



California Commissioning Collaborative

California Commissioning Collaborative Advisory Council Meeting

September 16, 2010

Hosted by Pacific Gas & Electric





Agenda

9:30 AM	Welcome, Introductions, and Announcements	Don Frey, LightLouver
9:40 AM	CCC Updates	Kirstin Pinit, CCC Brenda Hopewell, CCC
9:50 AM	CALGreen “Guide to the California Building Standards Code-Non-Residential (Commissioning)”	Dan Burgoyne, DGS
10:20 AM	BREAK	
10:30 AM	The Role of Commissioning in the Implementation of AB 758	Martha Brook, CEC
11:45 AM	LUNCH	
12:45 PM	Upcoming CCC Activities and Topics	Don Frey
1:00 PM	ECAM Tool Update/Demonstration: PNNL’s Building Re-tuning Process	Bill Koran, QuEST Srinivas Katipamula, PNNL
1:45 PM	Improving the Persistence of RCx Benefits: Energy Anomaly and System Fault Detection Toolsets (PIER Task 4.3 Project Report)	Joy Ulickey, Enovity
2:30 PM	LOad Based Optimization System (LOBOS) Case Study (45 minutes) and Site Tour (optional; 30 minutes)	Scot Duncan, Retrofit Originality Incorporated
3:45 PM	Advisory Council Meeting Adjourns	

Introductions & Announcements

ET Summit 2010 - November 7-9

Sacramento Convention Center & Hyatt

- Invited Keynotes:
 - Cathy Zoi, Assistant Secretary of Energy/EERE
 - Jon Wellinghoff, Chairman of FERC
- 4 Technical Tracks:
 - Residential/Mass Market
 - Commercial
 - Industrial/Agricultural/Financial
 - Future Vision/Policy & Programs
- Up to 100 Exhibitors

ETCC-Conference.com



Bruce Baccei
bbaccei@SMUD.org
916-732-5715

ET Summit 2010 - November 7-9 (cont.)

Registration: \$440

Exhibitors: \$1,250

Co-Sponsors: \$5,000 - \$20,000
(BPA, NWEAA)

ETCC-Conference.com

CCC Updates

- Title 24 Training for Building Inspectors and Plans Examiners
 - Developed by CCC/CEC, marketed through CALBO, presented by SMACNA
 - Recent/Upcoming Workshops
 - 7/8/2010: Fresno
 - 8/16/2010: Ventura
 - 8/25/2010: Burlingame
 - 9/13/2010: City of Industry
 - 9/23/2010: San Diego

CCC Updates

PIER Program Updates

- PIER pages of CCC website go live 9/17
- Project #4: Building Performance Tracking in Large Commercial Buildings (reports available 9/30)
 - Subtask 4.2: Investigating Energy Performance Tracking Strategies in the Market
 - Subtask 4.3: Energy Anomaly and System Fault Detection Toolsets
- Hannah Friedman presenting Energy Performance Tracking Research at CEE's Industry Partner's Meeting
- Next PAC Meeting
 - October 14; 10:30am-12pm
 - Conference call & webmeeting.
 - Contact Emilia Sibley at esibley@peci.org

CCC Policy Updates

- **California Long Term Energy Efficiency Strategic Plan**
 - The state's roadmap to achieve its energy efficiency goals
 - Engage 360 website: beta.engage360.ca.gov
- **Building Standards Commission Cx Task Force**
 - Providing definition and guidance around the Cx requirements in CALGreen for building owners, Cx professionals and building officials
- **AB 758**
 - A comprehensive energy efficiency program for existing buildings

CCC Policy Updates (cont.)

- **Building Star Legislation**
 - Federal legislation introduced early this year to provide financial incentives for energy efficiency retrofits to commercial buildings
- **DOE Commercial Real Estate Energy Alliance (CREEA)**
 - A DOE and commercial real estate owners working group evaluating new technologies that will improve sustainability and energy performance of commercial buildings



Guide to the 2010 California Green Building Standards Code

Dan Burgoyne
Sustainability Manager
State of California
Department of General Services



2010 California Green Building Standards Code (CALGREEN)

- California Code of Regulations (CCR), Part 11
- Takes effect January 1, 2011
- Includes mandatory & voluntary measures
- Includes 2 tiers of energy efficiency measures
- www.bsc.ca.gov/CALGreen

CALGREEN Cx Overview

504.4 5.410.2 Commissioning.

- Mandatory for new non-res. bldgs $\geq 10,000$ s.f.
- Optional for schools & hospitals
- “Commissioning shall be performed in accordance with this section by trained personnel with experience on projects of comparable size and complexity.”

