2022 CALIFORNIA BUILDING ENERGY CODE STANDARDS ISSUES OF CONCERN
August 2020

The 2022 California Building Energy Code development cycle is well underway. Most of the draft CASE Reports have been released, and the remaining are expected to be released by the end of July. The CASE Reports contain 43 proposed submeasures of varying impact, some measures are mere compliances options, some are code clarifications, others are manufacturing standards for various kinds of equipment. ConSol has reviewed all these proposals and in this document highlights six measures of concern to the commercial building sector. To help push back against these issues ConSol would like to solicit any relevant data, comments, or concerns regarding these measures.

Data regarding both the current use of the measures, and the potential cost would be most helpful in informing the CEC's code adoption process which begins this fall. **Our request for data is in bold at the end of each measure impact summary.** Please respond and help make the 2022 Standards as practical as possible.

The performance of the measures is evaluated by climate zone which typically has a significant impact on the performance of any energy efficiency measure. Measures that save energy in Lake Tahoe may increase consumption in the Central Valley. The descriptions below highlight the cost effectiveness ratio (CE) (any measure the CEC adoptions is required to a cost to benefit ratio of at least 1:1 over the lifecycle of the measure), and the climate zones most impacted where relevant.

Because of the high variability of the inputs and assumptions used, as well as energy commodity prices, ConSol believes any measure with a CE below 3 is of significant concern. Additionally, the heading of each description is an active link to the full measures descriptions available from the CASE website.

Contact Matthew Hargrove, CBPA, for non-technical questions on the process or to help fund this project.
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ISSUES OF CONCERN:

1. High Performance Windows: CE average of 1.0, with 5 climate zones below 1 (the full draft CASE Report for this measure is not yet available, and there is potential for additional revisions)

   This measure calls for increasing window performance standards, both u-value and solar heat gain coefficients (SHGC). Fixed window changes: U-factor: 0.36 to 0.34, and SHGC: 0.25 to 0.22; and curtain wall or storefront: U-factor: 0.41 to 0.38, and SHGC: 0.26 to 0.25. Operable window performance values will remain the same as 2019.

This measure will have significant upfront costs with very long pay back periods in most cases, and some where payback will never be achieved. This measure should not be cost-effective at all.

Data request: What u-value and SHGC are you currently installing? What would be the cost impact of installing the proposed windows?

2. Whole building air leakage testing: Climate Zones 3, 5, 6, 7, CE below 3

   The CASE Authors have proposed new standards for building envelope air leakage performance. The Authors propose limiting air leakage to 0.30 cfm/ft2 from 0.40. In addition to reducing the air leakage performance standard, the Authors purpose much more stringent testing requirements wherein buildings that do not meet the performance standard will be tested, inspected, and an improvement plan will be developed. These requirements will also apply to building alterations and additions. The Authors do allow room for exceptions where existing buildings fail to meet the standard, allowing that the building may pass if all practical efforts have been made to reduce air leakage. Practical is not a distinctly defined term.

   This measure suffers from both cost and practicality issues. In the case team's assessment, the cost benefit ratio was less than 3 in several climate zones. A ratio below 3 would require a payback term of ten years or longer. However, practicality is where this measure truly fails. Many, if not most large commercial developments go through phased construction and occupancy, where there may be a gap of months or years between the time of first occupancy, and construction completion. In projects with multiple independently conditioned spaces thorough testing could be laborious to the point of overwhelming cost. While there are benefits to verifying building performance, this measure is not yet well enough developed to be reasonably included in the 2022 code.

   This proposal also includes a requirement for vestibules in new construction, which will clearly add significant upfront costs. However, the final cost-benefit analysis for this measure is not yet available.

   Data request: Do you currently test your building for air leakage (air changes per hour? How practical is it to test a multi-tenant building when only a few spaces may be occupied? What are the costs for with air leakage testing?

   The CASE Authors propose new prescriptive requirements calling for all commercial buildings to include enclosed vestibules. Exceptions allow for revolving doors, and doors that open into spaces of less than 3000 sq. ft. This measure is pending further review, and cost effectiveness data is not presently available.

3. Indoor lighting: Open ADR requirement has a CE of 1 on average; the measure performs poorly overall

   This measure places new limits on occupancy based lighting controls, bringing new requirements to have occupancy-based lighting controls in all office spaces over 250 ft^2, with requirements for subzone lighting dimming to no more than 20% of full intensity.

   This proposal to advance occupancy-based lighting controls is not cost-effective. Not only does the more expensive equipment provide very limited benefits, but there is very little evidence to

discuss the reliability of network-based controls. These systems are a nascent technology and need more time for development before they can be included in the code.

Data request: Has occupancy-based lighting controls been effective in your new buildings and/or tenant improvements? What are the costs associated with occupancy-based controls?

4. Roof Alterations: Average CE of 2 (the full draft CASE Report for this measure is not yet available, and there is potential for additional revisions)

   For roof alterations the same cool roof standards apply as they would to new roofs, and now even simple roof recovers will require either meeting current insulation standards or, where that is not practicable, the measure will require insulation of at least R-8 to be installed.

   This represents an increase in replacement and repair costs and offers an average benefit to cost ratio of 2:1, with significant variation across the state, with minimal benefits in mild climates, and the largest savings in very warm, and very cold climate zones. This measure suffers for significant practicality concerns, most notable the substantial disincentive to perform building maintenance, and the dramatic cost increases seen when emergency repairs are called for.

   Data request: What cost impact is added R-8 roof insulation to roof deck when performing minor roof repairs?

5. Service water heating and boiler controls: oxygen trim controls perform poorly with significant expense (CE of 1 or less in climate zones 6, 7, 8, 15)

   This measure requires new equipment for oxygen trim controls for commercial boilers.

   This measure has very poor cost benefit outcomes in most climate zones and has significant upfront costs.

   Data request: What are costs associated with installing oxygen trim controls for service boiler?

6. Refrigeration systems – low benefit; CE of 1.5 overall

   Automatic door closures will be required for all commercial and retail refrigeration system, spanning from grocery stores, to walk-in coolers to refrigerated warehouses.

   This measure sees upfront new construction costs estimated at $5,000 to $10,000, or at $707 per door installed. The cost benefit ratio is less than 1.55 in all cases.

   Data request: CEC study estimate cost for automatic door closures is $700 per door. If you have installed or bid automatic door closures, what are your estimated spelling costs?