Preliminary Technical Program

The sixth annual *CxEnergy Conference & Expo* provides more topical, in-depth educational presentations than ever for commissioning and energy management professionals. The following is a preliminary presentation lineup of speakers and topics. Check this link often for additions and the final schedule.

The Whole is Greater than the Sum of its Parts: The Interdependence of MEP and Envelope Commissioning

Mark Gelfo, PE, LEED Fellow, CxA, EMP, TLC Engineering for Architecture
Darek Brandt, PE, Intertek / PSI


Commissioning of building mechanical, electrical and plumbing systems (MEP) has existed for years, however Building Enclosure Commissioning (BECx) is still considered relatively new and still not widely incorporated in the building industry. This presentation will discuss the "Whole Building" Commissioning Process, the synergies between MEP and Envelope Commissioning benefits, and dive further into industry standards and code requirements. We will show how a well-integrated BECx + MEP Cx process will benefit building Owners and enhance building performance beyond the just the "sum of the parts."

Trends in Water Treatment Planning for Legionellosis Mitigation and Prevention

Alok Kumar, PE, EMP Director Energy Services, Nika Architects + Engineers

This presentation educates design engineers, building O&M staff, and building owners about health concerns related to Legionnaire's disease, a form of pneumonia caused by the Legionnella bacteria which lives in inadequately maintained building water systems. Attendees will learn how Legionellosis is spread in facility-wide water systems; understand the importance of proper water treatment system design and monitoring to prevent Legionellosis; and learn about its regulatory environment and best practices being implemented by water treatment experts.

Using Data Analytics to Automate and Enhance the Commissioning Process

John Petze, SkyFoundry

Consultants involved in commissioning, energy analysis, energy management and monitoring and verification have found data analytics software to be a powerful tool that enables them to transform their services to their clients. Today's software allows them to automate the analysis that has traditionally required continuous manual effort, and provide clients with new, ongoing consultation-based service offerings to help continuously improve facility performance and eliminate the backward-drift seen in many energy conservation projects. This presentation will provide three case study examples demonstrating specific how analytics software was applied to the commissioning process and its role in delivering significant financial results and help owners and operators make energy and operational efficiency improvements permanent.

Cybersecurity for Energy Managers

Christopher J. Markstein, PE, CEM, Schneider Electric

Cybersecurity is an important aspect of project implementation and support today, and will become increasingly critical as information and operations technology convergence continues. In the current threat landscape, vulnerabilities can quickly lead to the loss of availability of critical infrastructure, exposure of confidential data or an interruption of business function. This discussion will seek to inform on both the current state and developments in the field of cybersecurity within facilities operations, building management, systems integration, and remote connectivity and support. Topics covered include common deficiencies leading to avenues of compromise as well as approaches to achieving and maintaining end-to-end cybersecurity within your projects.

Commissioning a Biomass Heating System in a Remote Alaska Community

Walter Heins, PE, CxA, Coffman Engineers
Jonathan Fitzpatrick, Coffman Engineers

The use of biomass energy for heating commercial and institutional facilities is viable in areas with adequate resources. Our topic covers a case study of the Southeast Island School District (SISD), Alaska, where five communities in Prince of Wales (POW) Island have developed a biomass program. The biomass boilers not only heat the school and greenhouse, but provide community-strengthening opportunities for involvement and economic development. The SISD learned valuable lessons that led to improved Owner's Project Requirements, revised design criteria, and important startup and operational criteria.

Commonly Made Commissioning Mistakes

Steven Metzgar, CxA, EMP, Gresham, Smith and Partners
Johnathan Woodside, PE, CEM, Gresham, Smith and Partners

As project schedules continue to tighten, anxious clients shorten construction durations to meet aggressive schedules. Since functional performance testing and final commissioning activities are last, they are the first to get cut. The result seems to always be

functional performance tests that weren't completed, reports that weren't finalized, equipment operation that is not exactly right and owners are left holding the bag. We've compiled a list of commonly made commissioning mistakes and oversights as a case study to illustrate a perfect storm of commissioning folly.

Implementation of a Strategic Campus Sustainability and Energy Plan

Nate Boyd, PE, LEED AP, University of Central Florida
Wade Conlan, PE, CxA, LEED AP, Hanson Professional Services Inc.


