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STATE AND CONSUMER SERVICES AGENCY
CALIFORNIA BUILDING STANDARDS COMMISSION
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Office Use Item No. _____

PARTICIPATION COMMENTS FOR THE NOTICES DATED APRIL 22, 2011
Written comments are to be sent to the above address.

WRITTEN COMMENT DEADLINE: JUNE 6, 2011

Date: June 6, 2011

From:

Martha VanGeem
Name (Print or type)


(Signature)

CTLGroup
Agency, jurisdiction, chapter, company, association, individual, etc.

5400 Old Orchard Rd. Skokie IL 60077
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I do not agree with:

The Agency proposed modifications As Submitted on Section No. A5.409

and request that this section or reference provision be recommended:

Approved Disapproved Held for Further Study Approved as Amended

Suggested Revisions to the Text of the Regulations:

A4.409.1 General. Life cycle assessment shall be ISO 14044 compliant. The service life of the building and materials assemblies shall not be less than 60 years unless designated in the construction documents as having a shorter service life as approved by the enforcing agency.

A5.409.2 Whole building life cycle assessment. Conduct a whole building life assessment, including operating energy, showing that the building project achieves at least a 10 percent improvement for at least three of the impacts listed in Section A5.409.2.2, one of which shall be climate change, compared to a reference building of similar size, function, complexity and operating energy performance, and meeting the 2010 California Energy Code at a minimum.

A5.409.2.1 Building components. The building envelope, structural elements, including footings and foundations, interior ceilings, walls, and floors; and exterior finishes shall be considered in the assessment.

Exceptions:

1. Plumbing, mechanical and electrical systems and controls; fire and smoke detection and alarm systems and controls; and conveying systems.
2. Interior finishes are not required to be included.

Notes:

1. Software for calculating whole building life cycle assessments includes those found at the ~~Athena Institute website (Impact Estimator software)~~, the PE International website (GaBi software), and the PRe Consultants website (SimaPro software).
2. Interior finishes, if included, may be assessed using the NIST BEES tool.

A5.409.2.2 Impacts to be considered. Select from the following impacts in the assessment:

1. Climate change (greenhouse gases)
2. Fossil fuel depletion
3. Stratospheric ozone depletion
4. Acidification of land and water sources
5. Eutrophication
6. Photochemical oxidants (smog)

A5.409.3 Materials and system assemblies. If whole building analysis of the project is not elected, select a minimum of 50% of materials or assemblies based on life cycle assessment of at least three for the impacts listed in Section A5.409.2.3, one of which shall be climate change.

Note:

Software for calculating life cycle assessments for assemblies and materials may be found at the ~~Athena Institute web site and the NIST BEES web site.~~

[remaining text was not changed]

Reason: This amendment to Section A5.409 is based on points 1 and 7 of the California Health and Safety Code (§18930).

Point 1 of the California Health and Safety Code (§18930) states: "The proposed building standards do not conflict with, overlap, or duplicate other building standards."

By allowing the use of the Athena Impact Estimator software, this code is conflicting with itself. In Section A5.409.1 and Section A5.409.5 (1), this code requires the "life cycle assessment shall be ISO 14044 compliant" and "the assessment is performed in accordance with ISO 14044," respectively. However, the Athena tools are not compliant with ISO 14044. Specific examples include:

- ISO 14044 and 21930 indicate that inputs and outputs should have environmental relevance.
 - In the Athena Impact Estimator, the assumptions for concrete (with one amount of fly ash that is not commonly used) are not consistent with environmental relevance. For example, the recycled content of cementitious materials and the total cementitious materials in concrete has a large effect on LCA results and should be included in a simplified tool, for accuracy and educational purposes. Yet, the Athena Impact Estimator assumes all concrete has the same cement content and recycled materials content, even though this can vary by a factor of 5 or more and therefore affect the results by a factor of 5 or more.
 - Similarly, the assumptions for masonry in the Athena Impact Estimator (with no replacements for portland cement) are not consistent with environmental relevance. The Athena Impact Estimator also assumes there is no recycled content in masonry, which is incorrect.
 - Concrete is the most used material on earth besides water yet the Athena Impact Estimator does not address the major LCA issues that designers can control when specifying concrete. Cementitious materials do not fair well in the Athena Impact Estimator because of the heavy weighting on CO₂ emissions of cement. Yet, the Athena Impact Estimator provides no means of using less cement or a replacement for cement (such as fly ash or slag cement), which has a major effect on the embodied CO₂ of the concrete.
 - The country of origin of the material needs to be indicated and properly accounted for in the LCA. Commonly used LCA models have data for building materials manufactured in North American and Europe but not for those manufactured in China and other emerging countries. So, the data are not available to perform a relevant LCA. The Athena Impact Estimator should not be used for materials imported from other countries.
 - Note that no steel is manufactured in states with high environmental controls such as California. The LCA for steel needs to be from its country of origin, and steel manufactured in China has approximately 50,000 times the impacts as steel manufactured in the US (Reference: Scientific Certification Systems SCS-002 Type III Life-Cycle Impact Profile Declarations Standards Committee). We are not aware of any LCA models that have data for steel manufactured anywhere other than the US, North America, or Europe, so the criteria cannot be met with any assurance of accuracy. The

quantity and the associated impacts for steel used for construction imported from China and other emerging economies is not accounted for in the Athena Impact Estimator.

