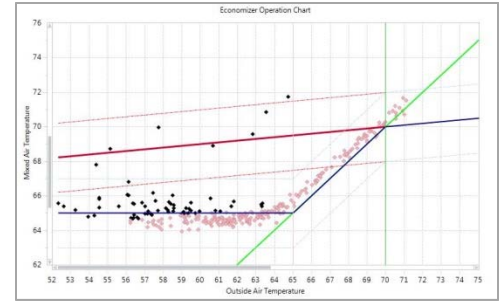
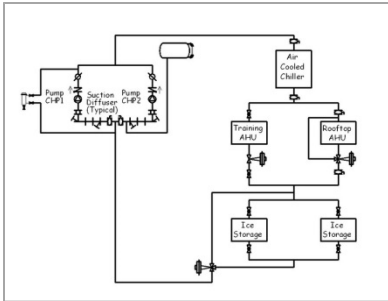


# Existing Building Commissioning Workshop Series – 13

offered through the PG&E Pacific Energy Center,  
851 Howard Street in San Francisco, CA



## Training Description:

Building commissioning is a growing industry in need a qualified professionals with a specific skill set. Navigant Research has predicted that annual building commissioning revenue will double to \$4.4 billion worldwide by 2020 and 35% of energy-efficiency-related job listings in the Bay Area mention “commissioning” (the most frequently used term). And building commissioning is now a required element of Title 24, California’s energy code, and sustainability rating systems like LEED. The challenge for most engineering firms is finding qualified candidates with commissioning field experience. The EBCX workshop series is designed to develop these required skills.

In June we will begin our 13<sup>th</sup> offering of this unique training opportunity. Each class meeting is structured with a morning lecture and afternoon lab. Typically the technical concepts introduced during the lecture are applied in the lab through defined exercises. Students are then asked to apply their newly-learned ability to a building they can access over the course of the year-long training series. We have found the application and re-application of the above skills one of the keys to the success of the EBCx trainings.

There are several unique aspects to the EBCx workshops. These trainings will include 14 sessions over a 12-month period with three meetings taking place at student facilities. The training schedule is provided below (the 2018 dates will be set by the time the class commences in June). In order to insure that all participants are prepared for the elevated level of training content, we will test all EBCx candidates at the first meeting to insure that everyone possess basic HVAC, energy and excel knowledge. And students will be required to complete project work outside of class time; these assignments are almost always focused on one of the 10 skills outlined as learning objectives and require application at the students’ project facilities. People interested in participating must attend the class prerequisite, “RCx 101: Identifying and Assessing Common Retro-commissioning Opportunities, scheduled for May 23 at the PEC. An email will be sent to all EBCx class registrants in early-June with additional details on the class logistics. It will include notes about the pre-class exams and the student project facility. I encourage anyone interested in building commissioning to sign up for the training series and to attend the first class meeting. Questions about the training series can be directed to Ryan Stroupe at r2s2@pge.com.

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Register here: <http://usi.pge.com/event-details?EventID=16399>

First session on June 29, 2017 8:30 am to 4:30 pm at PEC



## Ten Key EBCx Technical Skills:

These skills are the abilities training participants are expected to develop.

1. The ability to **benchmark your facility** and analyze its utility consumption patterns.
2. The ability to **scope a facility and identify obvious indicators** of opportunity to improve performance and/or resource consumption.
3. Familiarity with **HVAC fundamentals** (which is a fairly broad topic we realize).
4. Have a firm grasp of the system concept and be able to apply it to develop or mentor the **development of system diagrams** for key systems in your facility.
5. Be familiar with the **rending capabilities** of your control system and know how to supplement its capabilities with data loggers.
6. Be familiar with **functional testing techniques** and know how to develop and run a test targeted at providing the data you need to resolve operational issues or provide data that can be used to improve your operations and/or support projects.
7. Be familiar with **data analysis techniques** that will allow you to use the data you collect from your trends, data loggers and tests to support projects and resolve operating challenges.
8. Be familiar with basic **HVAC and energy calculations** so you can use the results of your data analysis to assess the cost and benefit of improvements you are proposing.
9. Be familiar with **Return On Investment (ROI) calculations** so you can present your projects in the best light to management and the investors behind your facility. In particular, be familiar with the nuances of the ROI process and the related spreadsheet.
10. Develop a **competency with control systems**, including a basic understanding of how they function as well as an understanding of how to go about procuring one that will meet the needs of your immediate project and the ongoing needs of your facility. This will include having an understanding of the role point lists, narrative sequences, logic diagrams, detailed specifications, and system diagrams have in the control system procurement process.

## Past Participants:

List of companies and organizations that have sent employees to EBCx Workshop series.

