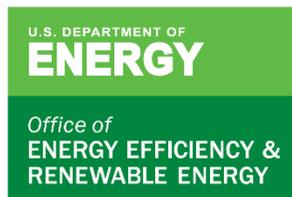


FEMP Facility Evaluation (Audit) Definitions

The Federal Energy Management Program (FEMP) Facility Evaluation (Audit) Definitions are the detailed reference for the facility audit terms used in the FEMP Facility Evaluation (Audit) Decision Tree¹ and FEMP Audit Scope of Work (SOW) templates². These resources are available to download from the FEMP Audit Program website³.



¹ <https://www.energy.gov/sites/prod/files/2020/11/f80/facility-evaluation-audit-decision-tree.pdf>

² See <https://www.energy.gov/eere/femp/energy-and-water-audits-federal-buildings> for the FEMP Audit SOW templates

³ <https://www.energy.gov/eere/femp/energy-and-water-audits-federal-buildings>

Introduction

FEMP developed the Facility Evaluation (Audit) Definitions to serve as a central reference for the facility audit terms used in the FEMP facility auditing resources. The Audit Definitions describe onsite and remote facility audits that can satisfy the Energy Independence and Security Act of 2007 (EISA) section 432 (42 U.S.C. 8253(f)) evaluation requirement⁴. The FEMP Facility Evaluation (Audit) Decision Tree⁵ provides selection criteria to choose between onsite and remote audits, and the FEMP Audit Scope of Work (SOW) templates⁶ serve as guides to plan and execute the selected onsite and remote audits that satisfy the EISA requirement. The Audit Definitions also contain a “Related Terms” section that provides descriptions of audit related terms that may be unfamiliar, and a “Related Energy and Water Assessment Activities” section which describes facility evaluations that possibly overlap with onsite and remote audits and certain EISA requirements. The FEMP auditing resources are available to download from the FEMP Audit Program website⁷. Note that the term ‘audit’ is used interchangeably with the term ‘evaluation’ throughout all the FEMP auditing resources.

Facility Evaluation (Audit) Categories

EISA section 432 and the Consolidated Guidance for the Management of Energy and Water Efficiency in Federal Covered Facilities⁸ give Agencies the flexibility to select the best audit approaches to evaluate their covered facilities⁹. Agencies have the discretion to choose audits based on the level of analysis the facility conditions suggest and/or their preference of audit type. Facility audits that can satisfy the EISA requirement are categorized as an “Onsite Audit”, “Remote Audit”, or “Remote Re-Evaluation”. Furthermore, the onsite and remote audit options are distinguished as “basic audits” or “detailed audits” according to their level of detail. The typical scopes of facility audits common in industry address energy efficiency measures, but often fall short of satisfying the EISA evaluation requirements pertaining to analysis of water efficiency measures¹⁰, renewable energy measures, and/or life-cycle cost effectiveness. Audits must include analysis of water efficiency and renewable energy measures along with energy efficiency, as well as a life-cycle cost analysis (LCCA) of all recommended measures, in order to satisfy EISA. A specific EISA compliance explanation is included with each of the industry audits addressed in these audit categories.

⁴ https://www.energy.gov/sites/prod/files/2013/10/f3/eisa_s432_guidelines.pdf [Update in progress]

⁵ <https://www.energy.gov/sites/prod/files/2020/11/f80/facility-evaluation-audit-decision-tree.pdf>

⁶ See <https://www.energy.gov/eere/femp/energy-and-water-audits-federal-buildings> for the FEMP Audit SOW templates

⁷ <https://www.energy.gov/eere/femp/energy-and-water-audits-federal-buildings>

⁸ https://www.energy.gov/sites/prod/files/2013/10/f3/eisa_s432_guidelines.pdf [Update in progress]

⁹ https://www4.eere.energy.gov/femp/requirements/laws_and_requirements/definition_covered_facilities_0

¹⁰ See <https://www.energy.gov/eere/femp/downloads/water-evaluation-tools> for FEMP water resources to help in identifying and analyzing water efficiency measures

I. **Onsite Audit**

An evaluation with a site visit to collect data to assess facility energy and water efficiency opportunities and improvements. A basic or detailed onsite audit can be used to meet the EISA evaluation requirement at the discretion of the Agency.

