



U.S. Department of
ENERGY

Guidance for the Implementation and Follow-up of Identified Energy and Water Efficiency Measures in Covered Facilities

*(per 42 U.S.C. 8253(f), Use of Energy and
Water Efficiency Measures in Federal Buildings)*

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United States Department of Energy
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I. PURPOSE

This document provides specific guidance to agencies on the implementation and follow-up of energy and water efficiency measures identified and undertaken per Section 432 of the Energy Independence and Security Act of 2007 (EISA) (42 U.S.C. 8253(f)(4) and (5)). This guidance also provides context for how these activities fit into the comprehensive approach to facility energy and water management outlined by the statute and incorporates by reference previous DOE guidance released for Section 432 of EISA and other related documents. 42 U.S.C. 8253(f)(7)(A) specifies that facility energy managers shall certify compliance for each covered facility with the 42 U.S.C. 8253(f)(2)-(5) requirements via a web-based tracking system and make it publicly available. This document also describes the role of the tracking system that has been developed for the collection and reporting of data needed for the demonstration of compliance and progress toward meeting all energy and water efficiency requirements outlined in the statute.

II. BACKGROUND

A. Authority

Section 432 of EISA amends section 543 of the National Energy Conservation Policy Act by adding a new subsection, *Use of Energy and Water Efficiency Measures in Federal Buildings* (42 U.S.C. 8253(f)¹) (See Appendix B for a reprint of Section 432 of EISA.) The new subsection, referred to as “the statute” in this guidance, outlines a framework for facility energy and water project management and benchmarking, including the following requirements for Federal agencies:

- Designate “covered facilities” and assign “facility energy managers” for ensuring compliance of “covered facilities” subject to the requirements;
- Conduct “comprehensive energy and water evaluations”;
- Implement identified efficiency measures;
- Follow up on implemented efficiency measures;
- Use the FEMP-deployed web-based Compliance Tracking System (CTS) to report covered facilities’ energy use, evaluations, projects, follow-up, and analysis;
- Benchmark metered buildings that are, or are part of, covered facilities; and
- Disclose to Congress and the public agency progress in evaluating covered facilities, project implementation, follow-up status, and benchmarked building performance monitoring status.

B. Related DOE Guidance

This document is the third of three guidance documents issued to implement the statute. (See matrix on page 4 to reference other guidance issued.) The first guidance document addressed the EISA Section 432 requirements that the Secretary of Energy issue guidelines to agencies for designating covered facilities, assigning energy managers, and performing comprehensive evaluations (42 U.S.C. 8253(f)(2) and (3)). This published guidance, “**Facility Energy**

¹ Note that EISA established two subsections designated (f). This reference is to the first subsection (f).

Management Guidelines and Criteria for Energy and Water Evaluations in Covered Facilities” is located at http://www1.eere.energy.gov/femp/pdfs/eisa_s432_guidelines.pdf. It covers a comprehensive approach for evaluating facilities and identifying potential energy and water efficiency projects.

DOE was also required to select or develop a building energy use benchmarking system for building performance monitoring and to issue guidance for use of the system (42 U.S.C. 8253(f)(8)). This second guidance document, **“Building Energy Use Benchmarking Guidance,”** is located at http://www1.eere.energy.gov/femp/pdfs/eisa432_guidance.pdf.

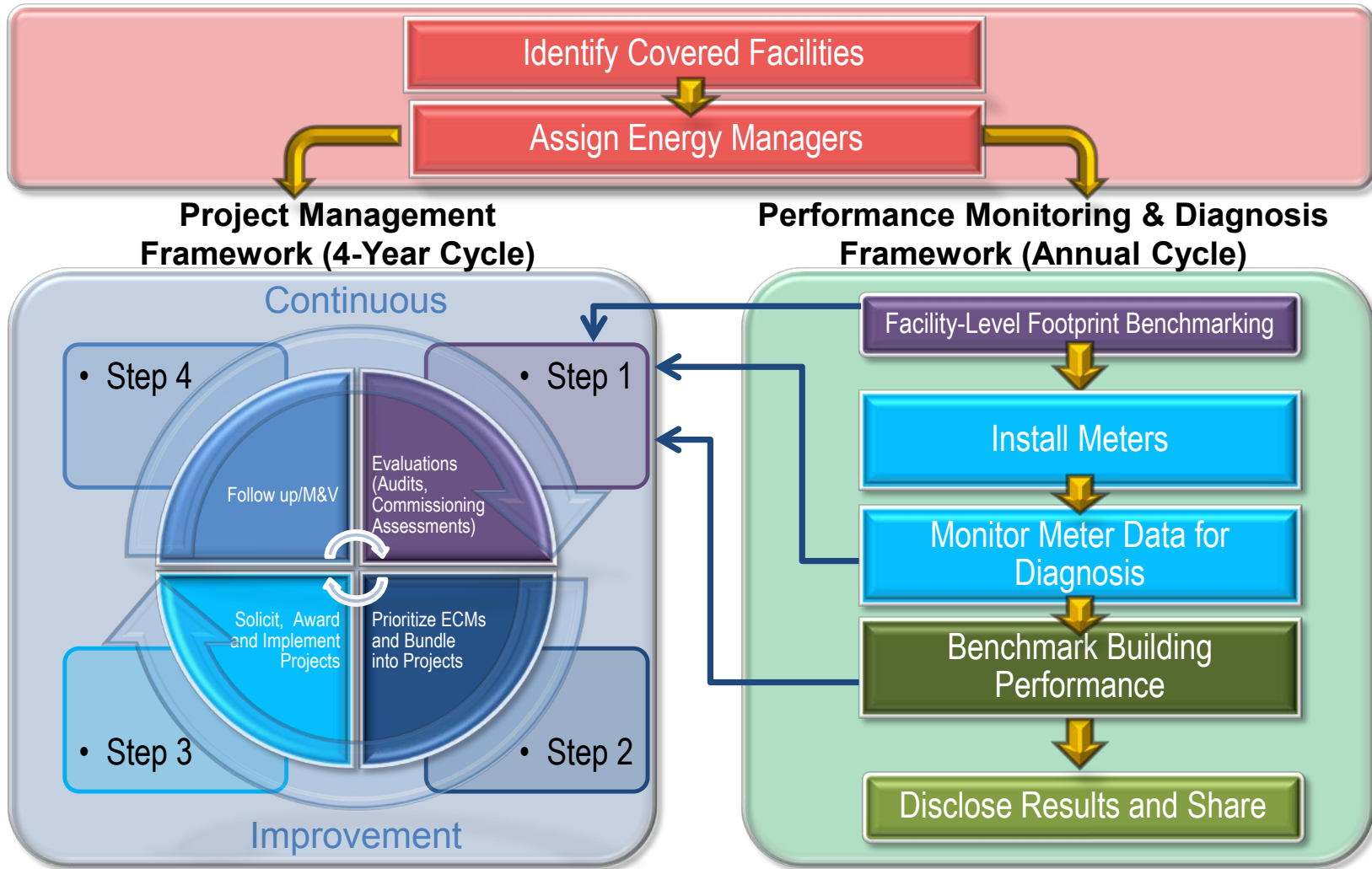
III. EISA FACILITY MANAGEMENT APPROACH

EISA Section 432 describes a comprehensive approach for deploying energy and water efficiency and conservation measures (ECMs) in Federal buildings and monitoring project and building performance (42 U.S.C. 8253(f)(3)-(8)). (For the purpose of this document, the acronym “ECM” will always represent both water and energy efficiency measures. Efficiency *projects* may consist of one ECM or implementation of several ECMs combined within one project.) Two general frameworks, one for managing energy and water efficiency projects and one for monitoring performance, are indicated within the statute:

- **Energy and Water Efficiency Project Management:** The EISA facility project management approach is a cyclical process of continuous improvement that is intended to ensure persistence of savings of implemented projects and provides a structure for ongoing evaluation of facilities, implementation of energy and water saving projects, and reporting of project and performance impacts. This four-year cycle of activity includes evaluating facilities, identifying and implementing projects, and following up on and maintaining efficiency measures as part of the re-evaluation process. As agencies identify and implement their projects, initial estimates of energy and water savings from implemented projects are confirmed and tracked through project follow-up and re-commissioning. Throughout this process, the findings are entered into the web-based EISA 432 CTS.
- **Performance Monitoring Framework:** Complementing the continuous improvement project management process is the requirement for annual building performance monitoring. This framework provides for ongoing performance monitoring and disclosure of results, supported by existing metering requirements under 42 U.S.C. 8253(e) and ongoing benchmarking of buildings covered under the statute. An overview of metering requirements and best practice guides are available at: http://www1.eere.energy.gov/femp/pdfs/adv_metering.pdf

These two frameworks and a cycle of continuous improvement are illustrated in the graphic that follows. Under the performance monitoring framework, buildings are monitored and these findings inform the next round of facility evaluations. Also, benchmarking individual buildings against similar building types over time will indicate potential for additional ECM opportunities and corrective action for ECMs that are not persistent in saving energy and water. The matrices that follow the graphic provide an overview of the EISA requirements and a summary reporting requirements and performance metrics for assessing agency progress and compliance.

EISA Facility Management Approach



A. EISA ENERGY AND WATER EFFICIENCY MANAGEMENT REQUIREMENTS MATRIX

Key Energy/Water Management Requirements	Frequency	Description	Guidance/Statute
Designate Covered Facilities	Once, then as needed	Each Department and independent agency must designate “covered facilities” that comprise at least 75 percent of its facility energy use. The term “facility” 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 statute excludes from this definition any land or site for which the cost of utilities is not directly paid by the Federal Government.	EISA Guidance <i>Facility Energy Management Guidelines and Criteria for Energy and Water Evaluations in Covered Facilities</i> http://www1.eere.energy.gov/femp/pdfs/eisa_s432_guidelines.pdf 42 U.S.C. 8253(f)(2), (3), and (5)
Assign Facility Energy Managers	Once, then as needed	Each agency must have appropriately-trained energy managers assigned for each of its covered facilities. 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.	Related Guidance <i>Energy Savings Assessment Training Manual</i> http://www1.eere.energy.gov/femp/pdpd/esa_manual.pdf
Perform Initial Comprehensive Evaluations in Covered Facilities	All facilities by June 2012 42 U.S.C. 8253(f)(3)(A)	In a comprehensive evaluation, potential life-cycle cost-effective ECMs are identified that can be implemented separately or bundled into projects. Facility operational issues are also examined as part of a commissioning assessment and may lead to retro- or re-commissioning measures. The evaluation also identifies implementation costs to accomplish potential ECMs and the estimated energy and water savings that would result. Clarifications related to the audit and commissioning assessment components of the evaluation are included in Appendix D.	<i>Commissioning Federal Facilities Operations & Maintenance Best Practices: A Guide to Achieving Operational Efficiency</i> http://www1.eere.energy.gov/femp/pdfs/commissioning_fed_facilities.pdf <i>Metering Best Practices</i> http://www1.eere.energy.gov/femp/pdfs/mguide_complete.pdf
Perform Follow-Up Comprehensive Evaluations in Covered Facilities	Once every 4 years	A comprehensive evaluation for each covered facility must be completed at least once every 4 years.	<i>Metering Best Practices</i> http://www1.eere.energy.gov/femp/pdfs/mbpg.pdf
Benchmark Metered Buildings that are, or part of, Covered Facilities	Annually	<p>Data for each metered building that is (or is a part of) a covered facility is to be reported into the ENERGY STAR Portfolio Manager benchmarking system (with limited exceptions for laboratories and data centers and in cases where an agency is already using their own system).</p> <p>Benchmarking data will be uploaded each year in the web-based EISA 432 Compliance Tracking System (CTS)</p>	EISA Guidance <i>Building Energy Use Benchmarking Guidance</i> http://www1.eere.energy.gov/femp/pdfs/eisa432_guidance.pdf 42 U.S.C. 8253(f)(8) Related Guidance <i>Guidance for Electric Metering in Federal Buildings</i> http://www1.eere.energy.gov/femp/pdfs/dv_metering.pdf 42 U.S.C. 8253(e)

