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ONLINE TRAINING BY KRISHNAJI PAWAR
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MODULE 16

Existing Building Commissioning

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CERTIFIED COMMISSIONING MANAGER CCM TRAINING PROGRAM OVERVIEW

The commissioning process for building systems is crucial for both existing facilities and new construction. It involves verifying that the design, construction, and operation of the commissioned systems conform to the Owner's Project Requirements (OPR).

Learning Objectives

- Introduction
- What is Existing Building Commissioning (EBCx)?
- Existing building commissioning process
- EBCx Process Planning Phase
- Current facility requirements
- EBCx Process Investigation Phase
- EBCx Process Implementation Phase
- EBCx Process Turnover Phase
- Conclusion

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INTRODUCTION

- The comprehensive building systems commissioning process provides substantial benefits for both existing facilities and new construction, additions, and extensive renovations.
- Existing building commissioning (EBCx) and new construction commissioning (NCx) share numerous similarities.
- In new construction commissioning, for instance, the Commissioning Provider (CxP) verifies that the design, construction, and operation of the commissioned building systems conform to the Owner's Project Requirements (OPR).
- In EBCx projects, the CxP verifies that the building systems are compliant with the Current Facility Requirements (CFR).
- In ASHRAE Guideline 0.2-2015: Commissioning Process for Existing Systems and Assemblies, ASHRAE defines EBCx as "a quality-focused process for attaining the [current facility requirements] of an existing building and/or its systems and assemblies."

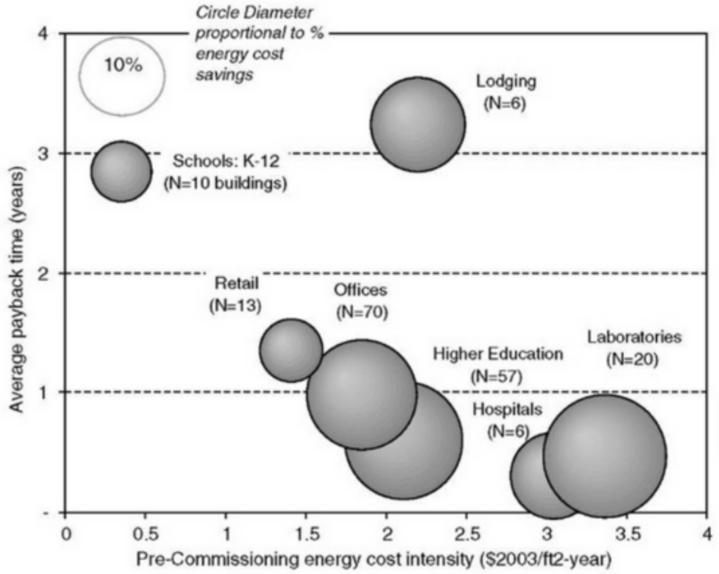
WHAT IS EXISTING BUILDING COMMISSIONING (EBCX)?

Existing Building Commissioning (EBCx)

a. Retro-Commissioning(RCx)
b. Re-Commissioning(Re-Cx)
c. OngoingCommissioning
d. Monitoring-Based Commissioning (MBCx)

Energy consumption and environmental emissions reductions, improved indoor environmental quality, risk mitigation, and water conservation are among the benefits of EBCx.

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Average simple payback time and percent energy savings from commissioning of existing buildings by building type.

AVERAGE SIMPLE PAYBACK TIME AND PERCENT ENERGY SAVINGS FROM COMMISSIONING OF EXISTING BUILDINGS BY BUILDING TYPE.

EXISTING BUILDING COMMISSIONING PROCESS

BEYOND MSART CITIES has adopted the following five-phase process for EBCx:

- Project Initiation and Planning Phase
- Assessment Phase
- Investigation Phase
- Implementation Phase
- Hand-Off Phase

EBCx phases may vary depending on project parameters. In terms of terminology and deliverables, there are numerous parallels between building systems commissioning for new construction and EBCx. As previously stated, compliance with the OPR is the success metric for the former, whereas compliance with the CFR is the success metric for the latter.