- a. **Basic Onsite Audit** – A basic onsite audit meets the minimum requirements for onsite facility evaluations. First, data collection is performed on energy and water end-uses via a walk-through survey. Then data analysis is performed using the collected data to estimate energy and water consumption for each major end-use. Third is the development of potential energy, water, and renewable energy measures with the objective of cost-effectively reducing energy and water use and increasing efficiency. The list below provides examples of basic onsite audits.
- **ASHRAE Level 1 Audit**¹¹ – An onsite energy audit process as defined by ASHRAE Standard 211-2018 which includes: preliminary energy use analysis (benchmarking), rate structure review, facility site survey, space function analysis, identification of no-cost and low-cost energy efficiency measures, and identification of potential capital improvement recommendations. To meet EISA section 432 evaluation requirements, cost-effective water efficiency and renewable energy measures must also be included, as well as a LCCA for all recommended measures.
 - **Industrial Assessment Center (IAC) Audit** – This is a facility evaluation of energy efficiency opportunities completed by students enrolled in a Department of Energy (DOE) IAC program at their university. This audit may be available to agencies with qualifying manufacturing facilities that are within 150 miles of a participating university¹². An interested agency should contact an IAC to determine their facility eligibility and audit availability. The DOE has approved IACs to audit non-manufacturing facilities in the past on a case-by-case basis. To meet EISA section 432 evaluation requirements, cost-effective water efficiency and renewable energy measures must be included along with a LCCA of all recommended measures.
 - **Utility Incentive Program Audit**¹³ – These are facility evaluation services that electricity and natural gas utility companies may provide for customer facilities within their service territory. The utility company’s program representative must be contacted to determine the services that can be provided since availability and scope can vary between utility companies. To meet EISA section 432 evaluation requirements, cost-effective water

¹¹ <https://www.ashrae.org/technical-resources/bookstore/standards-180-and-211>

¹² See <https://www.energy.gov/eere/amo/industrial-assessment-centers-iacs> for locations and contact of IACs and eligible facility types

¹³ See <https://www.dsireusa.org/> for directory of utility incentive programs by state

efficiency and renewable energy measures, as well as a LCCA of all recommended measures, must be included in the utility program evaluation.

- b. **Detailed Onsite Audit** – This is a more in-depth facility evaluation that is performed when project development is the focus and a more precise LCCA is required. The following list provides examples of detailed onsite audits.
- ASHRAE Level 2 Audit¹⁴ – An onsite energy audit as defined by ASHRAE Standard 211-2018 which evaluates building operation and control parameters, energy end-uses, energy efficiency and renewable energy measures, and the economic paybacks for all measures. To meet EISA section 432 evaluation requirements, water efficiency measures must be included.
 - ASHRAE Level 3 Audit¹⁵ – The most rigorous onsite evaluation of energy efficiency and renewable energy measures as defined by ASHRAE Standard 211-2018. A level 3 audit requires detailed building modeling or measurement (including seasonal and occupant variations), life-cycle cost analysis, and analysis of project implementation uncertainty. To meet EISA section 432 evaluation requirements, water efficiency measures must be included.
 - Deep Energy Retrofit Audit¹⁶ – A whole building analysis process that achieves much larger energy and cost savings than those of conventional energy retrofits. The process has a high energy savings target, usually 40% energy savings and greater. To meet EISA section 432 evaluation requirements, the cost-effectiveness of water efficiency measures must also be assessed.
 - Performance Contract Preliminary Assessment (PA) and Investment Grade Audit (IGA) – One (or both) of these analyses are conducted at facilities when an agency engages in an energy savings performance contract (ESPC)¹⁷ or utility energy service contract (UESC)¹⁸.
 - Preliminary Assessment (PA)¹⁹ – The initial energy efficiency, renewable energy, and water efficiency evaluation conducted by an energy service company (ESCO) or a site’s utility provider when a facility’s management team has solicited interest in an ESPC or UESC. The agency reviews the PA and identified measures to