Key Energy/Water Management Requirements	Frequency	Description	Guidance/Statute
Implement Projects (ECMs) in Covered Facilities	Ongoing	Agencies may implement any energy- or water-saving measure that the Federal agency identified in comprehensive evaluations conducted that is life-cycle cost-effective; and bundle individual measures of varying paybacks together into combined projects. Agencies may use appropriated funds or performance contracting otherwise authorized under Federal law, including energy savings performance contracts (ESPCs) or utility energy service contracts (UESCs)	EISA Guidance <i>Guidance for the Implementation and Follow-up of Identified Energy and Water Efficiency Measures in Covered Facilities</i> http://www1.eere.energy.gov/femp/pdfs/EISA_project_guidance.pdf 42 U.S.C. 8253(f)(4) and (5)
Follow-up and Verify Savings of Implemented Projects (ECMs)	Once every 4 years	Project follow-up activities must be accomplished during the next scheduled comprehensive evaluation of the facility (or no later than four years from prior facility evaluation), as these activities relate closely to the re-commissioning component of the every-four-year evaluation.	42 U.S.C. 8253(f)(8) Related Guidance/Tools <i>Life-Cycle Costing Manual for the Federal Energy Management Program</i> (NIST Handbook 135) http://www.nist.gov/customcf/get_pdf.cfm?pub_id=907459 <i>Building Life-Cycle Cost (BLCC)</i> software http://www1.eere.energy.gov/femp/information/cfm/register_blcc.cfm <i>M&V Guidelines: Measurement and Verification for Federal Energy Projects</i> http://www1.eere.energy.gov/femp/pdfs/mv_guidelines.pdf
Web-Based Certification and Disclosure	Ongoing	Agencies shall certify compliance with the EISA energy and water efficiency management requirements for each covered facility via the web-based EISA 432 CTS deployed by DOE. The EISA 432 CTS must be made available to Congress, other Federal agencies, and the public through the Internet. Agencies may request that specific data from individual buildings and/or entire facilities not be made public if public disclosure would raise national security concerns.	Related Guidance <i>EISA 432 Compliance Tracking System (CTS) User's Guide</i> http://www.eisa-432-cts.eere.energy.gov/EISACTS/Help/CTS_Users_Guide.pdf 42 U.S.C. 8253(f)(7)

B. EISA REPORTING REQUIREMENTS/PERFORMANCE METRICS MATRIX

Key Reporting/Disclosure Requirements	Frequency	Data Elements	Compliance/Progress/Performance Metrics
Update CTS and Disclose Facility Characteristics Data for Prior Fiscal Year	Annually, Mar 31 (recommended)	Covered Facility name, location, energy use, square footage, energy manager assignments	<p>Agencies must maintain covered facility inventories comprising at least 75% of the total facility energy use each year. (42 U.S.C. 8253(f)(2)(B))</p> <p>Compliance Metrics:</p> <ul style="list-style-type: none"> • Covered facilities % of total agency facility energy use. • % of covered facilities with an assigned energy manager.
Update and Disclose Progress in Evaluating Covered Facilities	Annually, June 30	<p>Facilities/square footage evaluated, potential ECMs identified, potential investment, energy/water savings, commissioning assessment.</p> <p>When reporting findings from comprehensive evaluations, agencies must only report data on potential projects that are life-cycle cost-effective.</p>	<p>Progress metric: % of covered facilities evaluated at the agency-level by:</p> <ul style="list-style-type: none"> • Number of facilities evaluated; • square footage evaluated; or • energy use of evaluated facilities. <p>During the initial four year period, evaluation <u>progress</u> will be tracked by the CTS. After that, <u>compliance</u> will be determined by verifying that each covered facility continues to be evaluated every four years. OMB will assess agency progress on their Sustainability/Energy Scorecard during the initial four year reporting periods based on the following milestones:</p> <ul style="list-style-type: none"> • Complete evaluations on 25% of covered facilities by June 30, 2009, • Complete 50% by June 30, 2010, • Complete 75% by June 30, 2011, • Complete 100% by June 30, 2012. <p>(See 42 U.S.C. 8253(f)(3)(A) and (9))</p> <p>After the initial 4 years, the compliance metric will be % of facilities remaining in compliance (i.e. facilities evaluated within last 4 years).</p>

Key Reporting/Disclosure Requirements	Frequency	Data Elements	Compliance/Progress/Performance Metrics
Benchmark Metered Buildings that are, or part of, Covered Facilities	Annually, Nov 30	<p>Key performance metrics from Energy Star Portfolio Manager or enter data for other systems:</p> <ul style="list-style-type: none"> • Annual energy use (site-delivered million Btu) • Annual energy use (source million Btu) • Annual site-delivered Btu/Sq. Ft. • Annual source Btu/Sq. Ft. • Annual weather-normalized site Btu/Sq. Ft. • Annual weather-normalized source Btu/Sq. Ft. • Energy Star Rating (if applicable) • Annual water use (thousand Gallons) • Annual water use intensity (Gallons/Sq. Ft.) • Greenhouse Gas Emissions (MT CO₂e) • Sustainability Guiding Principles Compliance (optional) 	<p>Number of metered buildings and percentage of agency covered facility square footage metered and benchmarked.</p> <p>Annual historical performance of benchmarked buildings at the building level.</p>
Update and Disclose Progress in Implementing and Following-Up on Projects	Annually, Dec 15	<p>Awarded projects/ECMs, investment amount by type, estimated annual savings by energy type, follow-up M&V of project actual annual savings.</p> <p>Agencies may report all active projects implemented since January 2006 in order to accommodate audits completed in the “previous two calendar years” that were included in the first round of facility comprehensive evaluations. Projects which may not be considered life-cycle cost-effective may be reported if they meet other mandated goals, such as renewable energy, water intensity or GHG reduction goals.</p>	<p>Progress metrics:</p> <ul style="list-style-type: none"> • number of projects awarded, • project investment awarded, • number of projects followed-up on, • estimated vs. documented energy and water savings.

IV. PROJECT IMPLEMENTATION AND FOLLOW-UP

This section provides specific guidance as directed under the statute to agencies pertaining to the implementation and follow-up of energy and water efficiency measures identified and undertaken per EISA Section 432 (42 U.S.C. 8253 (f) (4) and (5)). These guidelines focus on the project management activities that commence after the completion of the required comprehensive evaluations and identification of potential projects.

A. Prioritize ECMs, Bundle, and Package into Projects

In developing potential ECMs into projects, facility energy managers (with the assistance of their agency energy coordinators) analyze the findings from the comprehensive evaluations paying particular attention to life-cycle cost analysis data, prioritize the potential ECMs for implementation, and package these into projects that best align with available funding approaches. A listing of ECM technology categories and example ECMs is included in Appendix C. Agencies may bundle individual ECMs that are less cost-effective with those that are more cost-effective into projects that generate a more positive return on investment. This allows implementation of ECMs that may have longer payback periods, but achieve other mandated sustainability goals such as water efficiency, renewable energy generation, and greenhouse gas reduction.

1. Life-Cycle Cost (LCC) Analysis

LCC analysis is an economic evaluation of a project in which all costs arising from acquiring, constructing, owning, operating, maintaining, and disposing of a project are key decision criteria. LCC analysis costs represent the sum of present values of investment costs, capital costs, installation costs, energy costs, operating costs, maintenance costs, and disposal costs over the life-time of the project, product, or ECM. LCC present values are obtained by “discounting” all project costs to the present, with the discount rate representing the time value of money over the project life-cycle. Discount rates for Federal projects are frequently determined on the basis of the interest rate on U.S. Treasury securities of similar maturity to the project life-cycle.

LCC analysis is used to calculate several economic performance measures for evaluation of potential projects, such as Life-Cycle Cost (LCC), Net Savings (NS), the Savings to Investment Ratio (SIR), and an adjusted internal rate of return (AIRR). 42 U.S.C. 8254 and 10 C.F.R. Part 436 require that agencies use LCC analysis, and the associated economic performance measures, to evaluate and prioritize potential projects. Agencies must indicate NS of implemented projects in the web-based CTS. LCC analysis is well suited to the economic evaluation of design alternatives that satisfy a required performance level but may have differing investment, operating, maintenance, or repair costs, and possibly different life spans. LCC analysis is particularly relevant to the evaluation of investments where high initial costs are traded for reduced future cost obligations.

To evaluate individual ECMs solely on the basis of cost criteria, DOE recommends using the criteria of lowest LCC or highest NS when comparing mutually-exclusive projects in terms of

level of efficiency, system selection, or for combinations of interdependent ECMs. For independent projects being considered for allocation of limited budget funding, DOE recommends ranking the projects in descending order of SIR or AIRR until the budget is exhausted. Optionally, the SIR and AIRR metrics can be used as an adjunct to LCC and NS rankings, but there are drawbacks to their use and users should be cautioned about their limitations:

- SIR and AIRR may favor less-efficient ECMs.
- The results of SIR and AIRR analyses may be inconsistent with the more accurate LCC and NS results.
- SIR and AIRR must not be used to make accept/reject decisions among mutually-exclusive ECMs. Their use must be confined to ranking efficient ECMs for eventual implementation during periods of limited funding.

For more information, please see the following LCC resources:

- The “Life-Cycle Costing Manual for the Federal Energy Management Program” (NIST Handbook 135): http://www.nist.gov/customcf/get_pdf.cfm?pub_id=907459
- “Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis” Annual Update (FEMP): <http://www1.eere.energy.gov/femp/pdfs/ashb11.pdf>.
- “Guidance on Life-Cycle Cost Analysis” (FEMP): http://www1.eere.energy.gov/femp/pdfs/lcc_guide_05.pdf
- “Building Life-Cycle Costing Program Information” (FEMP): http://www1.eere.energy.gov/femp/information/download_blcc.html

2. Bundling ECMs

Where appropriate, agencies are to consider the LCC of combinations of projects, particularly to encourage bundling of energy efficiency projects with water efficiency and renewable energy projects. That said, there are often situations in which it makes sense for a project to be comprised of a single ECM. Facility energy managers should also consider retiring inefficient equipment on an accelerated basis where replacement results in lower life-cycle costs.

FEMP recommends that ECMs be bundled in order to optimize energy-saving and/or environmental benefits from a project. Renewable energy measures and other measures that save large amounts of energy, improve energy-related infrastructure, reduce water use, or reduce greenhouse gas emissions may be bundled with other ECMs as long as the overall project is life-cycle cost-effective. ECMs in a bundle must be complementary, i.e., an integral part of the project. Furthermore, energy managers must take an integrated systems approach when defining the scope of a building retrofit or other energy-related project. In many cases, a decision about one ECM will directly affect the scope or type of other ECMs.

Why is it important to bundle ECMs? Projects can be bundled to accomplish in a more cost-effective manner multiple goals such as water reduction, introducing more renewable generation, and lowering greenhouse gas emissions. With the issuance of Executive Order 13514, it is increasingly important to ensure renewable energy options and other GHG mitigation strategies

are included in projects. The Executive Order also directs agencies to “take into consideration environmental measures as well as economic and social benefits and costs in evaluating projects and activities based on lifecycle return on investment.” (74 FR 52117; Oct. 5, 2009)

3. Tailor ECM Package for Funding Source

Part of the process of packaging ECMs into projects is to consider the funding approach that is being pursued. If the agency has a central fund for capital or infrastructure improvements, the potential projects from within the agency can be ranked and prioritized against each other for allocation of limited funds, as other projects are separately identified as more appropriate for performance contracting. Documenting the potential cost-effectiveness of projects identified by energy managers can help justify funding to an agency’s chief financial officer, senior sustainability official, agency head, or OMB, and may demonstrate that additional resources are warranted and will produce savings.

It is up to each facility and agency to determine the appropriate funding source for projects. Agencies may use appropriations to fund projects directly or may consider the use of performance-based contracts such as energy savings performance contracts or utility energy service contracts to execute comprehensive energy efficient projects. The statute authorizes that a Federal agency may use any combination of appropriated funds made available under the statute and alternative financing authorized under Federal law to carry out the same measure under this subsection. (42 U.S.C. 8253(f)(10))

These approaches are outlined below:

a) Direct Funding

In general, direct funding includes appropriations or other funding from centralized agency funding accounts for larger capital-intensive projects or from decentralized operating budgets for smaller projects. Examples of centralized agency funding include agency infrastructure improvement funds under the American Recovery and Reinvestment Act, the Department of Defense’s Energy Conservation Investment Program (ECIP), and the General Services Administration’s Federal Buildings Fund. Decentralized operation and maintenance budgets administered by agency regions and sites are also important sources for efficiency investment.

