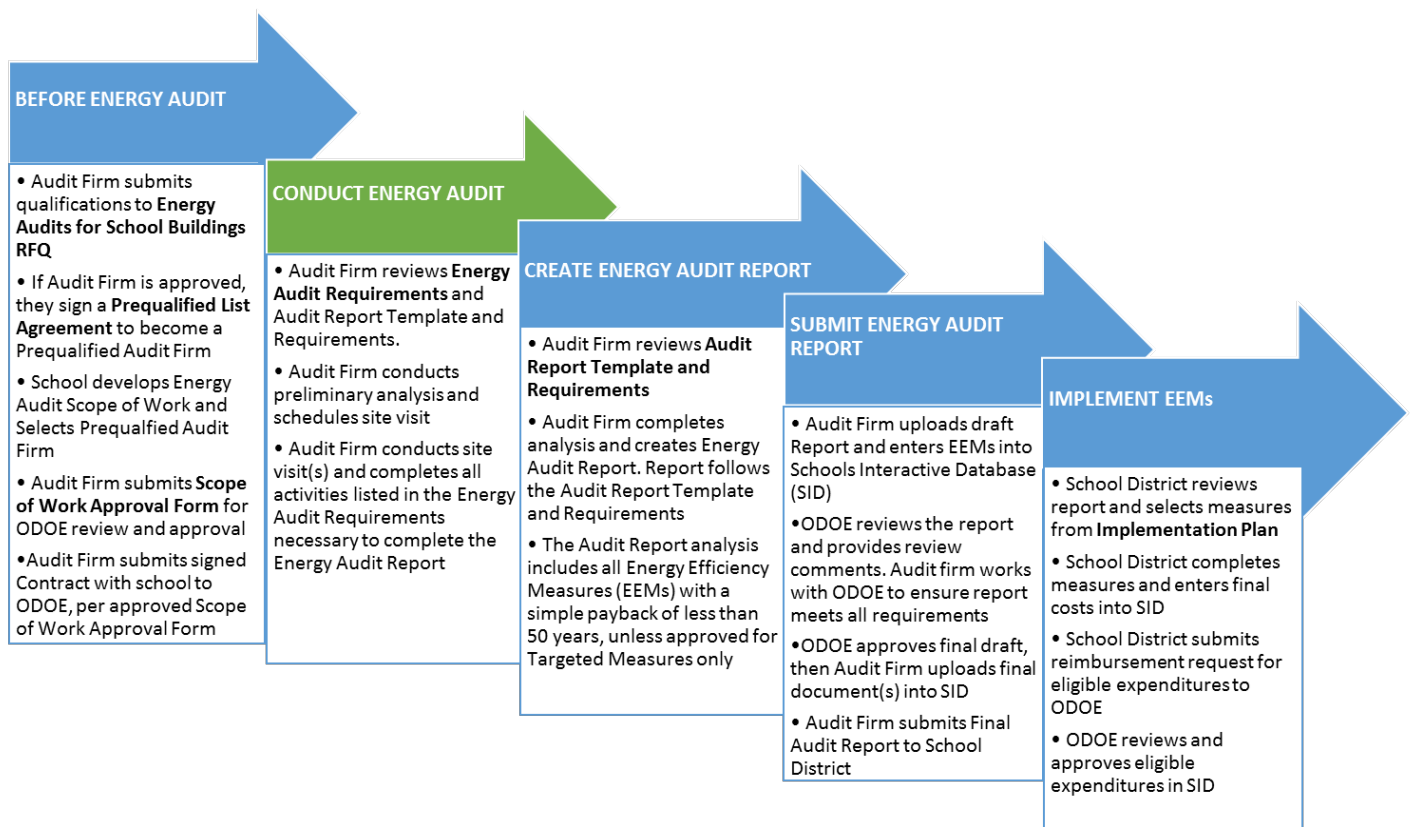


Energy Audit Requirements

Overview

This document sets forth the expected standards for all Energy Audits to ensure that Contracting Agencies receive complete and accurate guidance in energy efficiency decision making. ASHRAE auditing processes and requirements¹ are the foundation for this document and have been incorporated into SB 1149 program-specific requirements.

Qualified energy auditing firms are expected to meet these requirements. Failure to adhere to the requirements herein may be grounds for termination of a Prequalified List Agreement for Energy Auditing Services and/or withdrawal of ODOE's approval of an affected Scope of Work Approval Form.



Audit firms must review the SB 1149 Program Guidelines for details on implementation of SB 1149 and the role of audits in the program, located on the [SB 1149 Schools Program Guidelines](#) web page.