¹⁴ <https://www.ashrae.org/technical-resources/bookstore/standards-180-and-211>

¹⁵ *ibid*

¹⁶ <https://www.wbdg.org/design-objectives/sustainable/optimize-energy-use>

¹⁷ <https://www.energy.gov/eere/femp/process-procuring-federal-energy-savings-performance-contract>

¹⁸ <https://www.energy.gov/eere/femp/utility-energy-service-contracts-federal-agencies>

¹⁹ <https://www.energy.gov/eere/femp/federal-espc-process-phase-2-esco-selection-and-preliminary-assessment>

decide whether to move forward the next ESPC²⁰ or UESC²¹ steps, which include completing an IGA and project implementation. The ESPC or UESC procurement process could end at the preliminary assessment if the agency decides not to move forward with the project after PA review, but the agency should arrange with the ESCO to retain the PA findings to satisfy their EISA requirement for a completed EISA evaluation. To meet EISA section 432 evaluation requirements, the cost-effectiveness of any potential water efficiency and renewable energy measures must also be analyzed.

- **Investment Grade Audit (IGA)**²² – A complete technical description of the project and price proposal for an ESPC or UESC project which refines and updates the PA data and identified measures. The IGA is performed after the PA if the agency decides to move forward with the ESPC or UESC after PA review. The IGA provides the information needed to establish the energy and operations and maintenance (O&M) baselines and finalize the feasibility analyses of the efficiency conservation measures (ECMs) under consideration. Project implementation²³ follows the IGA in the ESPC and UESC steps. Note that an IGA is interchangeably referred to as ‘feasibility study’ in FEMP UESC terminology²⁴.

II. **Remote Audit**

A facility evaluation performed without a site visit. Relevant data²⁵ is collected remotely and is used to analyze facility energy and water opportunities. A basic or detailed remote audit can be used to meet the EISA evaluation requirement at the discretion of the Agency.

- a. **Basic Remote Audit** – An analysis of datasets from specific building systems or operations to derive opportunities for energy efficiency, water efficiency, and renewable energy generation. Facility data is collected without a site visit and

²⁰ <https://www.energy.gov/eere/femp/process-procuring-federal-energy-savings-performance-contract>

²¹ <https://www.energy.gov/eere/femp/downloads/utility-energy-services-contracts-guide-0>

²² <https://www.energy.gov/eere/femp/federal-espcc-process-phase-3-project-development#step3>

²³ See <https://www.energy.gov/eere/femp/federal-espcc-process-phase-4-project-implementation-and-construction> for ESPC project implementation and <https://www.energy.gov/eere/femp/downloads/utility-energy-services-contracts-guide-0> for UESC project implementation

²⁴ <https://www.energy.gov/eere/femp/downloads/utility-energy-services-contracts-guide-0>

²⁵ See <https://www.energy.gov/sites/prod/files/2020/11/f80/facility-evaluation-audit-decision-tree.pdf> for a full description of relevant data

analyzed (often using specialized building software, and in some cases, with limited subject matter expert adjustment).

