ZERO ENERGY COMMERCIAL BUILDINGS CONSORTIUM

Combined Heat and Power (CHP), Multi-Building Systems, and Grid Integration Working Group

Zero Energy Commercial Buildings Consortium (CBC)
Call Notes
June 23, 2010; 12:00-1:00 pm EST

Key Conclusions

- Existing buildings is part of the scope for this group, and there should be recasting of some questions and addition of others to better tease out that aspect vs. new construction.
- Regulatory barriers and existing utility structures is a key area for examination for this group.

Next Steps

- **Technologies Survey:** Before the next call, members should fill out this online survey to get started in identifying the technologies, tools, and issues to be further explored.
  - **http://www.surveymonkey.com/s/DSLXXKZ**. **–Deadline is Friday, July 2, 2010.**
- **Detailed Write-Ups:** Concurrently, members can provide more in-depth examinations (1-2) pages on topics that were discussed on the call and in which they have expertise and experience in. ***(See Member Assignments Below)***
  - Submit content to Garth Otto (gotto@naseo.org) for collection. **–Deadline is Friday, July 2, 2010.**
- The chairs will compile and synthesize these member write-ups and the survey results for discussion on the next call.
- **Resources:** Members should send any relevant resources (hyperlinks preferred) and a bibliography can be created for circulation and reference.
  - Submit that content to Garth Otto (gotto@naseo.org) for collection. **–Ongoing activity.**
- **Call Schedule:** Calls will take place bi-weekly, on Wednesday from 12:00-1:00pm EDT. Future calls will be:
  - Wednesday, July 7, 2010
  - Wednesday, July 21, 2010
  - Wednesday, August 4, 2010
  - Wednesday, August 18, 2010
  - Wednesday, September 1, 2010

Member Assignments

*Please submit content to Garth Otto (gotto@naseo.org) by **Friday, July 2, 2010** to include in discussion for the next call. If your name's not down for something, don't let that stop you from submitting content on topics you think are relevant!*

- **Luke Leung** can provide background information on Tri-gen electric heating and cooling.
- **SOM** will provide additional information on the Beijing CBD project
- **Jeremy Poling** to send information on Natural Resources Canada's spreadsheet tool for RE
- **Jeremy Poling (?)** Chicago and Milwaukee MBS projects
- **Aaron Needham** to provide additional info/examples of regulatory hurdles with states, PUCs, and grid integration.
- **Aaron Needham** to provide example of a project on EVs and grid integration.
- Building Intelligence Quotient methodology

Meeting Minutes

Co-chairs Nick McLellan, Johnson Controls, Inc. and Bill Sisson, United Technologies Corporation discussed the three subgroups and opened the call to generate content and member engagement.

- This WG needs to complete its information gathering and drafting by the end of August. Timeline is as follows:
    1) WG chapters to task leads by end of August 2010
    2) Task leads to compile draft reports for DOE by end of September 2010
    3) Finalize reports by end of December 2010

All WGs are being encouraged to look at both new and existing construction, especially with DOE's current focus on existing buildings.

One potential common ground between new and existing is to think about how we can make today's new construction and tomorrow's existing stock fit into a NZE strategy and approach. As we put new buildings in place, what can we do to make it better for future retrofits. Let's not overlook opportunities between the 2 areas.

The bulk of the call was spent in discussion on the Framing Questions document:

Combined Heat and Power (CHP)

- Question of how CHP affects accounting between site and source energy. This raises a larger question about how to define NZE.
- Question if Tri-gen is included in the scope.
    - Yes, though we will want to coordinate with the CBC's Mechanical Systems group as appropriate.
    - **Luke Leung will provide additional information on Tri-gen.**

- There are some available modeling tools (but with limitations). DOE has tools, but these are not turnkey solutions.
- Choose your tool wisely based on what the building will need. Natural Resources Canada has a spreadsheet based tool for RE, but doesn't include CHP. This is not a model, only a tool.
    - **Jeremy Poling will provide follow-up info on this.**
- Many of these systems (grid, on site power, etc.) are challenged by the inability of building models to reflect these areas more accurately.
- There are structural and institutional issues with economic transactions when you start exchanging surplus energy.

Multi-Building Systems (MBS)

Generally, looking at buildings individually is suboptimal and there is a lot of lost opportunity. If we can look a communities of buildings and planning and designing on a larger scale, we may be able to achieve more dramatic results and find new approaches.

- SOM is involved with a project to replan Beijing's CBD to use an integrated resource-sharing system, smart grid system, and tri-gen. If you have buildings that share resources, the solutions

are different than if you have singular NZE buildings. The target is to achieve 50% GHG reduction in Beijing's CBD. It may be easier to do something on a city-scale in a one-party system like China, but regardless, if you have buildings that share resources, the solutions are different than if you have singular NZE buildings.
    - **SOM will provide additional information** on this project, and thoughts about how this approach might be applied elsewhere.

- Question to consider: What is the principal advantage of an MBS? Is it primarily a cost advantage or load diversity and energy management advantage?
    - SOM commented that in their Beijing CBD project, part of the attractiveness is that there is a great reduced first cost for infrastructure installation. It would be a very different story in an existing city.
    - We should also broaden the discussion from only load management to information management in general.
- Question to consider: When we say MBS, does this only include physically contiguous building systems? What about aggregated building portfolios such as a retail chain?
- Institutional and Regulatory Barriers:
    - There have been some difficulty convincing retailers to sign on to shared systems, because of their lease structure and cost structure.
    - Utility rate structures
    - Micro-grids

- Other case studies include Chicago and Milwaukee.
    - **Jeremy Poling to provide additional info.**
- One member brought up the Building Intelligence Quotient methodology for determining classes of buildings as they relate to MBS structures.
    - **More information to come.**

Grid Interconnectivity (GI)

- There may be more challenges in this area than success stories. Much of this may not be technological issues, but rather structural, institutional, and/or policy issues. The fundamental point is that experience here is thin.

- Utilities play a large role in this area. Incentives and regulations may be a larger part of this discussion than in the other two sections.
    - This group may want to include an exploratory topic on whether our existing utility structures are obsolete and if we need to re-envision a new system.
- Does the grid only include power, or can it be broadened to include district scale grids for thermal energy?

- Multiple projects are encountering issues with local regulations. Some states, PUCs are only allowing units of a certain size to be integrated into their grid. Also, sometimes you have to secure a PPA before you can sell into the grid. There are many regulatory hurdles.
    - **Aaron Needham to provide more information and examples**.