



ZERO ENERGY COMMERCIAL BUILDINGS CONSORTIUM

CHP, Multi-Building, & Grid Integration

Working Group

Zero Energy Commercial Buildings Consortium (CBC)

Call Notes

August 4, 2010; 12:00-1:30 pm EST

Key Conclusions

- The chairs will revise and update the outline based on today's discussion and post to site (*Week of 8/2*).
- The Working Group (WG) will follow the outline to support drafting the needed inputs for the Working Group submission of the draft section by August 31. Adaptations will be made, as needed.
- The WG will split into two sub-groups – 1) CHP and 2) Multi-Buildings and Grid Integration
 - CHP will be chaired by Bill and a subgroup team, to be defined. **Contact Bill directly at sissonwm@utrc.utc.com to join this subgroup.**
 - Multi-buildings and Grid Integration will be chaired by Nick. **Contact Nick at Nick.P.McLellan@jci.com to join this subgroup.**
 - Current members include: Toby Considine; Brian Patterson; Aaron Needham.
- Each chair will set up meetings accordingly to support their activities.

Next Steps

- **Next all-group call will be August 25, 2010.** A working draft based on the subgroups' work will be discussed during that call. Call-in details and agenda will be distributed ahead of the meeting.
- Each subgroup will work independently ahead of the 25th to complete the outline content, as appropriate.
- Separate contributions are encouraged, outside of scheduled meetings and can be sent to Bill or Nick at the above email address. As a starting point, please see meeting minutes below for some member assignments identified during the call.
- The WG report, structured to the outline, will be delivered on August 31. Reviews will be scheduled accordingly after submission.

Meeting Minutes

WG co-chairs just developed a working outline including:

- Definitional issues
- Technologies
- Challenges
- Policies, strategies

The CHP element of the outline includes current technologies and how they are fueled, with traditional and non-traditional sources. There were also non classic CHP examples like PV combined with thermal (PV/T). Input on other methods is encouraged, particularly if there are known research topics or emerging technology areas in play via start-ups.

Note: There is a definition in EO 13514; "zero-net-energy building" means a building that is designed, constructed, and operated to require a greatly reduced quantity of energy to operate, meet the balance of energy needs from sources of energy that do not produce greenhouse gases, and therefore result in no net emissions of greenhouse gases and be economically viable."

- Let's keep this in mind as a direction, but not obsess over it
- We need to pay attention to economics. The goal is directional and not quantitative. The definition of net zero should not be something we occupy our time with too much. How CHP contributes to building structures is important.

It is important to remember that the framing and definition of net zero will be in broad report, so each WG doesn't need to focus on the definition itself.

The report also has plenty in it, we just to focus on making sure the right information is included. The content will be populated in the next week for feedback.

- Where does thermal energy storage fit in?
 - It's been bought up (in multi buildings-not sure if this is the right area though).
- Tri-gen systems?
 - This is a system that combine multiple uses; heating, power production, and heat generated cooling
- Have micro grid technologies been looked at for grid integration?
 - They have been looked at, but need further exploration as it is important to grid integration. This is planned on being discussed in report, but will have to focus on how micro grids *relate* to buildings.
 - Micro-grid needs to be framed, there are many recursive instances of a "micro-grid"

CHP

For this group in particular, it may be important to discuss thermal and electrical load balance and timing and relationship with the rest of the grid.

- Jeff Harris; we're a long way from getting buildings to zero. For now, it's probably enough to keep drastic energy reductions in mind along with on-site vs. off-site, load timing, and economics. Also, the focus isn't on off-grid buildings

Market penetration and use:

- Applications in data centers have been interesting (Bill has a case study on this)
- Net metering-you need the two way metering technologies
- Also, load balancing is a key factor.
- **Aaron Needham can provide a case study** on the integration of XX industry on a financial model.

Regulatory Structures:

- Accounting for NZE is generally on an annual basis, but payback periods are calculated on 3-5 years period. What are the impacts of this?
 - Brad Hollomon: We can assume that pricing structures may change, so we don't necessarily have to limit ourselves to the current pricing systems. E.g., what would the world be like if carbon credits were available?
- Where's the focus on R&D? Is this in our scope?

- We will need to add this section into our outline, especially since the report is meant for helping DOE roadmap their program.

For CHP and in general for the other areas, we should include a line topic on Future Technologies – research topics and emerging technologies so that we capture the longer range views of each technology area.

Multi Building

- **Toby can provide information on load shaping (as it ties to smart grid).** Integrate this into Multi-Building systems – Whole systems approach
- Utility structures are frequently structured only towards single buildings. What do we do about MBS?
 - Public right of ways preventing MBS infrastructure. You will be a regulated entity if you intersect a public right of way. The problem is fairly well known on residential side, but less so on commercial side
- All interactions are with single buildings; who at DOE is responsible for multi buildings systems? No one really (this is a barrier/suggestion)

Grid Integration

Grid integration is difficult and institutional; some of it is rudimentary technologies issues. Nick and Bill will check in with Brad Holloman to make sure outline is on right track. If observations come up which involve economics, that's okay.

- The grid can't innovate, but micro grids can take more risks.
- Toby: Micro grids are also good labs for testing out new technologies because they have less risk compared to large national grids. **Toby can provide additional information and examples on micro-grids.**

Market considerations:

- Adaptive reuse; storage from non-traditional heat sources. For example, waste heat in data plants
 - Jeremy; one other note on micro grids, we need to be specific about scale or level. Micro grids at different levels will have different roles and integration with the national grid. **Jeremy can provide some definitions and graphics.**

Barriers and Suggestions

Another barrier (and policy recommendation), related to ownership structure, involves how to change the current frame of reference and organizational structure of DOE, state energy programs, utility and municipal customer/taxpayer relationships.

- Campus ownerships offer one point of intervention
- Non-contiguous building portfolios offer another

Also, we should not forget the possibility of rapid entry of disruptive technologies particularly relevant on more flexible and adaptive micro grid structures over large and static regional grids.