- Automated Audit – An evaluation that uses specialized building analysis software services to discern efficiency opportunities from metered or aggregated building information datasets without an onsite visit. To meet EISA section 432 evaluation requirements, water efficiency and renewable energy measures must be analyzed, and all recommended measures must include a LCCA.
 - Continuous Monitoring of Building Systems – Facilities that conduct ‘continuous monitoring’ actively monitor operations and systems using a building automation system (BAS), utility management control system (UMCS), energy management information system (EMIS), or monitoring-based commissioning (MBCx) process. These identify needed repairs (e.g. building diagnostics), adjustments to optimize energy (and if applicable, water) use, and/or systems for retro-commissioning. Trend logs and/or meter data from the BAS/UMCS/EMIS can be collected and inspected for energy and water efficiency opportunities or ongoing commissioning and measurement-based savings accounting. To meet EISA section 432 evaluation requirements, any potential cost-effective energy efficiency, water efficiency, and renewable energy measures must be identified and include a LCCA.
 - Portfolio Screening – An evaluation of facilities using screening tools that show the likelihood of available energy efficiency, water efficiency, and/or renewable energy measures. To meet EISA section 432 evaluation requirements, the screening must include potential cost-effective energy, water, and renewable energy measures along with a LCCA for all recommended measures.
- b. Detailed Remote Audit** – A rigorous analysis of building systems and operations to identify opportunities for energy efficiency, water efficiency, and renewable energy generation. Facility data is collected and analyzed without a site visit by a subject matter expert.
- Desk Audit – Identifies and analyzes energy and water efficiency opportunities, renewable energy potential, and likely building control system commissioning opportunities without an onsite visit. This is completed using building information, meter data, and records obtained from data requests and previously completed facility evaluation reports (if applicable). If the facility does not have a completed audit, reports for similar facilities can be used to extrapolate information. A LCCA is performed for all identified measures.

- **Remote Controls Evaluation** – A remote facility controls assessment via a remotely accessible building control system (BCS). A subject matter expert reviews the trend logs and alarms to identify opportunities for energy optimization. A LCCA is performed to quantify the opportunity for savings if the measures are implemented. To meet EISA section 432 evaluation requirements, any potential cost-effective water efficiency and renewable energy measures must also be included.

III. **Remote Re-Evaluation**

An agency self-review of past audit reports to document the following; changes to energy and water use and utility rates, known present conditions, implementation status of prior identified ECMs, a LCCA review for remaining applicable unimplemented ECMs, and a summary of any controls re-tuning or continuous commissioning initiatives. The list of criteria to determine the applicability of this approach can be found in the FEMP Facility Evaluation (Audit) Decision Tree²⁶.

Related Energy and Water Assessment Activities

EISA section 432 implementation guidance²⁷ gives flexibility in approaches to complete the evaluation requirement. Agencies can use facility surveys for other projects planned at their covered facilities to collect the facility information for energy, water, and renewable energy measure analysis to satisfy the EISA requirement. The following list includes activities that typically require facility visits and provide opportunities to coordinate facility information collection and ECM analysis.

- **Advanced Building Technology Projects** – These are innovative projects that can be funded at an agency’s facility and would likely require site visits and facility data collection to develop and install equipment associated with the project. Examples are advanced metering, demand response, grid-interactive efficient buildings, and technology demonstrations. The site surveys can help collect information on building systems for an audit analysis to fulfill EISA section 432 requirements in conjunction with the project.
- **Facility Master Planning/Strategic Planning** – Agency planning studies involving its facilities’ energy and water infrastructure. This could include site visits focused on topics such as: sustainment, portfolio energy and water goal attainment, sustainability goals, or other facility planning concerning energy or water infrastructure. Additional facility information can be collected for any covered facilities during the site visits to complete an audit analysis to fulfill EISA section 432 evaluation requirements.

²⁶ <https://www.energy.gov/sites/prod/files/2020/11/f80/facility-evaluation-audit-decision-tree.pdf>

²⁷ https://www.energy.gov/sites/prod/files/2013/10/f3/eisa_s432_guidelines.pdf [Update in progress]

