

FEMP Facility Evaluation (Audit) Decision Tree



How to Use this Resource

This decision tree is intended to be a resource and used alongside the Audit Definitions and FEMP Consolidated Facility Management Guidance in conjunction with the best practices and expert judgment already used by Agencies to determine the best approaches to evaluate their facilities.

Two situations are covered in this decision tree:

- Recurring Energy and Water Audit guidance to select the most appropriate type of evaluation for a facility that has already received at least one audit.
- First-Time Energy and Water Audit guidance to select the most appropriate type of evaluation for a facility that has never had an audit.

There are three main activities when using the FEMP audit decision tree:

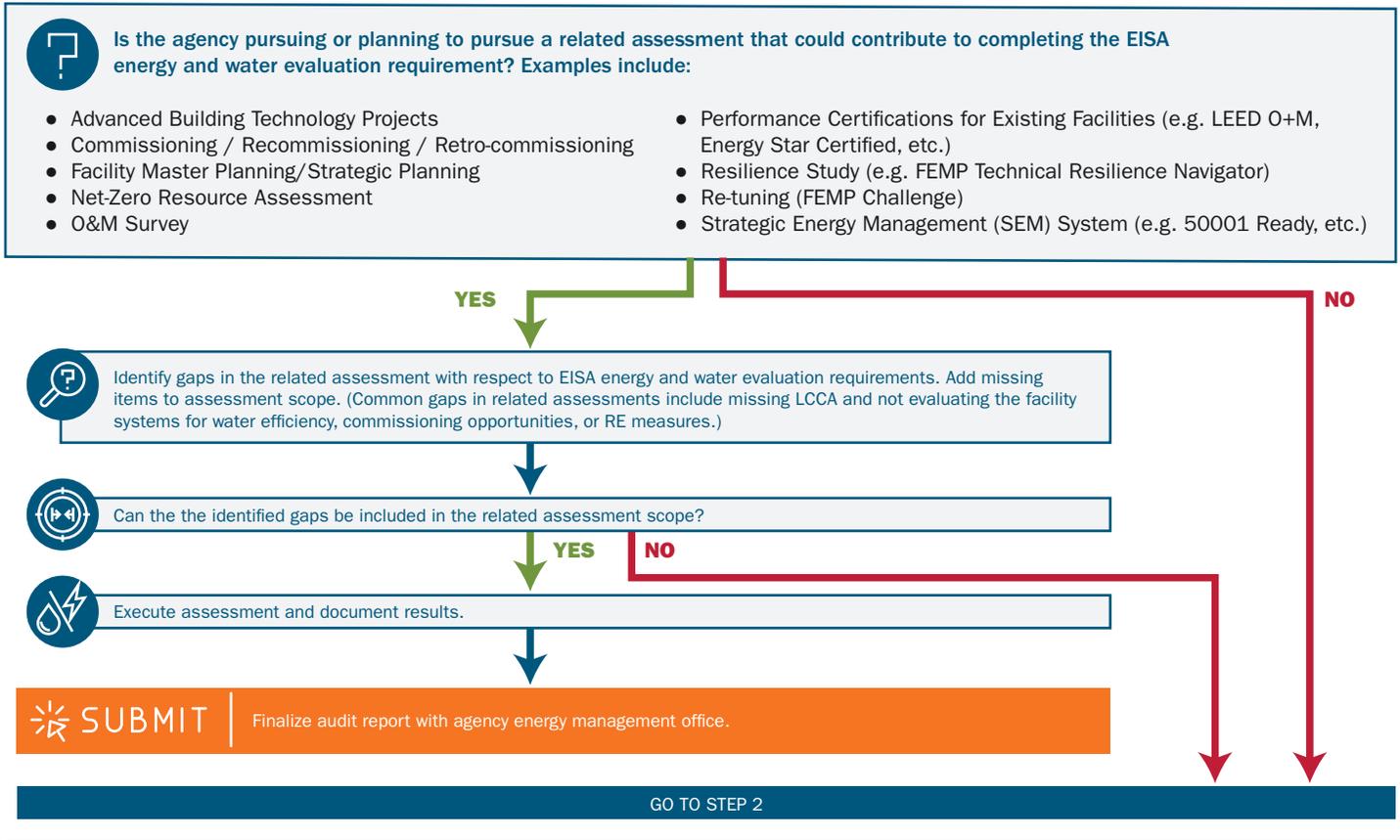
- Identify related assessment activities and/or if it would be appropriate to exclude the facility due to demolition or renovation status.
- Gather facility data to understand the existing conditions and benchmark the facility against others in the portfolio to determine whether an onsite or remote audit is appropriate.
- Determine the best type of assessment among the remote or onsite audit options (i.e. basic or detailed) that could be executed.

