

BUILDING COMMISSIONING (Cx) MILESTONES FROM 1977 TO 2015

- 1977** - Public Works Canada begins to use Cx in its project delivery system
- 1981** - Disney includes Cx in the design, construction, and startup of Epcot center
- 1984** - University of Wisconsin, Madison begins to offer Cx courses
ASHRAE HVAC Commissioning Guideline Committee formed
- 1988** - Texas LoanStar Program applies monitoring and existing building Cx
ASHRAE publishes *HVAC Commissioning Guideline*
- 1989** - ASHRAE national convention includes Cx presentation
Montgomery County, Maryland institutes Cx Program
University of Michigan establishes facilities evaluation and Cx group
First edition of BPA's *Building Commissioning Guidelines* published
- 1991** - Electric utilities begin to require Cx on energy installations
BPA tests *Commissioning Guideline* on Energy Edge building in Portland, OR
- 1992** - BPA publishes *Building Commissioning Guidelines, Second Edition*
BPA (Bonneville Power Administration) and PEI convene Cx roundtables
US GSA develops *HVAC Functional Inspection & Testing Guide*
- 1993** - Pacific Energy Center offers its first course on Cx
NEBB (National Environmental Balancing Bureau) develops Cx provider certification program
NEES (now National Grid) offers a Cx program to commercial customers
US Army Corps of Engineers develops Cx guide specification
University of Washington begins to require Cx and develops Cx guide specifications
1st NCBC (National Conference on Building Commissioning) hosted by SMUD
- 1994** - LADWP (Los Angeles Department of Water and Power) launches Cx program
Public Works Canada publishes *Project Commissioning Manual*
Executive Order 12902 requires a Cx program for federal agencies
Florida Design Initiative introduces eDesign Online to compliment Florida Department of Management Services Cx program
US Army Corps of Engineers develops *HVAC Commissioning Procedures*
ASHRAE Cx series offered via Professional Development Seminars
ACEEE Summer Study devotes a full panel of presentations to Cx and O&M
LBNL focus on building performance assurance through metrics, Cx and operations
SMUD offers incentives to owners who develop Cx plans
SCE initiates the Cx Research Study and Demonstration
2nd NCBC: Hosted by Florida Design Initiative



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- 1995 -** ENERGY STAR Building Partnership Program includes Cx
AIA magazine, *Architectural Record*, publishes article on Cx
US EPA & DOE conduct Cx demonstrations of five existing buildings
US GSA publishes *Building Commissioning Guide, Version 1*
US GSA & Facility Operations Divisions initiate Cx program
Detroit Edison one-day Cx conference draws more than 300 attendees
NW Commissioning Collaborative sponsors regional conference
State of Washington requires Cx
APPA publishes Cx manual and provides training
3rd NCBC: Hosted by Energy Center of Wisconsin
- 1996 -** ASHRAE publishes updated *Guideline 1-1996: The HVAC Commissioning Process*
US GSA & FEMP fund development of *Model Commissioning Guideline and Specification*
EPRI conducts market study of firms providing Cx services
International Measurement & Verification Protocols recommends Cx in all projects
US DOE/FEMP conducts Cx workshop for federal agency project managers
NW Commissioning Collaborative holds 2nd conference and publishes provider directory
US GSA & FEMP conduct existing building demonstration in Seattle, WA
State of Tennessee begins existing building Cx program for state buildings
4th NCBC: Hosted by Florida Design Initiative
- 1997 -** US DOE/FEMP publishes *Model Commissioning Plan and Guide Specifications*
Sprint commissions World Headquarters in Kansas
Sandia National Laboratories issues Cx specification
E Source Tech updates *Commissioning Existing Buildings*
Cx articles begin to be published in trade press on a regular basis
NEEA conducts Commissioning Baseline and Market Research Study
Oregon Office of Energy's Commissioning Toolkit becomes available online
Federal RCx demonstration projects are conducted in the Northwest
AIA sponsors Cx workshop at Client Connection Conference
5th NCBC: Hosted by Southern California Edison
- 1998 -** US DOE sponsors National Strategy for Building Commissioning
BCA (Building Commissioning Association) incorporated as a not-for-profit trade association
USGBC (US Green Building Council) LEED (Leadership in Energy and Environmental Design)
criteria includes Cx as a fundamental requirement
ENERGY STAR Benchmarking Tool and Building Label create new opportunities for Cx
Washington State Board of Education recommends matching funds for Cx of K-12 schools
US DOE/FEMP proposes Cx to be part of federal building renovations
US GSA announces Comprehensive Building Commissioning Program
US DOE Rebuild America publishes Cx guide
MasterSpec begins to integrate Cx into specifications
NEEA (Northwest Energy Efficiency Alliance) funds Commissioning Public Buildings Program
Cx workshop at AIA National Convention
Seattle Energy Code incorporates Cx for HVAC and lighting controls