- Net-Zero Resource Assessment²⁸ – A feasibility assessment for a facility to match its annual source energy and/or water use with onsite energy and/or water resource production through efficiency opportunities, renewable energy generation, water reclamation, and water source return. It can include waste diversion as well to minimize generated refuse streams but is not necessary for EISA compliance.
- O&M Survey²⁹ – An evaluation of the maintenance approaches (e.g. preventive, predictive, reliability-centered, and proactive) and delivery (i.e. frequency and quality) for building systems at a facility to identify opportunity for improvements and new practices or tracking (such as cataloging maintained building systems to incorporate FEMP O&M program best practices³⁰). Building system information for an audit analysis to fulfill EISA section 432 evaluation requirements can be collected as well.
- Performance Certifications for Existing Facilities – Programs designed to increase facility performance by meeting certification requirements such as installing efficient building technologies and/or adopting practices to increase building performance. Examples are LEED O+M³¹, Energy Star Certified³², ASHRAE Building EQ³³, and Passive House³⁴. The facility accreditations typically involve rigorous data collection and analysis, making them a good opportunity to add audit analysis to complete EISA section 432 evaluation requirements in parallel.
- Recommissioning Project³⁵ – Assesses the functionality of building systems and controls for a facility that was commissioned during construction, in order to restore the building to its original design intent and implement building controls optimization. This includes determining the commissioning objectives, determining the scope of the equipment to be recommissioned, and reviewing the original design intent and the basis of design for the equipment or system(s) being recommissioned. The design and/or specifications for equipment or system(s) should be updated if warranted by changes in building or facility use or occupancy. Operating performance is measured and monitored, and equipment and/or system deficiencies are recorded and prioritized. In addition, building system operation can be monitored after commissioning to proactively correct performance degradation.
- Resilience Study³⁶ – A detailed assessment that determines facility resilience needs and goals, evaluates the current facility or site energy and water infrastructure, identifies

²⁸ <https://www.energy.gov/eere/femp/net-zero-energy-water-and-waste-handbooks>

²⁹ https://www.energy.gov/sites/prod/files/2013/10/f3/omguide_complete.pdf [Update in progress]

³⁰ *ibid*

³¹ <https://www.usgbc.org/leed/rating-systems/existing-buildings>

³² <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification>

³³ <https://www.ashrae.org/technical-resources/building-eq>

³⁴ <https://www.phius.org/phi-us-certification-for-buildings-products>

³⁵ <https://www.energy.gov/eere/femp/commissioning-federal-buildings>

³⁶ <https://www.energy.gov/eere/femp/energy-and-water-resilience-and-security>

critical loads, and develops solutions to address identified gaps, optimize energy and water use, and identify options for secure energy and water generation and storage. FEMP developed the Technical Resilience Navigator (TRN)³⁷ to guide organizations through these resilience study steps.

- Retro-commissioning Project³⁸ – Assesses the functionality of building systems and controls for a facility that did not receive commissioning at construction, in order to optimize systems to meet potential new operational needs through testing and adjusting and implement building controls optimization. This includes determining the commissioning objectives and the scope of the equipment to be retro-commissioned in comparison with the original design intent and the basis of design for the equipment. The basis of design specifications for equipment or system(s) should be updated if warranted by changes in building or facility use or occupancy. Operating performance is measured and monitored, and equipment and/or system deficiencies are recorded and prioritized. In addition, building system operation can be monitored after commissioning to proactively correct performance degradation.
- Re-tuning (and FEMP Re-tuning Challenge)³⁹ – A systematic process aimed at minimizing building energy consumption by identifying and correcting operational problems at no-cost or low-cost. Re-tuning relies on BAS data and access to identify and implement control improvements at no cost beyond the time to program the changes. FEMP supports re-tuning evaluations at selected federal sites through its Re-tuning Challenge⁴⁰ where the required data collection includes much of the information used in a facility audit analysis.
- Strategic Energy Management (SEM) System⁴¹ – This is an energy management methodology that can be implemented at a facility or organization level. A SEM system can be used for ISO 50001 certification or for voluntary adoption of the ISO 50001 standard⁴² through a methodology such as DOE’s 50001 Ready⁴³. An organization or facility with a SEM system regularly collects much of the data required for an audit analysis making them advantageous to leverage for completing the EISA section 432 requirement.

