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MODULE 02-B

Overview of CxA Process

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Learning Objectives

- Overview of the CxA Process
- Why Commission Building Systems?
- The Program for Optimal Quality Assurance
- The definition of commissioning
- The advantages of commissioning
- When Does Commissioning Start?
- Which Projects Should Be Commissioned?
- Which Systems Should Be Commissioned?
- Can We Afford It?
- Elements of Commissioning
- Who is a Commissioning Authority?
- Emerging Technology's Effect on the Commissioning Process
- Commissioning Team (Cx Team)
- Independent Third- Party Commissioning
- Financial Benefits of Commissioning

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INTRODUCTION

- Building system commissioning can lead to safe, healthy, and comfortable facilities that operate correctly and efficiently.
- Across all business sectors and facility types, owners and managers have embraced building system commissioning for a variety of reasons.
- Effective building system commissioning generates significant value for the owner and offers benefits to occupants, managers, and operations and maintenance (O&M) staff.
- For building system commissioning to be successful, the commissioning provider (CxP) must skillfully lead a talented, focused, and collaborative commissioning team (Cx Team) throughout the entire commissioning process.
- Beyond Smart Cities advocates for the direct owner engagement of an independent third-party CxP at the start of a project to deliver the comprehensive building systems commissioning process.



WHEN DOES COMMISSIONING START?

Ideally, commissioning should start during facility predesign (programming). Various factors often delay the commissioning authority's hiring, but the project team should agree to commission the facility during predesign. It will be difficult to meet commissioning goals and owner needs if functional issues are not addressed and documented during this phase and early design.

This does not mean advanced projects are finished.

The predesign phase cannot be commissioned. Commissioning during design or construction.

Even though the process will be slower, commissioning can begin and the project will benefit. These later stages require design and construction contract revisions to include commissioning.

Since traditional design and construction team members are not yet familiar with commissioning requirements and processes, a qualified commissioning authority should be hired early in the project to guide the process.

WHICH PROJECTS SHOULD BE COMMISSIONED?

- Every new facility should be commissioned, yes.In an ideal world, the response would be affirmative.
- However, the decision must be based on what is most important to the owner in terms of health, safety, and liability risk in relation to the primary use of the facility and the comfort and productivity of the occupants.
- Facilities that, by definition, provide essential services to the owner, institution, or community must be fully commissioned.
- Including hospitals and other health care facilities, research and teaching laboratories, and any facility that handles hazardous materials or engages in activities that could be deemed potentially hazardous.
- The prudent owner will allocate resources where they will be most beneficial and minimize the risk for the community and investment.
- The variables involved in determining which projects should be commissioned are not so much which tactic should be commissioned as how much of the tactic—that is, which systems should be commissioned.





WHICH SYSTEMS SHOULD BE COMMISSIONED?

- Ideally, both static and dynamic building systems should be commissioned.
- All health and life safety systems must be commissioned without question.
- The majority of building codes mandate functional performance.
- Regarding the health and life safety system, TAP should concentrate on systems from previous projects whose poor performance has plagued occupants and the operations team.
- The performance of roof and window systems can be thoroughly tested.
- virtually guaranteeing a positive outcome Similarly, if indoor air quality has been a persistent issue, applying the commissioning process to the HVAC and envelope systems virtually guarantees that the design solution, construction documents, and construction process will result in a problematic heating, cooling, and ventilation system.
- The owner, commissioning authority, and design professional, if available, should discuss scope-of-commissioning issues and arrive at a philosophical consensus during the first stage of predesign.

CAN WE AFFORD IT?





- How much will this extra email and detail during design and construction cost?
- It's likely that design and construction costs will rise initially.
- However, experience will show that commissioning will not increase the owner's costs when compared to not commissioning.
- As the commissioning industry matures and Design professionals and contractors become more familiar with the building commissioning process and its benefits, project costs should decrease, though this may be difficult to prove.
- While a cost reduction may seem unlikely, experience shows that prime contractors' project management is significantly improved due to increased discipline for scheduling and coordinating throughout construction, with commissioning properly integrated.

