



BEYOND
SMART CITIES

LEARN.BEYONDSMARTCITIES.IN

WELCOME TO BEYOND MONITORING BASED COMMISSIONING - MBCX

ONLINE TRAINING

KRISHNAJI PAWAR - CEO & FOUNDER



04

Investigation Phase - MBCx

SECTION - MBCX



Field observation and testing of system and equipment operation, interviewing facility staff, reviewing equipment and building documentation, reviewing preventive maintenance plans, evaluating sequences of operation, evaluating BAS performance, documenting findings, identifying ECMs and FIMs, estimating energy impacts and costs, evaluating source of performance problems, and investigating rebates or incentives.



Preparing Countries & Tomorrow's Commissioning Specialists

Learning Objectives

- Brief Introduction
- Activities during Investigation Phase
- Define High Priority Systems for Performance Monitoring
- Create an EMIS User Interface
- Configure Energy Savings and Anomaly Tracking

Introduction

In order to support a successful MBCx project it is critical to establish robust monitoring tools to support continuous energy and system analysis. This process goes far beyond simply installing hardware and software; the EMIS must be commissioned to ensure that the right data are accurately and reliably gathered, and to ensure that software programming is aligned with MBCx program goals.



MBCx Investigation Phase – Activities

- Define data configuration requirements
- Calibrate critical sensors
- Perform EMIS data quality checks
- Create an EMIS user interface
- Configure the FDD
- Configure energy savings and anomaly tracking

Define Data Configuration Requirements

- Outlines the data types that will be monitored using the EMIS to support the MBCx program.
- In addition to configuring an ongoing data stream, there will be certain meters for which historical data will also be imported (for example, to provide a historical energy baseline).
- Data point naming/tagging will follow consistent, transparent naming conventions.

Calibrate Critical Sensors

- Wherever possible, meters/sensors will be calibrated, and values derived from interval meters and submeters will be cross-checked against monthly billing data to ensure consistency.

The most critical points for calibration are

- Outside air temperature
- Air handler supply air temperature, return air temperature, and mixed air temperature
- Chilled water supply and return temperatures
- Hot water supply and return temperatures

Perform EMIS Data Quality Checks

EMIS data being used for the MBCx program (documented in Appendix C) will be quality-checked, with particular attention to the following potential issues :

- Data values falling outside the range of an installed meter or sensor
- Meters installed incorrectly
- Insufficient data capture (e.g., memory too small, sample rate too high, data gaps due to power outage and no cache memory at meter)
- EMIS not reporting data
- Misleading data labeling
- Data interval insufficient for analysis purposes

Create an EMIS User Interface

- After data quality is validated, MBCx will develop EMIS dashboards and drill-down views for the MAP and other reporting purposes. EMIS dashboards may usually be customised for each user. The EMIS provider will receive the necessary information and photographs and confirm the default dashboard design. The EMIS vendor will train the lead user and other users on how to customise dashboards.
- Building name and geographical location
- Simple chart display or summary table indicating key performance indicators
- Sorting of sites within a portfolio (if applicable)
- Navigation from the main landing page to specific buildings, metres, charts, etc.
- Summary of outstanding issues or alerts
- Progress towards long-term organisational goals

Configure the Fault Detection and Diagnostics

- After the FDD tool is configured to import BAS data points, calibration is checked, and data storage and communications are set up, FDD rules are selected and implemented.
- Rules will initially be limited to select system or fault kinds to manage operator burden and efficiently deploy MBCx FDD.
- The MAP will guide rule implementation, and fault thresholds will be tweaked.
- At installation, a schedule will be defined for periodic/ongoing refinements, such as regular FDD vendor/consultant check-ins to review or add FDD rules. The fault prioritising mechanism (cost, occupancy, etc.) and response plan will be adjusted to MBCx programme objectives and resources.

Configure Energy Savings and Anomaly Tracking

- An advanced EIS can be used for two key energy management functions:
- (1) to measure energy savings
- relative to a historical baseline, and
- (2) to alert users when energy use exceeds current expectations

Section 2: EMIS Configuration Phase			
2.1 Define data configuration requirements	All existing meters, BAS controls, and any other potential data sources or metering improvements have been identified. Data configuration requirements are documented in Appendix C.	Building energy managers and engineers	
2.2 Calibrate critical sensors	For the most critical monitored points, sensors are calibrated, such as outdoor air temperature, air handler supply air temperature, return air temperature, mixed air temperature, chilled water supply & return temperatures, hot water supply & return temperatures. A list of points, acceptable ranges, and frequency of calibration has been compiled for each major HVAC system. [Refer to a calibration plan here, if applicable. An example calibration plan template may be downloaded at www.cacx.org .]	Building engineers and contractors	
2.3 Perform EMIS data quality checks	Data quality checks have been performed, including: [Include details from Sec 2.3 here as applicable.]	EMIS vendor and MBCx providers	
2.4 Create EMIS user interface [or adapt existing EMIS interface for MBCx program]	EMIS dashboards have been configured for the MBCx program, to include dashboard variations for different users. Default dashboard design has been finalized. Where dashboards may be user-customized, the EMIS vendor will provide instructions to the facility's lead user and other users as needed.	EMIS vendor, MBCx providers, and system integrator	
2.5 Configure the FDD	FDD rules have been programmed. FDD rules will initially be limited to certain system or fault types [optional]. The MAP has been used to inform the specific rules to be developed. At time of installation a schedule will be set for periodic/ongoing refinements; for example, regular check-ins with the vendor/consultant and a schedule for reviewing or adding FDD rules. Also, the fault prioritization method (e.g., based on cost impact, occupant impact, etc.) and response plan has been tailored to MBCx program objectives and resources.	EMIS vendor, MBCx providers, IT engineers	
2.6 Configure energy savings tracking	Historical or current performance baselines/benchmarks for all relevant metrics in the Monitoring Action Plan (Appendix B) have been set, from which deviations will be measured. Baselines will generally be set based on the previous 12-month period.	EMIS vendor and MBCx providers	



Thanks

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


KRISHNAJI PAWAR
SUSTAINABILITY SPECIALIST

[LEARN.BEYONDSMARTCITIES.IN](https://learn.beyondsmartcities.in)