



BEYOND
SMART CITIES

LEARN.BEYONDSMARTCITIES.IN

WELCOME TO ADVANCED EXISTING BUILDING COMMISSIONING

ONLINE TRAINING

KRISHNAJI PAWAR - CEO & FOUNDER





business lounge



4. HAND-OFF PHASE EBCX

KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP

COMMISSIONING SPECIALIST CURRICULUM



NEXT



Learning Objectives

- Introduction
- Update and Deliver Documentation
- Train Staff and End Users
- Close-Out Project
- ONGOING COMMISSIONING
- Deliverables

The hand-off phase ensures that facility employees and occupants have the knowledge and documentation to correctly operate and maintain EBCx upgrades and improvements to sustain performance benefits. Update and distribute important documents, train workers, and arrange for continuous commissioning (OCx) or monitoring-based commissioning (MBCx). Maintaining EBCx developments requires clear, accurate, and accessible documentation.





Introduction

Hand-Off Phase tasks include these activities:

- Update and Deliver Documentation
- Train Staff and End Users
- Plan for Persistence
- Close-Out Project

Update and Deliver Documentation

During the Hand-Off Phase, the following are updated and delivered to the Owner.

Sequences of Operation. Document sequences directly impacted by the EBCx process. Update or rewrite sequences for all key systems and equipment, including setpoints and reset schedules.

Final EBCx Report. Prepare the report as a record of the EBCx activities and measures implemented for the Owner. This will become an important document for the building and an invaluable resource to current and future building operators.

The final report typically includes:

- Planning Phase report and documentation
- Initial Assessment Phase report and documentation
- Investigation Phase report and documentation
- Implementation Phase report and documentation
- As-built and updated BAS sequence of operations
- Updated O&M documentation
- One-line and system diagrams
- Facility Guide



Update and Deliver Documentation +

O&M Manuals and As-Built Documentation.

Maintain as-built and O&M manuals. If the Owner has good, up-to-date O&M manuals, they merely need to be updated to cover EBCx project equipment and operation changes. The Owner should include a job in the EBCx scope to create or improve manuals if they are missing or insufficient for effective O&M of existing equipment. Digitizing all O&M and site documentation—drawings, specifications, submittals, TAB reports, control drawings, sequences, energy studies, warranties, PM plans, etc.—into a file/folder structure is excellent. Not just EBCx data, but all site data.

Preventive maintenance procedures.

Update preventative maintenance procedures as required to ensure systems continue to operate efficiently.

One-line schematic diagrams of major systems.

Create or update one-line diagrams of systems impacted by the EBCx. Accurate one-line diagrams will help facility staff troubleshoot issues and maintain optimum performance.

Facility Guide.

The CxP will prepare a Facilities Guide for EBCx systems and equipment. ASHRAE defines the Facility Guide as “a basic building systems description and operating plan with general procedures and confirmed facility operating conditions, set points, schedules, and operating procedures for use by facility operations to properly operate the facility.” By consolidating pertinent information in a Facilities Guide, building staff may operate the building more efficiently.

NEXT



Train Staff and End Users

- Commissioning should involve training. Train operations workers on EBCx findings and modifications during handoff.
- Operators learn why and how to regulate and maintain changes through training.
- End users may be trained on ECMs and FIMs that directly affect them, such as improved thermostats or lighting controls.
- Formalize training. Focus training on EBCx process results, measurements, system optimisation, tenacity, and continuous improvement. The operations guide, operations sequences, and O&M manuals are the main sources of training material.
- If end user training is needed, produce a paper tailored to their needs. End users should not be provided the systems operations handbook to learn how to use a new thermostat.

Verify Training Effectiveness.

- Ensure that operators have sufficient knowledge of the systems and EBCx changes to maintain optimum building operation. Verify that the training has accomplished these objectives through the use of quizzes, training evaluations by the trainees, or field observations of the training.
- This is often accomplished by the CxP and the operations staff working on the BAS or at the system/equipment and reviewing how the system operates, key setpoints, and the sequence of operations with the CxP asking the operator questions to confirm their understanding and knowledge, or asking them where in the project documentation to find the information.



Include Operational Parameter Checks

The persistence plan shall include frequencies for recalibrating sensors and actuators, descriptions and frequencies for running override and in-alarm reports, verification of time of day schedules and setpoints, standard trend logs and their interpretations, component or control loop functional tests and their periodic frequency, how to evaluate available energy and demand data over time, and the use of any "smart," "energy," or diagnostic alerts or alars. The CxP and EBCx project team will teach and verify the operations staff's routine operational parameter checks.



Implement Performance Tracking

- The CxP shall adopt performance tracking trending and data collecting analytical methodologies to review and certify operational performance of measures. The Owner will decide performance tracking strategy.
- The CxP performs these periodic operational performance reviews after the EBCx project's installation and handoff due to limited operational staff and knowledge.
- Ongoing or Monitoring–Based Commissioning (OCx/MBCx) is a cost-effective technique to track performance and maintain EBCx improvements.
- If OCx is implemented with the EBCx project or afterward, the CxP will work with the OCx software implementation team to establish performance metrics for systems and equipment and fault algorithms that measure, detect, and verify the performance and persistence of the implemented measures and other features and control loops.



ONGOING COMMISSIONING

- Creating a link between the end of an EBCx project and the continued performance of the building and its systems is the purpose of ongoing commissioning, which aims to do so by acting as a bridge.
- Our training course titled “Ongoing Commissioning Best Practices” outlines the best practises that are required to establish and maintain building performance throughout the lifecycle of a building.

Hand-off Phase EBCX Deliverables

- Updated CFR
- Training agenda, including sign in/out sheets, O&M maintenance info, Notes/Pics from training and contact info for the system responders
- EBCx Report, including the addition of the Lessons-Learned Report
- Plan for Persistence
- Facility Guide
- OCx Plan (if applicable)



Thanks



Learn From Beyond Smart Cities
Online professional courses led by
the world's top specialists

kr
KRISHNAJI PAWANI
SUSTAINABILITY SPECIALIST

LEARN.BEYONDSMARTCITIES.IN