Agency sites should apply for centralized capital improvement funding for those projects which most closely match the selection criteria for that funding. Also, agencies should explore revolving fund arrangements supported by project savings funding streams.

b) Performance Contracting/Alternative Financing Approaches

In addition to directly funding the projects solely with appropriations, agencies may negotiate and use performance contracting approaches to implement projects paid for from cost savings realized over time. These approaches include Utility Energy Service Contracts (UESC), Energy Savings Performance Contracts (ESPC), and if specifically authorized, Power Purchase Agreements (PPA), and Enhanced Use Leases (EUL). Agencies may also leverage their appropriated dollars to fund a more comprehensive performance contract. Agencies are encouraged to talk to their appropriate legal and financial offices as well as their senior sustainability officers about the

potential for employing all sources of available funding and contracting authority for energy efficiency and water improvements at Federal facilities as described below:

Energy Savings Performance Contract (ESPC)

An ESPC is a contract (such as a task order under DOE's multiple award, indefinite-delivery, indefinite-quantity (IDIQ) umbrella contract awarded to an energy service company) that provides for the performance of services for the design, acquisition, installation, testing, and where appropriate, operation, maintenance and repair, of an identified ECM or series of ECMs, at one or more locations. Such contracts shall provide that the contractor 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 resulting from implementation of such measures during the term of the contract and a guarantee that the savings cover the full cost of the investment. More details can be found at <http://www1.eere.energy.gov/femp/financing/espcs.html>.

Utility Energy Service Contracts (UESCs)

A UESC is a contract between a Federal agency and a local utility providing energy, water, or sewage services, as well as provision of technical services and/or upfront project financing for energy efficiency, water conservation, and renewable energy investments, allowing Federal agencies to pay for the services from the savings generated from improvement projects over time, either on their utility bill, or through a separate agreement. Agency sites should leverage existing relationships with servicing utility to request proposals for those projects that reduce demand of the commodity it provides, especially if demand side incentives are available from the utility. Agencies may also use a GSA Utility Area-wide master contract to procure utility services and to finance energy efficiency projects with generated savings. More information can be found at: <http://www.eere.energy.gov/femp/financing/uescs.html> and http://www.gsa.gov/graphics/pbs/procuring_energy_R2H915_0Z5RDZ-i34K-pR.pdf.

Enhanced Use Leasing (EUL)

An Enhanced Use Lease is an authority by which some Federal agencies can lease underutilized real property to the public or private sector as a means of obtaining services, facilities, revenue, space, etc., that enhance their mission. Under a EUL agreement, underutilized agency land or facilities can be leased to a developer, or energy service company in exchange for a wide variety of energy improvements, including large or long-term renewable energy and cogeneration projects.

Power Purchase Agreements (PPA)

A Power Purchase Agreement is a contract for the purchase of electricity, which may be generated by on-site renewable energy projects, where permitted. By purchasing the electricity from on-site renewable resources, the facility can contribute to the agency energy intensity reduction goal (42 U.S.C. 8253(a)) and obtain a percentage of its energy from renewable sources per 42 U.S.C. 1585(a) while providing an ongoing source of new renewable power to meet the Federal goal of Executive Order 13423.

Incentive Programs

Most states and utilities have energy incentive programs that help offset energy costs while promoting energy efficiency and renewable energy technologies. Examples of these programs include:

Energy Efficiency and Renewable Energy Programs:

- Public purpose programs administered by utilities, state agencies, or other third parties and paid for by utility ratepayers, typically through a non-by-passable system benefits charge instituted as part of restructuring legislation or rules
- Utility programs administered by the local utility and paid for by utility ratepayers through their bundled rates
- Programs sponsored by state agencies that are designed to promote energy efficiency and renewable energy and which are usually funded out of general tax revenues.

Demand Response/Load Management Programs:

These are programs that provide incentives to curtail demand during peak energy usage periods in response to system reliability or market conditions. Agencies can participate in state and utility incentive programs in order to reduce their energy usage and control their energy costs. More details can be found at <http://www1.eere.energy.gov/femp/financing/energyincentiveprograms.html>.

EPA's WaterSense program also has a link to water product rebate programs on its site at http://www.epa.gov/watersense/rebate_finder_saving_money_water.html.

B. Implementation of Projects

As projects are implemented, agencies are encouraged to follow project planning and implementation processes that maximize use of best industry standards to ensure a greater chance of higher energy and water savings. Through tracking in the CTS, agencies will be able to assess the effectiveness of their projects, isolate the impact of projects on energy or water savings, and justify future investment for achieving their energy efficiency goals. Below is a brief outline of standard project processes that will contribute to greater persistence of energy and water savings. Some activities discussed in this section and Section C may not be applicable to direct funded projects executed by agency facility staff. However the approaches should be followed where practicable.

1. Commissioning/Acceptance

At the end of the implementation step, the project is commissioned upon acceptance to ensure the equipment, material, and controls meet manufacturer's specifications and operate in accordance with the design specifications.

Energy managers will report in the EISA 432 CTS key status milestones for implemented projects including date of contract award, substantial completion, and project acceptance which indicates that all installed equipment or systems have been commissioned and incorporated into O&M planning.

2. O&M Plan/Life of Contract Management

As stated in 42 U.S.C. 8253(f)(5)(B), for each implemented measure, each energy manager shall ensure that “a plan for appropriate operations, maintenance, and repair of the equipment is in place at acceptance and is followed.” All facilities are required to have in place an O&M plan encompassing life of contract management for implemented projects. Operations and maintenance are the decisions and actions regarding the ongoing control and upkeep of property and equipment. These may include, but are not limited to, the following:

1. Actions focused on scheduling, procedures, and work/systems control and optimization; and
2. Performance of routine, preventive, predictive, scheduled and unscheduled actions aimed at preventing equipment failure or decline, and increasing efficiency, reliability, and safety.

The O&M plan may include: timelines, budget and cost estimate basis, work plan, staffing plan, quality assurance plan, safety and security plan, resource allocation plan, and management control plan for the system, hardware, and equipment upon the completion of the commissioning process.

Continuous commissioning is an on-going, whole building approach to prevent persistent operational problems and optimize energy use in existing commercial and institutional buildings and physical plants. Throughout the life-cycle of the project, continuous commissioning accomplishes the following:

- Identifies maintenance issues,
- Corrects identified operating problems,
- Improves building thermal comfort and indoor air quality,
- Minimizes building energy consumption and cost, and
- Provides knowledge-based and hands-on operations and maintenance training to in-house facility management staff.

Other aspects of project management that help to maximize the value of energy efficiency projects must also be undertaken: managing the behavior of facility occupants and choosing the right energy management system. Behavior change as it affects energy efficiency is a change in energy-consuming activity originated and controlled by a person or a group of people within an organization. An example of behavioral change is adjusting a thermostat setting, or changing appliance use habits. Behavior change by facility occupants can contribute significantly to either the success or failure of an energy efficiency project.

The quantity of data needed for meeting compliance requirements and maximizing the value created through energy and water efficiency means there is increasing demand on facilities management software. The number of systems and meters, personnel, facilities, maintenance, and changes in use and schedules increase the complexity of managing facilities and data effectively. Energy Management Control Systems (EMCS) integrate traditional facilities management functions, while Integrated Workplace Management Systems (IWMS) offer cross-functional platforms to manage data for all corporate assets, including facilities, production and distribution equipment and transportation systems. Advances in EMCS and IWMS can assist the energy

facilities manager in effectively collecting and reporting critical facility information and maximizing the value of the energy efficiency.

FEMP's *Operations & Maintenance Best Practices, A Guide to Achieving Operational Efficiency* is a key resource for O&M and continuous commissioning guidance, and is located at: http://www1.eere.energy.gov/femp/pdfs/omguide_complete.pdf.

C. Project Follow-Up/Measurement and Verification

It is required that project follow-up activities be accomplished, at a minimum, during the next scheduled comprehensive evaluation of the facility, as these activities relate closely to the re-commissioning component of the every-four-year evaluation. To clarify, the requirement for project follow-up is not an *annual* requirement; rather it is an activity that should be performed at least once every four years. The key reasons for the follow-up step include ensuring that the project performs in accordance with equipment and system specifications and agency and occupant needs, measuring project savings, justifying future project investment, and replicating savings efforts throughout the agency. EISA-required project follow-up activities can be performed by in-house staff or can be included in project or maintenance contracts.

1. Measurement and Verification (M&V)

Project follow-up must include an appropriate level of measurement and verification (M&V) to determine that the energy savings derived from completed projects or ECMs can be verified with a certain degree of confidence.

M&V is the process of determining savings from an energy management project or an ECM. It includes data collection as well as the monitoring and analysis associated with the verification of savings. Energy savings cannot be directly measured, since these savings represent the absence of prior energy usage, and instead these energy savings can be estimated by comparing energy use before and after implementation of a project or an ECM. It is possible that other changes unrelated to the project or ECMs (such as those in the weather, occupancy, hours of operation, etc.) are likely to occur during the time between the pre- and post- conditions. Standardized M&V procedures exist to normalize for these factors so that valid before-and-after energy use comparisons can still be made. Thus, the energy savings attributable to the project can best be described using the following equation:

$$\text{Energy savings} = (\text{baseline energy use}) \pm (\text{adjustments}) - (\text{post installation energy use})$$

The baseline energy use is the energy consumed before the implementation of the energy conservation initiative. Post-installation energy use, sometimes referred to as “performance period” or “reporting period” energy use, is the energy consumption after the project or program is implemented.

Appropriate levels of M&V procedures, described below, can be used to verify energy savings for implemented ECMs and for reporting project savings into the CTS system as part of the follow-up

activities required under the statute. Project savings can then be compared to the *estimated* projects savings previously reported.

Broadly, M&V options are divided into two general categories: retrofit isolation and whole-facility methods. Retrofit isolation methods look only at the affected equipment or system independent of the rest of the facility; whole-facility methods consider the total energy use and de-emphasize specific equipment or ECM performance. As described below, Options A and B are retrofit isolation methods; Option C is a whole facility method. Option D is commonly used with new construction energy efficiency programs. It uses calibrated computer simulation to model energy performance of a whole-facility. Option D is not frequently used for retrofit applications and not recommended due to high costs involved. More details on appropriate M&V procedures for particular project types can be found in “M&V Guidelines: Measurement and Verification for Federal Energy Projects Version 3.0” located at http://www1.eere.energy.gov/femp/pdfs/my_guidelines.pdf. Each M&V option has its advantages and disadvantages and should be properly chosen based on ECMs, site-specific factors and associated costs.

The key options pertinent to the EISA requirements are briefly described below:

a) Option A, Retrofit Isolation with Key Parameter Measurement

M&V Option A is based on a combination of measured and estimated factors when significant variations in factors are not expected over time. Measurements are spot or short-term and are taken at the component or system level, during both the baseline and post-installation phases. Measurements must include the key performance parameter(s) which define the energy use of the ECM. Estimated factors are supported by historical or manufacturer’s data. Savings are determined by means of engineering calculations of baseline and post-installation energy use based on measured and estimated values. Option A does not involve long-term measurements (as the factors are not expected to change over time), but regularly scheduled inspections and short-term metering or spot measurements need to be conducted to ensure that the installed ECMs are capable of generating energy savings. In general, Option A techniques are useful when an energy-efficiency project has resulted in a finite change in system performance. A typical application using this M&V option is lighting retrofit projects where a sample of power draws (wattages) of light fixtures are measured once during the baseline and once during the post-installation phase of the project. However, the operating hours for the affected lights may be measured or estimated once during pre-retrofit phase, and assumed to remain constant for the life of the project from an M&V standpoint. Savings determinations under Option A are usually less costly than other options, due to the limited measurements involved. Savings are determined by means of engineering calculations of baseline and post-installation energy use based on measured and estimated values.

b) Option B, Retrofit Isolation with All Parameter Measurement

M&V Option B is used when significant variations in factors affecting energy consumption are expected over time. This option isolates the performance of an ECM and verifies actual achieved energy savings using long-term or permanently installed metering or monitoring systems. Option B is appropriate to apply to verify the performance of ECMs whose energy use is affected by both

performance and operational parameters resulting from changes in weather patterns or inconsistent operating schedules or changes in occupant behavior. Measures such as variable-speed drives and chillers would be potential candidates for Option B verification methods. Essentially, Option B entails long-term periodic measurements for capturing variations in operating variables that define the ECM by isolating components or systems that cannot be accurately assessed using the spot or short-term metering techniques identified in Option A. Measuring or determining energy savings using Option B is more difficult and more expensive than Option A. Savings are determined by comparing baseline and reporting period energy use or proxies of energy use deduced from analyzing the meter data.

c) Option C, Utility Data Analysis

Option C determines energy savings at the whole building level and is applied to projects in which the individual effect of the ECMs cannot be accurately assessed by measuring the before-and-after energy use by using any of the retrofit isolation methods. Option C is appropriate to use when the ECMs installed interact extensively with each other, making the performance of a single ECM extremely difficult to measure and verify. Option C verification techniques involve whole building metering that uses hourly or monthly utility billing data. Savings are determined from analysis of baseline and reporting period energy data. Typically, regression analysis is conducted to correlate and adjust energy use to any variations due to independent variables such as weather or other uncontrollable factors, but simple comparisons may also be used. However, this option is appropriate for projects where savings are expected to be large enough to be discernible from the random or unexplained energy variations normally found at the level of the whole-facility meter. The larger the savings, or the smaller the unexplained variations in the baseline consumption, the easier it will be to properly identify the savings.

