Comments on:

# Commercial Buildings Integration Multi-Year Program Plan FY2009-2014

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## Overall

1. The program pursues aggressive, long-term goals but may not be fully successful given the major short-term focus that is based on incremental strategies. An ASHRAE committee chaired by John Mitchell concluded in 2006 that the incremental approaches that were useful to move the market to the 30%+/- savings range were unlikely to be successful alone in moving to the 50% savings range. There should be a portfolio approach with a set of activities that pursue a mix of activity- e.g. high risk / high reward longer term activities to complement the short-term, market-driven activities. In the past DOE success with longer range R&D solutions takes time to reach the industry- if R&D isn't started now it will not be "market-ready" when the market needs it in 5-15 years. The engagement with owners is the right starting point but a broader effort is needed with industry, state governments and other policy organizations, standards bodies, and non-programs to be more effective champions for aggressive energy research, related policy adoption, as well as shorter term market transformation.
2. This MYP draft is useful simply as in information tool to let all the NLCBT members know what is going on in the program and what is planned. The document has varying and uneven levels of detail – in some cases getting down to quarterly deliverables – in other cases being quite general about activities. It would be good to provide those levels of detail in terms of milestones, reports etc for all current work but might be better to put that level of detailed information in an appendix. It would also be useful to show the level of funding by project- its difficult in many cases to gauge the level of activity- funding provides some framework for understanding that.
3. Earlier feedback DOE in August provided a list of 13 topics that we thought were important to include in the DOE program- a few appear to be many mentioned in the document but many are not. Will there be an opportunity to get feedback from you on these topics so that we better understand if and how they might fit in the future?

## General

1. P1, para 2: "DOE's focus on marketable new NZEBs is a necessary condition for wider adoption of net-zero performance in existing, and thus all, buildings in later years." This isn't self-evident given that investment, technology, and process issues can be very different- is there data to support this?

2. P 3, #7: "*All* of DOE's commercial portfolio, from research to analysis, will be refocused to support DOE's goals and its market engagement strategy *directly*." Market engagement as a general strategy makes a lot of sense. As currently defined, it is focused almost exclusively on owners, which makes good sense when resources

are tightly constrained. If/when resources increase significantly, market engagement should be extended to direct, rather than indirect, engagement with manufacturers, designers, contractors, 3rd party operators and managers and ESCOs. In particular, manufacturers should be engaged at the system and whole building levels, not just at the component level. More active engagement of these actors in the Commercial Building Industry Energy Alliance will be needed as soon as resources allow.

3. P4, line 1: "November 2008 MYPP Integration Workshop" – would it be useful for the labs to send members to participate with DOE staff in these meetings- it would be a good approach to get familiar with all aspects of the program.

4. P4, Program Structure: We suggest a need for a fourth (interrelated) element, i.e. *Stock Modeling, Scenario Analysis and Impact Tracking*. Scenario analysis would be used to set goals for enhanced or new technology, including prioritization and resource allocation based on predicted contribution to high level goals. The next step would be to broaden the recent NREL technology impact analyses, making them more explicit with respect to different technologies and including other R&D organizations to add breadth and depth and provide internal review. An expanded Technology Evaluation & Screening cross-cutting activity (see below) would feed into this. The Design Package R&D activity addresses this need to a certain extent. In particular, one of the Design Package R&D selection criteria is "degree of importance in achieving new construction and existing building savings targets" but the Design Package R&D activity does not appear to include an objective, analytical process for establishing the "degree of importance". This need would be met by the proposed activity.

5. P6: Technology Procurements should be extended, over time, to include systems as well as equipment/components, e.g. lighting, lighting controls and active facades, HVAC systems. This may involve dealing with partnerships of manufacturers who take joint responsibility for turn-key systems. In the case of lighting, this could be an extension of the Commercial Lighting Solutions cross-cutting activity.

6. P7: The CLS activity looks like a good activity to move existing solutions into broader market acceptance. But there are many other lighting systems options, most built around advanced controls, sensors and fixtures, that are not used because the solutions have not yet been proven to be robust in the eyes of specifiers, because there is not good documentation of benefits and performance, or because further development is needed. DOE abandoned all R&D in this area several years- it seems like it is time to revisit this critical area. In the next 10-15 years the savings potentials are far greater than LEDs because the solutions are based on modifications of existing technologies and systems. Work would include new task/ambient systems, wireless controls, smart controls that address comfort, energy, tuning and DR. Results of these studies could be incorporated into the CLS web based tools once the solutions are proven.

