US-China Clean Energy Research Center (CERC)
Joint Work Plan for Research Projects on Building Energy Efficiency

1. Introduction

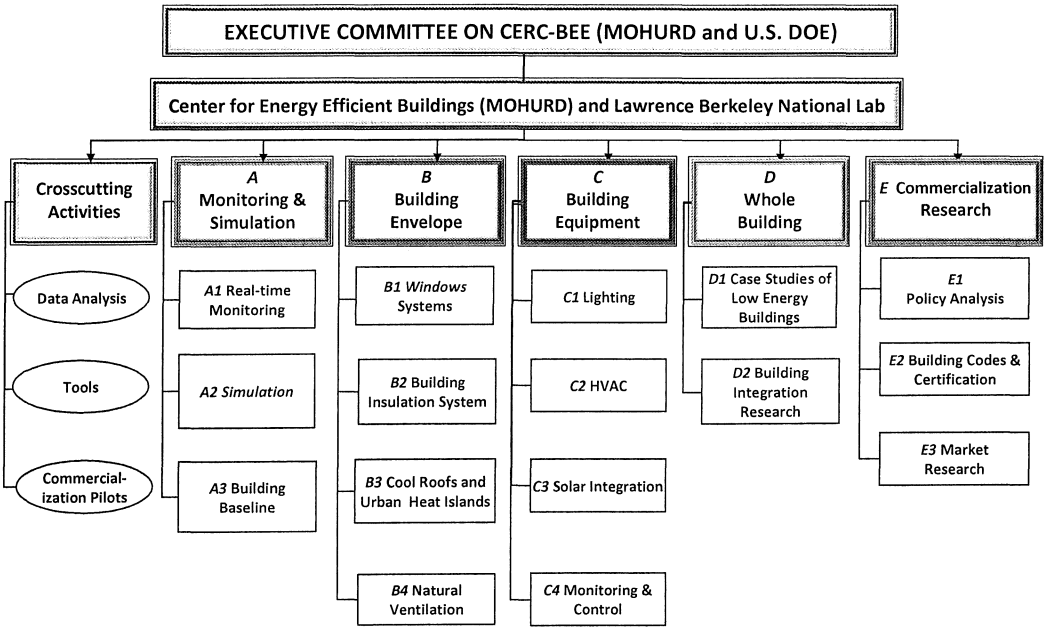
In November 2009, the President of the United States, Barack Obama, and the President of People's Republic of China, Hu Jintao, jointly announced the establishment of the US-China Clean Energy Research Center (CERC). On November 17, 2009, the United States Secretary of Energy, Steven Chu, and the Minister of the Ministry of Science and Technology of People's Republic of China, Wan Gang, as well as the head of National Energy Bureau of China, Zhang Guobao, signed the 2009 agreement, known as the U.S.-China CERC Protocol, and declared the formal establishment of the CERC. The Center aims to facilitate research, development and commercialization of clean energy technologies in both countries. It also serves as a platform for the exchange of knowledge and bilateral experts in terms of clean energy affairs.

The United States and Chinese Governments are currently implementing three programs under the CERC, one of which is CERC-Building Energy Efficiency (CERC-BEE), addressing research on building energy efficiency technologies and practices. For both countries, reduction in building energy consumption poses both challenges and opportunities. The United States needs to reduce the high-energy consumption of its existing building stock. China needs to avoid rapid growth in building energy consumption as a result of rapid construction of new buildings, economic development and the possible increase in indoor comfort. Both countries have significant potential for reducing building energy consumption, as well as in increasing building energy efficiency.

With these premises, the countries have appointed Lawrence Berkeley National Laboratory (LBNL) in the United States, and the Center of Building Energy Efficiency of the Ministry of Housing and Urban-Rural Development in China, to initiate the work by organizing expert teams from national and private institutes. Under the CERC's leadership, the expert teams will be dedicated to the development and implementation of this Joint Work Plan for the coming five years and will make significant contributions to reduction in building energy consumption in both countries.

2. Organizational Structure of the CERC-Building Energy Efficiency

The Chinese and the U.S. organization for building energy efficiency and its research areas is shown in the figure below. In the United States, the U.S. Department of Energy will be the highest level of organization that supervises the work of CERC-BEE. In China, the Ministry of Housing and Urban-Rural Development will take the responsibility of supervising the work of CERC-BEE.



3. Research Areas

United States and China will conduct research jointly in the areas identified in the figure above. Descriptions of a group of research topics from which specific projects will be chosen are as follows, with further details to be developed after the initiation of projects. Under the CERC's U.S.-China Protocol and its Intellectual Property Annex, no work on any cooperative activity between the two countries can begin without a mutually agreed upon Technology Management Plan.

1) Monitoring and Simulation

- Research on modeling of building energy consumption for comparisons within each country and between the two countries.
- Comparison and analysis of building energy consumption data of China and the United States in terms of case studies and statistical data.
- Development of a common platform to collect and organize data on real-time building electricity consumption.

- Development of scientific methods in collecting, monitoring and analyzing data on building energy consumption, to provide multiple linkages for the electricity grid and energy supply decision-making.
- Analysis and in-depth mining of actual energy consumption data.

2) Building Envelope

- Development of new types of building materials for insulation systems;
- Research on the impact of building walls and windows on building energy consumption and indoor environment; development of optimization and simulation tools for impact analysis;
- Development of high-efficient shading systems for buildings and related control systems;
- Research on natural ventilation and strategies of building integration;
- Exploration and understanding the impact of cool roofs and urban heat Island.

3) Building Equipment

- Development, demonstration and promotion of advanced heating, cooling and water heating equipment and technologies;
- Development, demonstration and promotion of accurate and applicable heat metering equipment, as well as technologies for data-collection;
- Research on design of lighting system for new types of buildings and cities, as well as research on lighting control methodology.
- Research on LED-based lighting design and control systems.
- Research on renewable energy and related technologies, including solar integration and its expected costs and performance.

4) Building Integration

- Surveys and analysis on the performance of low-energy buildings and green buildings in both countries;

- Optimization of energy-efficient technologies and distributed low carbon energy supply technologies that are suitable for both countries;
- Selection of typical case studies in both countries for in-depth testing, analysis and comparison in areas such as water source heat pump, ground source heat pump, photovoltaic power generation, solar thermal, and comprehensive utilization of a variety of renewable energy systems.

5) Commercialization Research

- Platform for data collection, analysis and release of the data on building energy consumption;
- Research on policies to promote implementation, evaluation and certification of building energy efficiency codes and labels;
- Policy research on green building standards, certification and promotion;
- Mechanism of and policy evaluation on market promotion for building energy efficiency;
- Expansion of exchanges and training of experts and managers specialized in building energy efficiency, in order to promote technical information exchange on building energy efficiency and green building.

6) Approvals

The above Joint Work Plan has been jointly developed and reviewed and is hereby approved by the respective authorities in each country, as indicated by the signatures of the appointed CERC-BEE Directors, below, made this date of January 18, 2011.

For the CERC Building Energy Efficiency Consortium of the United States:

For the CERC Building Energy Efficiency Consortium of the Peoples Republic of China: