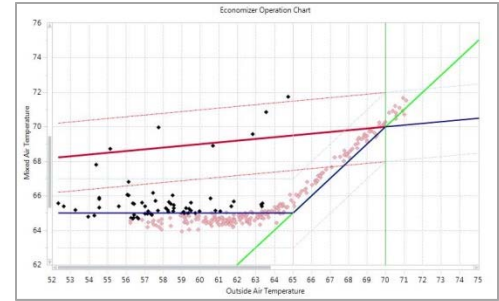
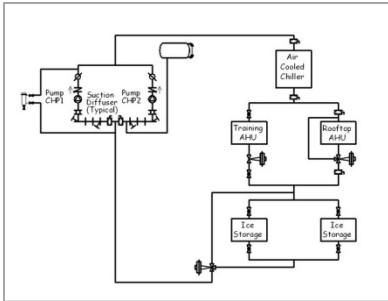


Existing Building Commissioning Workshop Series – 14

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 14th 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 project facilities. The training schedule is provided below (the 2019 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 June 6 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.

Register here: <http://66.198.243.12/event-details?EventID=19186>

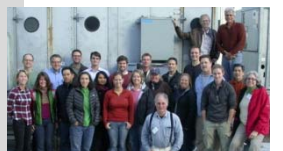
First session on June 28, 2018, 8:30 am to 4:30 pm at PEC



Ten Key EBCx Technical Skills:

These skills are the abilities that EBCx training participants are expected to develop:

1. **benchmark** a facility and **analyze** its utility consumption patterns using billing and interval data.
2. **scope** a facility and **identify** obvious indicators of opportunities to improve performance and/or reduce resource consumption.
3. **apply** a fundamental knowledge of HVAC systems in the EBCx process, including an understanding of mechanical components, systems and controls.
4. **apply** the system concept and **develop** diagrams that illustrate key systems in a facility.
5. **utilize** trending capabilities of control systems to collect building performance data and **supplement** EMS trend data with data loggers.
6. **apply** functional testing techniques and **develop** and **run** tests targeted at providing the information needed to resolve operational issues.
7. **analyze** data collected from trends, data loggers and tests to support projects and resolve operational challenges.
8. **utilize** basic HVAC and energy calculations to assess the impact of proposed building improvements.
9. **apply** Return-On-Investment (ROI) calculations to determine the financial cost and benefit of EBCx projects and **present** this information to facility ownership.
10. **apply** an understanding of building control systems by developing monitoring points lists, narrative control sequences and logic diagrams, and then **use** these tools to identify control issues and pursue tuning opportunities.



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	P2S Engineering
Capital Engineering Consultants	PG&E
Carbon Lighthouse	Premier Mushrooms Inc.
CB&I	Presidio of Monterey (US Army)
City of Berkeley	RetroCom Energy Strategies
City of Monterey	Roseville Joint Union High School District
City of San Francisco	San Francisco State University
City of San Jose	San Francisco International Airport
City of Santa Cruz	San Jose State University
Clovis Unified School District	San Mateo County
County of Sacramento	Sherrill Engineering
CSU, East Bay	Siemens
CSU, Maritime Academy	Stanford University
Cushman & Wakefield	STOK
DNV GL	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 & Blaevonet	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 28, 2018	Utility data, benchmarking and scoping	EBCx treasure hunt
Thursday, September 20, 2018	Measures lists and Issues logs	System diagrams and excel
Thursday, October 25, 2018	Data loggers and trend analysis	ECAM and dataloggers
Thursday, November 08, 2018	Resets and common control strategies	Functional test labs
Friday, November 09, 2018	Site visit to student project facility	Facility exploration
Thursday, December 13, 2018	Control logic diagrams	Functional test labs
January (date TBD), 2019	Site visit to student project facility	Facility exploration
January (date TBD), 2019	Site visit to student project facility	Facility exploration
February (date TBD), 2019	Universal Translator demonstrations	Functional test labs
March (date TBD), 2019	Data graphing best practices	Lighting functional tests
April (date TBD), 2019	Energy savings calculations	Energy savings calculations
May (date TBD), 2019	Perspectives from the field	Escape room and valve types
June (date TBD), 2019	Project documentation	Financial calculations
July/August (date TBD), 2019	Final project presentations	Project & student next steps

* All training dates will be set by the first session on June 28, 2018.

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 21 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.