

BEYOND

SMART CITIES

ENERGY AND ATMOSPHERE - GREEN
BUILDING TECHNOLOGY TRAINING PROGRAM
FOR ENERGY AND GREEN BUILDING SPECIALISTS
KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP
ENERGY SPECIALIST CURRICULUM

ENERGY EFFICIENCY SPECIALIST

BEYOND SMART CITIES

BEYOND

SMART CITIES

FUNDAMENTAL COMMISSIONING AND
VERIFICATION - PREREQUISITE - 2
FOR ENERGY AND GREEN BUILDING PROFESSIONALS
KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP
ENERGY EFFICIENCY SPECIALIST CURRICULUM

ENERGY EFFICIENCY SPECIALIST

BEYOND SMART CITIES

LEARNING OBJECTIVES



Intent of Fundamental
Commissioning and Verification -
Prerequisite
Behind the intent
Step by Step Guidance
Required Documentation
Terms and Definitions

COMMISSIONING AUTHORITY QUALIFICATIONS

By the end of the design development phase, engage a commissioning authority with the following qualifications.

- ✓The CxA must have documented commissioning process experience on at least two building projects with a similar scope of work. The experience must extend from early design phase through at least 10 months of occupancy;
- ✓The CxA may be a qualified employee of the owner ,an independent consultant, or an employee of the design or construction firm who is not part of the project's design or construction team, or a disinterested subcontractor of the design or construction team.
- For projects smaller than 20,000 square feet (1 860 square meters), the CxA may be a qualified member of the design or construction team. In all cases, the CxA must report his or her findings directly to the owner.

COMMISSIONING AUTHORITY

TABLE 1: Who can be the CxA?

Can ...	who is ...	be CxA for ...	
		fundamental Cx?	enhanced Cx?
an employee of the architecture or engineering firm	a member of the design team (e.g., a project architect, engineer or energy modeler who is also the HVAC designer)	No, unless project is under 20,000 ft² (1 860 m²)	No
	not a member of the design team (e.g., a LEED administrator or energy modeler who is not participating in the design)	Yes	No
a subconsultant to the architecture or engineering firm	a member of the design team (e.g., a project engineer subcontracted to the architect)	No, unless project is under 20,000 ft² (1 860 m²)	No
	not a member of the design team (e.g., a LEED administrator, Cx specialist, energy modeler)	Yes	Yes
an employee or subcontractor of the general contractor or construction manager	a member of the construction team	No, unless project is under 20,000 ft² (1 860 m²)	No
	not a member of the construction team	Yes	No
an employee of the owner or an independent consultant contracted to the owner		Yes	Yes

CURRENT FACILITIES REQUIREMENTS AND OPERATIONS AND MAINTENANCE PLAN

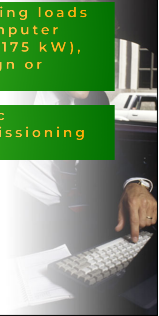
Prepare and maintain a current facilities requirements and operations and maintenance plan that contains the information necessary to operate the building efficiently. The plan must include the following:

- ✓a sequence of operations for the building;
- ✓the building occupancy schedule;
- ✓equipment run-time schedules;
- ✓set-points for all HVAC equipment
- ✓set lighting levels throughout the building;
- ✓minimum outside air requirements;
- ✓any changes in schedules or set-points for different seasons, days of the week, and times of day;
- ✓a systems narrative describing the mechanical and electrical systems and equipment;
- ✓a preventive maintenance plan for building equipment described in the systems narrative; and

DATA CENTERS ONLY

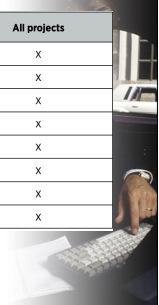
For small projects with computer room peak cooling loads less than 2,000,000 Btu/h (600 kW) or a total computer room peak cooling load less than 600,000 Btu/h (175 kW), the CxA may be a qualified employee of the design or construction team.

✓a commissioning program that includes periodic commissioning requirements and ongoing commissioning tasks, and continuous tasks for critical facilities



REQUIRED DOCUMENTATION

Documentation	All projects
	X
	X
List of systems to be commissioned	X
Verification of CxA activities and reviews	X
Cx plan	X
Documentation of testing and verification	X
CFR, O&M plan	X
Cx report	X



REFERENCED STANDARDS

- ✓ASHRAE Guideline 0 - 2013 , The Commissioning Process
- ✓ASHRAE Guideline 1.1 2007 , HVAC & R Technical Requirements for the Commissioning Process
- ✓ASTM E2947 - 16: Standard Guide for Building Enclosure Commissioning



CONNECTION TO ONGOING BUILDING PERFORMANCE

LEED O+M EA credit Energy Performance: Testing building systems after installation is fundamental to ensuring that systems function as designed. The development of a commissioning plan ensures that the building owner and facility managers have the information necessary to operate the building efficiently.



TERMS AND DEFINITIONS

Basis of design (BOD) the information necessary to accomplish the owner's project requirements, including system descriptions, indoor environmental quality criteria, design assumptions, and references to applicable codes, standards, regulations, and guidelines

Commissioning (Cx) the process of verifying and documenting that a building and all of its systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the owner's project requirements

Commissioning authority (CxA) the individual designated to organize, lead, and review the completion of commissioning process activities. The CxA facilitates communication among the owner, designer, and contractor to ensure that complex systems are installed and function in accordance with the owner's project requirements.





BEYOND
SMART CITIES

ENERGY EFFICIENCY SPECIALIST
★ BEYOND SMART CITIES ★

THANK YOU

THE WORLD'S 1ST GREEN TECHNOLOGY
MARKETPLACE