The University of Central Florida (UCF) is one of the largest universities in the United States, and is one of the most aggressive in pursuing energy efficiency due in large part to their Energy and Sustainability Policy within the Campus Strategic Impact Plan. Through this plan, UCF has successfully implemented continuous improvement measures to conserve energy and reduce costs by 42.5%, normalized per square foot, over the past 14 years. This presentation will cover roles and responsibilities like management of energy assessments and projects, commissioning consultants, energy optimization standards, financial metrics, and more. We'll also cover campus level, long term goals that address carbon-reduction targets toward achieving carbon-neutrality, operation of a cogeneration plant, expanding renewable energy generation to 14 MW of solar, and infrastructure improvements to allow the campus to operate in a micro-grid configuration.

Is an Audit & Retro-Cx an Rx for Energy Savings?

Al LaPera, CxA, EMP, TLC Engineering for Architecture
Nick Dalesandro, PE, Depository Trust Clearing Corporation (DTCC)

The presentation will review why some projects are successful and why some are not. The first part of the presentation will address some of the reasons why some EMC's fail to achieve their goals and other exceed. The program will address the pitfalls and what to do and not do. The second half will dive into a recent successful audit and retro-Cx project and why it was successful. So much so the local utility co came out to replace the meter multiple times due the reduced readings.

Evolution and Benefits of a District-wide Commissioning Program

Drew Daly, CxA , Hanson Professional Services Inc.
Speaker TBD, Orange County Public Schools

Orange County Public Schools (OCPS) is the fourth largest school district in Florida and the ninth largest in the United States. In 2009, OCPS initiated a commissioning program for their new schools and major school additions; initially limited to HVAC systems, and to construction and acceptance (testing) phase Cx services. However, as the program progressed and issues related to systems' design were identified during construction, the commissioning scope was expanded to included design and select submittal reviews, prior to the start of construction.

Fundamentals of Test & Balance for Engineers, Cx & Energy Providers
Jim Hall, PE, TBE, CxA, Systems Management & Balancing, Inc.

This practical, information-packed session explains many of the key test and balance issues—from precise specifications, to duct leakage testing, to pump- and fan-curve considerations—that if properly addressed in cooperation with an independent TAB firm can ensure that any project goes smoothly.

Energy Savings Opportunities on Compressed Air Systems
Joe Ghislain, Compressed Air Challenge

If you are looking for additional areas of energy savings opportunities to add to your commissioning or retro commissioning activities, then compressed air systems and this presentation might just be what you are looking for. This presentation provides an overview of how taking field-tested approach and applying best practices can improve a compressed air system, giving you energy savings using real world examples that lead to better energy management.

Tales of Commissioning and Net Zero Building – Lombardo Welcome Center at Millersville University
Shannon Kaplan, PE, LEED AP, AKF
Brendan McGrath, PE, LEED AP, AKF

The Lombardo Welcome Center is designed to be Millersville's first Zero Energy Building. Now open, the building stands as a clear testament of the owner's commitment to sustainability and to the goal of pursuing carbon neutrality by 2040. This case study presentation examines the challenges and rewards associated with this ambitious project.

Commissioning of the Mercedes-Benz Stadium, a Monumental Task and Achievement
John McFarland, WorkingBuildings

A venue as large as the Mercedes-Benz Stadium in Atlanta is essentially a small city, with a myriad of space uses, systems and equipment to support them all. With that level of complexity and sheer size, commissioning is not something that can wait until the end of the project. This presentation demonstrates how commissioning activities were incorporated into the construction schedule of the project so they could occur at the earliest time possible. Additionally, this presentation reveals how all of the data coming out of the commissioning process was tracked to resolution and highlights the commissioning activities surrounding the remarkable 1.2 million gallon rainwater retention and re-use system at the stadium.

Challenges of Phased Projects from the Commissioning Perspective

Dan Eckelkamp, CxA, Engineered Air Balance Co., Inc.

We'll explore the challenges presented to the commissioning process by projects that have a phased turnover schedule. We will review a recent multistory hospital for which the design did not account for a phased turnover approach and cover the challenges this produced and the strategies devised to try to mitigate them.