Agencies are encouraged to tailor this resource to best fit their priorities and facility management goals. Please note that FEMP is currently working to update this decision tree to incorporate impacts associated with the Energy Act of 2020.

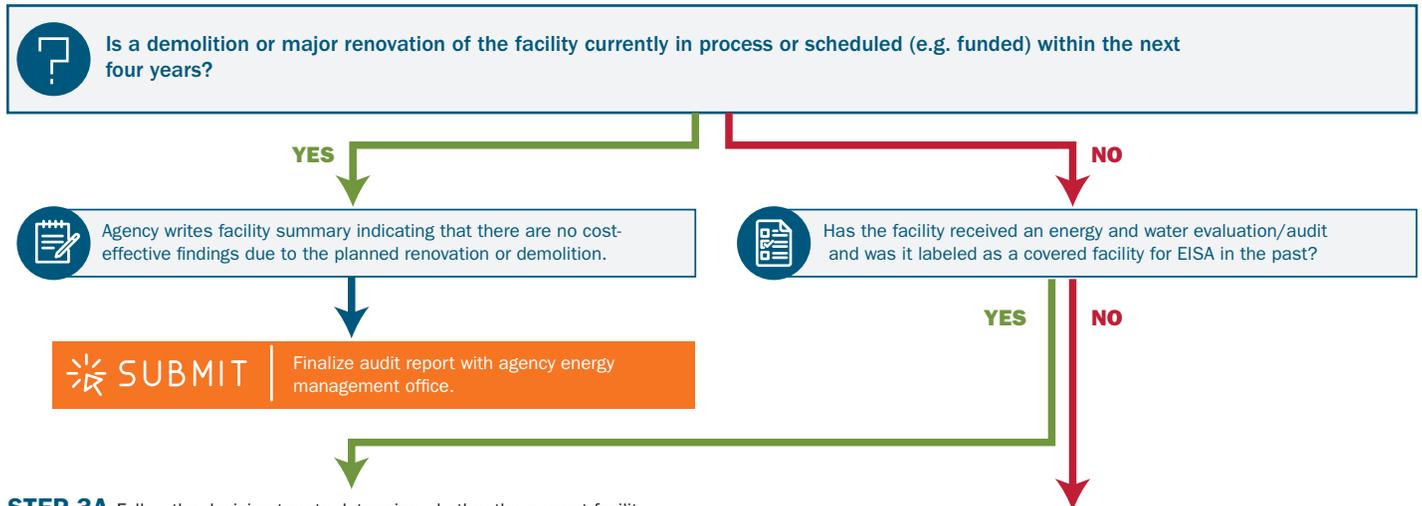
Acronyms:

CBECs – Commercial Buildings Energy Consumption Survey | **ECM** – Efficiency Conservation Measure (includes energy, water, and RE measures)
ESCO – Energy Services Company | **ESPC** - Energy Savings Performance Contract | **EUI** – Energy Use Intensity | **LCCA** – Lifecycle Cost Analysis
O&M - Operations and Maintenance | **RE** – Renewable Energy | **UESC** – Utility Energy Service Contract | **WUI** – Water Use Intensity

STEP 1 Follow the decision tree to determine whether a related facility assessment activity can contribute to meeting the EISA energy and water evaluation requirement.



STEP 2 Follow the decision tree to determine if a first-time audit or a recurring audit should be used to meet the EISA requirement.



