes annual progress toward 100 percent conformance with the <i>Guiding Principles</i> for its building inventory.	Ch. 1 Sec. 8 Ch. 4 Sec. 6
Sustainable Federal Buildings – New Construction	EO 13693 Implementing Instructions §III(D)(3)	Ensure that all new major construction, renovation, or repair and alteration of existing buildings greater than 5,000 gsf complies with the <i>Guiding Principles</i> where cost effective.	Ch. 5 Sec. 3
Sustainable Federal Buildings – Rehabilitation	EO 13693 Implementing Instructions §III(D)(3)	When complying with the <i>Guiding Principles</i> when rehabilitating Federally owned historic buildings, agencies should utilize best practices and technologies in retrofitting to promote long term viability of the buildings and preserve their historic character.	Ch. 3 Sec. 5 Ch. 5 Sec. 8
Sustainability Officer	EO 13693 §7(a)	The head of each agency shall designate a CSO who shall be accountable for agency conformance with the requirements within EO 13693.	Ch. 1 Sec. 10
Training – Contracting Officers	EISA §517(c)	COs responsible for negotiating energy efficiency contracts (e.g., ESPC) must participate in FEMP-sponsored contract negotiation and contract management training.	Ch. 8 Sec. 3



<b>Requirement Area</b>	<b>Legislation/Mandate</b>	<b>Description of Requirement</b>	<b>Section in the Order</b>
Training – Energy Managers	EPAAct 1992 §157(a)	Establish and maintain programs to train energy managers, and encourage the appropriate employees to participate in energy manager training courses.	Ch. 8 Sec. 3
Training – Energy Managers	Federal Buildings Personnel Training Act of 2010	Personnel performing building O&M, energy management, safety, and design functions are required to demonstrate core competencies, as defined by GSA, and pursue continuing education.	Ch. 8 Sec. 3
Water Consumption – Industrial, Landscaping, and Agricultural (ILA) Water	EO 13693 §3(f)(iii)	Reduce consumption of ILA water measured in gallons by 2 percent annually through FY 2025, relative to a FY 2010 baseline.	Ch. 2 Sec. 2
Water Intensity – Potable Water	EO 13693 §2(f)(i)	Reduce potable water consumption intensity measured in gal/sf by 36 percent by FY 2025 through reductions of 2 percent annually through FY 2025, relative to a FY 2007 baseline.	Ch. 2 Sec. 2
Water Meters	EO 13693 §3(f)(ii)	Install water meters, where life-cycle cost effective, and collect and utilize building and facility water balance data to improve water conservation and management.	Ch. 1 Sec. 8 Ch. 4 Sec. 4 Ch. 5 Sec. 1
WaterSense®	EO 13693 Implementing Instructions §III(E)(2) and §III(E)(6)	Agencies must purchase WaterSense-labeled products unless it meets one of the provided exceptions.	Ch. 7 Sec. 2

**Appendix D. Directive Feedback Information**

**FAA Form 1320-19, Directives Feedback Information**

Please submit any written comments or recommendations for improving this directive or suggest new items or subjects to be added to it. Also, if you find an error, please tell us about it.

Subject: Order 1053.1B, Energy and Water Management Program for FAA Buildings and Facilities

To: DOT/FAA  
Policy and Operations Division in the Office of Environment and Energy, AEE-400  
Orville Wright Building, FAA National Headquarters  
800 Independence Ave., SW  
Washington, DC 20591

*(Please check all appropriate line items.)*

- An error (procedural or typographical) has been noted in paragraph \_\_\_\_\_ on page \_\_\_\_\_.
- Recommend paragraph \_\_\_\_\_ on page \_\_\_\_\_ be changed as follows:  
*(Attach separate sheet if necessary.)*
- In a future change to this directive, please include coverage on the following:  
*(Briefly describe what you want added.)*
- Other comments:
- I would like to discuss the above. Please contact me.

Submitted by: \_\_\_\_\_ Date: \_\_\_\_\_

Telephone Number: \_\_\_\_\_ Routing Symbol: \_\_\_\_\_