V. EISA 432 COMPLIANCE TRACKING SYSTEM (CTS) AND PUBLIC DISCLOSURE

42 U.S.C. 8253(f)(7)(A) specifies that facility energy managers shall certify compliance for each covered facility with the 42 U.S.C. 8253(f)(3)-(5) requirements via a web-based tracking system. The EISA 432 CTS has been developed for the collection and reporting of data needed for the demonstration of compliance and progress toward meeting all energy and water efficiency requirements outlined in the statute.

A. Status and System Design

The EISA 432 CTS was initially deployed for agency use on July 19, 2010 with initial core functionality focusing on:

- Registration of users;
- Covered facility characteristics;
- Energy manager assignments;
- Comprehensive evaluation findings, including estimated costs to implement potential ECMs and anticipated energy, water, and cost savings.

Version 2.0 of the CTS was made available to agencies on December 29, 2010 and included the following additional functionality:

- Implemented Project module including data elements to track follow-up activity;
- Building Benchmarking module to capture annual performance metrics;
- Updated reports of compliance and progress performance metrics.

Subsequent versions of CTS introduced the following functionality and features:

- Protocol for retrieval of benchmarking data for metered buildings from ENERGY STAR Portfolio Manager;
- Automated data upload protocols to import evaluation and project data captured in existing agency data systems into CTS via xml web services, xml import, and Excel spreadsheets;
- Enhanced User Interface and administration features;
- Updated User Guide.

The CTS is designed to manage the process of registration of users in the system, entering and managing data, and generating summary and progress reports. A complete User Guide for CTS is available at http://www.eisa-432-cts.eere.energy.gov/EISACTS/Help/CTS_Users_Guide.pdf.

A brief outline of the core functions of the system follows:

1. System Access and User Management. Full user administration is included within the CTS framework. Users are assigned to agencies, sub-agencies and facilities and specific access rights are controlled by the user's role and organizational affiliation. The primary roles are: the Agency Energy Coordinator (AEC) and delegates; and the Facility Energy

Manager (FEM) and delegate. Users with the appropriate rights may manage user rights, assign, and approve new users within their organizational boundaries.

2. Agency Dashboard. An agency-specific home page provides general CTS system information, user notifications, as well as graphical representations of the agency's compliance and progress. Access to all system functionality as well as to pertinent guidance documentation is provided from this screen.
3. User Profile. System Users may manage their own personal information and login credentials within the User Profile module.
4. Data Download. All data which has been entered into the system may be downloaded (by authorized users) to excel spreadsheets and filtered by parameters such as sub-agency and reporting year.
5. Reports. Extensive reporting capability is available from within CTS. The reports fall into two general categories:
 - 1) Data summary reports: Various views of detailed agency data may be extracted from the application. Data can be viewed at the facility level or aggregated at the agency/sub-agency level.
 - 2) Compliance progress reports: Demonstration of compliance and progress toward meeting the statutory requirements is expressed through various metrics. Depending on the specific metric, the report may be available at the facility, or agency level. For example, reports indicate the designation of the Facility Energy Manager at the facility level, as well as the overall percentage of facilities with designated managers for the agency overall.

Access to reports and to various reporting capabilities and filters is constrained by the user's role and agency affiliation. Appendix A contains a listing of available reports.

6. Covered Facilities. Covered facility characteristic details (name, location) as well as annual footprint energy and square footage data may be entered and edited within the CTS user interface. Facilities are listed by sub-agency and can be filtered by Facility Energy Manager. Facility Energy Manager assignments are made within Facility Detail tab by users with the appropriate access rights. Individual buildings within a larger covered facility are listed individually for the purpose of capturing benchmarking data of metered buildings within multi-building covered facilities.
7. Comprehensive Evaluations. Key findings from comprehensive evaluations may be uploaded into CTS or entered and edited through the CTS user interface screens. Evaluation findings are saved for evaluations in progress and for evaluations completed (by date).
8. Implemented Projects. Data related to projects implemented within covered facilities are accessed through the projects tab for each covered facility record. The project status, cost,

funding sources, estimated energy and water savings are all captured, as well as the types of ECMs deployed and bundled into the project.

9. Follow-up of Projects. Actual savings from implemented projects are also captured in the project tab for each covered facility. Type of measurement and verification (M&V) option used and actual energy and water savings data may be entered and compared to the project's original savings estimates.
10. Benchmarking. Building performance benchmarking data fields align with those used by ENERGY STAR'S Portfolio Manager and may be captured for metered buildings that are, or are part of, covered facilities. Key benchmarking annual performance metrics will be collected and stored with the facility record at the building level.
11. Administration. Based on user role and organizational boundaries, users may have access to various administration functions including:
 - 1) Agency level data management
 - 2) Bulk Facility Energy Manager assignment
 - 3) User administration and approval

Details on the data elements captured by CTS and associated reports are in Appendix A: EISA Section 432 CTS Data Elements and Reports.

B. Public Disclosure and Transparency

Per 42 U.S.C. 8253(f)(7)(A), each agency must delegate responsibility to the facility energy managers for entering or uploading facility-level data into CTS. The CTS produces reports that can be viewed by designated users of the system within the agency as determined by that agency's energy coordinator. Detailed data and reports may be shared with other sub-agencies to encourage competition and provide opportunities to discover lessons learned and best practices.

The statute states that DOE must make the web-based tracking system available to Congress, other Federal agencies, and the public through the Internet. (42 USC 8253(f)(7)(C)(i)) CTS will provide data at the Federal agency level, facility-level, and sub-agency level (for some agencies). Each agency's data aggregated at the top-tier of its organization will be publically available to demonstrate Government and agency progress in meeting the requirements for facility evaluation, project implementation and follow-up, benchmarking and compliance with covered facility inventory requirements and energy manager assignments. Sub-agency aggregated data may also be made available to the general public, at the discretion of the top-tier agency or Department. The EISA CTS data findings will be available to the public 120 days after the release of this Guidance at http://www1.eere.energy.gov/femp/regulations/facility_ctsreports.html.

In general, complete facility-level detailed data will be publicly available within agency-defined organizational boundaries by default for the most recent and prior years. Facility energy managers and agency energy coordinators associated with a specific agency will have access to, and editing rights to, facility-level reports and facility-level detailed data. Facility-level data will be made available to the general public for review via facility-level reports unless the Secretary of Energy grants an exemption from public disclosure for national security purposes.

Agencies may request that specific data from individual buildings and/or entire facilities not be made public if public disclosure would raise national security concerns. (42 USC 8253(f)(7)(C)(ii)) The head (or appropriate delegate) of each top-tier agency should submit a consolidated request to exempt data for specific covered facilities from public disclosure to the Secretary of Energy within 90 days of the release of this Guidance. Requests should identify each covered facility for which the exemption is sought, the data sought to be withheld, and the reason public disclosure would affect national security. Requests **must not include** information that is sensitive or classified. Although facility-level data that is exempt from public disclosure will not be disclosed, this data will still be included in top-tier agency totals, to the extent possible. If, in the future, there is a need to apply the exemption to a facility because building stock/functions change, requests to withhold data from public disclosure must be submitted to the Secretary of Energy, through FEMP, 90 days prior to required non-disclosure. Changes to the exemption status of specific data for specific buildings must be submitted to the Secretary of Energy 90 days prior to removal from public disclosure. The format for submitting a request for exemption from public disclosure is in Appendix E of this Guidance.

Data on potential ECMs identified in comprehensive evaluations will be disclosed in the aggregate for each facility, and the agency, but not at the individual ECM level. In public reports, the findings from evaluations will be clearly characterized as the upper bound of potential

investment and savings as not all identified ECMs may be cost-effective or in the interest of the agency to implement.

Estimated cost and savings of implemented projects will be disclosed in the aggregate at the facility and agency level, but not at the individual project or ECM level. Measured cost and savings of implemented projects will also only be disclosed in the aggregate for each facility, and the agency. If the associated data is exempt from disclosure for national security purposes, then relevant facility-level project data will not be disclosed, although the data will be included in agency totals.

Requesting exemption from public disclosure of benchmarking data for individually-metered buildings follows the same exemption process as for covered facilities.

The CTS reports assist in providing increased transparency for determining which agencies and projects are getting the best results. Greater transparency, through the provision of various data sets and reports for viewing by internal energy and facilities managers, other agency energy and facility managers, DOE, OMB, and the general public, is meant to accelerate continuous improvement of efficiency measures, adoption of best practices, demonstration and achievement of savings, and optimization of energy and water efficiency measures.

Appendix A EISA Section 432 CTS Data Elements and Reports

This appendix is divided into two main sections: CTS Data Elements and CTS Reports.

CTS Data Elements

Field Name	Description	Data Type/ Validation	Required/ Optional
Covered Facility Characteristics - Data Fields			
Agency Name	The Agency (sub-agency) to which the covered facility is associated	Selection (list)	Required
Facility Name	The Covered Facility name	Text: (75 char max)	Required
Agency Designated Covered Facility ID	Agency assigned internal covered facility identifier. This identifier provides the link between CTS and buildings entered into Portfolio Manager and must be unique across the top-tier agency.	Text: (25 char max)	Required
Activation Year	Year when Covered Facility was added to the inventory (corresponds to the first fiscal year of annual footprint data supplied)	Date	System generated
Last Completed Evaluation	The date of the most recent completed evaluation for this facility	Date	System Generated
City	City where Covered Facility is located.	Text: (50 char max)	Required
State	State where Covered Facility is located.	Text: (50 char max)	Required
Zip Code	The Zip Code where the Covered Facility is located.	Text: (50 char max) Recommended Formats: XXXXX (5 digit) XXXXX-xxxx (5 digit zip code, a hyphen, and the 4 digit extension) XXXXXXXXXX (5 digit zip code, no hyphen, and the 4 digit extension)	Required
Energy Intensity Reduction goal Exemption	Is this facility data exempt from the Energy Intensity Reduction Goal?	Selection: (Y/N)	Optional
Water Intensity Goal Exemption	Is this facility data exempt from the Water Intensity Reduction Goal?	Selection: (Y/N)	Optional
Public Disclosure Exemption	Is this facility data exempt from public disclosure?	Selection: (Y/N)	Optional
Reason for Public Disclosure Exemption	Describe reason for the public disclosure exemption indicated above	Text: (250 char max)	Optional
Facility Energy Manager Unique ID	Unique identifier of the energy manager assigned to the covered facility (May be used to indicate FEM assignment compliance to statute)	Text: (50 char max)	Optional for CTS system

Field Name	Description	Data Type/ Validation	Required/ Optional
Facility Energy Manager	The contact information of a user within CTS who is designated as the FEM for this facility. Either the FEM Unique ID or the designation of a CTS user is required to indicate FEM assignment compliance.	Selection (list) The user's information is displayed in the list: -First Name -Last Name -Email Address -CTS User Role	Optional if managed by agency