Benchmarking and Operational Achievements at Willis Tower

Rick Walls, CxA, Rivion

Samantha Longshore, Rivion

Over several months of rigorous investigation and benchmarking, Rivion assisted Willis Tower, formerly known as Sears Tower, with achievement of their first ENERGY STAR certification, becoming the largest office building ever to achieve this recognition. Building upon this framework, Rivion guided the 4.5 million square foot property through two simultaneous LEED Gold certifications in both version 2009 and the newest version 4.1 rating systems in October of 2018. We will discuss the challenges faced by the property throughout these certification processes and the strategies used to overcome them to make the "impossible" possible.

Information & Optimization: A Pragmatic Approach to Getting the Most of Chilled Water Systems

Mark Gallagher, Armstrong Fluid Technology

Making informed upgrade decisions for central chilled water plants has historically been predicated on partial and sometimes, erroneous information.

Avoid costly mistakes by first understanding the existing equipment and operating characteristics of your central plant. By using a structured approach to optimizing existing equipment, the most cost-effective savings are captured first, ensuring you get the most out of your existing system. Subsequent equipment upgrade decisions are then based on improved overall insight, leading to better overall capital decisions.

The presentation will cover how to identify opportunities in central plant optimization and the next steps to address inefficiency. Additionally, we will review some projects in which customers have saved up to 40% in central plant energy consumption without major equipment replacement.

An opportunity to capture "low hanging fruit" energy savings, where many people do not even realize they exist.

Energy Procurement: Next Level Practices for Today's Energy Management Professional
Kevin Hamilton, NuEnergen

Purchasing energy at the best price can be a complex endeavor. It's not enough just to choose what may appear to be the lowest price. To get the highest value for the energy dollar, it pays to take a more strategic approach to sourcing energy. During this deep-dive session, discover next level practices that will enable energy managers to identify how the market is changing, achieve energy savings, control operating costs and monitor energy purchasing performance. Explore real-world case studies as well as instruction on the specific energy procurement requirements set forth by the Department of Energy for the Better Buildings Workforce and used in EMA's Energy Management Professional certification program.

State of NFPA 3; Standard for Commissioning of Fire Protection and Life Safety Systems
Shawn Mahoney, National Fire Protection Association

What is the current state of fire protection and life safety commissioning? Previously developed as a Recommended Practice, NFPA 3; Standard for Commissioning of Fire Protection and Life Safety Systems is now a Standard that provides a set of requirements to use as part of the total building commissioning or as stand-alone commissioning for individual fire protection and life safety systems. We will discuss why NFPA 3 was initially developed, how NFPA 3 became a standard, who is involved in fire protection and life safety system commissioning, and what are some common misconceptions about fire protection and life safety system commissioning.

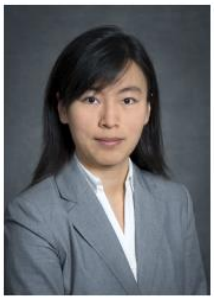
The Case for Cx: Update of Landmark Study Shows Evolution of Profession 2004-2018
Eliot Crowe, Lawrence Berkeley National Lab

Evan Mills' 2004 study "Building Commissioning A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions" is considered the seminal work articulating the cost/benefit of commissioning. It is routinely cited by building owners and Cx providers to make the case for implementing Cx in new and existing buildings, and by policymakers as key background for deployment programs. Lawrence Berkeley National Laboratory has updated the study with new results and findings and this presentation covers the data developed in what is now the world's largest resource of Cx cost and benefit data for commercial buildings.

Using Infrared Technology to Define Energy saving Opportunities
Jim Park, I-Star Energy Solutions

Many facilities pay good money for infrared cameras but often use it without proper training. This presentation provides specific information on what infrared measures and how to make use of the measurements, the importance of infrared training to properly and effectively use the technology, how to find other uses for infrared analysis and why infrared is an effective tool to find energy saving opportunities (and how to act on them). It will open eyes to the possibilities for infrared analysis in facilities and demonstrate to commissioning agents the opportunities for increasing their value to clients.

MBCx State of the Art Using Fault Detection & Diagnostics Tools
Guanjing Lin, PhD Lawrence Berkeley National Lab



Automated Fault Detection and Diagnostics (AFDD) is a powerful tool in the fast-growing area of monitoring-based commissioning to ensuring efficient building operations. AFDD offers the potential to greatly improve performance, and to do so cost effectively. This session will provide an overview of recent Lawrence Berkeley National Laboratory (Berkeley Lab) research on AFDD. It will cover the current state of the market, success stories, and outstanding needs in the industry, from a vendor survey and direct engagement with users of AFDD technology. It will also present a framework for evaluating the performance of AFDD algorithms.

