

ENERGY EFFICIENCY AND CONSERVATION
BLOCK GRANT (EECBG) PROGRAM

Key Activities Summary

Blueprint 2A: Energy Efficiency – Energy Audits, Building Upgrades

This Key Activities Summary provides a concise overview of the **Energy Efficiency - Energy Audits, Building Upgrades Blueprint**. DOE plans to provide technical assistance support to all entities who select this Blueprint, which may include one-on-one attention from DOE or national lab experts, webinars, and peer learning opportunities.




INTRODUCTION

What

Energy assessments and audits are key activities to identify potential energy saving opportunities in buildings and provide the technical and financial information (e.g., upfront costs, ongoing costs, projected energy savings, return on investment, etc.) that decision makers need to evaluate and approve energy efficiency, electrification, and grid interactivity retrofits. Retrofitting existing buildings presents an opportunity to improve the energy performance and operational costs of building assets including heating, cooling and ventilation (HVAC) systems and equipment, lighting and control systems, and the building envelope, while improving occupant control (such as with grid-interactive technologies). Retrofits also offer a chance to invest in energy burdened and underinvested areas.

Justice and Equity

The Justice40 Initiative is a U.S. government effort to deliver at least 40 percent of the overall benefits from certain federal investments to disadvantaged communities. Building assessments and upgrades can help reduced exposure to pollutions prevalent in low-income communities (LIC) and communities of color (COC), which experience pollution at a higher rate than wealthier and whiter communities. Increasing energy efficiency programs and projects, reducing greenhouse gas (GHG) emissions, and decreasing harmful environmental exposer among disadvantaged communities are key pillars of Justice40. State and Local governments can play a vital role in upgrading buildings that serve these communities, demonstrating leadership in safety, energy efficiency, and environmental justice.



	Government Office	Police Station	Library	K-12 School	Courthouse
Median Size (ft ² per building)	6,000	6,000	11,600	14,400	32,000
Median Age (years)	33	23	34	28	47
Median Operating Hours (hours per week)	45	168	53	45	45
Source Energy Use Intensity (kBtu/ft ²) - National Median Reference Value	116.4	124.9	143.6	104.4	211.4
Estimated Energy Cost (\$/year) ^a	6,684	7,172	15,941	14,387	64,739

Small- and medium-sized state and local government buildings are ripe for energy upgrades that can help save an estimated 20-30% in energy costs which can be leveraged to save taxpayer dollars, supplement limited budgets, and pay for other public priorities. Source: DOE, [Achieving Energy Savings in Small- and Medium-Sized Public Facilities: A Strategic Approach to Prioritizing and Financing \(2021\)](#).

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Why

Investing in energy-efficiency retrofits offers significant opportunities and benefits, including energy, water, and cost savings, a shorter deferred-maintenance backlog, improved occupant comfort, and progress toward overarching energy- and greenhouse gas (GHG)-reduction goals. A carefully designed, targeted energy retrofit can pay for itself through energy savings and, depending on how the project is financed, can incur no debt and result in minimal disruption to an organization's operating and capital budgets. Proactive building analysis afford decision makers with time to design more comprehensive projects that maximize energy and cost savings. These evaluations can also identify aging or faulty equipment (reducing the occurrence of urgent upgrades motivated by equipment failures) and electrification opportunities (improving indoor air quality and reducing onsite-generated GHG emissions). In many buildings, energy costs can be reduced by 20 percent or more through the identification and implementation of energy conservation measures (ECMs). These savings can be leveraged to save taxpayer dollars, supplement limited operating budgets, and pay for other public priorities.

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Key Activities

These selected Key Activities are suggestions of important steps a government could take to begin or make progress on their energy audit and building upgrade journey. EECSBG Program awardees that utilize a Blueprint will receive expedited application review from DOE. Applicants must execute at least one of the key activities listed under each selected Blueprint but should avoid going beyond the recommended activities. Going beyond these key activities may trigger additional reviews of your EECSBG Program project to ensure you're meeting NEPA, historic preservation, and/or other federal regulations. While each step is important, they should be seen as a guide. Awardees should determine their own priority activities based on their local context.

- 1 **Building Energy Assessments**
- 2 **Energy Audits**
- 3 **Building Upgrades including Energy Efficiency, Grid-Interactivity, and Electrification Upgrades**



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Building Energy Assessments

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Understanding how much energy your buildings are using and how that compares to similar types of buildings is an important first step to understanding where energy efficiency improvements could be made and how much opportunity for savings they could offer.

» **Gather Data and Establish a Baseline** - Improving the energy performance of a building begins with understanding how that building is performing today. This starts with a simple, yet thorough assessment to measure performance and identify potential improvements. Establishing an energy performance baseline will help you understand how your buildings are performing. This activity includes gathering historic energy usage and costs (e.g., reviewing past energy bills); tabulating building information such as size and age; and capturing other relevant context including weather, building-use patterns (e.g., hours of operation), and known age of energy consuming building equipment (e.g., HVAC systems).

» **Benchmark Your Building** - Once building and equipment characteristics and energy consumption data have been collected and a baseline established, the building's energy performance can be compared, or benchmarked, to similar buildings or established norms (e.g., a reference building built to a standard energy code), with the goal of providing analysis that can inform performance improvement. Buildings that are underperforming compared to similar buildings are good candidates for an energy audit and upgrades.