Field Name	Description	Data Type/ Validation	Required/ Optional
Covered Facility Annual Footprint - Data Fields			
Data Year	Fiscal Year of annual footprint data	Selection (4 digit Year)	Required
Gross Square Feet	Gross area of the Covered Facility (during the reported fiscal year)	Numeric: (Thou. Sq Ft)	Required
Number of Buildings Metered for Electricity	Total number of buildings within the covered facility which have been metered for electricity	Numeric (integer)	Required
Total Annual Energy Use	Total Annual Energy Use for Covered Facility (during the reported fiscal year)	Numeric: (Million Btu)	Required
Total Annual Water Use	Total Annual Water Use for Covered Facility (during the reported fiscal year)	Numeric: (Thou. Gallons)	Optional
Comments	Include comment relating to any facility annual footprint data field	Text: (1000 char max)	Optional

Field Name	Description	Data Type/ Validation	Required/ Optional
Covered Facility Evaluation - Data Fields			
Evaluation Name	Descriptive name of this evaluation (may include facility name, timestamp, etc)	Text: (100 char max)	Required
Evaluation Completion Date	Date that the entire covered facility completed evaluation	Date (mm/dd/yyyy)	Optional
Retro/Re-Commissioning Assessment	Indicate if an <i>assessment</i> of retro- or re-commissioning measures was completed as part of the comprehensive evaluation	Selection: (Y,N, or NA)	Required
Gross Evaluated Square Feet	The square footage of the facility area evaluated (may include areas deemed not appropriate for detailed energy audit – ie. “desk audits”)	Numeric (Thou. Sq Ft)	Required
Estimated Implementation Cost of Measures	The estimated cost for implementing all of the efficiency measures identified in this evaluation	Numeric : (Dollars)	Required
Estimated Annual Energy Savings	The estimated site-delivered Btu <i>annual</i> energy savings expected from all identified energy efficiency measures for this evaluation	Numeric (Million Btu)	Required
Estimated Annual Energy Cost Savings	The estimated <i>annual</i> energy cost savings expected from all identified energy efficiency measures	Numeric: (Dollars)	Required
Estimated Annual	The estimated <i>annual</i> water savings	Numeric (Thou.	Required

Field Name	Description	Data Type/ Validation	Required/ Optional
Water Savings	expected from all identified water use and disposal (sewer) efficiency measures	Gallons)	
Estimated Annual Water Cost Savings	The estimated <i>annual</i> water cost savings expected from all identified water use and disposal (sewer) efficiency measures	Numeric: (Dollars)	Required
Estimated Other Annual Ancillary Cost Savings	The estimated <i>annual</i> other ancillary cost savings expected from all identified efficiency measures. These may include savings due to reduced maintenance, operational costs, repairs, etc.	Numeric: (Dollars)	Optional
Estimated Life-cycle Energy Savings	The estimated site-delivered Btu energy savings expected from all identified energy efficiency measures over the collective life spans of the measures.	Numeric (Million Btu)	Optional
Estimated Life-cycle Energy Cost Savings	The estimated present value energy cost savings expected from all identified energy efficiency measures over the collective life spans of the measures.	Numeric: (Dollars)	Optional
Estimated Life-cycle Water Savings	The estimated water savings expected from all identified water use and disposal (sewer) efficiency measures over the collective life spans of the measures.	Numeric (Thou. Gallons)	Optional
Estimated Life-cycle Water Cost Savings	The estimated present value water cost savings expected from all identified water use and disposal (sewer) efficiency measures over the collective life spans of the measures.	Numeric: (Dollars)	Optional
Estimated Life-cycle Other Ancillary Cost Saving	The estimated other ancillary present value cost savings expected from all identified efficiency measures over the collective life spans of the measures. These may include savings due to reduced maintenance, operational costs, repairs, etc.	Numeric: (Dollars)	Optional
Potential ECMs Identified	Number of potential Energy and Water Conservation Measures identified by the current evaluation (by ECM type)	Numeric: (integer per each ECM type) (20 categories)	Required if savings were indicated
Comments	Add any comments related to any evaluation data field	Text: (2000 char max)	Optional

Field Name	Description	Data Type/ Validation	Required/ Optional
Implemented Project – Data Fields			
Project Name	The implemented project name	Text: (100 char max)	Required
Agency Designated Project ID	Internal agency defined project identifier. This identifier is used to link follow-up activity to existing projects in CTS during batch uploads. It must be unique across the sub-agency.	Text: (50 char max)	Required
Project Initiation Date	Date of contract award	Date field(s)	Required
Project Implementation Date	Date when majority of the project was completed and implemented. (substantial completion)	Date field(s)	Optional
Project Acceptance Date	Date of project completion and formal project acceptance. (equipment commissioned/O&M plan in place)	Date field(s)	Optional
Funding Source	Funding Source Type: <ul style="list-style-type: none"> • Direct (ARRA) • Direct (Centralized Capital Funding) • Decentralized Operating Budgets • Utility Energy Service Contract (UESC) • Energy Savings Performance contract (ESPC) • Power Purchase Agreement (PPA) • Enhanced Use Lease (EUL) • Incentive Program • Other 	Selection: (list) Funding Source is indicated by supplying the Funding Level (Dollars)	Required (indicate the Funding Level for at least one Funding Source OR supply the Total Project Implementation Cost)
Funding Level	\$ value associated with funding source	Numeric: (Dollars)	Required for each funding source type selected
Total Project Implementation Cost	Total Project Implementation Cost may be entered by Funding Source or directly as a total. Does not include financing and interest payments	Numeric: (Dollars) Option: If entered by Funding Source, the system calculates the total of Funding Levels above.	Required
Financing Costs	Total financing from all funding sources	Numeric: (Dollars)	Required (if applicable)
Total Awarded Contract Value	<i>Calculated field:</i> Total Project Implementation Costs + Total Financing Costs for all sources	Numeric: (Dollars) system calculated total	Required
Estimated LCC Net Savings	Measure of cost effectiveness used to validate this project. Value in \$ entered directly	Numeric: (Dollars)	Required
Life of Project	Estimated life of project in years	Numeric: (Years, integer)	Optional

Field Name	Description	Data Type/ Validation	Required/ Optional
Estimated Annual Energy Savings by Fuel Type	<p>Estimated Savings (converted to Million Btu from fuel savings entered in native units below):</p> <ul style="list-style-type: none"> • Electricity Savings (Kwh) • Natural Gas Savings (Thou. Cu Ft) • Coal - Anthracite (Short Tons) • Coal - Bituminous (Short Tons) • Coal - Coke(Short Tons) • Distillate Fuel Oil #1 (Gallons) • Distillate Fuel Oil #2 (Gallons) • Distillate Fuel Oil #4 (Gallons) • Distillate Fuel Oil #5 (Gallons) • Distillate Fuel Oil #6 (Gallons) • Propane (Gallons) • Liquid Propane (Gallons) • District Steam (Thou. Lbs) • Chilled Water - Electric Driven (Ton Hours) • Chilled Water - Absorption (Ton Hours) • Chilled Water – Engine Driven (Ton Hours) • Kerosene (Gallons) • Diesel (Gallons) • Other 	Numeric: (Saved in native units by fuel type as indicated)	Required (if applicable)
Total Estimated Annual Energy Savings	Combined Estimated Annual Energy Savings entered by Fuel Type or entered directly as Million Btu	Numeric: (Million Btu) Note: Either calculated from native fuel type or entered as a total in Million Btu.	Required (if applicable) At least one: Energy or Water or Renewable Savings, is required.
Estimated Annual Water Savings	Estimated Annual Water Savings	Numeric: (Thou. Gallons)	Required (if applicable; see note for Total Estimated Energy Savings)
Estimated Renewable Savings (Electricity)	Estimated Annual Renewable Electricity Output Savings	Numeric: (Kwh)	Required (if applicable; see note for Total Estimated Energy Savings)
Estimated Renewable Savings (Thermal)	Estimated Annual Renewable Thermal Output Savings	Numeric: (Million Btu)	Required (if applicable; see note for Total Estimated Energy Savings)
Efficiency and Conservation Measures Implemented	<p>List of energy and water Efficiency and Conservation Measures (ECMs) implemented within this project grouped by Technology Category;</p> <p># of ECMs bundled is indicated.</p>	Selection: (list) Allow selection of multiple Technology Categories and ECMs. (choose at least 1 of 20 categories)	Required
Project Comments	Text field for capturing any notes related to this implemented project	Text: (2000 char max)	Optional

Field Name	Description	Data Type/ Validation	Required/ Optional
Project Follow-up Measurement and Verification – Data Fields			
Follow-up Activity Date	Indicate date of this M & V report	Date	Required
M & V Methodology	Identify the M & V Methodology used: <ul style="list-style-type: none"> Option A: Key Parameter monitoring (short term metering/ spot measurements of key parameter) Option B: All Parameter monitoring (long term monitoring of all parameters normalizing for weather occupancy etc.) Option C: Whole Building monitoring Option D: Calibrated Computer Simulation 	Select: (list)	Required
Measured Annual Energy Savings	Measured Energy Savings converted to Million Btu from fuel savings entered by Fuel Type in native units.	Numeric: (Million Btu)	Required (if applicable) At least one: Energy or Water or Renewable Savings, is required.
Measured Annual Energy Savings By Fuel Type	Measured Energy Saving reported by fuel type in native units: <ul style="list-style-type: none"> Electricity Savings (Kwh) Natural Gas Savings (Thou Cu Ft) Coal - Anthracite (Short Tons) Coal - Bituminous (Short Tons) Coal - Coke (Short Tons) Distillate Fuel Oil #1 (Gallons) Distillate Fuel Oil #2 (Gallons) Distillate Fuel Oil #4 (Gallons) Distillate Fuel Oil #5 (Gallons) Distillate Fuel Oil #6 (Gallons) Propane (Gallons) Liquid Propane (Gallons) District Steam (Thou. lbs) Chilled Water/Electric (Ton Hours) Chilled Water/Absorption (Ton Hours) Chilled Water/Engine (Ton Hours) Kerosene (Gallons) Diesel (Gallons) Other (Million Btu) 	Numeric: (Million Btu)	Required (if applicable) At least one: Energy or Water or Renewable Savings, is required.
Measured Annual Water Savings	Measured Annual Water Savings	Numeric: (Thou. Gallons)	Required (if applicable; see note for Total Estimated Energy Savings)
Measured Renewable Savings (Electricity)	Measured Annual Renewable Electricity Output (Solar PV, Wind, etc.) Savings	Numeric: (Kwh)	Required (if applicable; see note for Total Estimated Energy Savings)
Measured Renewable Savings (Thermal)	Measured Annual Renewable Thermal Output (Geothermal, Active/Passive Solar Biomass, etc) Savings	Numeric: (Million Btu)	Required (if applicable; see note for Total Estimated Energy Savings)

Field Name	Description	Data Type/ Validation	Required/ Optional
Benchmarked Buildings - Data Fields			
Building Name	Benchmarked Building name	Text (100 char max)	Required
Real Property Unique Identifier	Unique identifier for the benchmarked building. (asset level real property profile identifier) This identifier must be unique across the top-tier agency.	Text (25 char max)	Required
Building City	Building City	Text (50 char max)	Required
Building State	Building State	Text (50 char max)	Required
Building Zip Code	Building Zip Code	Text (50 char max)	Required

Field Name	Description	Data Type/ Validation	Required/ Optional
Benchmarking Activity of Metered Buildings - Data Fields			
Benchmarking Activity Year	Fiscal Year of benchmarking activity	Date: (4 digit year between 2008 and current FY)	Required
Benchmarking System	Benchmarking system used: 1. ENERGY STAR Portfolio Manager 2. Labs 21 Benchmarking Tool 3. Data Center Energy Profiler (DC Pro) 4. Other Approved System	Selection: (list)	Required
Building Type	Current Energy Star Portfolio Manager building types: <ul style="list-style-type: none"> • Bank/Financial Institution • Courthouse • Data Center • Hospital (Acute Care, Children's) • Hotel • House of Worship • K-12 School • Medical Office • Office • Residence Hall/Dormitory • Retail • Senior Care Facility • Supermarket/Grocery • Warehouse • Multi-family Housing • Municipal Wastewater Treatment Plant • Water Treatment and Distribution Utility • Other • Parking • Swimming Pool 	Selection: (list) Dynamically generated based on export from Portfolio Manager	Required
Building Total Floor Space	Building Area benchmarked	Numeric: (Thou. Sq Ft)	Required