EBCX PROCESS

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01 Development of Existing Building Commissioning goals, facility requirements, and a commissioning plan.

02 Field inspections, data collection, testing, and analysis to evaluate system performance and identify improvements.

03 The desired facility enhancements have been implemented, and the results and performance have been validated.

04 Systematic transfer from commissioning to standard operating practice and operations and maintenance.

05 Implementation of tools to support the benefits of persistence and the continuous improvement of performance over time.

EBCX PROCESS OVERVIEW

- Select a suitable project;
- Determine the project scope
- Benchmarking
- Prepare a CFR.
- Conduct a systems evaluation.
- Prepare a report for the investigation phase.
- Supervise the application of corrective actions;
- Perform performance evaluations.



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PROJECT INITIATION AND PLANNING PHASE



PROJECT INITIATION AND PLANNING PHASE+



- The initial phase of EBCx is characterized by extensive planning.
- The CxP's planning activities include developing and agreeing with the client on overall project objectives and strategies, establishing the initial EBCx Team, and compiling and reviewing O&M documents pertaining to the building systems and equipment included in the scope of commissioning services.
- A Request for Proposal (RFP) document could be utilized to achieve this objective.
- The CxP uses the information gathered during this phase to develop the EBCx Plan during the following phase.
- By the end of the EBCx Project Initiation and Planning Phase, the CxP and client should be in agreement regarding the EBCx project's general focus and scope.

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SELECT AN APPROPRIATE PROJECT

- Facility questionnaire for the owner and operations personnel
- Agents of RCx assist owners in selecting the most qualified building candidates.
- Consider resident complaints
- Think about work order frequency.
- Compared to the energy consumption of comparable facilities
- Customize the RCx scope to the owner's needs and budgetary constraints.



SET PROJECT OBJECTIVES

- The phase of the planning procedure entails defining the project's goals and objectives.
- Determine the project's scope or an outline of the to-be-implemented procedures and processes.



DOCUMENTATIONGATHERING

- Utility data
- Design documents
- Work order history
- TAB report (if available)
- Operations and maintenance (O&M) manuals



BENCHMARKING

- Building Based:

1. Annual Utility Consumption from Billing
2. Calculate EUI (energy use per SF).
3. Compare to databases available

- Utilize EUI to determine existing building commissioning EBCx potential and the most suitable candidates for EBCx.
- Consider any distinctive differences between your building's systems and equipment and those found in the benchmark database.





CURRENT FACILITY REQUIREMENTS

A written document that describes the current functional requirements of a facility and the expectations of how it should be used and operated. This may include goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information to meet the requirements of occupants, users, and Owner(s) of the facility.

CURRENT FACILITY REQUIREMENTS

- CFR defines the current operational needs and requirements of the facility.
- Needs are defined with realistic but specific targets:

1. Space Allocation
2. Energy use expectations
3. Temperature/Humidity
4. Hours of Operation
5. Lighting Levels
6. Pressurization
7. Referenced Standards

- CFR often differs from the original design requirements.



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DEVELOP EXISTING BUILDING COMMISSIONING PLAN

DEVELOP EXISTING BUILDING COMMISSIONING PLAN

- Develop the Existing Building Commissioning (EBCx) Plan after reviewing the building documentation and gaining a firm grasp of the project's objectives.
- The owner and owner's staff must have input and review.
- Specify roles and responsibilities and create a schedule for the investigation phase.





EBCX PROCESS
INVESTIGATION PHASE



EBCX PROCESS INVESTIGATION PHASE+



- The Assessment Phase of EBCx involves the CxP's objectives to develop and confirm specific project objectives, review and update the client's Construction Risk Report (CRF), and develop the EBCx Plan.
- The client requests EBCx services and informs the CxP of the building systems to be included in the scope of commissioning services.
- The EBCx scope is a crucial outcome of this phase, which typically begins during the project's initiation and planning phases but must be refined and expanded during the assessment phase.
- The client must sign off on the final EBCx work scope.
- It is best practice for the CxP to discuss the EBCx scope and costs with the client prior to each phase of EBCx and obtain their approval.