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ELEMENTS OF COMMISSIONING

- Elements of Commissioning
- Design Intent Documents(BOD,OPR)
- Commissioning Plan
- Commissioning Specifications
- Design Reviews
- Submittal Reviews
- Site Observations, Meetings
- Resolution Tracking Forms (RTFs)
- System Verification Checklists
- Systems Start-Ups
- Functional Performance Tests (FPTs)
- Operation and maintenance (training)
- O&M Documentation
- Commissioning Report
- Systems Manuals
- Warranty Review of Building Operation
- Preventative Maintenance Programs
- Energy Usage Evaluations



WHO IS A COMMISSIONING AUTHORITY?



- The acquisition of knowledge pertaining to heating, ventilation, and air conditioning (HVAC) systems encompasses a comprehensive understanding of various aspects, including system design, prevalent control strategies, installation procedures, operational considerations, and maintenance practices.
- The individual possesses a comprehensive background in controls for HVAC systems, demonstrating a strong understanding of contemporary technological advancements in the field.
- A background in practical field construction
- The individual has exhibited proficiency in effectively coordinating numerous specific activities within a given context.
- A well-structured and logical commissioning plan.
- The individual has exhibited proficiency in effectively arranging numerous distinct activities into a cohesive commissioning plan.
- Proficiency in written and verbal communication skills, particularly in the context of documentation.
- The individual possesses prior involvement in collaborating with multi-disciplinary teams.
- A comprehensive understanding of the principles and practices related to testing and balancing.

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Emerging Technology's Effect on the Commissioning Process

- New software and hardware are essential for commissioning providers (CxPs) to implement commissioning activities.
- Information technology (IT) is used throughout the building systems commissioning process to ensure owner success.
- The building design and construction industry views commissioning as a way to improve project quality, not just another requirement.
- CxPs must now commission more complex building systems due to the rise of "smart" or "intelligent" buildings.
- To ensure their project meets owner project requirements (OPR) or current facility requirements (CFR), owners need more support as building systems and assemblies become more complex.

1. Technological Advances in Project Management and Communication
2. Technological Advances in Modeling and Visualization
3. Technological Advances in Building Systems and Diagnostics
4. Internet Security Concern



Commissioning Team (Cx Team)

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- The Commissioning Team (Cx Team) is defined by Beyond Smart Cities as the group of professionals who perform commissioning activities or contribute to commissioning deliverables as part of the building systems commissioning process.
- The precise size and composition of the Cx Team will vary from project to project, but typical members include the Commissioning Provider (CxP), the owner or owner's representative, and select members of the design and construction teams.
- Certain operations and maintenance (O&M) personnel are frequently integral members of the CX Team throughout the building systems commissioning process for existing facility projects.
- In today's construction industry, the term "commissioning team" (or "CX team") is commonly understood to refer to the key parties who collaborate on a project to implement the commissioning process.
- However, this term is not universally accepted, so ANSI/ASHRAE/IES Standard 202-2018: Commissioning Process for Buildings and Systems does not employ it.







INDEPENDENT THIRD- PARTY COMMISSIONING



- An independent CxP reports to the owner or owner's representative rather than project team members who perform work the CxP will evaluate. The CxP must be independent from designers, builders, vendors, suppliers, and project stakeholders to advocate for the owner objectively.
- Independent thinking and action by the CxP should lead to impartial problem solving, conflict resolution, testing, verification, and reporting.
- Many contractors can test the building equipment and systems they install, but they may not be able to test integrated systems or diagnose and document integration issues.
- Asking contractors to objectively observe, check, test, and confirm their own work is difficult or impossible.
- Contractors must test and verify their installations according to project specifications, but this is not commissioning without independent oversight.

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FINANCIAL BENEFITS OF COMMISSIONING

Well-executed building systems commissioning has clear financial benefits. Building systems that work as expected add value, lower O&M costs, and extend the facility's lifespan. The commissioning provider (CxP) should holistically commission building systems as an owner advocate. The CxP should focus on building performance and system performance.

The CxP should evaluate TCO based on first costs, energy and water consumption, maintenance issues, daily operations, environmental impacts, and future plans. Each factor is explained below.

- First Costs:
- Energy and water consumption:
- Maintenance Issues:
- Day-to-Day Operations:
- Environmental Impacts:
- Future Plans:



WHAT ARE THE ELEMENTS OF CX PROCESS?