Guidance on Trained Personnel

- Cx Coordinator may be
 - Independent 3rd party Cx professional
 - Project design team member (e.g. engineer or architect)
 - Owner's engineer or facility staff
 - Contractor or specialty sub-contractor
- Methods for Evaluating Trained Personnel
 - Technical knowledge
 - Relevant experience
 - Potential conflict of interest concerns
 - Professional certifications and training
 - Communication and organizational skills
 - Reference and sample work products

Cx Minimum Requirements

1. Owner's Project Requirements
2. Basis of Design
3. Commissioning measures shown in the construction documents
4. Commissioning Plan
5. Functional Performance Testing
6. Post Construction Documentation & Training
 - A. Systems Manual
 - B. Systems Operations Training
7. Commissioning Report

Building Systems Included

- Heating, Ventilation, Air Conditioning (HVAC) Systems and Controls
- Indoor Lighting System and Controls
- Water Heating System
- Renewable Energy Systems
- * Landscape Irrigation Systems
- * Water Reuse Systems

* Systems beyond LEED-required Cx

Guide to the 2010 Non-Residential CALGreen Code

- Guidelines published to better describe code requirements & compliance
 - First edition (Aug 2010) does not include Cx info
 - Future updates and revisions to come



Cx Guide Working Group

Government

- CBSC
- DGS
- CEC
- City of LA
- City of Palo Alto
- City of Newport Beach

NGO's

- CALBO
- SMACMA
- CCC
- BCA
- PECI
- CBIA
- ICC
- CBPA

Cx Providers & Others

- HDR
- Capital Engineering
- Summit Building Engineering
- Taylor Engineering
- Guttman & Blaevoet
- Seyfart Shaw LLP

- Met together 7 times June-Sept 2010
- Developed draft guidelines and templates

2010 CALGREEN Cx Guide

- Draft for review & comment by 9/21 to CCC
- Updated Guide including Cx portions will be posted online in October
 - [Living documents & resources](#)
- Guidance documents
- Appendix & links to website including:
 - [Sample templates & documents](#)
 - [Recommended compliance forms \(for building officials\)](#)

Example of Cx Guide - OPR

1. Owner's Project Requirements

CALGreen Section: 5.410.2.1 Owner's or Owner representative's Project Requirements

(OPR). The expectations and requirements of the building appropriate to its phase shall be documented before the design phase of the project begins. This documentation shall include the following:

1. Environmental and Sustainability Goals
2. Energy Efficiency Goals
3. Indoor Environmental Quality Requirements
4. Project program, including facility functions and hours of operation, and need for after hours operation
5. Equipment and Systems Expectations
6. Building Occupant and O&M Personnel Expectations

Intent:

The Owner's Project Requirements (OPR) documents the functional requirements of a project and expectations of the building use and operation as it relates to systems being commissioned. The document describes the physical and functional building characteristics desired by the owner and establishes performance and acceptance criteria. The OPR is most effective when developed during pre-design and used to develop the Basis of Design (BOD) during the design process. The level of detail and complexity of the OPR will vary according to building use, type and systems.

Existing Law or Regulation:

No existing law or regulation. Review local ordinances for any applicable commissioning OPR requirement.

Example of Cx Guide (cont.)

Compliance Method:

Compliance is demonstrated by the owner or owner's representative developing and/or approving the Owner's Project Requirements (OPR) document and can be defined as follows:

1. *Environmental and Sustainability Goals* – Establish environmental project goals and objectives beyond the code for the project's sustainability which may include:
 - a) CALGreen voluntary measures or Tiers sought, or other specific green building rating system or program credits and/or level of certification sought
 - b) Specific environmental or sustainability goals such as water efficiency, water reuse, CO2 monitoring, xeriscaping, etc.
2. *Energy Efficiency Goals* – Establish goals and targets affecting energy efficiency which may include:
 - a) Overall energy efficiency (exceeding T-24 by __%)
 - b) Lighting system efficiency (exceeding T-24 by __%)
 - c) HVAC equipment efficiency & characteristics
 - d) Any other measures affecting energy efficiency desired by owner
 - Building orientation and siting
 - Daylighting
 - Facade, envelope and fenestration
 - Roof
 - Natural ventilation
 - Onsite renewable power generation and net-zero energy use
 - Landscaping and shading
3. *Indoor Environmental Quality Requirements* - For each program space describe indoor environmental requirements including intended use and anticipated schedule
 - a) Lighting

Example of Cx Guide (cont.)