³⁷ <https://trn.pnnl.gov/>

³⁸ <https://www.energy.gov/eere/femp/commissioning-federal-buildings>

³⁹ <https://www.energy.gov/eere/femp/re-tuning-federal-buildings>

⁴⁰ *ibid*

⁴¹ <https://betterbuildingsolutioncenter.energy.gov/iso-50001/what-iso-50001>

⁴² <https://www.iso.org/iso-50001-energy-management.html>

⁴³ <https://www.energy.gov/eere/amo/50001-ready-program>

Related Terms

- **50001 Ready**⁴⁴ - The DOE’s self-guided approach for facilities to establish an energy management system (EnMS) and self-attest to the structure of ISO 50001⁴⁵, a voluntary global standard for EnMS in industrial, commercial, and institutional facilities.
- **Advanced Metering**⁴⁶ – A utility metering system that provides energy and/or water consumption data at least daily and measures consumption at least hourly; may be at the facility, building, or end use level.
- **Assessment of Basic Building Controls Optimization Measures**⁴⁷ – Identification of building control system improvement opportunities for federal buildings that are below the recommended commissioning size in the FEMP Consolidated Guidance for the Management of Energy and Water Efficiency in Federal Covered Facilities⁴⁸; can be performed remotely or onsite.
- **Assessment of Commissioning Opportunity**⁴⁹ – Identification of the opportunity for recommissioning or retro-commissioning when a federal building meets the DOE recommended commissioning size. Recommissioning/retro-commissioning is generally recommended only for larger federal buildings (recommended when > 50,000 sqft) or those with an energy intensive function such as data center, healthcare, or laboratory (recommended when > 25,000 sqft).
- **Benchmarking**⁵⁰ – A process or tool which compares and tracks a facility’s energy and water use against similar facility types/characteristics or prior years (e.g. Energy Star Portfolio Manager).
- **Building Automation System (BAS)** – A system of digital controllers, communication architecture, and user interface that monitors and controls a building’s mechanical and electrical equipment such as heating, ventilation, and air conditioning (HVAC), lighting, fire protection, vertical transport systems, and irrigation systems. The system can be used to optimize facility operation and reduce energy consumption. Also known as building control system (BCS), energy management system (EMS), direct digital controls (DDC), etc.
- **Building Energy Asset Score**⁵¹ – A tool for assessing and standardizing the physical and structural energy efficiency condition of commercial and multifamily residential buildings. Asset Score is a simple energy efficiency rating that enables comparison

⁴⁴ *ibid*

⁴⁵ <https://www.iso.org/iso-50001-energy-management.html>

⁴⁶ <https://www.energy.gov/eere/femp/metering-federal-buildings>

⁴⁷ https://www.energy.gov/sites/prod/files/2013/10/f3/eisa_s432_guidelines.pdf [Update in progress]

⁴⁸ *ibid*

⁴⁹ *ibid*

⁵⁰ <https://www.energy.gov/eere/femp/eisa-federal-facility-management-and-benchmarking-reporting-requirements>

⁵¹ <https://www.energy.gov/eere/buildings/building-energy-asset-score>

among buildings and identifies (screens) opportunities to invest in energy efficiency upgrades.

- Building EQ⁵² - Assists in the preparation of an ASHRAE Level 1 Energy Audit to identify means to improve a building's energy performance including low-cost, no-cost energy efficiency measures and an Indoor Environmental Quality survey with recorded measurements to provide additional information to assess a building's performance.
- Commissioning⁵³ – A process of verifying and documenting, from the design phase to a minimum of one year after final acceptance, that all the facility systems are planned, designed, installed, tested, operated, and maintained to meet the Owner's Project Requirements. EISA requires a commissioning assessment to be conducted as part of the comprehensive evaluation to identify any potential low-cost, no-cost measures to improve operational efficiency. Different commissioning names are used to distinguish commissioning of existing buildings from new construction.
- Comprehensive Evaluation⁵⁴ - Terminology used in EISA section 432, which requires that a comprehensive energy and water evaluation of agency covered facilities must be completed at least once every four years for EISA compliance. The comprehensive energy and water evaluation must identify any life cycle cost-effective energy efficiency, renewable energy, and water saving measures and include an assessment of recommissioning or retro-commissioning measure opportunities for each covered facility.
- Covered Facility⁵⁵ – A facility designated by a Federal agency to be included in the 75% of agency energy facility use subject to the requirements of EISA section 432 and subject to comprehensive evaluations every four years.
- Demand Response⁵⁶ - The action of reducing or shifting electricity usage during peak periods in response to time-based rates or other forms of financial incentives.
- Efficiency Conservation Measure (ECM) – When pertaining to the FEMP Audit Definitions and Audit Decision Tree, ECMs are energy, water, and renewable energy measures that improve the energy and/or water efficiency of a building.
- Energy Star Certification⁵⁷ - A designation for a building with an ENERGY STAR score of 75 or higher, which indicates it performs better than at least 75 percent of similar

