

**DOCKETED**

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**Comments on the Draft 2019 ACM Reference Manuals and Compliance Software Tools**

*Additional submitted attachment is included below.*

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California Energy Commission  
Dockets Office MS-4  
1516 Ninth St.  
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**Introduction:**

I am a self-employed Title 24 part 6 energy consultant and Certified Energy Analyst, mostly working on low-rise residential projects. I am also a CABEC board member, but I am writing here strictly on my own capacity and do not intend to speak for the CABEC board or its members. Also, as a self-employed consultant I am writing these comments at the last minute, and with a number of needy projects currently on my desk. Thus, I may dispense with the care that I would like to take to properly edit, format, and consider my thoughts, and I hope that this isn't interpreted in a negative light. My sense of formalism has sabotaged previous attempts at submitting comments, and I've been encouraged by staff to submit in whatever form I can. I hope that my best intentions nevertheless shine through the shabbiness of my prose, argument, and formatting. Lastly, I'll admit that I come from the custom home world, and as I've been reminded in the past, we're 5% of the homes but 95% of the time and hassle for the commission (percentages indicative, but not precise). So, with those caveats...

**Comments (generally in order as I read the draft ACM Reference Manual)**

**1. CBECC-Res: alpha-versions and open source**

1.A. Thank you for providing ongoing alpha versions of the software and for committing to open-source. As an energy consultant and as a citizen of California, I believe this is a demonstration of good governance, and I am constantly expanding my toolset to expedite my workflow, which would not have been possible in the past with closed-source compliance software.

**2. All-electric baselines for multi-family, high-rise and Non-residential**

2.A. I'd like to echo the many other comments to the effect of 'leveling the playing field' and providing a fuel neutral baseline for Performance compliance.

2.A.1. Specifically, this pertains to outstanding observed issues with non-residential/high-rise performance as well as low-rise multifamily water heating systems

2.B. I recognize that there is plenty of staff and advocacy attention on this, so consider this comment an additional 'vote' for your ongoing efforts.

3. Thermal bridging

3.A. I had this comment originally attached to the QII section, but it could just as equally apply to Section 2.3.2.

3.B. *Proposal: Please add thermal bridging into the compliance analysis*

3.B.1. I expect this is completely unworkable for the 2019 standards, and maybe even the 2022 standards. So, I'm just putting it into the docket for posterity.

3.B.2. Reasons:

3.B.2.a. Reason #1: It's important. Just ask John Straube. I'm just an unfrozen caveman energy consultant. He's a doctor.

3.B.2.b. Reason #2: It's rampant. It happens *all the time*. I'm am literally now in the cafe surrounded with low-rise apartments with patios and steel structural elements that provide an easy conduction pathway in the exterior surface.

3.B.2.b.1. QII inspection protocol and default 'derating' of cavity insulation value is not an apt or reasonable approximation for the purposes of compliance.

3.B.2.c. Reason #3: Our ignorance of thermal bridging will eventually hamstring and undermine efficiency improvements. Nay, it already is.

3.B.3. Passive House has an an interesting approach to this with 2-d and 3-d thermal bridging coefficients. I've found that most of the thermal bridges I've needed to model have already been pre-calculated and that I haven't needed to dive into THERM for bespoke analysis.

3.B.3.a. I understand that adding these might entail a bit of work on CSE and a little work in CBECC-Res, but the basic math for a heat conduction element with negligible mass seems trivial.

4. Section 2.3.2 Construction Assemblies and materials/assemblies options:  
(Also pertinent to sections in 2.5.6)

4.A. *Proposal: Allow materials and assemblies similar to non-residential compliance.*

4.A.1. Reason 1: As it stands now, this is one more element of the ruleset which seems excessively arbitrary and ends up adding to compliance's opacity for plancheck. I'll argue allowing for these materials will strengthen confidence and understanding in the modeling, or at least in it's review at plancheck. As of now, the arbitrarily limited rules force consultants to submit calculations that facially do not represent the designed building, especially with respect to building assemblies. Plancheckers comment, and then

they are advised that common siding materials such as 'brick' or 'vinyl' or 'aluminum' is not possible due to CBECC-Res constraints. What they've learned is that they simply shouldn't review most of the CF-1R-PERF report.

4.A.2. Reason #2: I think that buildings need to be more accurate as it pertains to thermal mass. As TDV shifts to the 'spikier' and to be later in the day, I think that thermal mass in the building assemblies will be an increasingly useful and cost-effective load shifting and energy efficiency measure. As the Commission and Utilities are evaluating 'active' demand response and load shifting technologies such as batteries and DHW thermal storage, we should not neglect the readily deployable passive thermal mass that can be included as a part of the asset efficiency evaluation.

