Energy Management Web Training Companion Guide

BEFORE you watch the web training, answer the following questions:

1. What do you think are the components of an Energy Management Plan?

2. What do you currently have in place in your school or district?

AFTER you watch the web training, answer the following questions:

1. What additional aspects of energy management did you learn during the training?

2. What will you do to begin to improve energy management at your school or district?

3. What further information do you need to get started and where can you find it?

Green Schools: A green school creates a healthy environment that is conducive to learning while saving energy, resources and money.

Energy Management: An energy management plan includes a process to benchmark the energy efficiency of buildings, outlines clear and measurable energy performance goals, and identifies and implements strategies to meet those goals. The plan should also include a process to measure and verify that the systems are working as designed to ensure energy and cost savings are realized and to evaluate the plan to continually seek ways to improve it.

The goals of an energy management plan:

- Benchmark energy usage
- Implement systems and strategies to increase energy efficiency
- Generate energy and cost savings
- Regularly assess energy performance
- Continuously seek opportunities to improve

Recommended Assessments

Gathering the answers to the preliminary assessment questions below can help you determine how far along your school or district is in implementing an energy management plan. This is not an exhaustive list, but it does provide a good starting point.

Energy Management: Preliminary Assessments

- Does the school have an energy management plan?
- Does the school get a separate energy bill or is it tracked at the district level?
- Are buildings metered? Sub-metered?
- What is the number and size of windows in the facility?
- Are windows single pane? Double? Triple?
- What kind of light bulbs are in the facility? What is the re-lamping policy?
- Are there any lighting controls other than room-by-room switching?
- Is there a preventive maintenance plan for building equipment?

Energy Management: Audits

To fully assess energy use, comprehensive audits are needed. ASHRAE is the American Society for Heating, Refrigeration and Air Conditioning Engineers (http://www.ashrae.org). They have a series of audits referred to as ASHRAE level one, level two, and level three. A level one audit includes a preliminary energy-use analysis and involves looking at the facility's historical energy use, benchmarking the building, and performing a utility rate analysis to identify any cost-saving opportunities. The benchmarking can be completed using EPA's ENERGY STAR Portfolio Manager. For more information on ENERGY STAR, view the Tools for Green Schools web training module.

The level two audit includes more detailed energy calculations and financial analysis of the proposed energy saving measures suggested by the level one audit. This financial analysis most often includes Life Cycle Analysis (LCA), which allows the facility owner to understand the true costs and financial benefits of implementing upgrades or improvements because it analyzes the total cost of owning equipment, including maintenance, energy use, and equipment lifetime. A level three analysis builds upon level one and two audits and is based on the school's selection of specific measures to examine further. This may include refinement of an energy model, more extensive data collection, or more intensive study of potential equipment replacement.

Financing Options

Equipment Finance Agreements (EFA)

An equipment finance agreement, also known as a conditional sales agreement, is an agreement for the purchase of an asset in which the borrower is treated as the owner of the asset for federal income tax purposes, thereby entitled to the tax benefits of ownership, such as depreciation, but does not become the legal owner of the asset until the terms and conditions of the agreement have been satisfied.

Equipment Leases

Under an equipment lease, the lender owns the equipment and leases it to the organization for a defined period of time for a set cost. At the end of the lease term, the organization may purchase the equipment at its fair market value or for a predetermined price. It can also continue the lease, lease new equipment, or return the equipment.

Power Purchase Agreements (PPA)

A power purchase agreement is a contract between an electricity generator and a building owner to provide electricity at guaranteed rates. This is used for renewable energy projects like solar and wind. The electricity generator is usually a utility company and is referred to as the PPA provider.

The owner purchases energy from the PPA provider for a guaranteed rate. The PPA provider in turn secures funding for the renewable energy project, maintains and monitors the energy production, and sells the electricity to the owner at a contracted price for the term of the contract. The term usually runs ten to 25 years. In some contracts, the owner has the option to gain ownership of the generating equipment from the PPA provider at the end of the term. Other options may include renewing the contract with different terms or having the equipment removed. Insurance on the system may be provided by the PPA provider.

