Non Residential Commissioning:
Title 24 Part 6 (Energy) vs. Part 11 (Cal Green)

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This program is funded by California utility customers under the auspices of the California Public Utilities Commission and in support of the California Energy Commission.
A website developed by the Statewide Codes & Standards Program to help you meet the requirements of Title 24, Part 6

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A variety of tools to help you identify the forms, installation techniques, and building energy standards relevant to building projects in California

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**Ace*Resources™**
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In order to improve compliance…

Analyze the compliance supply chain market actors’ unique roles and needs

Determine:
1) How current performance compares to desired performance
2) Reasons for the gap
3) Appropriate solutions to improve code compliance

Apply appropriate performance-based solutions that meet stakeholders’ specific needs and preferences
Examples of Problems & Appropriate Solutions

We interviewed key players in the code industry, and asked:

**Scoping Study:**
- "What are the barriers to compliance?"
- "How can we help improve compliance?"

**Lack of knowledge or skill**
- "The code isn't enforced because people don't know the code. It's too complicated and code officials are uninformed."
- "We need to improve the quality of work being performed by energy consultants and the quality of the Certified Energy Plans Examiners exam."

**Implementation seen as burdensome**
- Building departments need more resources to properly implement code
- Lack of electronic forms and automated processes

**Desired performance isn't expected or rewarded**
- Enforcing energy code seen as competition with life/safety requirements
- Home and building owners don't demand compliance
- Contractors who do pull permits can't compete with those who don't
Title 24 Part 6: CEC Documents

Energy Standards: §120.8

Chapter 12

- Building Commissioning Guide

Nonresidential Appendix NA7

- Installation and Acceptance Requirements

http://www.energy.ca.gov/title24/2013standards/index.html
Part 6 vs. Part 11

Title 24 Part 6
- Occupancy groups A, B, E, F, H, M, R S, and U:
  - Ventilation
  - Space-Conditioning Systems and Controls
  - Water Heating Systems and Controls
  - Lighting Systems and Controls
  - Electrical Power Distribution
  - Envelope (insulation, fenestration, cool roof, etc.)
  - Acceptance Testing
  - *Excluding covered process*

Title 24 Part 11
- Occupancy
  - “I” (Institutional)
  - “L” (Laboratories)
- All occupancies:
  - Renewable Energy Systems
  - Landscape Irrigation Systems
  - Water Reuse Systems
When Is Cx Required for Title 24 Part 6?

**Trigger**

All **new** nonresidential buildings

- Does not include additions and alterations
- Does not include high-rise residential or hotel/motel occupancies (It **DOES** include a nonresidential occupancy within a **mixed use building**)
- Includes all mandatory, prescriptive and performance features covered under Part 6 for **conditioned spaces**

**EXCEPT** covered process (§120.6 and §140.9)

- New nonresidential buildings with conditioned space >10,000 ft²: all Cx requirements
- <10,000 ft²: NRCC-CXR forms, Cx Specifications and Acceptance Testing (NRCA forms) only
The purpose of the OPR is to define and document the owner’s energy-related expectations and requirements for the system designers prior to the beginning of design.

**What should it include?**
- Energy efficiency goals
- Ventilation requirements
- Project program, including facility functions and hours of operation, and need for after-hours operation
- Equipment and system expectations

### Table 1. Commissioning Requirements in Title 24, Part 6

<table>
<thead>
<tr>
<th>Commissioning Requirements in Part 6</th>
<th>Conditioned Space</th>
<th>&lt;10k ft²</th>
<th>≥ 10k ft²</th>
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<tbody>
<tr>
<td>OPR (§120.8(b))</td>
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<tr>
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<tr>
<td>Commissioning Plan (§120.8(f))</td>
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<tr>
<td>Functional Performance Tests (§120.8(g))</td>
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<tr>
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<tr>
<td>Commissioning Report (§120.8(i))</td>
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The BOD is essentially the system designer’s documented response to the requirements laid out in the OPR.

### What is this?

The BOD is essentially the system designer’s documented response to the requirements laid out in the OPR.

### What should it include?

- HVAC systems and controls
- Indoor lighting systems and controls
- Water heating systems and controls

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Table 1. Commissioning Requirements in Title 24, Part 6
Design Review (NRCC-CXR Forms)

What is this?

- NRCC-CXR-01-E: Design Review Kickoff
- NRCC-CXR-02-E: Basic Review Checklist
- NRCC-CXR-03-E: Simple HVAC Checklist
- NRCC-CXR-04-E: Complex HVAC Checklist
- NRCC-CXR-05-E: Signature Page

Who does it?

<table>
<thead>
<tr>
<th>Building Size</th>
<th>&lt; 10,000 ft²</th>
<th>10,000 - 50,000 ft²</th>
<th>&gt; 50,000 ft²</th>
<th>Complex systems in Bldgs &gt;10,000 ft²</th>
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<td>Allowed Design Reviewer</td>
<td>Any licensed professional engineer, including the engineer of record</td>
<td>A licensed professional engineer in-house to the design firm but not associated with the building project, or a third party licensed engineer</td>
<td>A third party licensed professional engineer</td>
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</tr>
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Table 2. Who can act as the Design Reviewer, per §120.8(d)
## Cx Specifications: 120.8(e)

### What is this?

**<10,000 ft²**: The construction documents should include all necessary documentation for the design reviewer to perform the design review (NRCC-CXR).

**>10,000 ft²**: To inform bidding contractors of the commissioning requirements so they can include the effort to coordinate with a CxA within their bid, and be contractually obligated to participate.

### What should it include?

- List of systems and assemblies commissioned
- Testing scope
- Roles and responsibilities of contractors
- Requirements for meetings
- Management of issues
- The commissioning schedule
- Operations and maintenance manual development
- Training, and checklist and test form development
- Execution and documentation

### Commissioning Requirements in Part 6

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*Table 1. Commissioning Requirements in Title 24, Part 6*
What is this?
The commissioning plan is vital to the commissioning process as it communicates to the owner, design, and construction teams what to expect from the CxA, what will be tested, and what role members of the teams must play.

What should it include?
✧ The commissioning plan should include more detail on roles and responsibilities once the construction team (including subcontractors) are awarded the job. Before permit, this plan will just be a draft.
Functional Performance Tests: 120.8(g)

Functional performance testing (FPT) is used to demonstrate that relevant equipment has been installed and is operating as designed.

What should it include?

- Issues Log provides a summary of items found during FPT which did not meet design intent or operational requirements.
  - This is not required by Title 24 Part 6, but is strongly recommended.
  - Acceptance forms (NRCA forms) are an aspect of this process for functional testing, which IS required.
O&M Training 120.8 (h)

What is this?
The CxA is responsible for providing a systems manual and associated training to building operation staff.

What should it include?
✧ Training for maintenance staff (as directed by Cx Plan) on installed equipment and controls.
What is this?
The Cx Report is the final deliverable in the Cx process.

What should it include?
✧ The commissioning report should be a compilation of all the documents produced during the Cx process.
✧ It should also include a description of the process, and any major findings.