5. *Equipment and Systems Expectations* – Describe the following for each system commissioned:
 - a) Level of quality, reliability, equipment type, automation, flexibility, maintenance and complexity desired
 - b) Specific efficiency targets, desired technologies, or preferred manufacturers for building systems, acoustics and vibration
6. *Building Occupant and O&M Personnel Expectations* – Describe the following:
 - a) How building will be operated and by whom
 - b) Level of training and orientation required to understand, operate and use the building systems for building operation and maintenance staff, as well as occupants
 - c) Building operation and maintenance staff location and capabilities

Examples and templates for Owner's Project Requirements (OPR) documents:

- a) <http://www.documents.dgs.ca.gov/green/ToolKit/OPRsample.doc>
- b) <http://en.sas.usace.army.mil/enweb/httproot/ae/spreadsheet/uloprt.doc>

Enforcement:

At their discretion, the building official confirms demonstrated compliance at *Plan Intake* by:

- a) Receipt of a copy of the OPR document, or
- b) Receipt of a form signed by the owner or owner representative attesting that the OPR has been completed and approved by the owner.

Example of Cx Guide Template

Owner's Project Requirements (OPR)

DRAFT TEMPLATE – September 3, 2010

[The Owner's Project Requirements (OPR) is a step of commissioning required for compliance with the 2010 CALGREEN Code, section 5.410.2.1, for newly constructed buildings greater than 10,000 sq. ft. This template is a guide to collecting the information recommended for the OPR. The information should be developed by the project team in collaboration with the Owner.]

1. Owner and User Requirements

- A. *[Typically already covered in Project Scope as described in the building program. Includes primary purpose, program and use of project. May also describe future expansion needs, flexibility, quality of materials, construction and operation costs.]*

2. Environmental and Sustainability Goals

- A. Project shall meet performance requirements required by the owner.
- B. Other Owner requirements: *[e.g. Owner priorities among CALGREEN Code or other areas]*

3. Energy Efficiency Goals

- A. Project shall comply with Title 24 building energy efficiency standards, or achieve increased level of efficiency determined by owner.
- B. Lighting systems offer cost effective energy savings potential, and lighting fixtures and/or controls

Example of CALGREEN Compliance Form

Owner's Project Requirements

- The following form may be required to be printed on the permit set of construction drawings or submitted separately.
- Italicized text indicates direct or partial quotes from the CALGreen Code.

CAL Green Commissioning Requirement 5.410.2.1. Owner's Project Requirements (OPR)

5.410.2.1 Owner's Project Requirements (OPR). *The expectations and requirements of the building appropriate to its phase shall be documented before the design phase of the project begins.* The OPR includes the checked elements listed below and have been approved by the Owner or Owner Representative.

OPR Elements	Included
1. <i>Environmental and Sustainability Goals.</i>	<input type="checkbox"/>
2. <i>Energy Efficiency Goals.</i>	<input type="checkbox"/>
3. <i>Indoor Environmental Quality Requirements.</i>	<input type="checkbox"/>
4. <i>Project program, including facility functions and hours of operation, and need for after hours operation.</i>	<input type="checkbox"/>
5. <i>Equipment and Systems Expectations.</i>	<input type="checkbox"/>
6. <i>Building Occupant and O&M Personnel Expectations.</i>	<input type="checkbox"/>

Owner / Owner Representative Signature

Date

What Can the CCC Do to Help?

1. Prepare specific recommended edits to guide, templates and forms to CBSC
 - Use strikeouts to remove text and underline to add
2. Provide examples of Cx elements required in CALGREEN
 - Templates for: OPR, BOD, Cx Plan, FPT Test forms, Systems Manual, Operational Training outline, Cx Report
 - Examples of these elements completed
 - Permission needed to post on government website (DGS)
 - Especially need examples from less common Cx systems:
 - Landscape Irrigation Systems, Water Reuse Systems
3. Please submit comments by 9/21/2010 to CCC (info@cacx.org)

Submit Further Edits, Comments, Examples & Suggested Templates

- Submit to enrique.rodriguez@dgs.ca.gov
 - Additional materials & comments welcome after 9/21, but may not be included in Guide right away
- Questions?
 - Dan Burgoyne
 - daniel.burgoyne@dgs.ca.gov
 - (916) 376-5010
- www.bsc.ca.gov/CALGreen