STEP 3A Follow the decision tree to determine whether the present facility conditions reflect the previous audit report to satisfy the EISA requirement or if a new audit should be chosen to evaluate the facility onsite or remotely.

Recurring Energy & Water Audit
Gather information on current project status, EUI/WUI, maintenance reports, and facility operations and compare with information from previous audit report.

Checklist 3A

Check the boxes as applicable based on data gathered and continue the decision tree for options to consider.

YES	Previous audit was completed satisfactorily (including the appropriate type of water, RE, and re/retro-commissioning measure identification and LCCA) and information is still relevant?	NO
YES	Current weather-adjusted facility EUI and WUI are at or less than previous audit (and not due to occupancy or function change)?	NO
YES	Facility function, facility conditions, and operation remain the same from previous audit?	NO
YES	Projects and recommendations from previous audit have been implemented, are underway, or remain relevant and are awaiting implementation?	NO
YES	The agency has all of the information needed to develop projects from the previous audit (e.g. obtain appropriated funds or engage ESPC/UESC partner)?	NO

Remote Re-Evaluation - Agency review summarizing that the previous audit findings still represent the ECM opportunities of the current facility conditions. It includes:

- Changes to energy and water use and utility rates
- Discussion of known present conditions and applicability of prior identified ECMs
- A review of the project LCCA for remaining applicable ECMs

SUBMIT Finalize audit report with agency energy management office.

STEP 3B Follow the decision tree to determine if remote auditing options can be considered for a first-time audit.

First-time Energy & Water Audit
Are building characteristics and **ALL RELEVANT DATA** to perform LCCA available, obtainable, or able to be estimated without an in-person visit?

Checklist 3B

Check Yes or No for the **RELEVANT DATA** that are available or obtainable:

YES	Monthly utility consumption, costs, and rates	NO
YES	Facility function and occupancy patterns	NO
YES	Equipment types (e.g. inventory or drawings)	NO
YES	Information for building controls and setpoints NOTE: For buildings >50,000 square feet (sf) or energy intensive function >25,000 sf (e.g., data center, healthcare, lab, etc.): An assessment of the opportunity for re or retro-commissioning measures is required All others: An assessment of basic building controls optimization measures is required (e.g. thermostat settings)	NO
YES	Recent project history and/or building system problems (e.g. maintenance records)	NO
YES	Other necessary data based on understanding of building or facility, if applicable (also choose Yes if no other data is necessary)	NO

IF ALL YES

IF ANY NO

GO TO STEP 4A

GO TO STEP 4B

GO TO STEP 5B (Onsite Audit)

STEP 4A Follow the decision tree to determine whether to evaluate a facility onsite or remotely for a recurring audit.

STEP 4B Continue the decision tree to determine whether a first-time audit should be conducted onsite or remotely.



Recurring Energy & Water Audit

Are building characteristics and **ALL RELEVANT DATA** to perform LCCA in the prior audit report, obtainable, or able to be estimated without an in-person visit?



First-time Energy & Water Audit

A majority Yes indicates that it is applicable to consider a remote audit and a majority No indicates that an onsite audit is more applicable.



Checklist 4A

Check Yes or No for the **RELEVANT DATA** that are available or obtainable:

YES	Monthly utility consumption, costs, and rates	NO
YES	Facility function and occupancy patterns	NO
YES	Equipment types (e.g. inventory or drawings)	NO
YES	Information for building controls and setpoints NOTE: For buildings >50,000 square feet (sf) or energy intensive function >25,000 sf (e.g., data center, healthcare, lab, etc.): An assessment of the opportunity for re or retro-commissioning measures is required All others: An assessment of basic building controls optimization measures is required (e.g. thermostat settings)	NO
YES	Recent project history and/or building system problems (e.g. maintenance records)	NO
YES	Other necessary data based on understanding of building or facility, if applicable (also choose Yes if no other data is necessary)	NO



Checklist 4B

An **OVERVIEW** (of ECM opportunities) can include evaluating the opportunities to secure eligibility for future appropriated funds or to pursue an ESPC/UESC at a site.

DETAILED PROJECT DEVELOPMENT can include gathering more specific design detail for execution of projects that will be funded by either appropriated funds or performance contract (ESPC/UESC).