The audit firm and energy auditors must review all Energy Audit Requirements before surveying the site. These requirements will dictate how the energy auditor will assess the facility and what data must be collected and reported in the Energy Audit Report

If an audit firm is contacted to perform an Energy Audit, the firm must ask and confirm that the school district is eligible for an SB 1149 Energy Audit **before they enter into a contract with the school district.**

¹ ASHRAE, *Procedures for Commercial Building Energy Audits*, 2nd Edition (Atlanta: ASHRAE, 2011), 3-14.

Before the Energy Audit

A preliminary analysis should precede any energy audit work to provide background data for the audit and should be performed before site visits. Energy auditing firms shall take the following actions for ALL audits, regardless of audit type or Scope of Work:

1. Assign a Qualified Energy Auditor to lead the Audit. The Energy Auditor shall be the primary point of contact for all issues related to review and revision of the Energy Audit.
2. Obtain and review a minimum of two years of monthly energy consumption records (actual utility bills preferred) for the facility. Complete the same for bulk fuel's quantity delivered (and BTU content, if available) along with frequency of delivery.
 - Note the rate schedule and cost per unit (kWh, kW, therm, gallon, etc.) for the Energy Audit Report.
 - Trends and abnormalities in the consumption records should be discussed with school staff. Display and analysis of monthly energy consumption is required in the Energy Audit Report.
3. Obtain and review copies of any Energy Audits or other studies previously completed for the facility. Discuss all ideas that facility representatives have considered to save energy and/or to improve operations and comfort. Include in these discussions, the evaluation of long-range energy conservation plans and short and long-term energy conservation priorities.
4. Obtain a single-line floor plan with current room names for the facility. Make copies and bring them for use during the Energy Audit. If auditor obtains floor plan from source other than the facility staff, auditor should provide a copy to staff at time of visit. Schedule a time to meet with both the facility manager and the business manager (or other staff as identified by Contracting Agency) to discuss the Energy Audit and the school district's goals for energy management and/or expenditures.
5. **Recommended:** Complete a pre-audit interview with facility staff to gain the following information (which will be required in the Energy Audit Report):
 - Equipment operation and scheduling
 - Building occupancy and scheduling
 - Persistent maintenance or comfort issues
 - Discuss data-logging plan and schedule

During the Energy Audit

Energy Audit Objectives

The on-site energy audit will need to be comprehensive and detailed enough to complete the Energy Audit Report and supporting documentation. Preliminary analysis and on-site data collection should be planned with these requirements in mind:

1. List and analyze all potential Energy Efficiency Measures (EEMs) with a *likely* simple payback of less than 50 years, and any pre-identified EEMs that are contractually required by Contracting Agencies (*Refer to the [Audit Report Template and Requirements](#) for details on what to include in Audit Report*).
 - Measure description should include any data/assumptions used to identify the measure, estimate the measure cost, and calculate the estimated energy savings.
 - Analysis of potential costs and savings associated with any EEM must be accurate to **± 20%**.

- References for accepted approaches to calculating the cost-effectiveness of a measure in determining its Simple Payback Period are ASHRAE Guideline 14 or equivalent.
 - Include any qualitative or quantitative effects on the facility operation and maintenance.
2. Provide a quantitative analysis of the interactions among all recommended measures, especially lighting and HVAC and envelope and HVAC EEMs.
 3. Develop detailed energy end-use breakdown based on data-logging major energy-using equipment.
 4. Provide a single-line floor plan that documents the different HVAC zones, location of major HVAC equipment and zones served by each HVAC unit.
 5. Provide a basic HVAC sequences of operations flow-chart.
 6. Identify and list important O&M, Low or No-Cost, or other EEMs, regardless of the audit's scope of work.

Energy Audit Requirements

An energy audit must complete ALL the items listed below. A targeted audit may exclude some of these items, but must receive prior written approval from ODOE.

1. Perform an on-site facility audit with facility manager, or assigned representative(s).
 - The Qualified Energy Auditor must be present for the on-site audit.
 - The audit must include the entire facility and should inspect and document ALL energy-using systems currently in operation.
 - An on-site survey must occur when the heating system is operational. Exceptions may be granted with prior written approval from ODOE.
2. Verify and document the gross square footage (sum of the floor areas of all the spaces within the building) for all buildings included in audit.
 - Note if conditioned square footage varies from gross square footage.
 - Do not include covered walkways, open roofed-over areas, porches, exterior terraces or steps, roof overhangs, or parking areas.
3. Collect all necessary field data to complete a report that identifies any Energy Efficiency Measures (EEM) with a simple payback of less than 50 years.
 - For each EEM, the energy auditing firm shall identify existing conditions, proposed conditions, cost estimates, potential savings, and simple payback. All cost estimates shall include itemized cost of material, labor, engineering, design, project management, and commissioning.
 - Audits may give additional focus on certain equipment/systems, or other measures, as directed by the Contracting Agency, but must still account for the entire building and all equipment/systems. Concentrating the entire audit on a single or very few measures is not permitted. If a targeted audit is desired, the Audit Firm must acquire prior written approval from ODOE.
 - For schools that do not currently meet the specified EUI targets, the auditor must make every reasonable attempt to identify, through the audit, a sufficient number of EEMs and associated energy savings such that the facility's annual EUI would be at or below that the specified targets.
4. Survey and document the facility construction, envelope details, and condition. Detailed requirements are shown in the Audit Report Template and Requirements on the [SB 1149 Schools Program Guidelines](#) web page.