Field Name	Description	Data Type/ Validation	Required/ Optional
Benchmarking Activity of Metered Buildings - Data Fields			
Annual Energy Use (site delivered)	Annual Energy Use in terms of site-delivered Btu	Numeric: (Million Btu)	Required
Annual Energy Use (source)	Annual Energy Use in terms of source Btu	Numeric: (Million Btu)	Required
Annual Energy Intensity (site delivered)	Annual site-delivered energy intensity	Numeric: (KBtu/Sq Ft)	Required
Annual Energy Intensity (source)	Annual source energy intensity	Numeric: (KBtu /Sq Ft)	Required
Annual Weather-normalized Energy Intensity (site delivered)	Annual weather-normalized site-delivered energy intensity	Numeric: (KBtu /Sq Ft)	Required
Annual Weather-normalized Energy Intensity (source)	Annual weather-normalized source energy intensity	Numeric: (KBtu /Sq Ft)	Required
Energy Star Rating	Energy Star Rating (if applicable building type)	Integer: (1-100)	If applicable
Annual Water Consumption	Annual Potable Water Use	Numeric: (Thou. Gallons)	Optional
Annual Water Intensity	Annual Water Intensity	Numeric: (Gallons/Sq Ft)	Optional
Green House Gas Emissions	Equivalent CO2 emissions of source energy usage	Numeric: (Metric Tonnes of CO2e)	Optional
Guiding Principles Complete	Completion of Sustainability Guiding Principles	Selection: (Y/N)	Optional
Benchmarking Comments	Notes for annual benchmarking report	Text (2000 char max)	Optional

CTS Reports

Report	Metrics
Covered Facility – Compliance Progress	
Covered Facility Footprint and Energy Manager Assignment (Government-Wide)	Total Facility Energy Use (Billion Btu)
	Total Covered Facility Energy Use (Billion Btu)
	% of Covered Facility Energy Use
	Total # of Covered Facilities
	Total # of Covered Facilities with Assigned Energy Manager
	% of Covered Facilities with Assigned Energy Manager
	# of Agencies Meeting the Covered Facility Threshold
	% of Agencies Meeting the Covered Facility Threshold
	# of Agencies that have Energy Managers at each Covered Facility
	% of Agencies that have Energy Managers at each Covered Facility
	Covered Facility Evaluation Progress (# and percent)
	by # of Facilities with Completed Evaluations
	by Gross Square Footage Evaluated (Thou.)
	by Energy Use of Completely Evaluated Facilities (Million Btu)
	Total Potential Annual Energy Saving (Billion Btu)
	Total Potential Annual Water Saving (Thousand. Gallons)
	Total Potential Annual Cost Saving (Million Dollars)
Total Estimated Cost Of Implementation (Million Dollars)	
Compliance progress: Covered facility footprint and energy manager assignment. (by Agency)	Agency
	Total # of Active Covered Facilities
	Total # of Covered Facilities with Energy Manager Designated
	% of Total Covered Facilities with Energy Manager Designated
	Total Annual Facility Energy Use (Billion Btu)
	Total Annual Covered Facility Energy Use (Billion Btu)
	% of Total Facility Energy Use Comprised by Covered Facility
Compliance and Evaluation Progress Metrics (by Agency)	Covered Facility Evaluation Progress (%)
	Agency
	Agency Acronym
	% of Total Facility Energy Use Comprised by Covered Facility
	% of Covered Facilities with Designated FEM
	Covered Facility Evaluation Progress (%)
	by # of Facilities with Completed Evaluations
	by Gross Square Footage Evaluated
	by Energy Use of Completely Evaluated Facilities

Report	Metrics
Covered Facility – Detail	
Covered Facility Characteristics	Agency / Facility Name
	CTS Facility ID
	Agency Designated Covered Facility ID
	Activation Date
	Facility City
	Facility State
	Facility Zip Code
Facility Energy Manager	Agency / Facility Name

Report	Metrics
Covered Facility – Detail	
	CTS Facility ID
	FEM Unique ID
	First Name
	Last Name
	Email Address
	Covered Facilities With FEM Assigned
Covered Facility Annual Footprint	Agency/ Facility Name
	CTS Facility ID
	Covered Facility Gross Square Feet (Thou.)
	Number of Buildings Metered for Electricity
	Total Annual Energy Use (Million Btu)
	Total Annual Water Use (Thou. Gallon)

Report	Metrics
Comprehensive Evaluation Progress	
Comprehensive Evaluation Progress	Covered Facility Evaluation Progress (# and percent)
	# of Covered Facilities
	Covered Facility Gross Square Feet (Thou.)
	Covered Facility Energy Use (Million Btu)
Comprehensive Evaluation Progress (by Agency)	Agency
	Total # of Active Covered Facilities
	Covered Facility Footprint
	# of Covered Facilities
	Gross Square Feet (Thou.)
	Annual Energy Use (Million Btu)
	Covered Facility Evaluation
	# of Covered Facilities Completely Evaluated
	Gross Square Feet Evaluated (Thou.)
	Annual Energy Use of Completely Evaluated Facilities (Million Btu)
	Covered Facility Evaluation Progress
	by # of Facilities (%)
	by Sq Footage (%)
	by Energy Use (%)
Comprehensive Evaluation Progress (by Sub-Agency)	Agency
	Total # of Active Covered Facilities
	Covered Facility Footprint
	# of Covered Facilities
	Gross Square Feet (Thou.)
	Annual Energy Use (Million Btu)
	Covered Facility Evaluation
	# of Covered Facilities Completely Evaluated
	Gross Square Feet Evaluated (Thou.)
	Annual Energy Use of Completely Evaluated Facilities (Million Btu)
	Covered Facility Evaluation Progress
	by # of Facilities (%)
	by Sq Footage (%)
	by Energy Use (%)
Comprehensive Evaluation	Agency / Facility Name

Report	Metrics
Comprehensive Evaluation Progress	
Progress (by Facility)	Covered Facility Footprint
	Covered Facility Gross Square Feet (Thou.)
	Covered Facility Annual Energy Use (Million Btu)
	Covered Facility Evaluation Progress
	Evaluation Completion Date
	Due Date for Next Evaluation
	Completed or In-Progress Gross Square Feet Evaluated (Thou.)
	Evaluation Completed (Y/N)
Progress by Square Footage (%)	

Report	Metrics
Comprehensive Evaluation Findings	
Comprehensive Evaluation Findings (by Agency)	Agency
	Gross Square Feet (Thou.)
	Gross Square Feet Evaluated (Thou.)
	Gross Square Feet Evaluated (Thou.)
	Estimated Implementation Cost of Potential ECMs (Dollar)
	Estimated Annual Energy Cost Savings (Dollar)
	Estimated Annual Water Cost Savings (Dollar)
	Estimated Annual Ancillary Cost Savings (Dollar)
	Estimated Total Annual Cost Savings (Dollar)
	Estimated Annual Energy Savings (Million Btu)
	Estimated Annual Water Savings (Thou. Gallon)
Potential ECMs Identified (20 categories)	
Comprehensive Evaluation Findings (by Sub-Agency)	Agency
	Gross Square Feet (Thou.)
	Gross Square Feet Evaluated (Thou.)
	Gross Square Feet Evaluated (Thou.)
	Estimated Implementation Cost of Potential ECMs (Dollar)
	Estimated Annual Energy Cost Savings (Dollar)
	Estimated Annual Water Cost Savings (Dollar)
	Estimated Annual Ancillary Cost Savings (Dollar)
	Estimated Total Annual Cost Savings (Dollar)
	Estimated Annual Energy Savings (Million Btu)
	Estimated Annual Water Savings (Thou. Gallon)
Potential ECMs Identified (20 categories)	
Comprehensive Evaluation Findings (by Facility)	Agency
	Gross Square Feet (Thou.)
	Gross Square Feet Evaluated (Thou.)
	Gross Square Feet Evaluated (Thou.)
	Estimated Implementation Cost of Potential ECMs (Dollar)
	Estimated Annual Energy Cost Savings (Dollar)
	Estimated Annual Water Cost Savings (Dollar)
	Estimated Annual Ancillary Cost Savings (Dollar)
	Estimated Total Annual Cost Savings (Dollar)
	Estimated Annual Energy Savings (Million Btu)
	Estimated Annual Water Savings (Thou. Gallon)
Potential ECMs Identified (20 categories)	

Report	Metrics
Implemented Projects	
Implemented Projects by Calendar Year (by Agency)	Agency / Facility Name
	Number of Projects
	Total Project Implementation Costs (\$)
	Total Financing Costs (\$)
	Total Awarded Contract Value(\$)
	Estimated LCC Net Savings (\$)
	Savings to Investment Ratio
	Estimated Annual Energy Savings (Million Btu)
	Estimated Annual Water Savings (Gallons)
	Estimated Annual Renewable Savings (Electricity) (Kwh)
	Estimated Renewable Thermal Savings (Million Btu)
	Total ECMs
Implemented Projects by Fiscal Year (by Agency)	Agency / Facility Name
	Number of Projects
	Total Project Implementation Costs (\$)
	Total Financing Costs (\$)
	Total Awarded Contract Value(\$)
	Estimated LCC Net Savings (\$)
	Savings to Investment Ratio
	Estimated Annual Energy Savings (Million Btu)
	Estimated Annual Water Savings (Gallons)
	Estimated Annual Renewable Savings (Electricity) (Kwh)
	Estimated Renewable Thermal Savings (Million Btu)
	Total ECMs
Implemented Projects by Calendar Year (by Facility)	Agency / Facility Name
	Project Name
	Project Status
	Project Initiation Date
	Project Implementation Date
	Project Acceptance Date
	Follow-up Date
	Funding Source
	Total Project Implementation Costs (\$)
	Total Financing Costs (\$)
	Total Awarded Contract Value(\$)
	Estimated LCC Net Savings (\$)
	Savings to Investment Ratio
	Estimated Annual Energy Savings (Million Btu)
	Estimated Annual Water Savings (Gallons)
	Estimated Annual Renewable Savings (Electricity) (Kwh)
	Estimated Renewable Thermal Savings (Million Btu)
Total ECMs	
Implemented Projects by Fiscal Year (by Facility)	Agency / Facility Name
	Project Name
	Project Status
	Project Initiation Date
	Project Implementation Date

Report	Metrics
Implemented Projects	
Implemented Projects by Fiscal Year (by Facility)	Project Acceptance Date
	Follow-up Date
	Funding Source
	Total Project Implementation Costs (\$)
	Total Financing Costs (\$)
	Total Awarded Contract Value(\$)
	Estimated LCC Net Savings (\$)
	Savings to Investment Ratio
	Estimated Annual Energy Savings (Million Btu)
	Estimated Annual Water Savings (Gallons)
	Estimated Annual Renewable Savings (Electricity) (Kwh)
	Estimated Renewable Thermal Savings (Million Btu)
	Total ECMs
	Implemented Project Follow-up Activity Detail (by Facility)
Project Name	
Activity Date	
M&V Methodology	
Measured Annual Energy Savings (Million Btu)	
Measured Annual Water Savings (Gallons)	
Measured Annual Renewable Electricity Output (Kwh)	
Measured Annual Renewable Thermal Output (Million Btu)	

Report	Metrics
Benchmarked Buildings	
Benchmarked Buildings (by Agency)	Agency / Facility Name
	Number of Benchmarked Buildings
	Covered Facility Gross Square Feet (Thou.)
	Floor Space Benchmarked (Gross Sq Ft)
	% Floor Space Benchmarked
Benchmarked Buildings (by Facility)	Agency / Facility Name
	Building Name
	Real Property Unique Identifier
	City
	State
	Zip Code
	Benchmarking Activity Year (Fiscal Year)
	Covered Facility Gross Square Feet (Thou.)
	Benchmarked Floor Space (Gross Sq Ft)
	% Floor Space Benchmarked
	Benchmarking Activity Detail (by Facility)
Building Name	
Activity Year (Fiscal Year)	
Benchmarked Floor Space	
Benchmarking System	
Building Type	
Annual Energy Use (site delivered) (Btu/GSF)	
Annual Energy Use (source) (Btu/GSF)	
Annual Energy Intensity (site delivered) (Btu/GSF)	
Annual Energy Intensity (source) (Btu/GSF)	
Annual Weather-normalized Energy Intensity (site delivered) (Btu/GSF)	
Annual Weather-normalized Energy Intensity (source) (Btu/GSF)	
Energy Star Rating (1-100)	
Annual Water Consumption (Thou. Gallons)	
Green House Gas Emissions (MT CO2e)	
Guiding Principles Complete (Y/N)	

Appendix B

Section 432 of the Energy Independence and Security Act of 2007 (EISA)

SEC. 432. MANAGEMENT OF ENERGY AND WATER EFFICIENCY IN FEDERAL BUILDINGS.