⁵² <https://www.ashrae.org/technical-resources/building-eq>

⁵³ <https://www.energy.gov/eere/femp/commissioning-federal-buildings>

⁵⁴ https://www.energy.gov/sites/prod/files/2013/10/f3/eisa_s432_guidelines.pdf, Appendix A [update in progress]

⁵⁵ https://www4.eere.energy.gov/femp/requirements/laws_and_requirements/definition_covered_facilities_0

⁵⁶ <https://www.energy.gov/oe/activities/technology-development/grid-modernization-and-smart-grid/demand-response>

⁵⁷ <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification>

buildings nationwide based on the Commercial Buildings Energy Consumption Survey (CBECS)⁵⁸.

- Energy Star Portfolio Manager⁵⁹ – A benchmarking tool that tracks inputted building utility and function data and benchmarks that data to baseline user’s building performance against comparable buildings and prior years.
- Energy Savings Performance Contract (ESPC)⁶⁰ – A performance contract where an ESCO identifies, finances, and implements projects with cost savings designed to pay back the retrofit costs over the term of the contract (not more than 25 years). The facility’s management team is provided a PA to decide whether to move forward with an IGA.
- Facility - A single or set of buildings, central utility plants, distribution systems, and other energy intensive operations at a specified location or regional boundary.
- Facility Energy Decision System (FEDS)⁶¹ – A building energy efficiency software tool that identifies energy and water efficiency improvements that maximize life-cycle savings. The Windows-based program simulates building systems, loads, and energy use and analyzes the cost and performance impacts of thousands of potential efficiency measures.
- First-Time Energy and Water Audit – The first comprehensive energy and water evaluation of a covered facility.
- Grid-Interactive Efficient Buildings⁶² – A concept of making buildings more energy efficient by making equipment more intelligent through next-generation sensors, controls, connectivity, and communication. These capabilities give building occupants more control in managing building comfort and productivity while saving money on energy bills, plus they can benefit the electric grid by enhancing grid reliability and resilience, deferring capital expenditures, and helping balance the supply of renewable generation.
- Industrial Assessment Center (IAC)⁶³ – A DOE program at over 25 universities across the country for college students to conduct free energy assessments for local small- and medium-sized manufacturers and build hands-on work experience.
- ISO 50001⁶⁴ - The global energy management systems (EnMS) standard that specifies requirements for establishing, implementing, maintaining, and improving an EnMS. The standard is based upon the Plan-Do-Check-Act management system.

⁵⁸ <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager/understand-metrics/how-1-100>

⁵⁹ <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager>

⁶⁰ <https://www.energy.gov/eere/femp/process-procuring-federal-energy-savings-performance-contract>

⁶¹ <https://www.pnnl.gov/FEDS/>

⁶² <https://www.energy.gov/eere/buildings/grid-interactive-efficient-buildings>

⁶³ See <https://www.energy.gov/eere/amo/industrial-assessment-centers-iacs> for IAC locations, contact, and eligibility