Able Engineering	Jones Lang LaSalle
ACCO Engineered Systems	kW Engineering
Arup	Lawrence Berkeley National Labs
Axiom Engineers	Lockheed Martin
BASE Energy, Inc.	Marriott International
Beyond Efficiency	Nexant, Inc.
CA Department of General Services	PG&E
Capital Engineering Consultants	Premier Mushrooms Inc.
Carbon Lighthouse	Presidio of Monterey
CB&I	RetroCom Energy Strategies
City of Berkeley	Roseville Joint Union High School District
City of Monterey	San Francisco State University
City of San Francisco	San Jose State University
City of San Jose	San Mateo County
City of Santa Cruz	Sherrill Engineering
Clovis Unified School District	Siemens
CSU, East Bay	Stanford University
CSU, Maritime Academy	Taylor Engineering
EcoCosm Inc.	Travis Air Force Base
Ecology Action	UC Berkeley
EDesignC, Inc.	UC Davis
EMCOR Energy Services	UC San Francisco
EnerNOC Energy	UC Santa Cruz
Enovity	United Parcel Service
Guttman & Blaevoet	US Navy
Integral group	Western Allied Mechanical



## Testimonials: Past participants have said this about the EBCx workshop series:

"the EBCx series is the best educational experience I have ever attended including all my college courses"  
- Jay Tulley, Energy Manager, Presidio of Monterey

"The EBCx series helped me operate my building more efficiently and provided added value to the owner through no to low cost solutions. It was also a jumping off point to upgrade my career; I now manage the operations for a portfolio of facilities and use the skills I learned in the class almost daily." –Erik Carlson, Engineering Manager, Able Services

"This class definitely opened doors to a new career for me. David Sellers' experience is incredibly vast and he's so generous with his time and knowledge! I loved the hands-on learning doing functional tests in mechanical rooms. It's the best way to learn."- María García-Álvarez, Regional Asset Manager, UC Berkeley

"The EBCx class has given me the tools necessary to expand our market and successfully address some of our firm's toughest challenges. The instructors are able to perform the most difficult job in teaching – explaining very complex technical subjects in a way that students will remember." - Richard Thorne, Project Engineer, Axiom Engineers

"The EBCx training encouraged me to dig into the details of energy using systems, discover issues, and determine energy and cost savings. The experience has set me apart from my colleagues."  
- Tracy Marcial, Energy Manager, Contra Costa Community College District

"I hired two recent college grads that I needed to bring up to speed in HVAC efficiency and Cx knowledge. This course fulfilled that need in a better way than I imagined. It's been great." - Justin Lewis, Senior Energy Project Manager, UC Davis

## Workshop Schedule (in brief):

Training Dates	Lecture Topics	Labs
Thursday, June 29, 2017	Utility data, benchmarking and scoping	EBCx treasure hunt
Thursday, September 21, 2017	Measures lists and Issues logs	System diagrams
Thursday, October 26, 2017	Control logic diagrams	ECAM and UT3
Thursday, November 09, 2017	Resets and common control strategies	Functional test labs
Friday, November 10, 2017	Site visit to student project facility	Facility exploration
Thursday, December 14, 2017	Data loggers and trend analysis	Functional test labs
January (date TBD), 2018	Site visit to student project facility	Facility exploration
January (date TBD), 2018	Site visit to student project facility	Facility exploration
February (date TBD), 2018	Follow-up from site visits	Functional test labs
March (date TBD), 2018	Data graphing best practices	Lighting functional tests
April (date TBD), 2018	Energy savings calculations	Energy savings calculations
May (date TBD), 2018	Sequences of operation	Valve types and operation
June (date TBD), 2018	Project documentation	Financial calculations
July/August (date TBD), 2018	Final project presentations	Project & student next steps

\* All training dates will be set by the first session on June 29

## Speaker Bios:



**David Sellers**, a Senior Engineer at Facility Dynamics, is leading new and existing building performance projects. Mr. Sellers' experience includes 40 years of system design, fabrication, operation, and analysis focusing on HVAC systems, control systems, plumbing systems, and fire protection systems. He has been involved in all aspects of project design from schematics through construction documents. In addition, he has worked as a mechanical and control systems contractor and a facilities engineer, a background that exposed him to the practical issues associated with system installation and operation in addition to the theoretical issues associated with the design process.



For the past 20 years **Ryan Stroupe** has been the Building Performance Program Coordinator at the PG&E Pacific Energy Center. He teaches classes and consults with building professionals on a variety of issues including energy audits, building commissioning, measurement tool applications and architectural design. Ryan is also the lead developer of the Universal Translator, a software tool for managing and analyzing building performance data.