Section 543 of the National Energy Conservation Policy Act (42 U.S.C. 8253) is amended by adding at the end the following:

“(f) *Use of Energy and Water Efficiency Measures in Federal Buildings.*--

“(1) **DEFINITIONS.**--In this subsection:

“(A) **COMMISSIONING.**--The term ‘commissioning’, with respect to a facility, means a systematic process--

“(i) of ensuring, using appropriate verification and documentation, during the period beginning on the initial day of the design phase of the facility and ending not earlier than 1 year after the date of completion of construction of the facility, that all facility systems perform interactively in accordance with--

“(I) the design documentation and intent of the facility; and

“(II) the operational needs of the owner of the facility, including preparation of operation personnel; and

“(ii) the primary goal of which is to ensure fully functional systems that can be properly operated and maintained during the useful life of the facility.

“(B) **ENERGY MANAGER.**--

“(i) **IN GENERAL.**--The term ‘energy manager’, with respect to a facility, means the individual who is responsible for--

“(I) ensuring compliance with this subsection by the facility; and

“(II) reducing energy use at the facility.

“(ii) **INCLUSIONS.**--The term ‘energy manager’ may include--

“(I) a contractor of a facility;

“(II) a part-time employee of a facility; and

“(III) an individual who is responsible for multiple facilities.

“(C) **FACILITY.**--

“(i) **IN GENERAL.**--The term ‘facility’ means 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.

“(ii) **INCLUSIONS.**--The term ‘facility’ includes--

“(I) a group of facilities at a single location or multiple locations managed as an integrated operation; and

“(II) contractor-operated facilities owned by the Federal Government.

“(iii) **EXCLUSIONS.**--The term ‘facility’ does not include any land or site for which the cost of utilities is not paid by the Federal Government.

“(D) **LIFE CYCLE COST-EFFECTIVE.**--The term ‘life cycle cost-effective’, with respect to a measure, means a measure the estimated savings of which exceed the estimated costs over the lifespan of the measure, as determined in accordance with section 544.

“(E) **PAYBACK PERIOD.**--

“(i) **IN GENERAL.**--Subject to clause (ii), the term ‘payback period’, with respect to a measure, means a value equal to the quotient obtained by dividing--

“(I) the estimated initial implementation cost of the measure (other than financing costs); by

“(II) the annual cost savings resulting from the measure, including--

“(aa) net savings in estimated energy and water costs; and

“(bb) operations, maintenance, repair, replacement, and other direct costs.

“(ii) **MODIFICATIONS AND EXCEPTIONS.**--The Secretary, in guidelines issued pursuant to paragraph (6), may make such modifications and provide such exceptions to the calculation of the payback period of a measure as the Secretary determines to be appropriate to achieve the purposes of this Act.

“(F) **RECOMMISSIONING.**--The term ‘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.

“(G) **RETROCOMMISSIONING.**--The term ‘retrocommissioning’ means a process of commissioning a facility or system that was not commissioned at time of construction of the facility or system.

“(2) **FACILITY ENERGY MANAGERS.**--

“(A) **IN GENERAL.**--Each Federal agency shall designate an energy manager responsible for implementing this subsection and reducing energy use at each facility that meets criteria under subparagraph (B).

“(B) **COVERED FACILITIES.**--The Secretary shall develop criteria, after consultation with affected agencies, energy efficiency advocates, and energy and utility service providers, that cover, at a minimum, Federal facilities, including central utility plants and distribution systems and other energy intensive operations, that constitute at least 75 percent of facility energy use at each agency.

“(3) **ENERGY AND WATER EVALUATIONS.**--

“(A) **EVALUATIONS.**--Effective beginning on the date that is 180 days after the date of enactment of this subsection and annually thereafter, energy managers shall complete, for each calendar year, a comprehensive energy and water evaluation for approximately 25 percent of the facilities of each agency that meet the criteria under paragraph (2)(B) in a manner that ensures that an evaluation of each such facility is completed at least once every 4 years.

“(B) **RECOMMISSIONING AND RETROCOMMISSIONING.**--As part of the evaluation under subparagraph (A), the energy manager shall identify and assess recommissioning measures (or, if the facility has never been commissioned, retrocommissioning measures) for each such facility.

“(4) **IMPLEMENTATION OF IDENTIFIED ENERGY AND WATER EFFICIENCY MEASURES.**--Not later than 2 years after the completion of each evaluation under paragraph (3), each energy manager may--

“(A) implement any energy- or water-saving measure that the Federal agency identified in the evaluation conducted under paragraph (3) that is life cycle cost-effective; and

“(B) bundle individual measures of varying paybacks together into combined projects.

“(5) **FOLLOW-UP ON IMPLEMENTED MEASURES.**--For each measure implemented under paragraph (4), each energy manager shall ensure that--

“(A) equipment, including building and equipment controls, is fully commissioned at acceptance to be operating at design specifications;

“(B) a plan for appropriate operations, maintenance, and repair of the equipment is in place at acceptance and is followed;

“(C) equipment and system performance is measured during its entire life to ensure proper operations, maintenance, and repair; and

“(D) energy and water savings are measured and verified.

“(6) **GUIDELINES.**--

“(A) **IN GENERAL.**--The Secretary shall issue guidelines and necessary criteria that each Federal agency shall follow for implementation of--

“(i) paragraphs (2) and (3) not later than 180 days after the date of enactment of this subsection; and

“(ii) paragraphs (4) and (5) not later than 1 year after the date of enactment of this subsection.

“(B) **RELATIONSHIP TO FUNDING SOURCE.**--The guidelines issued by the Secretary under subparagraph (A) shall be appropriate and uniform for measures funded with each type of funding made available under paragraph (10), but may distinguish between different types of measures project size, and other criteria the Secretary determines are relevant.

“(7) **WEB-BASED CERTIFICATION.**--

“(A) **IN GENERAL.**--For each facility that meets the criteria established by the Secretary under paragraph (2)(B), the energy manager shall use the web-based tracking system under subparagraph (B) to certify compliance with the requirements for--

- “(i) energy and water evaluations under paragraph (3);
- “(ii) implementation of identified energy and water measures under paragraph (4); and
- “(iii) follow-up on implemented measures under paragraph (5).

“(B) **DEPLOYMENT.**--

“(i) **IN GENERAL.**--Not later than 1 year after the date of enactment of this subsection, the Secretary shall develop and deploy a web-based tracking system required under this paragraph in a manner that tracks, at a minimum--

- “(I) the covered facilities;
- “(II) the status of meeting the requirements specified in subparagraph (A);
- “(III) the estimated cost and savings for measures required to be implemented in a facility;
- “(IV) the measured savings and persistence of savings for implemented measures; and
- “(V) the benchmarking information disclosed under paragraph (8)(C).

“(ii) **EASE OF COMPLIANCE.**--The Secretary shall ensure that energy manager compliance with the requirements in this paragraph, to the maximum extent practicable--

“(I) can be accomplished with the use of streamlined procedures and templates that minimize the time demands on Federal employees; and

“(II) is coordinated with other applicable energy reporting requirements.

“(C) **AVAILABILITY.**--

“(i) **IN GENERAL.**--Subject to clause (ii), the Secretary shall make the web-based tracking system required under this paragraph available to Congress, other Federal agencies, and the public through the Internet.

“(ii) **EXEMPTIONS.**--At the request of a Federal agency, the Secretary may exempt specific data for specific facilities from disclosure under clause (i) for national security purposes.

“(8) **BENCHMARKING OF FEDERAL FACILITIES.**--

“(A) **IN GENERAL.**--The energy manager shall enter energy use data for each metered building that is (or is a part of) a facility that meets the criteria established by the Secretary under paragraph (2)(B) into a building energy use benchmarking system, such as the Energy Star Portfolio Manager.

“(B) **SYSTEM AND GUIDANCE.**--Not later than 1 year after the date of enactment of this subsection, the Secretary shall--

“(i) select or develop the building energy use benchmarking system required under this paragraph for each type of building; and

“(ii) issue guidance for use of the system.

“(C) PUBLIC DISCLOSURE.--Each energy manager shall post the information entered into, or generated by, a benchmarking system under this subsections, on the web-based tracking system under paragraph (7)(B). The energy manager shall update such information each year, and shall include in such reporting previous years' information to allow changes in building performance to be tracked over time.

“(9) FEDERAL AGENCY SCORECARDS.--

“(A) IN GENERAL.--The Director of the Office of Management and Budget shall issue semiannual scorecards for energy management activities carried out by each Federal agency that includes--

“(i) summaries of the status of implementing the various requirements of the agency and its energy managers under this subsection; and

“(ii) any other means of measuring performance that the Director considers appropriate.

“(B) AVAILABILITY.--The Director shall make the scorecards required under this paragraph available to Congress, other Federal agencies, and the public through the Internet.

“(10) FUNDING AND IMPLEMENTATION.--

“(A) AUTHORIZATION OF APPROPRIATIONS.--There are authorized to be appropriated such sums as are necessary to carry out this subsection.

“(B) FUNDING OPTIONS.--

“(i) IN GENERAL.--To carry out this subsection, a Federal agency may use any combination of--

“(I) appropriated funds made available under subparagraph (A); and

“(II) private financing otherwise authorized under Federal law, including financing available through energy savings performance contracts or utility energy service contracts.

“(ii) COMBINED FUNDING FOR SAME MEASURE.--A Federal agency may use any combination of appropriated funds and private financing described in clause (i) to carry out the same measure under this subsection.

“(C) IMPLEMENTATION.--Each Federal agency may implement the requirements under this subsection itself or may contract out performance of some or all of the requirements.

“(11) RULE OF CONSTRUCTION.--This subsection shall not be construed to require or to obviate any contractor savings guarantees.”.

