Methods and Applications of Monitoring Based Commissioning (MBCx)

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Learning Objectives

1. Attendees will learn what monitoring-based commissioning is and how it differs from the standard commissioning process.
2. Attendees will learn how monitoring-based commissioning is used to identify energy efficiency opportunities in a thorough and cost-efficient process.
3. Attendees will learn how monitoring-based commissioning helps energy conservation measures persevere over time without diminishing effectiveness.
4. Attendees will be presented with case study examples of procedures and obstacles in measuring and verifying equipment efficiencies.
Types of Building Commissioning

**New Building Commissioning (Cx)**
Method of risk reduction for new construction and major renovation projects to ensure that building systems meet design intent and operate optimally.

**Re-Commissioning (ReCx)**
Process through which buildings are commissioned again as a check to ensure that systems are functioning as originally planned and constructed.

**Retro-Commissioning (EBCx)**
Commissioning of an existing building that has never been or was not fully commissioned at its completion.

**Monitoring Based Commissioning (MBCx)**
Relies on measurements of energy use to diagnose problems, account for savings, and help ensure that savings persist over time.
What is Monitoring Based Cx?

**Definition**

- Collecting, storing, analyzing and reporting data (collected through metering equipment) to optimize energy performance and efficiency.
- This process gives end users the ability to make informed, effective energy decisions.
What is Monitoring Based Cx?

Phases

• Continuous Monitoring
• Evaluation
• Implementation
What is Monitoring Based Cx?

Phases

- **Energy Baseline**
  - Equipment & Operational Audit
  - Short-Term Environmental Monitoring
  - Long-Term Energy Monitoring
  - Utility Data Collection

- **Energy Analysis**
  - Modeling and Analytics
    - Energy Expert
  - Energy Benchmarking
    - Energy STAR
  - Remote Analyst
    - Engineering Review
  - Data Review
    - Team Collaboration

- **Energy Actions**
  - Task Management
    - Energy Savings Measures
  - Data Archive
    - Storage, Security, Access
  - Continuous Review and Management Reporting
    - Executive Reports

**MBCx Continuous Improvement**
Continuous Monitoring Phase

- Various meters will gather building energy usage information on a 24/7 basis. This information can be accessed in real-time, allowing for a low cost and highly effective way to keep energy usage in check.
What is Monitoring Based Cx?

Continuous Monitoring Phase

• Requirements
  ○ Install permanent building energy system monitoring
  ○ Energy management information system

• Deliverables
  ○ Status report
What is Monitoring Based Cx?

Evaluation Phase

• Perform regular evaluations of the data using comprehensive software.

• Develop highly detailed and insightful recommendations for remediation.
What is Monitoring Based Cx?

Evaluation Phase

• Requirements
  ○ Extensive knowledge in whole building interaction
  ○ Close coordination between managers, engineers and operators

• Deliverables
  ○ Analytical reports
  ○ Suggestions for ECMs
What is Monitoring Based Cx?

Implementation Phase

- Execute the approved energy saving measures
- After measures are implemented, continual fine tuning will occur to ensure optimal operation.
What is Monitoring Based Cx?

Implementation Phase

• Requirements
  ○ Close coordination between managers, engineers and operators

• Deliverables
  ○ Priority list of ECMs
  ○ Schedule for implementation
Continuous Commissioning

Meters will collect energy consumption information on a 24/7 basis. This information can be accessed and analyzed in real-time.

Powerful software will collect the data and measure, monitor and manage energy consumption and expense across all utilities.

Engineers will be able to expertly analyze this information to provide innovative and efficient energy management solutions.

Engineers will then visit the facility and resolve any issues, armed with effective information and resolutions.
Benefits of MBCx

Advantages

• Provides sustained energy savings through long term tracking and trending of data to produce optimal operating strategies
Benefits of MBCx

Advantages

• Average savings in mission critical facilities and commercial office buildings of 12-20%
• Identifies equipment malfunctions and upgrades – justify with real data.
Benefits of MBCx

*MBCx provides three streams of additional energy savings relative to RCx.*

1) Savings from periodic retro-commissioning
2) Added MBCx savings from persistence
3) Added MBCx savings from new measures identified by metering and trending during initial Cx effort
4) Added MBCx savings from continually identified new measures

Final Thoughts

Wrap-Up

• Investments in energy efficiency have a significant impact on bottom lines.
• Integral to maintaining and improving a building’s environmental profile.
• Helps ensure that energy efficiency savings are maintained over time.
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