How to Save Energy, Save Money, and Get a Promotion:

Facility Manager's Guide to Existing Building Commissioning

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Introduction

The design of a building and the processes involved in its daily operations have the potential to make a significant impact on energy and utility costs, as well as on the environment. For the past 18 years, sys-tek has specialized in helping our clients achieve significant cost savings in commercial buildings through reduced energy use and improvement in energy performance. Our expertise in Existing Building Commissioning also provides facilities with indirect benefits such as improved building occupancy, fewer tenant complaints, and greater building asset value. For more information, visit www.sys-tek.com.

In the United States, buildings consume over 60% of total electricity and over 30% of total energy resources. Five billion gallons of water are used to flush toilets in commercial buildings every day, and the average commercial building generates about 1.6 pounds of solid waste for each employee or tenant on a daily basis.

Considering the impact commercial buildings have on the environment, a series of changes made through a process known as Existing Building Commissioning can reduce operating costs, improve tenant comfort, increase employee productivity, enhance the marketability of a building, and reduce the risk for liability that could occur from problems with poor indoor air quality.

Additionally, Existing Building Commissioning can result in the reduction or elimination of a building's negative impacts on the environment due to inefficient equipment or practices.

Experts in the energy industry say that if all building owners improved energy use in their buildings by only 10%, then the United States would be able to save about $20 billion annually and also reduce enough carbon emissions equal to taking approximately 30 million vehicles off the road.

To save both money and energy usage in your building's daily operations, facility managers and building owners can arrange to undergo Existing Building Commissioning (EBCx).

Understanding Existing Building Commissioning

EBCx is a process that ensures that all current building systems, equipment, and operations function optimally and efficiently to meet daily business demands and requirements. During the EBCx process, facility managers work on identifying opportunities for buildings to cut back on energy and water use, and examine ways to improve current conditions to result in better air quality, exposure to more natural light, and the implementation of green, sustainable products.

How EBCx can help a facility manager

When facility managers work side by side with commissioning providers to implement green changes, they can gain a better understanding of the efficiency and environmental impact of a building's daily operations. After the EBCx project has ended, the facility manager can work with existing building facility staff to maintain and enhance daily operations indefinitely.

The facility manager can also keep the building owners or stakeholders updated on the successes of daily operations and sustainability, which the owners can then use to uphold their reputation in the industry given the recent international focus on going green.

Also, in the event that facility managers need funding for equipment maintenance or improvements, they can be more successful at helping the building owners understand how such implementation would benefit the building from a cost-savings standpoint.

Saving energy and money with EBCx

EBCx requires an up-front investment from building owners and stakeholders, but due to the amount of savings in energy and from practicing sustainability, nearly all building owners are able to earn total payback from an EBCx project within 1 to 2 years. In most cases, larger buildings are known to receive quicker paybacks due to the amount of money that is saved immediately following the EBCx process.

The most significant savings associated with existing building commissioning projects are from reduced energy usage. The value of energy savings for a building typically equates to about $0.11 to $0.72 per every square foot in the building. The value of savings unrelated to energy usage usually equates to an additional $0.10 to $0.45 per square foot.

EBCx can extend the life of all building systems and equipment that are vital to daily operations and reduce maintenance costs that normally would have been applied to the upkeep of faulty or inefficient equipment.

EBCx can vastly improve the value of a building, especially in buildings with the sole purpose of producing income for building owners, such as apartment buildings. The improved features and indoor environmental quality of a building usually allow for a validated increase in rent, and in many cases, could indirectly influence tenants to stay in a building longer due to increased comfort and improved air quality.

EBCx process overview

The general goals of an EBCx project are to recognize and implement ways to cut back on energy use and building costs. Sometimes, certain systems and processes are primarily responsible for increased costs and energy consumption. However, a thorough walkthrough and evaluation of a building is necessary to determine all areas of opportunity for a commissioning project.

Following are some common goals of the EBCx process as determined by the building owner and facility manager:

- Improvement of overall building performance by reducing operational costs and energy output
- Identification and resolution of building system operational issues
- Documentation of system operations
- Reduction or elimination of all tenant complaints and improved tenant comfort
- Training for existing facility staff, where necessary, in regards to routine operations and maintenance (O&M)
- An increase in building asset value
- Extension of equipment and system life

The EBCx process will encompass commissioning for the entire building, and requires the evaluation of major systems, including:

- HVAC systems
- Building assembly
- Alarm systems
- Electrical systems (power and lighting)
- Plumbing systems (water distribution and sanitation systems)
- Conveying systems (elevators and escalators)
- Communication systems (video and audio systems)
- Protective systems (lightning protection, fire suppression)

Phases of EBCx process

There are 5 basic phases involved with the EBCx process: the planning phase, the investigation phase, the implementation phase, the turnover phase, and the persistence phase. Over the course of a building's lifetime, the facility manager and staff will revisit various parts of the commissioning process to ensure lasting energy efficiency and savings for the building.

Planning phase

During the planning phase, a facility manager will develop and outline the goals of the EBCx project and develop a plan that involves the participation of all facility staff.

The facility manager will define the roles and responsibilities of each staff member, and define a scope of work and schedule that outlines the time line and goals of the EBCx project. The facility manager will also make sure that all staff members are familiar with the building's existing documentation in order to gain a better understanding of the building, which in most cases leads to more efficient planning.

Investigation phase

During the investigation phase, a facility manager conducts a walkthrough of the building with the commissioning provider to gather current readings and historical data for all systems and equipment, including hourly, daily, weekly, and monthly energy usage and system performance.

Building tenants or employees may also be interviewed by the building facility manager and commissioning provider to identify additional areas of opportunity. In most cases, facility staff in charge of overseeing major daily operations can provide crucial feedback during the investigation phase.

During this same time period, a number of test procedures are developed with the purpose of determining the efficiency and performance of certain systems and processes.

At the end of the investigation phase, the building facility manager and commissioning provider may work together on developing what is known as a Master List of Findings. The building owner then works with the facility manager and commissioning provider to determine the highest priorities of the project based on available time, resources, funding, payback, benefits, risks, and other applicable or relevant factors.

Implementation phase

The implementation phase is when equipment and systems undergo major upgrades or are replaced with new environmentally friendly and efficient equipment. During this time, the items chosen from the Master Listing of Findings are implemented throughout the building, such as the installation of motion-activated lighting or upgrades to existing HVAC systems.

After the implementation of new equipment, systems, and processes, facility staff will evaluate performance results to measure the success of any new initiatives and to see how certain operations can be even more finely tuned to accommodate best practices.

Turnover phase

The turnover phase occurs when facility staff transitions from all commissioning activities back to normal daily operations and standard practices. During this time, O&M and system manuals are updated with new processes and distributed to all necessary parties in charge of daily operations and maintenance. The facility manager and staff also work together in developing an ongoing plan for sustainability and continuous improvement, at which time all involved parties learn how to maintain system and operational efficiencies and performance.

Persistence phase

During the persistence phase, facility staff demonstrates how to maintain and upkeep all changes that occurred during the EBCx project. The activities performed during the persistence phase are vital to a building's continuous performance improvement as time goes on after the EBCx project has ended.

Total building energy usage is to be tracked regularly and compared to other buildings in the industry, along with other non-energy performance metrics such as indoor air quality and tenant comfort.

By tracking all performance metrics for a building on a regular basis, the facility manager and staff can determine when another EBCx project needs to be conducted and plan accordingly to avoid any unnecessary energy costs or degrading equipment performance. Ideally, EBCx should occur within 3 to years of the original commissioning project or when building performance begins to shows signs of decline.

816.229.9009

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