

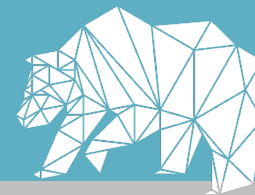
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CalBEM Working Group 3 Coordinated Software Testing

Additional submitted attachment is included below.



CalBEM

E-Comment Submission

To: California Energy Commission Docket Proceedings: 2022 Energy Code Compliance Software & Supporting Documents 22-BSTD-02

From: CalBEM Working Group 3 Participants

Date: 11 April 2022

Coordinated CBECC Title 24 2022 Software Testing

Greetings,

CalBEM Working Group 3 (Advancing BEM Simulation Capabilities, Accuracy, & Metrics) welcomed volunteers to join a coordinated test of the alpha and beta CBECC 2022 Title 24 Compliance Software releases. The group met and performed independent tests in March and April of 2022. Table 1 below describes each software issue identified by the group, including perceived bugs, user questions, and feature requests. Formatting edits have been made to issue descriptions to fit the table format.

Additional details meant to be helpful to the software development process are provided via links to the CBECC testing GitHub site created by NORESKO:

https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues. This site is private per NORESKO policy; please contact Rob Guglielmetti at robert.guglielmetti@noresko.com to discuss visibility.

If any other stakeholders in California BEM would like to join this group, they can email Elise Wall at elisewall@2050partners.com. If you would like to learn more about CalBEM, please visit our website: <https://calbem.ibpsa.us/about/>.

Thank you for your work on compliance issues. Kind regards,

Gina Rodda, Michael Sawford, and Elise Wall

CalBEM Working Group 3 Representatives

gina@gabelenergy.com

michael.sawford@redcaranalytics.com

elisewall@2050partners.com

Table 1. CalBEM Working Group 3 Coordinated CBECC Title 24 2022 Software Testing: Reported Issues

Submitter	Issue Title	Text Body	URL with full context
Gina Rodda	Scope: Multifamily building features	When you select "res" does that mean you HAVE to include mechanical AND envelope AND common use lighting? How will that work if the NR occupancy of a mixed use building does not use that pathway?	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/10
Gina Rodda	Envelope: Air Barrier	When modeling air barrier, will it only apply to NR occupancies?	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/11
Gina Rodda	Envelope: QII	When saying "yes" to QII at the Building Model Data layer on the mechanical tab, does this engage QII as a credit for >3 story MF occupancy? Does it do anything to the NR mixed occupancy spaces?	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/12
Gina Rodda	Designer Info	We need to add "PV and battery" designer.	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/13
Luke Morton	[ACM Comment] - PV Standard Design and Table 170.2-U (Part 1/3)	<p>This is a general comment on what I'm seeing is the implementation of Table 170.2-U (or more specifically, the ACM version of this). That is-- this is not a 'software' bug per se, but comment on the underlying rules. We don't have the ACM yet, so I'm <i>speculating</i> that this is consistent with the ACM Reference Manual and not something that has yet to be developed.</p> <p>**File Reference**</p> <p>To evaluate this, I was looking at the "MF88Unit_5Story_ELEC-CZ12" file and the verbose log of the rules.</p> <p>**Observation:**</p> <p>The Standard Design PV/Battery rules apply Factor A values similar to "Auditorium, Convention Center, Hotel/Motel, Library, Medical Office Building/Clinic, Restaurant, Theater" categories in table 170.2-U for PV/Battery simulation for most residential common spaces that aren't otherwise provided a specific category in the that Table.</p> <p><i>Continued in Part 2.</i></p>	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/14