YES	Does the facility have a lower than average EUI and WUI than buildings of similar age and function within agency or CBECs?	NO
YES	Presence of ongoing or planned projects at facility limit the number of identifiable ECMs (e.g. system lifetime replacements, etc.)?	NO
YES	Seeking an OVERVIEW of ECM opportunities among several facilities rather than DETAILED PROJECT DEVELOPMENT at a single site?	NO
YES	Can completed audits for other agency facilities within the last 4 years be applied to (i.e. results extrapolated) the building(s) under consideration for audit?	NO
YES	The function of building remains the same since the last commissioning?	NO

IF ALL YES

IF ANY NO

IF MAJORITY YES

IF MAJORITY NO

GO TO STEP 5A (Remote Audit)

GO TO STEP 5B (Onsite Audit)



STEP 5A (Remote Audit) Determine the most appropriate remote audit option by following this decision tree.

Is COMPREHENSIVE FACILITY DATA available?

Checklist 5A

COMPREHENSIVE FACILITY DATA is a necessary input for some analysis tools and methods used in Remote Audits. Check Yes or No for all data categories that are available:

YES	Interval utility meter data or estimated interval utility data (e.g. 15 minute, hourly)	NO
YES	Building control system trend logs (e.g. zone temperatures, schedule, HVAC equipment and distribution, etc.)	NO
YES	Status of control points (e.g. HVAC equipment that is online, offline, or in alarm)	NO

If ALL YES → [Green arrow]
If ANY NO → [Red arrow]

Would conventional efficiency analysis properly assess the site building systems, features, and functions (i.e. decide if remote audit methods using packaged building analysis tools will identify suitable ECMs for the facility type(s) of interest)?

YES → [Green arrow]
NO → [Red arrow]

Basic Remote Audit
(incl. water, RE, and LCCA)

- Automated
- Continuous Monitoring
- Portfolio Screening

Detailed Remote Audit
(incl. water, RE, and LCCA)

- Desk Audit
- Remote Controls Evaluation

For all Remote Audit Results:
 Are there large gaps in the findings due to unavailable information and further investigation is necessary to complete the measure identification?

NO → [Red arrow]
IF YES GO TO STEP 5B (Onsite Audit) → [Green arrow]

IF ANY NO → [Red arrow]

STEP 5B (Onsite Audit) Determine the most appropriate onsite audit option by following this decision tree.

Are there known building systems in need of major replacement?

YES → [Green arrow]
NO → [Red arrow]

Agency is considering pursuing a performance contract? (e.g. ESPC/UESC)

NO → [Red arrow] Seeking detailed project analysis?

NO → [Red arrow]

Detailed Onsite Audit

- ESPC/UESC Preliminary Assessment (PA) (+ water and RE)
- ESPC/UESC Investment Grade Audit (+ water and RE)
- ASHRAE Level 2 Audit (+ water)*
- ASHRAE Level 3 Audit (+ water)*

Detailed Onsite Audit

- ASHRAE Level 2 Audit (+ water)
- ASHRAE Level 3 Audit (+ water)
- Deep Energy Retrofit Audit (+ water and RE)

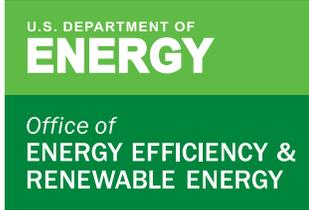
Basic Onsite Audit

- ASHRAE Level 1 (+ water and RE)
- Utility Incentive Program Audit (+ water and RE)
- Industrial Assessment Center audit (+ water and RE)

YES → [Green arrow]
NO → [Red arrow]

Decision to proceed with ESPC/UESC

If the agency decides not to move forward with an ESPC or UESC after PA review, then the agency should arrange with the ESCO to retain the PA findings as a completed audit.



For more information, visit:
energy.gov/eere/femp

PNNL-SA-157677 · November 2020

SUBMIT Finalize audit report with agency energy management office.

*Agency may want to first do an audit to identify ECMs independent of the ESPC/UESC contractor.