



Addressing Building-Wide Energy Use

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Approximately 30 percent of the energy office buildings consume is wasted, according to a study conducted by the U.S. Environmental Protection Agency (EPA). This finding demonstrates the potential energy-cost savings existing facilities can earn through improving the efficiency and operation of their building systems.

For building managers, it is important that the HVAC system operates at top efficiency to keep energy costs at a minimum. Building managers are also concerned with extending the life of HVAC equipment in order to reduce the frequency of repairs and replacements. As the HVAC system is closely tied to indoor air quality, building managers want a system that provides desired air conditions in an attempt to minimize occupant complaints.

To address these important concerns, the organization must set clear goals for building management. Facility goals can vary and include different measures from reducing energy costs savings to achieving or maintaining a building recognition like ENERGY Star or LEED. Regardless of what the goal is, building managers need to understand the goals before structuring a plan with specific strategies targeted to achieving the goals.

Reducing overall building energy use is a goal that can be achieved with the implementation of several strategies. Actions that building-managers can take towards reducing building-wide energy use are:

- > Conducting energy audits
- > Commissioning or retrocommissioning the facility
- > Implementing a preventative maintenance program

Most of the strategies involved with reducing building energy consumption require little to no-cost measures; however, other energy-efficient projects might require capital investment. Certain building energy use statics generated by the EPA, might justify building management's capital improvement projects. According to the EPA, the energy in typical office building can be broken down as follows:

- > 17% of energy is generated by lighting systems
- > 53% of energy is accounted by space conditioning and ventilation
- > 20% of energy is used by office equipment
- > 10% of remaining energy is used by miscellaneous activities
- > 70% of the office building's energy is used by the building's mechanical and electrical systems

Conducting Energy Audits

Energy audits provide valuable information that help building managers better understand the way their facilities are operating. Audits also help managers make more educated decisions when determining the best ways to create a more overall efficient building, reduce energy costs, and provide optimal indoor air quality for occupants. With an energy audit, building managers are given feedback about how efficiently the facility is being run and recommendations on how efficiency can be improved.

The energy audit, which can be conducted by a technician, identifies and develops opportunities that a building can implement to reduce energy use and in turn reduce utility costs. The recommendations can range from replacing outdated equipment with new models to providing information on how building management can optimize their energy-management system in order to create a balance between occupant comfort and minimal building energy-consumption.

There are three levels of energy audits. Which level audit is conducted is based on how much information and level of analysis building management wants extracted for the audit report.

LEVEL 1:

The first, and most basic, level audit is the walk-through analysis. The audit looks at building equipment and operations and provides recommendations of no-to-low cost measures to improve energy efficiency. Simple paybacks based on energy-cost savings are generally provided as well. Issues that require further investigation beyond the scope of the Level 1 audit will be identified for building management as well.

LEVEL 2:

The second level of energy audits involves a detailed energy survey and analysis. The audit involves looking closely at building systems such as light, plumbing, and mechanical and analyzing the installation, operation, and maintenance of the equipment involved in the systems.

LEVEL 3:

The third level energy audit provides an extensive analysis of capital-size modifications. Analysis is done by running a computer model to identify the projects that would create the most energy savings. The audit also goes further with providing the potential cost of the recommended projects as well as schematic layouts. This level of audit provides building management with the most comprehensive feedback about their building.

Commissioning or Retrocommissioning the Facility

Commissioning is the process of ensuring that a new facility or system is operating in accordance to the operational needs of the owner. Retrocommissioning looks at an existing facility or system to verify that it is operating to design. These thorough investigations provide valuable insight into a building's electrical, mechanical, and plumbing systems.

Building management benefits from these processes with reduced energy savings, increased energy efficiency, decreased utility costs and improved indoor environmental quality. These programs can create energy savings from 5-20 percent.

Depending on the building size and age, system types, and process intricacy, the cost of retrocommissioning can range from 27-40 cents per square foot. Payback of the project, however, can range from six months to two (2) years. Commissioning is more expensive at approximately \$1 per square foot and a payback of five (5) years.

Implementing a Preventative Maintenance Program

A preventive maintenance program is critical to ensuring that a facility is running at peak efficiency, which in turn reduces utility costs extends the performance life of the equipment. This program is intended to help managers reduce the amount of equipment repairs and replacements as well as keep occupant complaints to a minimum.

Preventative maintenance programs are typically comprised of schedules that assign technicians to routine maintenance tasks. Written steps of how technicians should perform each task should be provided as well. Based on the equipment, schedules should be modified on a monthly, quarterly, annual or seasonal basis. Documenting all equipment maintenance is also an important aspect of a preventative maintenance program because it holds staff accountable for their completing their maintenance tasks and gives building management maintenance history of the facility equipment.