4.A.2.a. The CSE engine is evaluating zones at 3-minute time intervals and it generally seems capable of properly evaluating mass effects. The compliance ruleset should allow for this kind of evaluation.

4.A.3. I can understand that this is a complex topic for the purposes of compliance, and that there's perhaps some historical baggage here. Still, I think there's some room for improvement on the margin for modeling and reporting assemblies that cleave closer to reality.

4.A.4.

## 5. Section 2.9 DHW Systems

5.A. Heat loss from DHW distribution systems

5.A.1. *Observation: It is my observation that heat loss from DHW systems is not 'coupled' into the zone heat balance.*

5.A.1.a. I suspect there's an interesting reason for this, but my comment is in the form of a question: **'Why not?'**

5.A.1.b. To wit: if my project in CZ 15 is going to run a DHW system on a timer or continuous recirc pump, then why doesn't some/most of that heat loss end up in the zone where the plumbing is located and also be counted against the space cooling budget?

## 6. Section 2.5.6.6 Skylights:

6.A. "The Standard design has no skylights"

6.A.1. Why does the Standard design deviate from the Prescriptive in this specific case? If the Standard design generally uses the Prescriptive pathway as its ruleset, then why is this element the exception to that rule?

6.A.2. *Proposal: allow for the Prescriptive square footage of skylights with Prescriptive NFRC values.*

## Comments of a clerical or stylistic nature

I feel a little sheepish even mentioning some of this since it's generally inconsequential.

### 7. Section 1.7 Demand Response

7.A. Thanks for a definition on Demand Response. Other than battery storage, demand response doesn't appear explicitly anywhere else in the ACM. Why is this here? Maybe a placeholder for 2022?

7.A.1. *I think it would be interesting to see some Demand Response credits available in the ACM someday. My clients ask about this all the time.*

### 8. Section 2.2.10 Attached Garage

8.A. For the purposes of modeling, all unconditioned zones are considered 'garages'. But throughout the ACM, garages are considered specific examples of unconditioned zones. This represents conflicting ontologies.

8.A.1. The more I read into it, the messier it looks. It also seems like there is confusion between Exterior and demising walls. See 2.5.6.3-- are exterior walls also intended to be against unconditioned space? Looking in the software, I can only deploy 'interior' wall types as demising walls against specific unconditioned zones.

8.B. I see there's hints of cleaning this up in places (page 26 for example). I figure cleaning up this whole ACM to make all the terminology consistent and coherent and reconciled with the Standards is a significant task and it's not like you don't see this stuff, but it's just that who has the time to actually clean it up?

### 9. Section 2.2.8 Front Orientation

9.A. *Proposal: Modify this section to at least indicate why it is meaningful for the physics model.*

9.A.1. Argument 1: 'Front' is a subjective descriptor and has no meaning or significance for compliance. To wit-- many of my projects have multiple 'front' orientation

9.A.1.a. E.g. there's the mail address front, there can be multiple 'front' facades, and the front door can be on a different orientation from all of those previous.

9.A.2. Argument 2: The 'Front' is misleading for the plancheckers-- they care a lot about whether or not the 'front' orientation is correct, and don't seem to check the actual azimuth on the fenestration. I know because I've had discussions with them when they disagree with my definition of 'front' and when I advise them to check the actual azimuth of my fenestration, they seem to have no idea as to why that would matter.

9.A.3. I just think it would be nice to have some language in the ACM on this particular topic that could be educational for them.

#### 10. Section 2.6.4 Attic Conditioning

10.A. Whether or not an attic is unventilated doesn't really pertain to whether or not is conditioned. There are building departments that I know of that do not require attic venting at all, regardless of their construction or conditioned status.

10.A.1. This is generally a confusing topic for energy consultants to navigate, thanks to *apparently* ambiguous and conflicting modeling instructions and code interpretations between the part 6, part 2.5, and the ACM. I say 'apparently' mostly because I can't make heads or tails of it.

FIN

In parting, thank you for this opportunity to comment. I can genuinely say that this compliance regime is creating substantial improvements in efficiency for the projects that I work on, and I expect these improvements to continue in the future. There has been some really heavy lifting in recent years, and there is still much more to be done. I thank you for the tireless efforts that the Commission and its staff have expended to get where we are, and thank you in advance for the hard work yet to come.

Best regards,  
Luke Morton  
CEA (Res) 2016