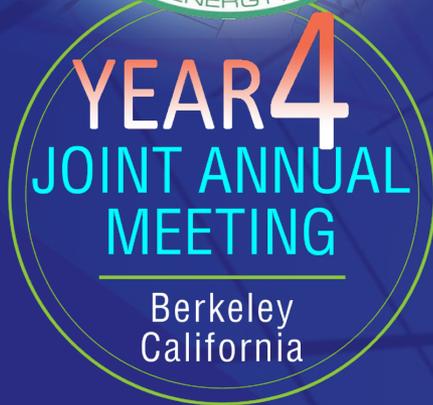


BUILDINGS ENERGY EFFICIENCY CONSORTIUM

U.S. - CHINA CLEAN ENERGY RESEARCH CENTER (CERC-BEE)



E3: Commissioning, Operation, Real Time Monitoring and Evaluation of Pilot Achieving Optimal Performance through Building Commissioning

Xiufeng Pang, Mary Ann Piette, Bin Hao

Interface Engineering, PG&E, WattWise, CABR, Xingye

Presented By

Lawrence Berkeley National Laboratory

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Objectives

- Promote the adoption of U.S. Building Commissioning (Cx) Standards and Guidelines in China.
- Develop guides to help U.S. companies to adapt to China's building Cx market.
- Identify the improvement potentials of the current building Cx practice in China.
- Provide technical support to integrate various demonstrated technologies and make sure that they work together as a whole.

Technical Approach

- Provide building Cx workshop for the stakeholders in China
 - The workshop will be conducted by U.S. experts to introduce the U.S. building Cx standards and guidelines, and explain the merits of building Cx and how building Cx is implemented in U.S.
- Compare the building Cx practice between U.S. and China
 - Choose three recently completed building Cx projects in China and collect all the necessary building information.
 - Invite the U.S. industrial partners to develop the Cx plan and energy efficiency measures (EEMs) for the three buildings.
 - Compare the Cx plans and EEMs developed by the U.S. practitioners with that developed by the Chinese practitioners. Find the differences and figure out the causes.
- Provide technical support to demo projects to ensure that the CERC-BEE demonstrated technologies work properly and are integrated with the rest of the building systems
 - Review the Cx plans for the two demo projects, the CABR building and the Xingye building.
 - Develop optimal control sequences for radiant systems and multi-cooling/heating sources systems, and develop integrated functional testing protocols for the optimal control sequences.

Progress on Milestones, Target Outcomes

- Apr 1st to Jun 30th , 2014
 - Identify workshop speakers (Completed)
 - Develop seminar curriculum (Completed)
 - Complete the seminar (Completed)
 - Collect the design documentation and specifications of the demonstrated technologies in CABR and Xingye demo buildings (70% Completed)
- Jul 1st to Sep 30th , 2014
 - Review the Cx plans for the demo buildings (30% Completed)
 - Develop the optimal control sequences for the radiant systems of CABR building (40% Completed)
 - Identify and collect the information of candidate buildings for the Cx practice comparison (Completed)
- Oct 1st to Dec 31st , 2014
 - Develop the integrated functional testing protocols
 - Complete the comparison analysis

Cx Workshop

- Four Cx experts from U.S.
 - **McHenry “Mack” Wallace, P.E.**, the Director of Design Build Services for TXU Energy
 - **Stacey Lin, P.E.**, the Mechanical Principal in Interface Engineering
 - **Joseph Deringer, AIA, LEED AP**, the Executive Director of the Institute for the Sustainable performance of Buildings
 - **Xiufeng Pang, Ph.D, P.E.**
- Topic Covered
 - Introduction of building Cx in the U.S., the standards and guidelines
 - Building enclosure Cx
 - New building Cx and LEED Cx requirements
 - Existing building Cx



Cx Workshop

- Post-seminar Survey

- Total 40+ attendees
- Evaluation results (29 forms collected)

Items	Excellent	Good	Neutral	Poor	Terrible	NA
Relevance of the Seminar Topic	52%	38%	7%			3%
Usefulness of Information Presented	28%	52%	20%			
Building Cx Standards and Guidelines	35%	41%	10%			14%
New Building Cx	24%	45%	28%			3%
Building Enclosure Cx	28%	55%	14%			3%
LEED Cx	17%	31%	24%			28%
Existing Building Cx	66%	34%				

- Some comments

- “Be more specific on LEED Cx”
- “It’s better to provide more case studies and explain in more detail”
- “Want to know how to Cx a control system”
- “Should talk about how to adapt it to the building industry in China”

Candidates for Cx Comparison

- China Development Bank

- Location: Beijing
- Year: 2012
- Gross Area: 1,500,000 ft²
- Building Type: Office



- Novel Plaza

- Location: Shanghai
- Year 1996
- Gross Area: 300,000 ft²
- Building Type: Commercial complex



- Shenzhen Customs Building

- Location: Shenzhen
- Year: 2004
- Gross Area: 300,000 ft²
- Building Type: Office



Appendix – Concept Proposal

- Budget: \$50K
- Outcomes:
 - Cx comparison Report
 - Optimal control sequences and functional testing protocol for radiant cooling system and multi-cooling/heating sources system
 - Outreach to industry through PG&E and PECI website
- Benefits:
 - Business opportunities for U.S. companies
 - Freely available technical deliverables - Optimal control sequences and functional testing protocol for radiant cooling and multi-cooling/heating sources system – through CERC, PG&E and PECI websites.

Appendix – Project Budget

- Proposed Funding: \$100K
- Total Spending as of July 31st : \$30K
- Cost Share as of July 31st
 - Shenzhen IBR: \$15K
 - Interface Engineering: \$10K
 - EMSI: \$10K

Appendix – Project Plan

- Apr 1st to Jun 30th , 2014
 - Identify workshop speakers
 - Develop seminar curriculum
 - Complete the seminar
 - Collect the design documentation and specifications of the demonstrated technologies in CABR and Xingye demo buildings
- Jul 1st to Sep 30th , 2014
 - Review the Cx plans for the demo buildings
 - Develop the optimal control sequences for the radiant systems of CABR building
 - Identify and collect the information of candidate buildings for the Cx practice comparison
- Oct 1st to Dec 31st , 2014
 - Develop the integrated functional testing protocols
 - Complete the comparison analysis