What is Integrated System Testing for Fire Protection and Life Safety Systems, and how will it affect building commissioning?
Shawn Mahoney, National Fire Protection Association

What is Integrated System Testing for Fire Protection and Life Safety Systems? Why is it so critical now? How will the requirements for integrated system testing affect you? We will discuss how NFPA 4; The Standard for Integrated Fire Protection and Life Safety System Testing was developed to address a gap in the codes and standards process dealing with confirmation of system integration. We will identify the types of buildings that require integrated system testing and what model codes will require testing to be completed. Finally, you will learn who is involved in integrated system testing and how you can either benefit, or be burned by the new requirements.

Water Audits & Water Management in the Energy Plant and Beyond

Dr. Valerie A. Shoup, Heritage Institute of Sustainability

As droughts and other factors steadily increase the cost of water, conservation becomes increasingly important but energy engineers and facilities managers often overlook vast opportunities for water savings. This presentation, based on actual case studies, will discuss planning strategies and include how to benchmark, measure, document, and prioritize water management projects.

Introduction to PACE: Funding for Energy Efficiency and Distributed Energy Projects

Scott Ringlein, The Energy Alliance Group of North America

PACE programs—which utilize a voluntary property tax assessment to secure funding—cover 100% of the cost for energy efficiency, water conservation, and distributed energy projects. To date, projects totaling $750MM have been funded through the PACE program, which is now available in 36 states. This session—which includes two case studies—will discuss how PACE works, what types of improvements qualify and how much funding is available.

Commissioning Electrical Systems in Mission Critical Facilities

Paul J. Liesman, CxA, EMP, CFM, Jacobs
David M. Relko, PE, CxA, Jacobs

Commissioning electrical systems in mission critical facilities requires great care and planning. Performing this task correctly can save your clients the extreme costs and embarrassment of system outages due to improperly tested equipment or insufficient levels of testing. This presentation will detail the commissioning process and discuss important tasks and sequences required to successfully ensure your electrical systems will perform as intended.

IoT and Cloud computing meet ASHRAE to deliver productivity and energy savings

Deepinder Singh, 75F

According to the EPA, indoor air tends to be 2-5x more toxic than outdoors. How can commercial buildings provide a healthier environment without increasing operational costs? This session will explain how newer IoT and cloud computing technologies enable pervasive Building Intelligence which improves IAQ, occupant health and productivity while reducing energy usage. It will also explain how ASHRAE 62.1 was adopted to take advantage of these technologies which increase operational efficiency.

Managing Commissioning in a 180-Facility Health Care Corporation
Robert Langford HCA

Hospital Corporation of America (HCA) currently owns 180 hospitals across the United States and United Kingdom. The yearly construction budget to improve and add to our campus' program wide per year reaches $1.5 Billion. This presentation will focus on how HCA utilizes a Cx Database to assist two commissioning agents with this workload. HCA is also applying the Cx Database to improve the Cx process by identifying and eliminating common issues as well as monitor contractors' performance. There have been lessons learned along the way.

FDD Software to Support Monitoring-based Commissioning & Building Optimization
Peter Serian PE, CopperTree Analytics

This session explores how advanced energy and building analytics software unlocks the power of BAS data to enable monitoring-based commissioning, giving owners and energy managers the insights to improve energy efficiency, occupant comfort, and equipment longevity. An overview of Fault Detection & Diagnostics (FDD) tools will be presented. These advanced tools allow users to leverage BAS data to automatically and continuously identify energy saving measures.

Design for Dynamic Light: How to Create Successful Dynamic Lighting Systems
Dr. Ian Rowbottom, Lutron

Provides an overview of Dynamic Light and how it can be deployed. Details are provided on the process of creating use case scenarios through to a thorough sequence of operations. Quality of tunable lighting sources is shown in a way that can be easily specified based on performance. Further information is provided on the effect protocols have on design when implementing a Dynamic Lighting system.

Commissioning in the Building Codes
Jason Toves, International Code Council

Commissioning has been increasingly integrated into codes and standards. This program will review the commissioning requirements in the International Green Construction Code (IgCC), the International Energy Conservation Code (IECC), and the tools commissioning authorities and code officials can use to support compliance with these codes. These additional tools include standards, accreditation, guidelines and compliance forms and templates.