10 Minute Break

The Role of Cx in the Implementation of AB 758

Martha Brook, CEC

AB 758 Discussion

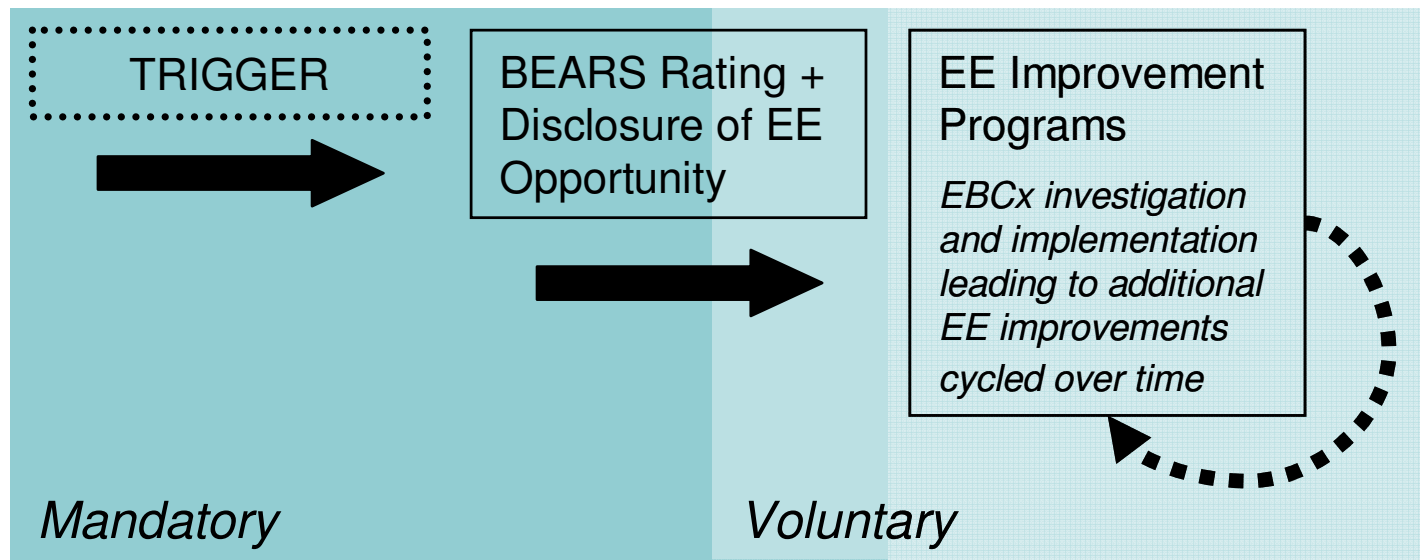
Triggers

Aside from time-of-sale triggers, what other logical triggers could be used to initiate a BEARS rating and disclosure?

- Permit for major renovation; ties to other code requirements
- Building/system vintage – required at a certain age
- Building type/size – required at a certain date (eg all labs EBCx by 2030)

The Role of Cx in the Implementation of AB 758

Discussion: Mandatory vs. Voluntary



AB 758 Discussion

Mandatory

- Screening: Assessment required (an aspect of property condition assessment?) to receive BEARS rating
- Initial Findings: Disclosure of rating and potential EBCx/EE opportunities with (rough) cost estimate for implementation of improvements
- Implementation:
 - Required to achieve an incremental improvement in BEARS score
 - Required for any findings related to deferred maintenance. (additional implementation eligible for incentives through utility programs)

Voluntary

- Enrollment in utility program (with incentive that covers partial cost of BEARS rating and disclosure?)
- Identification and implementation of EBCx findings
- Identification and implementation of retrofits and other EE program offers

AB 758 Discussion

Limitations and Exclusions

- Are special considerations needed when a building is sold and then resold in less than 3-5 years?
- Unnecessary to require EBCx if it would occur within 5 years of last occurrence?
- Are special considerations needed if there is a change of use of building to occur at the trigger point?

Lunch

11:45 – 12:45

Next Meeting – Advisory Council Work Session

Next Meeting	Thursday, December 2
Location	Energy Resource Center, Downey, CA
Host	SoCal Gas
Agenda	EBCx market and utility program topics

2011 Meeting Topics

- Support for EBCx 2012-15 program cycle planning
- Continued discussion related to AB 758 and other policy issues
- Workforce development initiatives (ARRA-funded training in development); support for delivery of new training in CA
- Bridging the gap between Cx and other commercial building service providers
- Cx Provider Certification – efforts to unify and/or standardize
- Technical topics: case studies and best practices for system optimization, technical solutions to get to zero net energy, daylighting innovations, [and more]

2011 Meeting Schedule (Tentative)

Date	Host
March 24	SMUD
June 9	SCE
September 8	PG&E
December 8	Sempra (SDG&E)

ECAM Tool Update/Demonstration

Bill Koran, QuEST

ECAM application: PNNL's Building Re-tuning Process

Srinivas Katipamula, PNNL

Improving Persistence of EBCx Benefits

Joy Ulickey, Enovity

LOBOS Case Study and Site Tour

Scot Duncan, Retrofit Originality Incorporated

Adjourn

*Thanks to PG&E
for hosting the meeting today!*