Key Resource

[ENERGY STAR® Portfolio Manager®](#) and [DOE's Building Energy Asset Score](#) are online platforms to collect and organize these datapoints.

Key Resource

[ENERGY STAR® Portfolio Manager®](#) converts inputted data into actionable metrics, such as energy use intensity (EUI). For a single building, ENERGY STAR provides U.S. national median reference values for EUI across common building types. Within a portfolio of buildings, a high building EUI signals an opportunity for energy savings relative to other buildings. Decision makers can reference these values to identify buildings that are good candidates for building audits and upgrades.

Key Resource

DOE's [Building Energy Asset Score](#) assesses the energy efficiency of the physical structure and major equipment of a building using information inputted by the user and identifies opportunities to invest in energy efficiency upgrades.

Key Resource

PNNL's [Facility Energy Decision System](#) (FEDS) can also help identify good energy audit candidates from a building portfolio. FEDS is an easy-to-use tool to evaluate building energy use and identify cost-effective savings opportunities.

Energy Audits

Onsite energy audits provide a deeper analysis of a building's energy performance and energy savings opportunities and typically involve an onsite, whole-building evaluation of current energy usage relative to prospective energy usage that could be achieved through improved operations and maintenance procedures and upgrades to building systems, such as lighting, HVAC, and the building envelope.

Energy audits range in rigor and complexity, ranging from low-cost or limited-detail analyses to high-cost, highly detailed analyses known as investment grade audits (IGAs). The most common and standardized audit approach is offered by the [American Society of Heating, Refrigeration and Air-Conditioning Engineers \(ASHRAE\)](#), which has developed three levels of audits that increase in detail, depth of analysis, and cost.

» **Hire an Energy Auditor** - As a starting point, many utilities offer no- or low-cost energy assessments. Energy audit services are also offered by energy services companies (ESCOs), energy consultants, and engineering firms. Firms may also provide insights on systems most beneficial to electrify, as well as make recommendations on appropriate grid-interactive technologies to install. The process for competitive selection of an energy auditor includes identifying potential individuals or firms, defining the scope-of-work and requesting bids, reviewing qualifications, considering Justice40 and inclusion goals, and contracting with the chosen person or firm. Portions of these procedures may also be adopted for a sole-source approach.

Most energy audits, regardless of cost or sophistication, result in recommended low- or no-cost energy-conservation measures that can quickly pay back the cost of the audit and are therefore a worthwhile investment. Any audit report should also provide enough information to make informed decisions about energy efficiency investments and next steps.

Key Resource

DOE's [Guide to Energy Audits](#) explains the types and levels of energy audits available, the process, and provides information and sample procurement documents to support the selection of an energy auditor.

Key Resource

[Achieving Energy Savings in Small- and Medium-Sized Public Facilities: A Strategic Approach to Prioritizing and Financing \(DOE\)](#) outlines project financing best practices and the advantages and disadvantages of financing options.

Key Resource

Insert your region or zip code at these ENERGY STAR® webpages to find available utility incentives:

- » [Energy Efficiency Rebates for Commercial Buildings \(ENERGY STAR\)](#)
- » [Special Offers and Rebates from ENERGY STAR Partners \(ENERGY STAR\)](#)

Key Resource

[Database of State Incentives for Renewables & Efficiency® \(DSIRE\)](#)

» **Determine Funding Sources(s)** - To help your project go even further, there are also a variety of other funding sources available to provide even greater impact. For example, capital improvement and operation and maintenance budgets are key funding sources for energy assessments. Your local electric and gas utilities and some governments may also offer technical and/or financial assistance for completing an energy audit. For many government facilities, Energy Savings Performance Contracting (ESPC) ([see Blueprint 2B](#)) is a preferred option for funding an audit and the identified energy upgrades.

Many funding and financing options are available to complete building energy upgrades.

Key Resource

Use [Financing Navigator \(DOE\)](#) to explore and compare financing options.

Key Resource

[Energy Savings Performance Contracting: Improving Infrastructure & Turning Waste into Wins \(DOE\)](#) to see the many ways performance contracts can benefit public sector stakeholders.



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Building Upgrades including Energy Efficiency, Grid-Interactivity, and Electrification Upgrades

Based on the energy audit results, implement energy improvements. Plan to hold a final meeting with the energy auditor and key building staff to review the analysis, results, and recommended energy efficiency, electrification, and/or grid-interactive measures. Identify which measures can be implemented immediately, the ideal sequence of upgrades, and which upgrades may need further study or should be incorporated into longer-term plans.

With the information provided by the audit, consider the present and future uses for the building. Determining whether a building is a candidate for rehab, onsite renewables, resilience projects, electrification and grid-interactivity or if the property is in an energy burdened or disadvantaged community can affect the direction of the upgrade pursued. Comprehensive upgrades can achieve 2.5 to 7 times more savings than typical single-measure retrofits and enable more advanced improvements.¹

¹American Council for an Energy-Efficient Economy (ACEEE), Moving the Needle on Comprehensive Commercial Retrofits, May 2022.
<https://www.aceee.org/sites/default/files/pdfs/b2203.pdf>