A PPA allows the building owner to utilize renewable energy without making a large up-front capital expenditure. The owner is able to lock-in an energy rate over the term of the contract, resulting in significant cost savings. In addition, a PPA gives a tax-exempt entity, such as a school, non-profit, or government agency, the opportunity to take advantage of federal tax incentives for renewable energy. By assigning system ownership as well as all rebates and tax credits to the PPA provider, the owner is able to reduce the system's installation costs significantly, resulting in a lower rate for the owner.

Property Assessed Clean Energy (PACE) Bonds
A PACE bond is a municipal bond where the proceeds are lent to commercial or residential property owners to finance energy efficiency measures and small renewable energy systems. The owners then repay their loans over a 20 year term via an annual assessment on their property tax bill.

Tax-Exempt Lease-Purchase Agreements
A tax-exempt lease-purchase agreement is an effective alternative to traditional debt financing because it allows organizations to pay for energy-saving upgrades by using money set aside in the annual utility budget. When properly structured, tax-exempt lease purchase agreements make it possible for public sector or qualifying organizations to draw on the anticipated savings from future utility bills to pay for new, energy-efficient equipment and related services up front.

In most states, a tax-exempt lease-purchase agreement does not constitute a long-term "debt" obligation because of non-appropriation and/or abatement language written into the agreement, which may mean that public approval is not required. Non-appropriation language effectively limits the payment obligation to the organization's current operating budget period, typically 12 months. The organization will, however, have to assure lenders that the energy-efficiency upgrades being financed are considered of *essential use,* which minimizes the non-appropriation risk to the lender. If, for some reason, future funds are not appropriated, the equipment is returned to the lender, and the repayment obligation is terminated at the end of the current operating period without placing any obligation on future budgets. Abatement language limits the payment obligation to the ability to use the equipment and may be required in some states.

Qualifying organizations should consider using a tax-exempt lease-purchase agreement to pay for energy-efficiency equipment and related services when the projected energy savings will be greater than the cost of the equipment (financing costs included). While the financing terms for tax-exempt lease-purchase agreements may extend as long as 20 to 25 years, they are usually less than 15 years and are limited to the useful life of the equipment.

Supplemental Funding

Supplemental funding is a category of financing that does not incur a formal recurring obligation or debt repayment. Examples are utility rebates, renewable energy grants, and revolving funds.

Utility Rebates and Renewable Energy Grants
Utility rebates or renewable energy grants are used to reduce capital costs, which in turn reduce the amount of financing needed, making the project more attractive to lenders.

Revolving Funds
Many institutions, including state governments and universities, have established revolving funds to finance building improvements that generate utility cost savings. The savings, in turn, are used to replenish the fund.

Training

Training and education programs help to build organizational capacity. Better informed staff is more likely to contribute ideas, operate equipment properly, and follow procedures, helping to guarantee the improvements will yield the desired energy and cost savings.

- **Operational and Procedural Training:** Provides instruction on new operating methods or procedures targeted towards specific audiences, such as facility managers, operations, and maintenance staff.

- **Administrative Training:** Includes reporting, monitoring, data collection, and other administrative efforts that support energy management.

- **Specialized Training:** Instructions on using and maintaining equipment or tools to ensure more efficient operation.

Commissioning

Commissioning is a quality-assurance process for achieving, verifying, and documenting that a facility's systems perform as designed. Commissioning accomplishes higher energy efficiency, environmental health, and occupant safety and improves indoor air quality by ensuring the building components are working correctly and that the owner's goals are met throughout design and construction.

