



May 24, 2013

Attn: Martha Brook and Mazi Shirakh
California Energy Commission

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Re: Key Issues Affecting the Implementation of the 2013 Standards

Martha and Mazi:

First, I'd like to applaud the amount and quality of work that the Energy Commission has done overseeing and managing the development of the 2013 Standards. Congratulations to the CEC staff and Consultants who worked on the new Standards for their high level of professionalism, effort, focus, dedication and skill in getting us to this point. In particular, compliments for the patience and the tone that you set in reaching out for comments from an enormous range of stakeholders, and responding to thousands of proposed edits to Standards documents.

Now we must all set our sights on effectively implementing the new Standards. As I have stated previously, I fully support the goals and overall architecture that the CEC articulated several years ago regarding 2013 Standards (and future) compliance software. The development and successful completion of the Residential and Nonresidential Compliance Software Managers is an important step toward the long term success of building energy performance standards for the next several decades. The new compliance software will be important in terms of how the Standards will intersect with a variety of stakeholders. My major concern is with software issues that, in my opinion, will - or more accurately, should -- delay the Standards effective date.

Please note that these comments are made by me as an individual professional, and do not necessarily represent the views of the IOUs Statewide Codes and Standards team with whom I regularly consult; or of the California Association of Building Energy Consultants (CABEC) where I am Chair of the Certified Energy Analyst (CEA) Committee. For the record, and notwithstanding my direct involvement in compliance software development in the 1980s and 1990s, I have not had any financial ties to an ACM software vendor since 1996.

Residential Compliance Software

Let me start by expressing full support for the direction and overall structure of the Residential Compliance Software Manager (RCSM), and trust that the final product will be capable of working as planned. However, the level of development of the RCSM -- now a bit more than 7 months before the Standards are scheduled to take effect -- is behind where compliance software has been at this point in the process for the past several decades of code cycle changes, and is far behind where it really should be for proper testing, de-bugging and preliminary use by interested parties. I take no satisfaction in

saying this, especially given the excellent work by the Commission consultants who are working very hard to produce a high quality product on time.

Here are some specific concerns:

- **Compliance Software Engine.** Despite considerable progress on the CSE demonstrated with the most recent release of CBECC-Res, the CSE – as the core calculation upon which performance standards are based – should be ready-for-prime-time by now and should have been well tested by a reasonable number of users. Currently, that is not the case.
- **Compliance Rule Set.** While progress has been made programming the Standard Design for new construction, the programming for the Standard Design for Existing + Addition + Alteration has not yet been done. Those should both be completed well in advance of the implementation of the 2013 Standards so that testing of the Rule Set under a large number and diverse set of design scenarios is possible; and so that the Rule Set can then be fully de-bugged in before it is needed for actual permit submittals.
- **Report Generator and Repository.** Because the residential performance forms are changing considerably, and because project data will be exchanged to a much larger extent with the HERS providers and the new repository, it's important to see the new forms and the data exchanges working. Currently, these are not fully operational.

If you believe that I am setting the bar too high for RSCM operational capabilities at this point in the 2013 Standards implementation time line, consider these factors which contribute to my concern:

- (1) **Stringency of the New Standards.** The 2013 Standards represent a cost-effective jump in energy efficiency measures which, nonetheless, the building industry will take some getting used to. Problems with the compliance software, especially the possibility of flaws undetected before the Standards effective date, will make it much more difficult for all parties to work with, understand and communicate the new energy requirements. Software bugs can diminish the credibility of the Standards and can make our work as energy analysts assisting the building industry very difficult.
- (2) **Compliance Options Within the Performance Approach.** The new Standards will be more effective in achieving greater energy efficiency when buildings meet the appropriate requirements, and there are more compliance options available in the performance approach for a building to meet and exceed code. However, it is important that state-approved and fully operational compliance software versions be available to the building industry and energy analysts at least four or five months before the Standards effective date to allow time for energy analysts to move up the 2013 Standards learning curve.
- (3) **New Forms and Procedures.** Early users of the 2013 compliance software should be able to generate reports for projects to better understand how to read and use the new forms. Because both the procedures and compliance paths for Existing + Addition + Alteration have also significantly changed, it's important to have those working within the compliance software at an earlier date.

