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*Comment Received From: thomas phillips*  
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## **Preventing Health, Productivity, and Climate Impacts**

*Additional submitted attachment is included below.*

TO: California Energy Commission, 2022 Title 24 Pre-Rulemaking

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

DATE: February 11, 2021

SUBJECT: Health, Productivity, and Climate Impacts of Building Energy Standards, Docket No.19-BSTD-03

Thank you for your work in developing proposals and holding public workshops on the nonresidential building energy standards update for 2022 standards. These efforts are critical to California meeting its goals to decarbonize buildings, integrate renewable energy supplies with the grid, adapt to extreme heat, and protect public health and safety.

However, we are now officially well into a global “climate emergency” that requires big, bold, preventive measures now, not three or six years later in future standards updates. Polar sea ice is now melting faster than scientists expected, marine heat waves are increasing in frequency, and major climate tipping points are becoming more likely in the next decade or so. We cannot afford more building standards that lose opportunities to mitigate and adapt to climate change.

Please consider the following comments to help fully meet California’s goals.

### **1) Need to Address Climate Change Impacts**

In order for the state to fully comply with CEQA Guidelines and other mandates to address cumulative impacts on indoor environmental quality (IEQ) and health in its building standards, the CEC must consider future climate conditions that will affect building performance.<sup>1</sup> This type of assessment is necessary for full disclosure of impacts and potential mitigation measures to the public, decision makers, and building owners.

Overheating of buildings is already a problem in many newer buildings, and it will be worsened by climate change. Climate change is projected to dramatically increase cooling degree days and decrease heating degree days by mid-century and beyond, for much of California. In addition, heat wave frequency and duration, warm nights, wildfires, and the risk of power outages, will also increase dramatically. About one third of our adult population has health conditions that make them sensitive to heat exposures, and this fraction is projected to increase significantly by the 2030s.<sup>2</sup>

The Cal-Adapt extreme heat tools and local climate change snapshot tools, which the CEC funded, illustrate these climate changes clearly.<sup>3</sup> This shift to a cooling-dominated climate and more extreme peak cooling demand will result in not only increased energy costs but also increased risk of overheated buildings, grid outages, increased GHG emissions, and increased deaths, hospitalization, learning, and productivity losses, not

to mention increased liability for building owners. The current approach in Title 24 of using historical weather data will grossly underestimate or ignore such impacts, leaving building owners holding the bag in the near future.

Other governmental agencies and green building groups have already adopted or proposed measures to mitigate the impacts of climate change on building energy and indoor thermal health. For example:

- British Columbia's energy step code (2019) adopted overheating and air quality guidance in 2019.<sup>4</sup> An analysis of various types of multifamily buildings in BC by RDH (2019) found that it was cost effective to prevent overheating under future climates.<sup>5</sup> Several projects in the UK's Design for the Future project have also demonstrated cost effective approaches for various types of buildings.<sup>6</sup>
- The Collaborative for High Performance Schools (2019 US and 2021 California versions) include credits for climate adaptation and resilience measures that use climate projections and future weather files for use in building energy and thermal models.<sup>7</sup> Future weather files for California are available from Weathershift (morphed files) and Altostratus (localized downscaled).
- The United Kingdom (2021) has published its draft Future Homes low carbon building standard, which includes guidance and requirements to assess and prevent overheating.<sup>8</sup> In addition, London building standards already require prevention of future overheating risks and current urban heat island impacts.
- Canada's National Research Council plans to publish national guidance of overheating assessment this spring.<sup>9</sup> They have recently published articles on future weather files and a health based indoor heat metric.
- The Atmospheric Fund's TowerWise project in Toronto has assessed and mitigated IEQ & future overheating problems as part of deep energy retrofits of multifamily buildings. Ten buildings are completed so far.<sup>10</sup>

## **2) Need to Electrify Buildings**

I strongly concur with the comments submitted by RMI, NRDC, Mothers Out Front, Redwood Energy, et al. on the need to electrify the building sector, the feasibility of such measures, and the need to focus on vulnerable populations. By shifting to highly efficient electric appliances and a low carbon grid, we can not only reduce air pollutant and carbon emissions, we can reduce waste heat emissions, which exacerbate urban heat island impacts on urban air quality, energy use, and heat stress. Electrification will also make buildings in milder climate zones ready for future increases in cooling needs.

In summary, the building standards update offers a unique opportunity for California to re-establish itself as a world leader in sustainable, healthy, and "climate ready" buildings by developing guidance for assessing and preventing overheating and excess energy use under future climates. Otherwise, it must provide a disclaimer that new buildings

that meet the Title 24 standards will probably not perform as designed for very long, in terms of energy use, cost, carbon emissions, and indoor thermal conditions. And California will also undershoot its goals for reducing carbon emissions and grid impacts.

Accordingly, I implore the CEC to work with other CA state agencies, environmental justice groups, and environmental health groups to mitigate climate change impacts and help meet California's goals for carbon neutrality, healthy IEQ, and climate equity. We need to be able to tell our children and grandchildren that we tried very hard to take the necessary climate actions, and I offer any support and assistance in your efforts to do so.

Sincerely,

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## NOTES

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<sup>1</sup> Weitz, R., 2019. [California Adopts CEQA Guidelines Aimed at Improving](#)

<sup>2</sup> Holmes et al., 2016. Overheating and passive habitability: indoor health and heat indices, Building Research & Information, 44:1, 1-19, DOI: [10.1080/09613218.2015.1033875](https://doi.org/10.1080/09613218.2015.1033875).

<sup>3</sup> Cal-Adapt, 2021. [Climate Tools](#). Note: higher wet bulb temperatures are also predicted to increase in much of California, due to moist tropical weather systems.

<sup>4</sup> BC Housing, 2019. Overheating and AQ Design Guidelines Supplement. [BC Energy Step Code Design Guide & Supplemental](#). Summary at [Builder Insight 19: Modeling the Future Climate ... - BC Housing](#).

<sup>5</sup> RDH, 2019. [Designing Climate Resilient Multifamily Buildings](#). Prepared for U. of British Columbia.

<sup>6</sup> Design for the Future.

<sup>7</sup> Collaborative for High Performance Schools, 2019. CHPS 3.0 National Core Criteria. Climate

Resilience and Adaptation, Sec. II.C.7.1. California update: public comment period ended January 2021.

<sup>8</sup> UK 2021. [Draft Future Homes Standard and Building Regulations](#). News article: [RIBA, 2021](#).

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<sup>9</sup> NRC Canada, 2019. [Preventing Overheating](#).

<sup>10</sup> The Atmospheric Fund. [TowerWise Project](#).