LEED Certification: A Way to Define Green for New and Existing Schools

In 2000, the U.S. Green Building Council (USGBC) established the LEED® rating system as a way to define and measure "green buildings." In school terms, LEED is like a report card for buildings, demonstrating to the community that a facility is built and/or operated in a way that supports the health and well-being of occupants and saves energy, resources and money. LEED is an internationally recognized certification system that measures how well a building performs using several metrics:

- sustainable land use
- energy savings
- water efficiency
- CO_2 emissions reduction
- improved indoor environmental quality
- stewardship of resources

LEED provides a concise framework for identifying and implementing practical and measurable green building solutions. Based on established sustainable building practices and emerging concepts, the LEED rating systems are performance-based and comprehensive in scope. Points are awarded on a 100-point scale, and credits are weighted to reflect their potential environmental impacts. Different levels of certification are granted based on the total number of earned points. The four progressive levels of certification are: Certified, Silver, Gold and Platinum.

Once the credits are implemented and the energy-efficiency and performance requirements met, the final step for certification is submitting the project certification documentation using the Web-based LEED Online system. The Green Building Certification Institute (GBCI) reviews the application and provides feedback. If all requirements are met, GBCI awards LEED certification to the building.

LEED Rating Systems:

LEED® for New Construction & Major Renovations™
LEED® for Existing Buildings: Operations & Maintenance™
LEED® for Commercial Interiors™
LEED® for Core & Shell™
LEED® for Schools™
LEED® for Neighborhood Development™
LEED® for Homes™
LEED® for Retail™
LEED® for Healthcare™

Green Building Certification Institute (GBCI)

Established in 2008, GBCI is the institution that grants both project certification and professional credentials that recognize excellence in green building performance and practice. GBCI administers project certification for commercial and institutional buildings and tenant spaces under USGBC's LEED rating systems. GBCI also manages the professional credentialing programs based upon the LEED rating systems, including the LEED Green Associate and LEED AP credentials.

How Much Does LEED Cost?

The cost to certify a school facility is based on the project's square footage. The process provides a comprehensive third-party review of the energy and environmental performance of the school and ensures that the stated goals of the project are met.

The cost to register and certify at 100,000-square-foot school for USGBC members is less than $4,000 using LEED for Existing Buildings: Operations & Maintenance, and less than $5,500 using LEED for Schools.

Prices are determined by GBCI and are subject to change. For complete pricing information, visit www.gbci.org.

LEED for Existing Buildings: Operations & Maintenance Rating System
Credits Related to Energy Management

The LEED for Existing Buildings: Operations & Maintenance rating system credits that apply to energy management fall under the Energy & Atmosphere (EA) credit category.

EA Prerequisite 1 – Energy Efficiency Best Management Practices – Planning, Documentation and Opportunity Assessment
Promote continuity of information to ensure that energy-efficient operating strategies are maintained and provide a foundation for training and system analysis. Document the current sequence of operations for the building. Develop a building operating plan that provides details on how the building is to be operated and maintained.

EA Prerequisite 2 – Minimum Energy Performance
Establish the minimum level of operating energy efficiency performance relative to typical buildings of similar type to reduce environmental impacts associated with excessive energy use.

EA Credit 1 – Optimize Energy Performance
Achieve increasing levels of operating energy performance relative to typical buildings of similar type to reduce environmental and economic impacts associated with excessive energy use.

EA Credit 2.1 – Existing Building Commissioning – Investigation and Analysis
Develop an understanding of the operation of the building's major energy-using systems, options for optimizing energy performance and a plan to achieve energy savings.

EA Credit 2.2 – Existing Building Commissioning – Implementation
Implement minor improvements and identify planned capital projects to ensure that the building's major energy using systems are repaired, operated and maintained effectively to optimize energy performance.

EA Credit 2.3 – Existing Building Commissioning – Ongoing Commissioning
Use commissioning to address changes in facility occupancy, use, maintenance and repair. Make periodic adjustments and reviews of building operating systems and procedures essential for optimal energy efficiency and service provision.