- (4) **New Training and New CEA Exam.** The IOUs and other stakeholders continue to invest heavily in new Title 24 Part 6 training curricula, special role-based trainings, webinars and other educational tools. Without fully working and widely tested compliance software, it can be a waste of valuable time and resources developing the case studies and reports needed for trainings. In addition, the new CABEC Certified Energy Analyst (CEA) examination covers energy modeling. This in turn necessitates the use of fully functioning compliance software at least six months or more before the Standards effective date.

So with regret, I urge the California Energy Commission to delay approval of the Residential Compliance Manual, Residential ACM Reference Manual and Residential Compliance Software. I support Commission approval of these items as soon as a truly complete, reasonably well tested and well documented working version of the Residential Compliance Software Manager is available to private Residential ACM vendors.

Nonresidential Compliance Software

CEC Staff correctly foresaw that the developmental complexity of the Nonresidential Compliance Software Manager meant that it would not be completed before the 2013 Standards took effect. Instead, Staff chose an appropriate path that allows current Nonresidential ACM vendors to revise their 2008 Standards software and get it approved by the CEC as long as they meet the requirements of the 2013 Nonresidential ACM Reference Manual (NACMRM) including:

- (1) A revised Nonresidential rule set capability to accurately set the Standard Design;
- (2) Revised energy performance compliance reporting; and,
- (3) Acceptable TDV energy accuracy of all NACMRM certification tests which use a current version of Energy Plus as the reference simulation engine.

One issue regarding the TDV energy accuracy tests is that current 2008 Nonresidential compliance software versions (e-Quest, Energy Pro and the public domain program) are all running a version of the DOE-2 simulation. None of them runs Energy Plus, the reference simulation program that the Commission, understandably, would like the industry to transition to. No one has yet determined whether any DOE-2 version will meet all the NACMRM certification tests, although EnergySoft is working on it. Here is the problem: If the Commission holds all 2013 approved compliance software to the technical accuracy requirements based on Energy Plus in the latest NACMRM draft without making any adjustments in acceptable range of accuracy of the tests, the CEC may effectively be doing the following:

- Disallowing all (i.e., thousands) of current 2008 Nonresidential Standards compliance software users from continuing to use the compliance programs they have learned to use over the course of many years; and,
- Forcing all 2013 Nonresidential compliance software users to learn and use a (currently) incomplete and untested Nonresidential public domain program (i.e., Nonres-CBECC) which is not going to be ready and fully tested by January, 2014.

The above scenario is an implementation nightmare that would seriously affect all major stakeholders. With 20/20 hindsight, we probably would agree that it would have been best if CEC Staff and consultants had been able to:

- (a) Complete the NACMRM certification test criteria much earlier;
- (b) Done a comparison with DOE-2 results; and
- (c) Told the current Nonresidential ACM vendors a year ago that DOE-2 based compliance software would not be able to receive CEC approval.

But it is too late now, as a practical matter, to require current vendors to have their programs re-certified using Energy Plus, since they don't have enough time to re-write their interfaces to connect to Energy Plus.

What is a workable solution?

- (1) Work collaboratively with EnergySoft to find out where certification test discrepancies exist between Energy Plus and DOE-2.
- (2) Consider modifying some modeling assumptions within the DOE-2 compliance programs so that the certification runs better match the Energy Plus results; and put those alternative modeling assumptions into the NACMRM for use with DOE-2.
- (3) Meanwhile, grant interim approval to DOE-2 based compliance software that meets modified accuracy tests vs. Energy Plus.
- (4) Finish the Nonresidential Compliance Software Manager (NCSM). When it is complete, including preliminary testing, announce that interim software must be re-certified using the new NCSM within 12 months.
- (5) Allow any building projects which were initially permitted with an interim compliance software version running DOE-2 to continue using that compliance software version for revisions to that specific permit for the duration of the code cycle.

This is a reasonable approach. It helps transition from DOE-2 as the compliance simulation engine to Energy Plus whenever the CEC's NCSM is done, and it gives ACM vendors enough time to link their programs to and test the new NCSM. After that, the stage will be set for the compliance software vendors using the NCSM for the start of the 2016 Standards.

Yours truly,



Michael Gabel