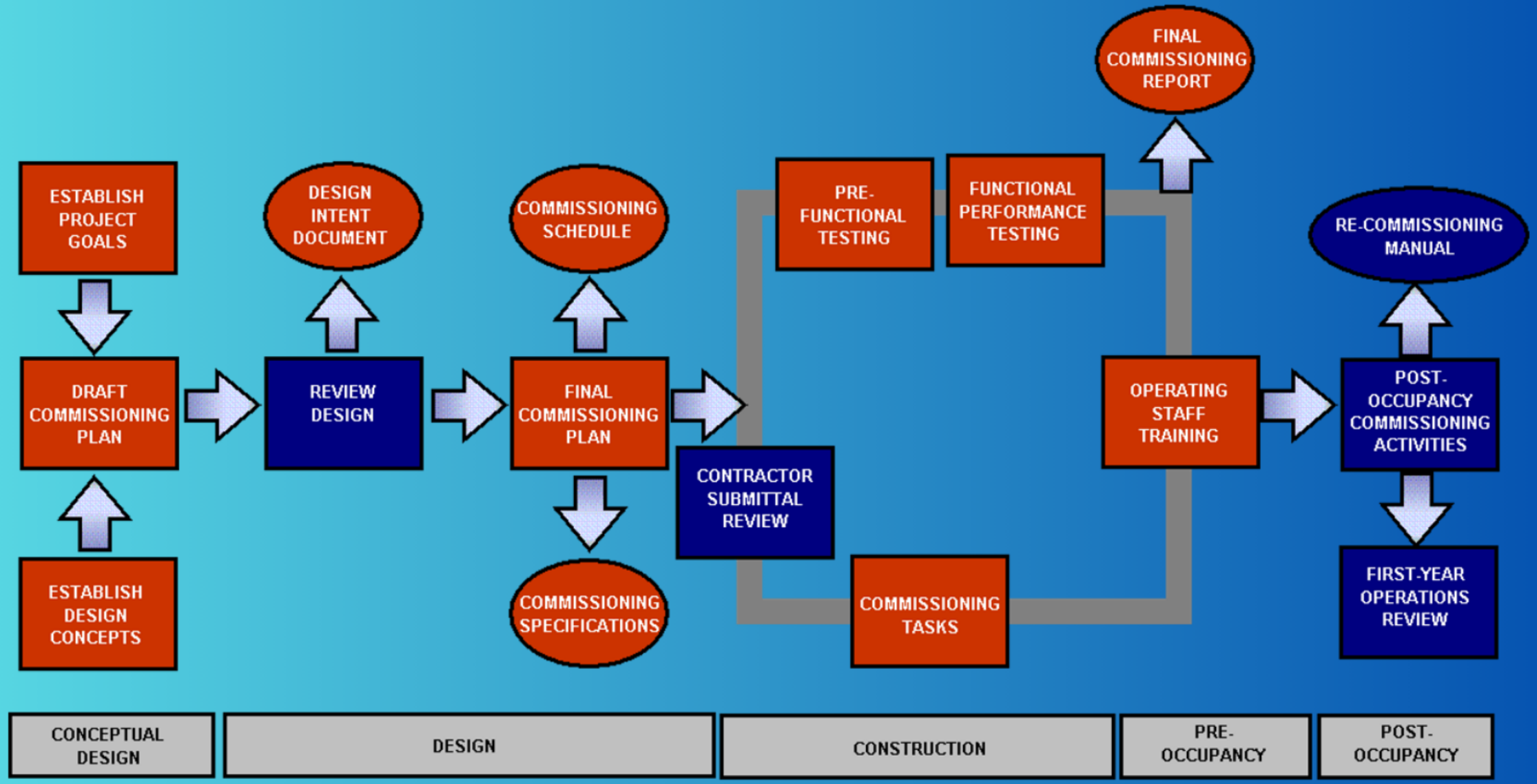


- Decision to do Commissioning
- Designation of Commissioning Provider
- Integrating Commissioning into the Project

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COMMISSIONING AND THE BUILDING DEVELOPMENT PROCESS



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