5. Review the facility's energy-using equipment and systems. A detailed list of data collection and survey requirements for energy-using equipment and systems is located in the [Audit Report Template and Requirements](#) document.
6. Document and measure facility's energy-using equipment and system information. Information will be included in the Audit Report Template and Requirements located on the [SB 1149 Schools Program Guidelines](#) web page.
7. Evaluate operating profiles, schedules, and controls. Critical items include:
 - HVAC Sequence of Operation
 - Fan schedules
 - Setpoints and Operating Schedules
 - Lighting inventory (must include all lights and spaces) and measured light levels
 - Building control system (BAS, DDC, etc.)
 - Plug load inventory
 - Equipment surveys
 - Complete data-logging/measurements on all critical systems/equipment
 - Operation and maintenance practices
 - Energy-consumption changes that have occurred or are anticipated
8. Evaluate maintenance staff knowledge of equipment/systems operation and maintenance. If staff is in need of assistance, suggest applicable training, such as theory, installation, calibration, and operation of HVAC controls, refrigeration, boiler and/or steam traps.
 - If Retro-Commissioning is warranted, included a separately listed EEM.
9. Complete a boiler combustion analysis for each boiler used for space (and pool if applicable) heating within the building. If prior analysis has been completed and is deemed appropriate (must explain why), it can be substituted with prior written approval from ODOE.
 - Combustion test results should note: Conditions/firing rate, stack temperature, room temperature, net stack temperature, percent O₂, percent CO₂, Stack draft, CO (ppm), smoke, and percent combustion efficiency (CE).
 - Domestic hot water boilers and a back-up boiler used for emergencies (i.e., when the main boiler(s) fail) are exceptions to this requirement.

Energy Audit Report and Analysis

The Audit Report Template and Requirements are outlined in a **separate document** located on the [SB 1149 Schools Program Guidelines](#) web page. The Audit Report must follow the report format and instructions specified in these documents. Deviations require prior written approval from ODOE.

Submitting the Audit Report

Before submitting the Audit Report, it is **critical** to ensure all information acquired, conclusions reached, recommendations, and evaluations are in accordance with the SB 1149 requirements.

1. Upload the Energy Audit Report, the Scope of Work Approval Form and additional Energy Audit Report documents to the [Schools Interactive Database \(SID\)](#).
2. Enter the report summary of Energy Efficiency Measures into SID. SID fields include, but are not limited to:

- Facility name;
 - Recommended Energy Efficiency Measures with descriptive titles;
 - Energy and cost savings estimated for each Energy Efficiency Measure recommended;
 - Estimated measure costs for each Energy Efficiency Measure recommended;
 - Measure service life; and
 - Auditing firm and Lead Energy Auditor's names.
3. Submit report to the Contracting Agency, according to the delivery or completion schedule established in the contract with the Contracting Agency.
- Regardless of the Contracting Agency's scope of work, all audits must meet the SB 1149 program requirements unless a waiver is granted by ODOE prior to the commencement of work.

Targeted Energy Audits

Definition and Scope

In contrast with whole-building energy audits which cover the entire building and all energy-using systems, a Targeted Energy Audit has a limited scope, typically focusing on a single area of the building, specific system, or measure to be analyzed.

As a starting point, the Targeted Energy Audit must follow the requirements listed in the SB 1149 Program requirements and RFQ documents. With prior approval from ODOE, the targeted audit may limit the scope or depth of the requirements as deemed appropriate (e.g., removing sections of audit report, limited description in certain section of audit report, remove or limiting items included in appendices).

Examples may include limiting the building and energy-using descriptions when completing a lighting-only audit; limiting lighting survey or description when completing a heating system targeted audit. **Unless specifically stated and agreed upon by the Contracting Agency and ODOE in the Scope of Work Approval Form, all other requirements will apply.**

Authorization to Proceed

Authorization for a Targeted Audit requires a [Scope of Work Approval Form](#) to be signed by both the Qualified Energy Auditing firm and Contracting Agency, AND **must have prior written approval from ODOE.**

The Scope of Work Approval Form must clearly and fully detail which items will be the focus of the Targeted Audit AND what requirements will be revised or omitted.