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Health Impact Assessment

Additional submitted attachment is included below.

TO: California Energy Commission, Docket 19-DECARB-01

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

DATE: June 8, 2020

SUBJECT: Health Impact Assessment Comments on CEC Commissioner Workshop on AB 3232 Building Decarbonization Assessment, May 22, 2020, Docket No. 19-DECARB-01

Thank you for the opportunity to comment on the California Energy Commission Workshop on AB 3232 Building Decarbonization Assessment. This program has the potential to not only greatly reduce our GHG emissions but also provide many other benefits to California and the world.

I was glad to hear that some of the May 22 workshop participants mentioned non-energy benefits such as indoor air quality and comfort. These benefits can be quite substantial and help improve public participation in building energy programs. However, it is not clear how the Building Decarbonization Assessment (BCA) will assess and promote health and safety in order to comply with CEQA and various other state laws, some of which explicitly include indoor environmental quality.

Please consider the following recommendations to help optimize the non-energy benefits of building decarbonization and also avoid major unintended consequences such as indoor heat stress and reduced student and worker perforamance.

1. **Conduct a Health Impact Analysis to identify the major health and safety issues and potential solutions. Include issues regarding the indoor environment such as heat stress and human performance impacts from building overheating, resilience during power outages, and cascading or multiple impacts from wildfires, floods, droughts, pandemics, etc.** Experts and resources in the fields of building science, environmental health, and indoor environmental quality should be utilized to learn from other programs and research around the world. The California Interagency Working Group on Indoor Air Quality would be one way to start accessing relevant information (contact the California Department of Public Health Indoor Air Quality Program). Also, researchers at UCLA and Arizona State University have conducted research in this area on Los Angeles, and on Phoenix, Arizona, which much of California will resemble by mid- to late-century.

2. **Conduct life cycle analyses of health impacts in the indoor and outdoor environment for mid- and late-century under business as usual climate projections**.
   Obviously, our mix of energy sources and levels of demand will shift drastically as California climate changes from little to moderate cooling energy demand to much higher cooling demand and much less heating demand. Consequently, the analyses should factor in the major shifts cooling costs, overheating risks, and the shift in

demographics towards more vulnerable populations such as seniors and chronic disease patients, who spend a large portion of their time indoors, even under current climate and air quality conditions. These analyses should also focus on peak exposures to extreme heat, as this will drive not only the health impacts and potential benefits of energy efficiency electrification, but also the impacts on the demand, outages, and GHG emissions of the grid. Given that current climate models are underestimating the rate of climate change, we should explicitly address more extreme climate conditions to build in some safety factor.

Examples of some relevant analyses of environmental impacts of building decarbonization in California include (references available on request):

- Zhu et al. (UCLA) for Sierra Club, 2020.
- Federico et al. (UCLA IOES) for CEC EPIC program, expected 2020.

3. **Evaluate strategies that could provide protection against heat and air pollution to vulnerable populations that are not based on energy intensive air conditioning, which produces waste heat, embedded carbon emissions, and relies on the power grid, energy storage, and good maintenance and operation**. For example, various "future proof" buildings have been designed and built to minimize carbon emissions and overheating risks. In cases where financing was a problem, government subsidies were provided or buildings were made ready for adding measures such as shading and green roofs later. I can provide examples on request and have submitted some to previous Title 24 proceedings.

4. **Identify the populations and building types most vulnerable to climate change and building overheating risks, to allow more effective targeting of building retrofit programs**. For example, the UK and Australia have used this approach to target building retrofit programs that will produce the most energy and health benefits (references available on request). For California, Sheridan et al. (2011) estimated that elderly populations in metro areas could have a ten-fold increase in heat mortality if not substantially mitigated (CARB final report, slides, and papers at https://ww3.arb.ca.gov/research/single-project.php?row_id=64809).

   Housing factors are essential information in assessing energy and health impacts. Consider these key examples of vulnerable populations and building factors in the U.S:

   -- A recent Harvard Study found that heat vulnerability indices and

assessments usually omitted housing factors and thereby underestimated the health risks and missed nuances such as air conditioning functionality and building age (Samuelson et al.2020. DOI: 10.1016/j.scitotenv.2020.137296; Preprint at https://www.researchgate.net/publication/339357776_Housing_as_a_critical_determinant_of_heat_vulnerability_and_health).

-- A recent USC study used smart meter data and climate change models for in Southern California to estimate air conditioning use and future risks to extreme heat. "… 80%, 55%, and 30% of these potentially vulnerable communities are expected to experience over 8, 16, and 32 extreme heat days per year, respectively. These extreme events can pose dire health-related impacts on those populations that cannot afford access to sufficient cooling in the future." (Chen et al., 2020. https://iopscience.iop.org/article/10.1088/1748-9326/ab6fbe/meta).

-- California's Enviroscreen mapping tool used to identify Disadvantaged Communities includes socioeconomic and environmental quality factors, but it does not currently address building characteristics that reflect vulnerability to overheating. Fixing this omission should be part of our Decarbonization effort.

5. **In general, make Health one of the key goals for this program and address it explicitly.** Recent efforts from British Columbia have found that listing Health and other program goals helped make their process transparent and improve public participation.

Sincerely,
Thomas J. Phillips
Healthy Building Research, Davis, CA