- The functional unit in the Athena Impact Estimator is not consistent with ISO 14044 and ISO 21930. A wall that serves more than one function, such as fire resistance, wind resistance, or resistance to noise is penalized because these have not been considered in the functional unit of the Athena Impact Estimator. The Athena Impact Estimator does not encourage integrated design because it does not consider integration of the assemblies with other functions of the building.

Point 4 of the California Health and Safety Code (§18930) states, "The proposed building standard is not unreasonable, arbitrary, unfair, or capricious, in whole or in part."

ASHRAE Standard 189.1-2009, much of which is similar to this document, allows only whole building LCAs for the following reasons:

- The Athena Impact Estimator uses average values that do not take into account relevant differences within product categories, as demonstrated above by the example of cement content in concrete.
- The Athena Impact Estimator only uses impacts that are favorable to wood and neglects impacts such as biodiversity and toxicity (to the environment or human health, or both) which "shall be included if relevant" according to section 8.2.4 of ISO 21930.
- The Sierra Club Forest Certification Committee, in a letter to USGBC dated January 12, 2011, stated, "...the proposed LCA tool, the Athena Institute's EcoCalculator for Assemblies, provides general average scores for various assemblies of different materials. In other words, this tool compares apples with oranges by assigning an average score for all apples and comparing it to an average score for all oranges. Since wood has the lowest average carbon footprint, it will always score the best when compared to the average carbon footprint of concrete, masonry, or steel. We believe this is not a useful comparison. Wood comes from sources whose environmental impacts at the point of extraction vary tremendously from product to product, more so than most building material categories."

Point 7 of the California Health and Safety Code (§18930) states: "The applicable national specifications, published standards, and model codes have been incorporated therein as provided in this part, where appropriate." The ISO 14044 standard for performing LCA is well-recognized by practitioners in the LCA community.

- The Athena Impact Estimator is oversimplified. Putting it into the hands of users who are not LCA practitioners will give them a false sense of security that the answer is accurate and robust. In fact, the Athena Impact Estimator makes many oversimplifying assumptions. Energy standards and codes do not allow the use of simple energy trade off programs. LCA is even more complex than energy analysis, and simplified programs should not be allowed.
- The result of the Athena Impact Estimator are not consistent with results in the published literature where results show that steel and concrete frame buildings have similar LCA profiles. This is most likely due to not considering the additional lateral and sheer support steel, often diagonal to beams and columns, that is required in a steel structure. A steel structure cannot be assembled from steel walls and steel floors as a concrete structure can. It needs a significant amount of diagonal steel in the floors and walls. This has not been considered and skews the results.

According to the EPA, the majority of environmental impacts related to a building occur during the use phase. To assess the environmental impact of a building, a whole-building LCA is needed, not just an LCA for the material assemblies. The Athena Eco-calculator does not include energy use (only material use); so assemblies with more insulation or more thermal mass will have a lower score. This will encourage designers to optimize their design so that they are using just enough insulation and thermal mass to meet the minimum energy code while still meeting the LCA requirements. This approach will NOT move designers towards zero energy buildings, because they will be penalized for using additional insulation and thermal mass. The combination of the energy portion of this code and the LCA Credit Calculator do not encourage integrated design because the energy and LCA portions are not integrated.

HEALTH & SAFETY CODE SECTION 18930

SECTION 18930. APPROVAL OR ADOPTION OF BUILDING STANDARDS; ANALYSIS AND CRITERIA; REVIEW CONSIDERATIONS; FACTUAL DETERMINATIONS

- (a) Any building standard adopted or proposed by state agencies shall be submitted to, and approved or adopted by, the California Building Standards Commission prior to codification. Prior to submission to the commission, building standards shall be adopted in compliance with the procedures specified in Article 5 (commencing with Section 11346) of Chapter 3.5 of Part 1 of Division 3 of Title 2 of the Government Code. Building standards adopted by state agencies and submitted to the commission for approval shall be accompanied by an analysis written by the adopting agency or state agency that proposes the building standards which shall, to the satisfaction of the commission, justify the approval thereof in terms of the following criteria:
7. The proposed building standards do not conflict with, overlap, or duplicate other building standards.
 8. The proposed building standard is within the parameters established by enabling legislation and is not expressly within the exclusive jurisdiction of another agency.
 9. The public interest requires the adoption of the building standards.
 10. The proposed building standard is not unreasonable, arbitrary, unfair, or capricious, in whole or in part.
 11. The cost to the public is reasonable, based on the overall benefit to be derived from the building standards.
 12. The proposed building standard is not unnecessarily ambiguous or vague, in whole or in part.
 13. The applicable national specifications, published standards, and model codes have been incorporated therein as provided in this part, where appropriate.
 - a. If a national specification, published standard, or model code does not adequately address the goals of the state agency, a statement defining the inadequacy shall accompany the proposed building standard when submitted to the commission.
 - (B) If there is no national specification, published standard, or model code that is relevant to the proposed building standard, the state agency shall prepare a statement informing the commission and submit that statement with the proposed building standard.
 14. The format of the proposed building standards is consistent with that adopted by the commission.
 15. The proposed building standard, if it promotes fire and panic safety as determined by the State Fire Marshal, has the written approval of the State Fire Marshal.