



MAINE SCHOOL ENERGY PROJECTS GETTING STARTED GUIDE

ASSESSMENT



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the Getting Started Guide series
and a full list of resources.

Introduction

Limited resources and deferred maintenance can make it difficult to decide how to prioritize potential energy retrofit projects. Should schools replace the old boiler and classroom unit ventilators, or invest in new LED light bulbs? Should a community solar power purchase agreement (PPA) be entered into right away, or the roof insulation be replaced? To gather the data needed to support decision making, school staff – and students! – can conduct an energy assessment, a great start to creating healthy and efficient learning environments.

An energy assessment identifies where a school uses the most energy and the investments that would generate the best financial return.

Assessments can be done by school facilities staff or can be contracted out if staff do not have the capacity. Energy audits are a more in-depth type of assessment that can begin to estimate financial returns for proposed projects. The *Third Party Energy Assessments* section of this guide provides more information on outsourcing options for these assessments.

If work is conducted in-house, the assessment will require examining the school's utility bills, taking inventory of current building equipment and operations, and identifying where energy is being used the most. This guide will help schools get started with the assessment process.

Step 1: Energy Assessment

Gather Energy Bills

Schools should collect at least 12 months of utility and delivered fuel bills and document how they use electricity, oil, natural gas, propane, kerosene, or wood chips or pellets. The superintendent or operations manager may have access to utility bills, or utility companies may provide a summary for the school portfolio.

Collect Building Information

At a minimum, the gross building square footage of the school should be noted. If a more advanced benchmarking program like [ENERGY STAR® Portfolio Manager](#) is used, additional building facts like typical operating hours, other building uses like pools and cafeterias, when the building was built, and other indicators that may inform how the building uses energy will need to be collected.

Educators and students have a right to request building data, using the Freedom of Information Act if necessary.

Compile Data in One Place

While a spreadsheet program like Microsoft Excel would work, [ENERGY STAR Portfolio Manager](#) provides an easy way to enter a school district's data and helps inform the next step. A [quick start guide](#) helps users through the process, and the program adds up bills to calculate where the most energy is spent and show trends over time.

Calculate Energy Use Intensity (EUI)

EUI is a way to measure energy equally across different fuel types. It is expressed on a British Thermal Unit (BTU) per square foot basis, so school buildings of different sizes can be compared to each other. [ENERGY STAR explains EUI](#) in more detail. To calculate EUI, schools can:

- ▶ Use [ENERGY STAR Portfolio Manager](#).
- ▶ Hire a consultant.
- ▶ Use a [calculator provided by the state of Oregon](#).
- ▶ Build a calculator using [ENERGY STAR energy conversion factors](#).

WORKING WITHOUT AN ASSESSMENT

Even without an energy assessment, schools can identify projects that are likely to save the district money. Upgrades that are eligible for [Efficiency Maine incentives](#) are designed to be “cost-effective,” meaning they are likely to save more money than they cost over the lifetime of the equipment. Examples of projects that are usually cost-effective include:

- ▶ Replacing oil boilers with heat pumps
- ▶ LED lighting
- ▶ Refrigeration solutions



REQUIRED BENCHMARKING

Portland has a [benchmarking ordinance](#) for single tenant buildings over 20,000 square feet.

Benchmark Buildings

Once schools have calculated their building’s EUI, they can compare it to target EUIs for schools. The table below offers some examples of target values for high-performing existing schools in climate zones similar to Maine. Schools can also set improvement targets. For example, “lower energy use by 20% across all schools in five years.”

Target EUI for High-Performing Existing Buildings

		Maine	Aroostook County**
Elementary or Middle School	Better*	52 EUI	60 EUI
	Best*	43 EUI	49 EUI
High School	Better	82 EUI	95 EUI
	Best	68 EUI	78 EUI

*“Better” target represents 40th percentile and “best” target represents 25th percentile of existing buildings by category as compiled in ANSI/ASHRAE/IES Standard 100-2024, Energy and Emissions Building Performance Standard for Existing Buildings.

**Aroostook County has separate targets due to climate zone.

Focus Efforts to Save Energy

Once schools know how their building is performing compared to typical schools, they can focus on assessing where in the building the most impact can be had. School buildings can also be benchmarked across a district to identify which schools need the most attention.