7. P8: Technology Evaluation & Screening: this is a critically important activity and needs to be substantially expanded, as resources allow, to include field studies and experiments in test buildings rather than relying on literature reports of work funded by others. In particular, there are a number of system-level, low energy technologies, e.g. displacement ventilation, daylighting, that appear not to perform consistently to their technical potential. These technologies require additional objective evaluation in the field and further maturation by a combination of researchers, manufacturers and designers. This activity would feed both the Scenario Analysis described above and the Design Package R&D activity. Partnerships to address these kinds of field based technical integration issues have been successfully undertaken, such as the NY Times building that addressed design, development and commissioning of automated shading, daylight dimming and glare control, and underfloor HVAC; they could be readily replicated and expanded for DOE.

8. P14: Design Package R&D: one concern is that the selection and prioritization process appears to be heavily dependent on the judgment of individuals and the business interests of the owners. Both of these are important but they should be supplemented by objective procedures to assess quantitatively the technical potential of enhancing existing technologies and developing new technologies, identified by methods such as exergy analysis.

9. P16: Topics for Directed R&D: four topics are listed- lighting, daylighting, envelope, and fenestration systems – major performance issues for virtually all ZEBs are noticeably missing from the list- what is the rationale for topics that are included vs those that are not?

10. P16: Commissioning is listed as one of four areas of Directed R&D but is not discussed and no plans for work are described. An MYP for Commissioning was prepared for DOE by a team consisting of LBNL, NIST, PECI and Texas A&M University and submitted in August 2007 but none of the recommendations contained in that document have been included; conversely, no rational is presented for not continuing work in this area.

11. P17: The Building Controls and Diagnostics section makes no mention of diagnostics. A report documenting barriers to commercialization of automated diagnostics and R&D recommended by industry to overcome these barriers was prepared for DOE by LBNL in 2006. None of the recommendations contained in that document have been included; conversely, no rational is presented for not continuing work in this area. The existence of barriers to automated diagnostics is noted, in passing, in the Appendix on Unaddressed Opportunities, at the top of P30.

12. Appendix A: Unaddressed opportunities- this section notes that limited funding and staffing have restricted addressing many important areas. It appears likely that there will be significant funding increases in the next 6 months- how would DOE address that? Is this an opportunity for DOE HQ staff to use the NLCBT to facilitate a larger, growing activity. This section describes a 3 step process by which CB Team

determined priorities – e.g. gathering and ranking ideas, etc. It would be useful to distribute results of that process so we can better understand planning directions at DOE.

13. P29: Electric Grid and Energy Storage: Reliable power is a key need for virtually all building owners. The lack of "trust" in grid reliability and the advent of growing use of mission critical on site needs, e.g. building level data centers and servers, is changing the way that owners view the grid-building relationship. We believe that all aspects of building integration with the existing grid, with on site power (renewable and conventional CHP) and with utility efforts at load management and demand response deserve more attention in this program. These issues can be major economic drivers- elsewhere the MYP notes that commercial decisionmakers are driven by cost and risk. Significant work is underway in other parts of DOE, at utilities and with some state agencies- e.g. Gridwise program and the electric reliability program; this should be carefully coordinated and integrated with the DOE CBI program. There are efforts by NIST to examine interoperability, links to BACnet and a Smart Grid communications infrastructure. Work at LBNL with the DR Research Center has developed an open interoperable model that links to ASHRAE BACnet objects to promote open standards based communications systems for DR. Research is also need to understand how to conduct DR with today's building control systems and the improved capability with advanced systems. Improved simulation tools are needed to help model DR impacts of building components and systems for different climates.

14. P30, first full para: Operational problems and their expected increased importance for high performance buildings are discussed but no connection to commissioning is made.

15. P30 Advanced Building controls- the document states, "While there are several potential roles for DOE to play in advancing building controls and intelligent buildings, it has been determined that there is not an appropriate role for DOE to play in the development of measurement and control sensors." Industry seems to be very excited about the potentials for advances in this area and is looking for support, partnering, help with standards, demonstrations of integration solutions, etc- What roles are anticipated and why is there no role for DOE in sensors for measurement and control?

16. P30 Potential DOE Roles: Lighting is identified earlier in the document as the largest energy issue in commercial buildings – isn't new activity needed in the lighting and daylighting areas? Several topics were submitted in August at an earlier request for input.

17. P32: In the HVAC section of the table, "Examples could include …" implies that the cited technologies have not actually been modeled. If this is the case, the predictions are speculative in that the feasibility and cost of achieving the specified savings in a particular climate and building type have not been established. See #2 above.