⁶⁴ <https://www.energy.gov/ISO50001>

- Leadership in Energy and Environmental Design (LEED)⁶⁵ – A green building rating system that can be applied to new construction, major renovations, interior design, building O&M, neighborhood development, homes, cities and communities, and net zero.
- Life-Cycle Cost Analysis (LCCA)⁶⁶ – An economic methodology to evaluate the implementation of a measure/project by examining the total cost over the course of the useful life of the measure/project.
- Monitoring-based Commissioning (MBCx)⁶⁷ – An OCx process that combines energy consumption and system performance monitoring to guide the re- and retro-commissioning processes in existing buildings and then verify the energy savings achieved. The monitoring maintains the persistence of savings by alerting building staff and management to degradation in performance and detecting faults in operation. In addition, monitoring can provide building operation data to identify improvement opportunities during re- and retro-commissioning and support continual commissioning and renewal of building systems. Also known as real-time commissioning.
- Ongoing Commissioning (OCx)⁶⁸ – A commissioning approach that incorporates planning, point monitoring, system testing, performance verification, corrective action response, ongoing measurement, and documentation to proactively address operating problems in the systems being commissioned as they occur.
- Passive House⁶⁹ - A building design strategy balancing a comprehensive set of factors including heat emissions from appliances and occupants to keep the building at comfortable and consistent indoor temperatures throughout the heating and cooling seasons with minimal need for space conditioning.
- Performance Contract⁷⁰ – The ESPC and UESC third-party funding mechanisms for agency energy, water, and renewable energy projects that are paid back through energy and utility savings and/or appropriated funds.
- Recommissioning (ReCx)⁷¹ – As defined in 42 U.S.C. 8253(f)(1)(F), “recommissioning means a process- (i) of commissioning a facility or system beyond the project development and warranty phases of the facility or system; and (ii) 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.” In practice, ReCx is accomplished through testing and adjusting the building systems to meet the original design intent and/or optimize the

⁶⁵ <https://www.usgbc.org/leed>

⁶⁶ <https://www.wbdg.org/resources/life-cycle-cost-analysis-lcca>

⁶⁷ https://buildingretuning.pnnl.gov/publications/PNWD-SA-8612_NCBC09P.pdf

⁶⁸ <https://www.energy.gov/eere/femp/commissioning-federal-buildings>

⁶⁹ <https://www.phius.org/what-is-passive-building/passive-house-principles>

⁷⁰ <https://www.energy.gov/eere/femp/energy-and-project-procurement-development-services>

⁷¹ <https://www.energy.gov/eere/femp/commissioning-federal-buildings>

systems to satisfy the current operational needs. ReCx relies on building and equipment documentation, along with functional testing to optimize performance. ReCx is applied to buildings that have been previously commissioned, either as new or existing buildings.

- Recurring Energy and Water Audit – Any evaluation of a covered facility after the first evaluation.
- Renewable Energy⁷² - The term 'renewable energy' means electric energy generated from solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project.
- Retro-commissioning (RCx)⁷³ – 42 U.S.C. 8253(f)(1)(G) defines retro-commissioning as “a process of commissioning a facility or system that was not commissioned at the time of construction of the facility or system.” Retro-commissioning is concerned with how equipment, systems, and subsystems function together, but it does not generally take a whole-building design approach to efficiency. The process can identify and solve problems that occurred during design or construction, as well as problems that have developed during the building’s operational life. While the goal of retro-commissioning may be used to bring the building, its systems, and equipment back to its original design intent, it is not a requirement. RCx improves the building O&M procedures to enhance overall building performance.
- Technology Demonstration – Validation of technology that is either near-commercialization or is commercially available and new to a market. Demonstrations typically measure the performance of the equipment and a variety of other success factors of the implementation.
- Utility Energy Services Contract (UESC)⁷⁴ – A performance contract where the facility’s utility service provider identifies, finances, and implements projects whose cost savings are designed to pay back the retrofit costs over the term of the contract (not more than 25 years). The facility’s management team is typically provided a PA to decide whether to move forward with the UESC and IGA. Note that the FEMP UESC guidance⁷⁵ uses feasibility study interchangeably with IGA.

⁷² <https://www.energy.gov/eere/femp/federal-renewable-energy-requirements-epact-2005-203-and-executive-order-13834-renewable>

⁷³ <https://www.energy.gov/eere/femp/commissioning-federal-buildings>

⁷⁴ <https://www.energy.gov/eere/femp/downloads/utility-energy-services-contracts-guide-0>

⁷⁵ *ibid*