Step 2: Building Assessments

With utility bill data in hand, schools can now begin to identify where they may be wasting energy. Seasonal patterns of energy use can provide clues on where to look, but a building walk-through should also be completed. Facilities staff should be able to help identify areas where energy efficiency could be improved, but there are also online tools that can help. The ENERGY STAR® [Treasure Hunt](#) and [Checklist](#) can help identify where energy performance can be improved.

ENERGY STAR® Treasure Hunt

BUILDING ENCLOSURE

- ▶ Identify door or window gaps or cracks that can be weather stripped or caulked.
- ▶ Check the roof or attic insulation for damage or inadequacies.

HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

- ▶ Ensure equipment is regularly maintained, filters changed, etc.
- ▶ Check age of equipment and have a plan for when equipment fails.
- ▶ Ensure boiler vents and flues are clear and inspect water pipes.
- ▶ Identify spaces with personal space heaters and explore why rooms are cold.
- ▶ Review heating controls and schedule to setback temperature at night.

LIGHTING

- ▶ Turn outdoor lighting off during the day.
- ▶ Add motion controls in low-traffic areas.
- ▶ Install dimming controls in rooms with natural light.
- ▶ Upgrade from fluorescent to LED, which last longer and pay back in less than a year.

FOOD SERVICE

- ▶ Establish procedures for equipment to minimize energy, such as preheating only when necessary and turning off equipment when not in use.
- ▶ Unplug unused appliances.
- ▶ Inspect refrigerator and freezer doors for leaks.
- ▶ Ensure new equipment is ENERGY STAR rated.

Schools should also create an inventory of building equipment. If equipment is near the end of its useful life, it is time to start considering energy-efficient or non-fossil fuel alternatives. Otherwise, when a propane boiler fails, schools may just replace it with a new one instead of fully understanding how much could be saved with a heat pump system.

Third Party Energy Assessments

Some schools may not have the capacity to conduct an in-house energy assessment or may want a higher level of detail and accuracy than an in-house team can provide. Third-party companies can provide energy assessment services with varying levels of detail depending on the information needed. [Efficiency Maine's Qualified Partner database](#) lists firms that can provide these services.

GREENHOUSE GAS EMISSIONS AUDIT

Energy audits don't necessarily examine greenhouse gas emissions reductions. The [U.S. Department of Energy Better Buildings initiative](#) offers guides for turning an energy audit into an emissions reduction audit.

Energy Audits

An energy auditor can help schools understand where they are using excess energy and how to intervene. Schools should obtain at least a Level 1 audit from the American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE), which identifies current energy use and some low-cost ways to improve. An ASHRAE Level 2 audit will estimate return-on-investment for larger proposed energy efficiency improvements.

Energy Service Company (ESCO)

Another option is to hire an ESCO by entering into an energy performance contract, or EPC. In short, ESCOs will pay some or all of the initial cost of upgrades but require long-term repayment to recoup their investment. For the school district, this is offset by reductions in energy bills.

Schools should always have a third-party expert review performance contracts before signing, ensuring the district is not liable for future changes in conditions beyond their control.

BENEFITS	CHALLENGES
<ul style="list-style-type: none">▶ Guaranteed Savings ESCOs assume the performance risk by guaranteeing energy savings.▶ No Upfront Costs Projects are typically funded through the savings generated by the project, making upgrades financially accessible.▶ Comprehensive Solutions ESCOs provide end-to-end services, including audits, project management, and ongoing maintenance.	<ul style="list-style-type: none">▶ Complex Contracts Energy performance contracts can be intricate and require expertise to evaluate.▶ Long Payback Periods Depending on the project, the repayment period may be lengthy, tying up future budgets.▶ Potential Disputes Misalignment on savings calculations or maintenance responsibilities can lead to conflicts.

ESCOs are best for school districts that need upfront capital for upgrades and have a strong team with the technical expertise to support a thorough planning and accountability process. ESCOs are focused on financial performance, so they prioritize upgrades with a predictable financial payback, and may not consider upgrades that advance other goals like improved indoor environmental quality or greenhouse gas emissions reduction. The resources at the end of this guide provide more information on engaging with ESCOs.

Contractors

For schools with a specific energy efficiency project in mind, such as replacing a propane boiler with a new heat pump, contractors may offer a free assessment to estimate the cost of the project and inform the decision-making process.

Finding a Qualified Partner

[Efficiency Maine's Qualified Partner database](#) lists energy auditors, ESCOs, and contractors.