Submitter	Issue Title	Text Body	URL with full context
Luke Morton	<p>[ACM Comment] - PV Standard Design and Table 170.2-U (Part 2/3)</p>	<p><i>Continued from Part 1.</i> Examples-- Corridors, stairwells, Breakrooms, Lobbies are designated as 'Other' categories and given the same PV Standard Design calculation (PV Factor A= 0.44 for CZ 12). A Leasing office is translated as a "Office, Financial Institution, Unleased Tenant Space" Category & assigned a Factor A correspondingly (3.13 for CZ 12).</p> <p>**What's the problem** (see follow-up below)</p> <p>The software/ACM is deviating from the Prescriptive Tables. Nowhere in the Prescriptive Tables is there a PV Factor A for Common Spaces in Multifamily, and the ACM seems to be intentionally diverging from this by creating an 'other' category that does not exist in the Prescriptive pathway (indeed, this seems to be a running theme in the Performance pathway). And in general, I understand that Prescriptive Design is not binding in any way to the Standard Design, but I think the deviations should be kept at a minimum for general legibility and enforceability of the code. <i>Continued in Part 3.</i></p>	<p>https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/14</p>
Luke Morton	<p>[ACM Comment] - PV Standard Design and Table 170.2-U (Part 3/3)</p>	<p><i>Continued from Part 2.</i></p> <p>Obviously, you can see that I believe the correction here should be that the Rules should be updated to be consistent with the Prescriptive table (so that MF common areas, as well as any other areas not specifically itemized in 170.2-U are not assessed PV). But I'll ask the question to change my mind-- is there a compelling reason why the Performance Pathway should deviate from the Prescriptive Tables here?</p> <p>**FOLLOW-UP**</p> <p>Upon further reflection, I don't think this is really a **problem**, but rather just something that will hopefully be clearly communicated in more public-oriented documents such as the MF/NR-Compliance Manual or other supporting documentation (in addition to the ACM). Often in schematic design, the energy consultant will use the Prescriptive calculation to approximate the PV/Battery requirements, and if later on the Performance model computes a significantly different number, there's understandable confusion and headache for Design Teams.</p>	<p>https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/14</p>

Submitter	Issue Title	Text Body	URL with full context
Luke Morton	[Feature] 2019 CBECC-Res/Com import feature	<p>I think I can speak for many-- I'd love a file import feature that could reasonably map from 2019--> 2022 projects. I know this is probably a heavy lift for some kinds of projects-- especially Low-Rise MF in CBECC-Res, but I think even some kind of import would be helpful. And, I wouldn't expect to be **perfect** either-- to wit-- no ongoing support promised on software teams part (though occasional updates would be nice if we can provide specific comments for improvement!).</p> <p>In general, the Beta-testing will be much easier if we can try out the projects we've already assembled on past projects. As of now, most of my testing has really been about learning about the implementation of ACM rules (sans ACM currently), and not with regards to whether or not the rules are correctly applied or whether or not they're being translated correctly into the physics engines. The former categories of testing will hopefully be forthcoming, and being able to import past work will be really helpful in those heuristics.</p>	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/15
Ben Brannon	[BUG] - Scaling for high resolution monitors	<p>There seems to be no way to adjust the size of the window text (not new to this release), and when very high resolution monitors are used the text is less than half the size of the windows system text which makes it fairly hard to work with.</p> <p>I've noticed this on a 3840x2160 laptop screen, but also on more standard 1920-1080 monitors connected to that computer (there was no issue with the same monitors when previously connected to a different laptop with lower screen resolution and graphics abilities)</p>	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/16
Avani Goyal	QII[Feature]	<p>Problem: The software seems to be missing an input option for QII, that especially applies for low rise multifamily buildings.</p> <p>Solution:</p> <ol style="list-style-type: none"> 1. A check box to enable QII 2. Update standard design for 3 habitable stories or less multifamily buildings to account for QII 	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/17

Submitter	Issue Title	Text Body	URL with full context
Mia Nakajima	[BUG] - W/CFM for IAQ Fan	<p>When the W/CFM is inputted in the IAQ fan, the CSE model that is generated shows a different W/CFM value.</p> <p>We input 0.4 W/CFM in the interface: Image: https://user-images.githubusercontent.com/8907627/162498274-974d1235-dc8b-43c5-975a-c3467ef7f03e.png</p> <p>But in the ap-cse file get this: Image: https://user-images.githubusercontent.com/8907627/162498124-12b57d16-bdbe-4f84-8e94-ad6b9dced6e2.png</p> <p>The ab-cse file has the same W/CFM. This W/CFM also does not match the multifamily W/CFM code requirement.</p>	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/18
Mia Nakajima	[BUG] - Multifamily HVAC	<p>There are a couple of items that are not updated in the standard design to match the 2022 code.</p> <ol style="list-style-type: none"> 1. For low-rise multifamily, climate zone 16 should have air conditioner + furnace, but has a heat pump in the standard design. 2. In climate zones 2 and 8-15 the AC Charge should be "Verified" and there is no requirement for the other climate zones. In the standard design, the refrigerant charge adjustment factor (rsFChg) is 0.96 regardless of climate zone. 3. The fan efficacy should be 0.58 W/CFM for heat pump systems and 0.45 W/CFM for furnace. However in the standard design, all the heat pumps have a 0.45 W/CFM. 	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/19

