

DOCKETED

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Healthy Buildings Research comments on ZNE 2019 Update Staff Workshop

Additional submitted attachment is included below.

TO: California Energy Commission

FROM: Thomas J. Phillips, Healthy Building Research, Davis, California

DATE: May 5, 2017

SUBJECT: Comment on Public and Worker Health Impacts, CEC's Staff Workshop on the 2019 Zero Net Energy Residential Standards, Docket No. 17-BSTD-01

Thank you for the opportunity to comment on the California Energy Commission (CEC)'s Staff Workshop on 2019 Zero Net Energy (ZNE) Residential Standards on April 20, 2017. The staff's emphasis on first improving energy efficiency of buildings is commendable and consistent with the climate action strategies of many developed nations. The 2019 update will have major, long lasting ramifications on not only the energy and climate impacts of California's building sector, but also the human health and performance impacts in California.

Given the urgency of the climate change impacts that California faces, Healthy Building Research is providing the following recommendations. These recommendations echo the current best practice strategy of designing sustainable buildings that are "fit for purpose, fit for the future, and fit loosely". I am available to provide further information.

1. **Conduct Life Cycle Analyses (LCA) of the energy, GHG, and thermal performance of buildings in order to reflect expected climate changes over the life of the buildings.** This is necessary to understand the long-term contribution of the building standards update to the state's climate action goals, and to avoid health hazards and productivity losses from overheating of buildings.
2. **Include design features that make it easier and cheaper to adapt buildings to climate changes in the future.** A little forethought will go a long way in giving homeowners and local governments options for reducing GHG emissions and providing indoor thermal comfort down the road.

Rationale for Recommendations

Due diligence, responsible public policy, and state regulations require that building standards fully consider climate change impacts over the life cycle of buildings. The Warrant-Alquist Act requires the CEC to conduct an LCA of the building energy efficiency standards. A reasonable lifetime for a home's envelope is 50 years, and up to 100 years if reasonable maintenance is conducted. The buildings built in the 2020's will still be operating by mid century and beyond. Hence, the envelope and the HVAC ductwork should be considered a long-term investment. The public and decision makers should be fully aware of the ramifications and opportunities that the 2019 building standards update presents to not only adapt in a healthful, sustainable way to climate change, but also to reduce liability and regain leadership in the sustainable building field.

Overheating of homes due to poor design and/or construction is already a problem in California, and will be exacerbated by the warming of the climate, increases in urban heat island effects, and increased power outages. By mid-century or earlier, much of California is expected to suffer hotter and more frequent days and nights of extreme heat and in some cases, increased humidity. Most of the state's new homes will be built in hot, inland areas that depend on mechanical air conditioning. According to the CEC's CalAdapt Beta website, buildings in Fresno could be facing summer heat waves that are much hotter than today's and that last 20-30 days, by the 2070s and 2080's.

It does not appear that the 2019 update is considering such climate change impacts. However, climate change models have been used widely to estimate building performance, typically under Business As Usual (RCP 4.5) and reduced GHG emissions (RCP 8.5). Modeling and demonstration projects have found that improving the thermal performance of buildings can provide both energy efficient and thermally comfortable buildings in a cost effective manner, through mid- and late-century. Building features can also be added later or phased in to facilitate future upgrades in thermal performance, but the features should be planned from the start.

From the public health perspective, many of our most vulnerable populations regarding extreme heat are in California's coastal areas, where air conditioning is not common and people are not physiologically adapted (or not self-selected) to tolerate hot weather. Vulnerable populations such as the elderly and disabled spend most of their time indoors and cannot easily or safely reach a cooling shelter during a heat wave. Our population is also rapidly aging – one million elderly by 2050 and 90% of those will be living in households rather than nursing homes (PPIC, 2015. [Planning for California's Growing Senior Population](#)).

Designing buildings for future climates, especially in the coastal areas, can help protect our vulnerable populations, and also delay the need to use or install air conditioning equipment. Greening of urban areas and cool roofs alone will not keep such homes from overheating in the future. In a modeling study of indoor and outdoor heat hazards in Berlin, Germany, researchers concluded that passive cooling and air-conditioning were most effective, and that combined measures are necessary to reduce the number of heat-related deaths (Buchin et al., 2015. Evaluation of the health-risk reduction potential of countermeasures to urban heat islands). Remember that even air conditioning with renewable energy results in GHG emissions from the equipment manufacturing, distribution, and maintenance, and contributes heat to urban heat islands.

Sincerely,
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