**Building Innovation Hub**

Developed in partnership with

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# Module 4: Commissioning
## Managing Performance through Commissioning

### Introduction

The current 2017 DC Energy Code is based on ASHRAE 90.1-2013, Chapter 7 of ASHRAE 189.1 and Appendix G of ASHRAE 90.1-2016, with additional modifications. The energy code was developed over the course of 2015-2016 with the intent of adoption in 2017, three years after the previous code cycle. Unfortunately, adoption was delayed until 2020. The energy code is a good foundation for BEPS compliance, but just meeting the code is not a good plan for long term compliance. Building Owners should consider above-code performance goals and how to optimize performance over the lifespan of their asset.

Fortunately, both the Green Building Act, which requires LEED Certification, and the 2017 DC Energy Code, have inherent commissioning requirements built in. Commissioning (often abbreviated as Cx) is a critical process in which follows the processes laid out in the table below. For a detailed guide to DC commissioning, download the Hub's Building Commissioning Guidelines for the 2017 District of Columbia Energy Conservation Code–Commercial Provisions.

## The Commissioning Process throughout Project Phases

| | LEED & Code Cx Requirements | LEED Enhanced Cx (MEP and/or Enclosure) | LEED Monitoring-Based Cx |
|---|---|---|---|
| **Concept Design** | The Owner defines project goals early in the process (Owner's Project Requirements, or OPR) | | |
| **Schematic Design (SD)** | The design team develops a Basis of Design (BOD) that addresses these goals; A third-party Commissioning Authority (CxA) or separate authorities for MEP and Enclosure join the team | | |
| **Design Development (DD)** | CxA issues Cx Plan<br>CxA reviews OPR & BOD for alignment<br>CxA participates in energy model review meetings* | CxA conducts peer reviews of drawings in DD, CDs and offers comments Lorem ipsum dolor | CxA defines/confirms monitoring metering and trending requirements; roles & responsibilities for data reviews, training, building repair and maintenance |
| **Construction Documents (CDs)** | CxA participates in energy model review meetings*<br>CxA develops Cx Specifications, Pre-functional checklists | CxA conducts peer reviews of drawings in DD, CDs and offers comments | CxA confirms measurement requirements and points to be tracked, frequency and duration for trend monitoring |
| **Construction** | CxA conducts kickoff at beginning of construction with General Contractor and major subs (MEP, controls)<br>CxA verifies the installation and performance of energy systems according to design intent (using pre-functional checklists)<br>CxA creates list of deficiencies for Contractor to correct<br>CxA develops a Current Facilities Requirements (CFR) and Operations & Maintenance (O&M) Plan (also referred to as a Systems Manual under Enhanced Cx) | CxA reviews contractor submittals<br>CxA confirms O&M training has been conducted for O&M personnel<br>CxA confirms O&M Manuals have been created and left for O&M personnel | CxA defines limits of acceptable values for tracked points and metered values, confirms elements used to evaluate performance<br>CxA develops detailed training to prevent O&M errors, planning for repairs needed to maintain performance<br>CxA develops action plan for identifying and correcting operational errors and deficiencies |
| **C/O** | CxA issues preliminary Cx Report | CxA develops ongoing Cx Plan | CxA verifies frequency of data analysis for first year of occupancy (at least quarterly) |
| **Post-Occupancy** | CxA revisits site to verify corrective actions were taken, issues final Cx Report | CxA revisits site within 10 months of occupancy to run seasonal testing and verify operations | CxA revisits site or reviews data remotely at least 1x per quarter to compare performance outcomes to modeled/expected performance and support fine-tuning |

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*not required by LEED or the 2017 DC Energy Conservation Code but recommended