Submitter	Issue Title	Text Body	URL with full context
Mia Nakajima	[BUG] - Multifamily Pipe Insulation	<p>The standard design is not updated for the multifamily pipe insulation requirement.</p> <p>For the 2022 multifamily mandatory requirements, if the nominal pipe size is 2.5 inches, the insulation thickness must be 2 inches. Image: https://user-images.githubusercontent.com/8907627/162500301-230a287a-a072-47b8-b5b1-dfed1c3d674b.png</p> <p>In the standard design, the nominal pipe size is 2.5 inches but the insulation thickness is 1.5 inches. Image: https://user-images.githubusercontent.com/8907627/162500394-776bba36-5631-48f8-afc8-326dfd75871c.png</p>	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/20
Mia Nakajima	[BUG] - Multifamily PV	<p>The standard sizing for PV does not seem be following the multifamily requirements.</p> <p>- For the 3 story prototype, it says the Standard Design PV Capacity is 74 kW every climate zone and the kWh usage in the PV end-use is exactly the same. There should be variation by climate zone according to Equation 170.2-C and be ~67 kW.</p> <p>*=- In CBECC-Res, we were able to have the software size the PV For us according to Standard Design. It looks like we must provide the capacity now. Is that true?</p> <p>*=- Additionally, there Is a battery sizing mentioned In the Compliance Summary, which may be confusing since battery Is not required For building with three or less habitable stories.</p> <p>Image: https://user-images.githubusercontent.com/8907627/162502071-39013dfa-718a-42b8-b686-3c96d978d4e8.png</p> <p>PV/Battery sizing: Image: https://user-images.githubusercontent.com/8907627/162502654-3e90f163-3003-49ce-9920-cc8f6d5d956e.png</p>	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/21

Submitter	Issue Title	Text Body	URL with full context
Mia Nakajima	[Question] CBECC vs. CBECC-Res	<p>We created a 2022 3-story prescriptive model in both CBECC (beta) and CBECC-Res (svn 2174) and compared the energy usage results.</p> <p>Some questions:</p> <ul style="list-style-type: none"> - We didn't see any energy usage under the "Indoor Lighting" category for CBECC. There is high energy usage under "Other Ltg" though. Is there documentation on what belongs to "Indoor Lighting" and what belongs to "Other Ltg"? - CBECC-Res and CBECC had pretty similar Domestic Hot Water kWh and Therms usage. However, there is a "Pumps & Misc" category in CBECC that I think is for the recirculation pump, and I cannot find that end use in CBECC-Res. Was that just not modeled before in CBECC-Res? - It looks like CBECC has less space heating and cooling energy usage variation by climate zone. What is causing this? <p>Space Heating: https://user-images.githubusercontent.com/8907627/162507681-b612fc00-6f95-4502-89d6-d408aa2274a0.png</p> <p>Space Cooling: https://user-images.githubusercontent.com/8907627/162507756-bd45cc6c-0489-4c56-a16f-3faed4479e22.png</p>	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/22

Submitter	Issue Title	Text Body	URL with full context
Avani Goyal	[BUG] - Standard design Window Spec	<p>**Describe the bug**</p> <p>The standard design does not seem up to date with all 2022 T24 multifamily code requirements. We have listed some of them below. This will affect the compliance margin for multifamily models.</p> <p>**To Reproduce**</p> <p>We ran the 3 story multifamily model in all climate zones and checked the "-ab" (cse) files.</p> <p>**Expected behavior**</p> <p>*=-ab Standard design files to reflect the prescriptive requirements For multifamily buildings</p> <ol style="list-style-type: none"> 1. Window U factor: Climate zone 7 and 8 wnUnfr: 0.34 2. Window SHGC: For climate zone 3, wnSHGC: 0.35 	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/23