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- (Con't 1998)** ACEEE/CEE conduct existing building Cx workshop
NIBS (National Institute of Building Sciences) conducts workshop on whole building Cx
US GSA *Building Commissioning Guide* becomes *Interagency Guide for Federal Buildings*
Cx session at ASHRAE Winter Meeting draws more than 300 attendees
Portland General Electric offers Retrofit Commissioning Program
Public Works Canada revises and expands its Project Commissioning Manual to define basic and enhanced Cx for various project types
US DOE produces a film on Cx with Sandia National Labs and holds a simulcast workshop for DOE sites
Seattle City Light partners with BCA to offer customers Cx services
6th NCBC: Hosted by Florida Design Initiative
- 1999 -** Oak Ridge National Laboratory publishes *Practical Guide for Commissioning Existing Buildings*
State of Tennessee begins New Construction Commissioning Initiative
US GSA conducts a Cx demonstration on its Advanced Workplace Lab
SMUD (Sacramento Municipal Utility District) offers an RCx program
State of Washington adopts Seattle Cx code requirements
ComEd launches Maintenance Operations and Repairs Program (MORES) which includes RCx and begins offering Cx as one of its Advisory Services
1st Annual Benner Award presented to Charles Dorgan, PE, PhD
7th NCBC: Hosted by Portland General Electric
- 2000 -** PG&E publishes *California Commissioning Market Characterization Study*
CCC (California Commissioning Collaborative) established as an ad-hoc group to promote Cx in California
PIER (Public Interest Energy Research) High Performance Commercial Building Systems Program includes integrated Cx
PG&E begins to incorporate Cx into Savings by Design Program
NYSERDA funds Cx market transformation program
ARTI launches research into automated Cx activities
PG&E pilots program for energy efficiency upgrades and RCx of long-term care facilities
BCA develops technical training
GPU Energy (now First Energy) holds Cx workshops
2nd Annual Benner Award presented to Carl N. Lawson
8th NCBC: Hosted by Spring World Headquarters Cx Team
- 2001 -** CERL (Construction Engineering Research Lab) produced Commissionpedia CD-ROM
Massachusetts code incorporates aspects of Cx
First International Conference on Enhanced Building Operation held in Austin, TX
CEC considers incorporating performance verification into California energy code
USGBC begins work on *Existing Building Guideline* to include Cx
SDGE (san Diego Gas & Elect.) funds RCx pilot study
PIER project investigates persistence of Cx
3rd Annual Benner Award presented to Karl Stum
9th NCBC: Hosted by GPU Energy