EA Credit 3.1 – Performance Measurement – Building Automation System
Provide information to support the ongoing accountability and optimization of building energy performance and identify opportunities for additional energy-saving investments.

EA Credit 3.2 – Performance Measurement – System-Level Metering
Provide accurate energy-use information to support energy management and identify opportunities for additional energy-saving improvements.

U.S. Green Building Council
Publications and Resources

Green Existing Schools Implementation Workbook (PDF)
The *Green Existing Schools Implementation Workbook* includes sample policies, programs, and plans; data collection forms and tables; and sample surveys.

Green Existing Schools Project Management Guide (PDF)
The *Green Existing Schools Project Management Guide* includes general guidance on navigating the LEED for Existing Buildings: O&M certification process, including how to conduct personnel and organizational assessments, educate and train staff, initiate the certification process, and manage a school or district-wide sustainability program.

LEED 2009 for Existing Buildings: Operations & Maintenance Project Checklist (XLS)
The LEED Project Checklist is a scorecard to track the credits being pursuing toward certification.

LEED 2009 for Existing Buildings: Operations & Maintenance Rating System (PDF)
The LEED 2009 for Existing Buildings: Operations & Maintenance rating system summarizes the intent, requirements, and technologies/strategies for each credit.

Sustainable Purchasing Tracker – Materials and Resources
Sustainable Purchasing Tracker – Indoor Environmental Quality
Solid Waste Management Tracker
Occupant Commuting Survey - Summary Table

These publications and resources can be found at the Centers for Green School's Green Existing Schools Toolkit at www.centerforgreenschools.org/k12toolkit.

Questions?
The Center for Green Schools at USGBC has assembled a panel of experts, facilities staff, and school district sustainability officers, to answer your questions. Please email schools@usgbc.org with the subject line "Green Existing Schools," and we will promptly connect you with a peer who can help you find the answers.

Energy Management
References and Resources

Advanced Buildings Technologies and Practices
http://www.advancedbuildings.org

Building Commissioning Association
http://www.bcxa.org

The Center for Green Schools at USGBC
http://www.centerforgreenschools.org/

Green Building Certification Institute (GBCI)
http://www.gbci.org

Green Existing Schools Toolkit
www.centerforgreenschools.org/k12toolkit

State Energy Program and Energy Efficiency Conservation Block Grant Technical Assistance
http://www1.eere.energy.gov/wip/assistance.html

U.S. Department of Energy, Energy Efficiency and Renewable Energy
http://www.eere.energy.gov

U.S. EPA ENERGY STAR
http://www.energystar.gov

U.S. EPA ENERGY STAR for Buildings
http://www.energystar.gov/buildings

U.S. EPA ENERGY STAR Energy Star for K-12 School Districts
http://www.energystar.gov/index.cfm?c=k12_schools.bus_schoolsk12

U.S. EPA ENERGY STAR Portfolio Manager
http://www.energy.gov/benchmark

U.S. EPA ENERGY STAR Target Finder
http://www.energy.gov/targetfinder

U.S. Green Building Council (USGBC)
http://www.usgbc.org

Alliance to Save Energy
http://ase.org

The Alliance to Save Energy is a nonprofit organization that promotes energy efficiency worldwide through research, education and advocacy. It encourages business, government, environmental and consumer leaders to use energy efficiency as a means to achieve a healthier economy, a cleaner environment and greater energy security. A strength of the alliance is the ability to create partnerships and to bring various constituencies and parties together to move the world toward a more energy-efficient, sustainable future.

EnergySmart Schools
http://www1.eere.energy.gov/buildings/energysmartschools

States and local agencies are planning to invest more than $60 billion in the next three years to build or renovate schools. Through the EnergySmart Schools public-private partnership, the Department of Energy (DOE) seeks to catalyze significant improvements in energy efficiency in the nation's K-12 schools. The DOE's program goals are to upgrade new schools to 50% better than current energy codes and improve existing schools by 30% in the next three years.