Submitter	Issue Title	Text Body	URL with full context
Avani Goyal	Central Heat Pump Water Heater Modeling	<p>We would like to understand the new terms/inputs better? Is there a User Manual that describes them and how it is being simulated in engine?</p> <p>1. HPWH loop tank is changed to "secondary tank" Image: https://user-images.githubusercontent.com/56365171/162510397-07932c8a-5351-4d1b-bb56-8e2222222222.png</p> <p>2. Added input for secondary tank configuration Image: https://user-images.githubusercontent.com/56365171/162510461-c4f4be6f-2259-41e5-a02b-d052fd0dc597.png</p> <p>3. Recirculation loop location option Image: https://user-images.githubusercontent.com/56365171/162510541-78ad4217-4cd7-4e2f-923a-2d79ac907955.png</p> <p>What is "semi-conditioned" in recirculation loop location? What HPWH models are available to model in addition to Sanden units?</p>	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/24
Daniel Salinas	Distribution Systems - Warning Notification	<p>**Is your feature request related to a problem? Please describe.**</p> <p>If a user selects a distribution system that is invalid because it doesn't apply to their specific model, the compliance module will read "COMPLIES", even though the system didn't run any calculations. For example, if I set the Type to "ducts located in a garage", and my model doesn't have a garage, then it won't tell me that's why it failed. This could result in users being unsure of what is causing the system to fail, especially if they made more than one change to the inputs at once.</p> <p>**Describe the solution you'd like**</p> <p>Either some types shouldn't be displayed (if there isn't a garage, don't show the garage option), OR there should be a popup that says that input is invalid due to the model specs.</p>	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/25

Submitter	Issue Title	Text Body	URL with full context
Ben Brannon	[General/Other] HVAC user experience of residential vs commercial	It took me quite a while on my first play with the release that the HVAC systems for demistic spaces have to be defined in the hvac tab, and then a residential 'type' has to be defined back on the building tab that references the system, and then the residential space itself has to reference that type. Though that's a bit convoluted, the process it'sef makes sense (epesccially with hotels and large MF to make it easier to repeat identical rooms), however to me it was not obvious that so much of it had to happen on the building/envelope tab instead of over on the HVAC, which is where system get assigned for NR space types (i spent quite a bit of time and dind't figure it out until I dug through the input text file in more detail). Obviously once the user manual is complete people will be bale to look up what to do, but I'd incourage a slight restucture to make things more consistant between NR and MF.	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/26
Ben Brannon	General renaming	Maybe a good time to clarify some naming, specifically the envelope and mechnaicl tabs. Envelope included a whole lot of things besides the envelope (actually envelope is a minority) and likewise, the mechanical tab also includes plumbing and other things. Maybe just 'Building' and then 'Systems'?	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/27
Gina Rodda	Renewables: Scope	I did not want this closed, not sure how that happened. Reposting as new issue. Hoping that we will get the SARA choice as a modeling option that will document correctly on the certificate of compliance. Additionally, how do you indicate that the SARA x 14 w is the less of the 2 allowances, since so far performance only support the CFA calculation? If I can't pull out of the performance calculation the PV and go prescriptive, that brings up undo hardship. Will it be added as an exception choice? _Originally posted by @GabelEnergy in https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/9#issuecomment-1083820619	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/28

Submitter	Issue Title	Text Body	URL with full context
Luke Morton	GBXML for solar shading import?	<p>Just wondering if anyone out there has an openstudio file modeling a PV system that can be exported to gbXML. Other software also claim to be able to able to export according to the schema (hat tip to John Kennedy! https://scollar.com/pages/the-scollar-pack). It would be interesting to test the PV/Shade geometry function.</p> <p>Software listing is here: https://www.gbxml.org/Software_Tools_that_Support_GreenBuildingXML_gbXML</p>	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/6
Gina Rodda	Envelope: Fenestration - Multifamily	I am trying to figure out how to engage "AW rated" windows and I found an option for "ADHP?" along with NFRC and Default. What is this used for? How do I define AW rated windows?	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/7
Gina Rodda	Envelope: Opaque Assembly Multifamily spaces	When determining how to develop a wall assembly that can convey the fire rating, I do not see how this is tagged? Is that being ignored in the performance approach? When choosing to import a new assembly, it is not clear what "create/import exterior walls constructassembly is used for - nonresidential occupancy spaces only? If so, that should be made clear because I assume I use the "create/import exterior walls residentialconstructassembly for multifamily occupancy spaces.	https://github.com/CBECC-Support/CBECC2022_prerelease_testing/issues/8