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- 2002** - PIER Program funds development of Functional Testing Guide
AABC publishes the *AABC Commissioning Guideline*
Energy Design Resources publishes online energy design tools and resources
AABC (Associated Air Balance Council) launches Cx certification program
NYSERDA publishes Cx guideline
4th Annual Benner Award presented to Rick Casault and Emory University
10th NCBC: Hosted by ComEd
- 2003** - SDG&E offers RCx program
PG&E publishes Commissioning Test Protocol Library
CCC develops online library of Cx-related of research, articles, brochures, and white papers
5th Annual Benner Award presented to ASHRAE
11th NCBC: Hosted by Southern California Edison
- 2004** - CCC incorporates as a non-profit organization
MBCx Program launched by UC/CSU/IOU Partnership
California Governor's Executive Order 5-20-4 includes Cx
BCA launches certification program
LBNL releases *The Cost-Effectiveness of Commissioning*, a national study of Cx costs & benefits
USGBC introduces LEED-EB and includes a prerequisite for Retro-commissioning
6th Annual Benner Award presented to Chad Dorgan
12th NCBC: Hosted by Emory University
- 2005** - California's Energy Efficiency Standards include acceptance testing requirements for nonresidential new construction
ASHRAE publishes *Guideline 0-2005: The Commissioning Process*, providing a basis and format for future commissioning standard development for other building systems
AABC Commissioning Group (ACG) 1st Annual Meeting
ASHRAE begins development of *Guideline 1.2: The Commissioning Process for Existing HVAC&R Systems*
Connecticut Light and Power Company initiates RCx pilot program
NEMI publishes a national study of market potential for new building commissioning
7th Annual Benner Award presented to Paul Tseng and NYSERDA
13th NCBC: Hosted by NYSERDA
- 2006** - California utilities roll out large-scale RCx programs
CCC publishes *Commissioning Guides for New and Existing Buildings*
California DGS publishes *In-House Commissioning Toolkit for Small Buildings*
PIER publishes *Specifications Guide for Performance Monitoring Systems*
PIER publishes online *Functional Testing and Design Guides*
ASHRAE announces plans for a certification program for Cx and integrated building design
8th Annual Benner Award presented to Mary Ann Piette and USGBC's LEED Green Building Rating System
14th NCBC: Hosted by Pacific Gas & Electric Company



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- 2007** - North Carolina includes commissioning in a bill to increase energy efficiency in state buildings
Massachusetts' LEED-based energy efficiency standards for state buildings require third-party commissioning for projects greater than 20,000 square feet
CCC publishes *RCx Toolkit - Templates and Sample Documents*
PECI develops *A Retrocommissioning Guide for Owners* with funding from the EPA ENERGY STAR Program
BCA membership increases more than 30% over 2006 membership
9th Annual Benner Award presented to Dan Turner and BCA
15th NCBC: Hosted by ComEd and Illinois Clean Energy Community Foundation
- 2008** - CCC expands *RCx Toolkit - Spreadsheet Tools*
USGBC restructures LEED-EB as LEED for Existing Buildings: Operations & Maintenance, allowing up to 4 points for RCx and 2 points for ongoing Cx
ComEd launches large-scale commercial building RCx and retrofit initiative
10th Annual Benner Award presented to Michael English and CCC
16th NCBC: Hosted by Southern California Edison
- 2009** - USGBC launches LEED v3 which continues prerequisite of fundamental commissioning, but allows up to 2 additional points for enhanced commissioning
11th Annual Benner Award presented to Don Frey of Architectural Energy, Inc.
17th NCBC: Hosted by BetterBricks
- 2010** - ASHRAE releases Standard 189.1: Standard for the Design of High-Performance, Green Buildings except Low-Rise Residential Buildings
12th Annual Benner Award presented to Carl Lundstrom, P.E., of EMC Engineers, Inc.
18th NCBC: Hosted by ComEd, Smart Ideas, and Illinois Clean Energy
- 2012 - 2012 International Energy Conservation Code now requires a formal commissioning effort, and treatment of the envelope to minimize leakage.
- 2014 - USGBC launches LEED v4 which continues prerequisite of fundamental commissioning, but now requires this Cx effort to start at the end of the DD Phase. Up to 6 points are now available for enhanced commissioning, including envelope commissioning.