Appendix C

Technology Categories and Associated Energy and Water Efficiency Measures

1. **Boiler Plant Improvements** - Efficiency measures such as, but not limited to:
 - Boiler control, including new controls and retrofits to existing controls
 - Replacement of existing boilers with high efficiency boilers
 - Boiler decentralization
2. **Chiller Plant Improvements** - Efficiency measures such as, but not limited to:
 - Chiller retrofits or replacements
 - Chiller plant pumping, piping, and controls retrofits and replacements
3. **Building Automation Systems/Energy Management Control Systems (EMCS)** - Efficiency measures such as, but not limited to:
 - Heating, Ventilating, and Air Conditioning (HVAC) upgrade from pneumatics to Direct Digital Control
 - Upgrade or replacement of existing EMCS systems
4. **Heating, Ventilating, and Air Conditioning (HVAC, not including boilers, chillers, and Building Automation System (BAS)/Energy Monitoring/Management Control System (EMCS))** - Efficiency measures such as, but not limited to:
 - Packaged air conditioning unit replacements
 - HVAC damper and controller repair or replacement
 - Window air conditioning replacement with high efficiency units
 - Cooling tower retrofits or replacements
 - Economizer installation
 - Fans and pump replacement or impeller trimming
 - Thermal energy storage
 - Variable air volume retrofit
5. **Lighting Improvements** - Efficiency measures such as, but not limited to:
 - Interior and exterior lighting retrofits and replacements
 - Intelligent lighting controls
 - Occupancy sensors
 - Light Emitting Diode technologies
 - Daylighting
 - Spectrally enhanced lighting
 - Fiber optic lighting technologies
6. **Building Envelope Modifications** - Efficiency measures such as, but not limited to:
 - Insulation installation
 - Weatherization

- Window replacement
 - Reflective solar window tinting
- 7. Chilled Water, Hot Water, and Steam Distribution Systems** – Efficiency measures such as, but not limited to:
- Piping insulation installation
 - Hot water heater repair and replacement
 - Steam trap repair and replacement
 - Repair or replacement of existing condensate return systems and installation of new condensate return systems
- 8. Electric Motors and Drives** - Efficiency measures such as, but not limited to:
- Motor replacement with high efficiency motors
 - Variable speed motors or drives
- 9. Refrigeration** - Efficiency measures such as, but not limited to:
- Replacement of ice/refrigeration equipment with high efficiency units
- 10. Distributed Generation** - Efficiency measures such as, but not limited to:
- Cogeneration systems installation
 - Microturbines installation
 - Fuel cells installation
- 11. Renewable Energy Systems** - Efficiency measures such as, but not limited to:
- Photovoltaic system installation
 - Solar hot water system installation
 - Solar ventilation preheating system installation
 - Wind energy system installation
 - Passive solar heating installation
 - Landfill gas, waste water treatment plant digester gas, and coalbed methane power plant installation
 - Wood waste and other organic waste stream heating or power plant installation
 - Replacement of air conditioning and heating units with ground coupled heat pump systems
- 12. Energy/Utility Distribution Systems** - Efficiency measures such as, but not limited to:
- Transformers installation
 - Power quality upgrades
 - Power factor correction
 - Gas distribution systems installation
- 13. Water and Sewer Conservation Systems** - Efficiency measures such as, but not limited to:
- Low-flow faucets and showerheads
 - Low-flow plumbing equipment

- Water efficient irrigation
- On-site sewer treatment systems

14. Electrical Peak Shaving/Load Shifting - Efficiency measures such as, but not limited to:

- Thermal energy storage
- Gas cooling

15. Energy Cost Reduction Through Rate Adjustments - Measures such as, but not limited to:

- Change to more favorable rate schedule
- Lower energy cost supplier(s) (where applicable)
- Energy service billing and meter auditing recommendations

16. Energy Related Process Improvements - Efficiency measures such as, but not limited to:

- Production and/or manufacturing improvements
- Recycling and other waste stream reductions
- Industrial process improvement

17. Advanced Metering Systems

18. Appliance/Plug-load reductions - Efficiency measures such as but not limited to:

- Replace air-cooled ice/refrigeration equipment
- Replace refrigerators
- De-lamp vending machines
- Plug timers
- Energy Star® products

19. Commissioning Measures

20. Other – Efficiency measures that cannot be included in any of the above categories

Appendix D

Facility Audit and Commissioning Assessment Clarifications

Facility Energy and Water Audits

To standardize the energy audit process, the energy manager may choose to utilize the protocols created by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). ASHRAE defines several energy audit “stages”, the most frequently used of which are the Level I and Level II analyses (see “Audit Levels” call-out box on next page). The Level I “walk-through” analysis assesses a building’s energy efficiency by analyzing utility bills and conducting a brief on-site survey of the building. A Level I analysis identifies and provides a savings and cost analysis of low-cost or no cost ECMs, and a listing of additional capital improvements and their potential costs and savings for further consideration. For *many* facilities, a Level I audit will be adequate to meet the statute. A Level II analysis includes a more detailed survey and cost-benefit analysis of potential ECMs. The Level II analysis will be adequate for *most* covered facilities. In some cases in which capital intensive modifications are desired, an ASHRAE Level III analysis may be performed. A Level III analysis performs energy modeling to verify potential savings and includes additional systems measurements, schematics and equipment lists.

While the ASHRAE energy audit levels provide detail and standardize approaches for agencies to follow, it is DOE’s *Facility Energy Management Guidelines and Criteria for Energy and Water Evaluations in Covered Facilities* http://www1.eere.energy.gov/femp/pdfs/eisa_s432_guidelines.pdf that outlines what is required to meet the requirements of 42 U.S.C. 8253(f). While the DOE audit requirements are sufficiently rigorous, it is flexible enough to ensure that viable energy-saving projects are identified, and also not so onerous as to require extensive resources to be spent auditing structures where engineers can quickly and easily conclude that no viable projects currently exist. The report format for this audit process is based on the Energy Saving Performance Contract (ESPC) Preliminary Assessment (PA) level audits. A PA-level audit contains the documented findings of a walk-through survey and “may include, but is not limited to, an evaluation of energy cost savings and energy unit savings potential, building conditions, energy consuming equipment, and hours of use or occupancy, for the purpose of developing preliminary technical and price proposals.”

Although the ASHRAE protocols for audits were developed for energy, the concepts and process may also be applied to water. FEMP has guidance for resources on measuring and tracking water performance (<http://www1.eere.energy.gov/femp/program/waterefficiency.html>). In addition, FEMP and the U.S. Environmental Protection Agency (EPA) list 14 best management practices for water efficiency that will be useful to facility energy managers (http://www.femp.energy.gov/program/waterefficiency_bmp.html). FEMP’s guidance on “Increasing Federal Office Building Water Efficiency” (http://www1.eere.energy.gov/femp/pdfs/waterefficiency_fedoffices.pdf) describes four steps for conducting a facility water audit. Web based training for conducting a water audit can be accessed at: (<http://femptraining.labworks.org>). Leak detection can be a useful tool in identifying facility water losses. Although developed for small public water systems, EPA’s guidance on Control and Mitigation of Drinking Water Losses in Distribution Systems (at http://water.epa.gov/type/drink/pws/smallsystems/upload/Water_Loss_Control_508_FINALDec.

[pdf](#)) has information that may be of use to energy managers, particularly those who manage campus-type installations.

Audit Levels

The audit component of comprehensive evaluations must identify potential energy or water conservation measures (ECMs) including annual water and energy savings information, life-cycle investment and implementation costs and cost savings. EISA audits typically equate with Levels 1 or 2 audit activities as described by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) *Procedures for Commercial Building Energy Audits*. Depending on the physical and energy-use characteristics of a building, and the needs and resources of the owner, these steps can require different levels of effort. A commercial building energy analysis can generally be classified into the following levels of effort:

1. **Type I audit, or preliminary or walk-through audit**, is the simplest and quickest type of audit. In general, a Type I audit is comprised of basic utility invoice analysis; interviews with site-operating personnel; a review of facility operations data, such as; operating hours, personnel and occupancy loading, and mission requirements; a room-by-room walk-through of the facility to identify obvious areas of energy waste or inefficiency; data analysis; and development of energy conservation measures (ECMs). This level of audit, while not sufficient for reaching a final decision on implementing proposed measures, is adequate to prioritize energy-efficiency projects and to determine the need for a more detailed audit and project prioritization. Advantages include: least expensive audit to perform; can be conducted by personnel with minimum to moderate audit experience; and provides preliminary data prior to investing in more detailed audits. Disadvantages include: has limited accuracy and is insufficient by itself to support large capital improvement projects.
2. **A Type II audit, or general audit** expands on the preliminary audit by collecting more detailed information about facility operations and by performing a more detailed evaluation of energy conservation measures. The Type II audit goes beyond simple observation and makes energy use analysis an important element of the process. Utility bills are collected for a 12 to 36 month period to allow the audit team to evaluate, trend, and compare the facility's energy rate structure, demand, and usage profiles. In addition, strategically placed energy monitoring devices extend the capability of the energy audit team by providing a steady stream of energy use information for specific building systems. Advantages include: balances time, effort, and cost with more complete, accurate, recommendations; has a greater degree of accuracy than a Type I energy audit; and incorporates methodical data collection that maximizes savings, makes analysis easier, and documents recommendations in a way that simplifies implementation. Disadvantages include: more costly and resource-demanding and requires more time to perform than a Type I energy audit.
3. **A Type III audit or comprehensive audit**, expands on the Type II audit by providing a dynamic model of energy-use characteristics of both the existing facility as-is, and the predicted energy-use characteristics of the facility after implementing selected energy conservation measures identified. The building model is calibrated against actual utility and weather data to provide a realistic baseline against which savings generated by implementing the proposed measures are calculated. Extensive attention is given to daily, weekly, monthly, and annual existing utility data supplemented with sub-metering of major energy consuming systems and data monitoring of system operating characteristics. Advantages include: provides detailed and accurate information through data collection and computer simulations; provides comprehensive data on project cost and savings based on published sources; and can identify energy conservation measures that are not quite so obvious. Disadvantages include: is typically the most expensive type of audit to perform; susceptible to "garbage in – garbage out" if the input data, assumptions used, and output results are not checked; and requires highly technical understanding of facility energy use modeling.

Facility Re-/Retro-Commissioning

Commissioning is a systematic process of assuring through verification and documentation, from the design phase to a minimum of one year after final acceptance that all facility systems perform interactively in accordance with the design documentation and intent, and in accordance with the owner's operational needs, including preparation of operational personnel. The commissioning process ensures that all of the equipment and systems within a facility are currently operating and functioning properly, and identifies items that need to be fixed or adjusted, typically in a low or no cost fashion.

Commissioning can also be conducted on a retroactive basis. The statute defines "retro-commissioning" as the retroactive commissioning of equipment or a system that was not commissioned at the time of installation or during the warranty phase. Typically, retro-commissioning is performed long after the facility is constructed and placed into service.

The statute defines "re-commissioning" as the process of commissioning a previously commissioned facility or system after expiration of the project development and warranty phases. The primary goal of re-commissioning is to optimize facility performance, in accordance with design or operating needs, over the useful life of the facility.

All forms of commissioning seek to ensure that all energy/water-using and energy/water-conserving systems in a building work together to meet the needs of the current occupants and the actual performance requirements of the owner.

As part of a covered facility's comprehensive evaluation, the statute requires identifying and assessing re-commissioning measures (or, if the facility has never been commissioned, retro-commissioning measures). Steps 1 and 2 of the approach described below fulfill this requirement. Steps 3 and 4 of DOE's recommended commissioning approach are accomplished as part of the facility's project implementation and follow-up process.

1. **Planning:** Determine the commissioning objectives and the scope of the equipment to be re-commissioned or retro-commissioned.
2. **Discovery/Design Review:** Review the original design intent and the basis of design for the equipment or system being re-commissioned or retro-commissioned. Update the basis of design specifications for equipment or systems if warranted by changes in building or facility use or occupancy. Measure and monitor operating performance and list and prioritize equipment and/or system deficiencies.
3. **Implementation and Verification/Correction:** Determine performance baselines and measure the performance of existing equipment and/or systems against baseline. Adjust the equipment and retest if deficiencies are found. Perform corrections from highest priority to lowest priority items. Perform functional tests to ensure that performance deficiencies have been corrected.
4. **Reporting and Periodic Review.** Complete the commissioning report. Update operations and maintenance manuals for equipment and systems to reflect commissioning findings. Train operations and maintenance staff on operations and maintenance of equipment and systems (see http://www1.eere.energy.gov/femp/pdfs/commissioning_fed_facilities.pdf)

Appendix E
Format for Requesting Exemption from Public Disclosure
for National Security Purposes

SENSITIVE AND CLASSIFIED INFORMATION MUST NOT BE INCLUDED ON THIS FORM

Date: (mm-dd-yyyy)

To: Secretary of Energy
c/o Federal Energy Management Program, EE-2L
1000 Independence Avenue, SW
Washington, DC 20585
EISA-432-Guidance@doe.gov

From: (Name of Authorizing Official)
(Agency Name)
(Phone Number)
(E-mail Address)

Subject: Request for Exemption from Public Disclosure of 42 U.S.C. 8253(f) Covered Facility Data for National Security Purposes

The following subject facilities and associated data elements are requested to be exempt from public disclosure for the stated reason pertaining to national security:

Facility Name: (Name(s) of Covered Facility(ies) for which exemption and non-disclosure of the data elements below is requested)

Agency Facility #: (Agency-provided identifier(s) in CTS for the Covered Facility(ies) for which exemption from public disclosure is requested)

Data elements not to be disclosed at the facility level (check all that apply):

- City
- State
- Zip Code
- Gross Square Footage
- Total Annual Energy Use
- Total Annual Water Use
- Evaluation Findings
- Implemented Project Data
- Metered Building Benchmarking Data (List all applicable buildings associated with the Covered Facility)

Reason for Public Disclosure Exemption: _____

Other Considerations: (i.e., special requests and rationale for excluding data from agency totals)