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PERFORM A SYSTEM ASSESSMENT.

- Setup trend data and/or launch data loggers;
- TAB evaluations (sampling).
- Conduct functional testing of the system.
- Heating, ventilation, air conditioning, and controls • Lighting
- Plumbing
- Develop and maintain a comprehensive list of defects.



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INVESTIGATION PHASE REPORT

INVESTIGATION PHASE REPORT +

- ExecutiveSummary
- SystemsSummaries
- Findings
- Recommendations

1. FIMs and ECMs
2. Organized by priority

- Cost estimates for each FIM & ECM
- Simple payback calculations for ECMs
- Appendices (CFR, Master List, trends, calculations)





IMPLEMENTATION PHASE+

IMPLEMENTATION PHASE+





- During the implementation phase, the client determines when and how to implement the FIMs and ECMs identified in the preceding phase.
- The CxP may endorse sampling strategies approved by the client to verify performance data during the implementation phase.
- The EBCx Team conducts and documents FPTs for building systems included within the EBCx scope.
- A member of the O&M staff or an ATC contractor may be asked to assist the EBCx Team by operating the building systems in accordance with the EBCx test plan.
- Throughout the Implementation Phase, the CxP, client, and EBCx Team analyze the results of additional site assessments and FPTs to determine whether or not the commissioned building systems are operating according to the CFR.

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EBCX PROCESS IMPLEMENTATION PHASE +

- Develop the Implementation Phase Cx Plan;
- Implement FIMs and/or ECMs
- Verify the selected improvements.





EBCX PROCESS IMPLEMENTATION PHASE

Recommended Corrections and Improvements

- The owner-selected measures could be implemented by the EBCxA, building staff, or subcontractors.

Oversee the Implementation of Corrective Measures

- Implementing the chosen processes and making sure that the retro-commissioning process working as planned.

Conduct performance verification.

- Verify the performance of systems over time against the baseline established from benchmarking and/or energy modeling.



EBCX PROCESS
TURNOVER PHASE

EBCX PROCESS TURNOVER PHASE +





- The hand-off phase is the fifth and final part of the EBCx process.
- This phase concludes with the client receiving the EBCx Report from the CxP. The EBCx Report includes information about pre-implementation and post-implementation building systems performance, observations and tests, FIMs and ECMs, the Issues and Resolution Log, and the implementation of measures and resolution of issues.
- During the hand-off phase, the CxP and EBCx teams assess the positive and negative effects of current O&M staff practices on the operation and performance of the building system.
- The EBCx Plan should clarify the requirements for digital audio and video recording.
- The emphasis of training sessions is on the operational aspects of the building systems, based on operational excellence best practices.

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EBCX PROCESS TURNOVER PHASE +

- Develop Final Report
- Compile a “Systems Manual”
- Develop a Re-Commissioning Plan
- ProvideTraining
- Hold Close – Out Meeting
- Implement Persistence Strategies



EBCX PROCESS TURNOVER PHASE+

- The hand-off process commences subsequent to the fulfillment of all authorized measures.
- During this stage, the process of final reporting will be carried out, alongside the provision of training for the facility staff.
- It is imperative to identify persistence strategies, such as ongoing commissioning, in order to adopt continuous activities that will effectively sustain the benefits over time.
- Create a comprehensive systems manual



IN SUMMARY

- EBCx has a thorough and methodical approach to these conditions.
- The following process elements improve building asset management and energy efficiency:Comparing the facility's current functional needs to the original designAnalysis of field-verified performance against the design basis and performance optimization opportunities.
- Find and use new systems, equipment, and technology that may have been unavailable when the project began.
- EBCx makes sure building systems meet Current Facility Requirements (CFR) and owner project goals and provides tools for ongoing commissioning (OCx), performance tracking, and system performance improvement.
- Most owners should hire an independent third party to commission and represent them.

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