Step 3: Creating a Plan

Once energy performance has been benchmarked and potential upgrades have been identified, schools can proceed with creating an energy efficiency plan using the following tips.

Goals for Success

What does success look like? Goals could include lower energy bills, improved student health and safety, reduced greenhouse gas emissions, or other priorities. Schools should pick performance metrics that allow them to track progress toward goals.

Low-Hanging Fruit

Plans should start with the easy ways to improve energy efficiency. These could include operational changes like updating schedules for lighting and HVAC or sealing air leaks. Schools may wish to pursue upgrades that will pay back quickly, such as replacing fluorescent lamps with LED lamps or adding heat pumps to a building heated by oil or propane.

Health & Safety

Schools should identify upgrades that improve health and safety for students. This could include adding or remediating ventilation systems, removing combustion heating, or other upgrades to create a healthier and more comfortable learning environment.

Infrastructure Readiness

Some projects may require upfront prep work, such as replacing or upgrading electric equipment or upgrading a roof before installing a solar array.

Long-Term Planning

In order to plan for end-of-life upgrades, the expected future timing of equipment replacements should be documented.

Maintenance Planning

A plan should be developed for the maintenance of new equipment and systems, such as solar panels. Manufacturers or power purchase agreement (PPA) companies may offer extended warranties or maintenance and service contract plans, or schools may need to contract out maintenance with a separate company.

Monitoring and Verification (M&V)

Schools should consider ways to assess how buildings are performing after completing upgrades. This could include tracking benchmarked energy performance, changes in comfort complaints, or a pre-/post-survey of students, educators, and staff.

GETTING STUDENTS INVOLVED

[ENERGY STAR®](#) offers a lesson plan for students that involves benchmarking with Portfolio Manager, conducting an assessment treasure hunt, and developing plans to achieve energy saving goals. [Resource Central's Renew Our Schools program](#) offers competitions with small prizes for groups that complete a school energy audit and develop an energy monitoring plan.

Energy Assessment Funding Resources

- ▶ [Efficiency Maine](#) offers funding opportunities for schools.
- ▶ [Efficiency Maine's Commercial & Industrial \(C&I\) Custom Program](#) offers incentives for Technical Assistance Studies.
- ▶ [Efficiency Maine's Qualified Partners database](#) lists energy auditors, ESCOs, and contractors.

Student Learning Resources

- ▶ [ENERGY STAR®](#) offers a K-12 Energy Efficiency Student Toolkit.
- ▶ [ENERGY STAR](#) offers resources for conducting Energy Treasure Hunts in industrial buildings.
- ▶ [ENERGY STAR](#) offers an Energy Treasure Map for K-12 schools.
- ▶ The [U.S. Green Building Council \(USGBC\) Learning Lab](#) provides K-12 sustainability curriculum.
- ▶ [Resource Central's Renew Our Schools program](#) offers fun competitions for students.

ESCO Resources

- ▶ The [U.S. Environmental Protection Agency \(EPA\)](#) provides information on ESCOs.
- ▶ The [U.S. Department of Energy](#) provides information on ESCOs.
- ▶ The [U.S. Department of Energy Better Buildings initiative](#) offers an Energy Savings Performance Contracting (ESPC) Toolkit.

Energy-Efficient School Resources

- ▶ [ENERGY STAR's Portfolio Manager](#) offers interactive energy benchmarking.
- ▶ The [American Society of Heating Refrigerating and Air-Conditioning Engineers \(ASHRAE\)](#) provides a resource for benchmarking existing buildings, setting goals, and appendices to help identify where buildings use more energy.
- ▶ The [City of Portland](#) offers information on their benchmarking ordinance.
- ▶ The [National Renewable Energy Laboratory \(NREL\) Guide to Zero Energy and Zero Energy Ready K-12 Schools](#) provides guidance on engagement for retrofit projects.
- ▶ The [New Buildings Institute \(NBI\) Decarbonization Roadmap Guide for School Decision Makers](#) and [Key Messages for Communicating Carbon Neutral Schools](#) offer advice on engagement and communication about school energy projects.
- ▶ [NBI Getting to Zero](#) provides a database of case studies for school energy projects across the country.
- ▶ The [U.S. Department of Energy Better Buildings initiative](#) offers resources for emissions reduction audits and assessments.

Contact

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