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Health Impacts of Gas Stove Pollution

Additional submitted attachment is included below.

California Energy Commission
Docket Office, MS-4
1516 Ninth Street MS-4
Sacramento, CA 95814-5512

Docket #: 19-BSTD-03

Project Title: 2022 Energy Code Pre-Rulemaking

Re: Commissioner Workshop - 2022 Energy Code Pre-Rulemaking - Advances in scientific understanding of the impacts of indoor cooking and associated ventilation on indoor air quality

Dear Energy Commissioners,

Physicians for Social Responsibility (PSR) is a national advocacy organization of physicians. Our organization combines the power of community activism with the knowledge and credibility of physicians and other health professionals to promote public policies that support human health. San Francisco Bay and Greater Boston are chapters of PSR. Our members are nationally-recognized experts in public health, cancer epidemiology, occupational medicine, environmental health, emergency medicine, disaster preparedness, and the health effects of climate change.

We write to express our support for implementing policies that reduce household gas stove pollution and for adopting indoor air guidelines that are protective of sensitive populations, including children and children with asthma. There is increasing evidence showing that burning fossil fuels in buildings degrades indoor and outdoor air quality, which affects the health of sensitive populations. In December 2019, the Massachusetts Medical Society recognized the association between gas cooking stoves, household air pollution and asthma.[1]

We outline the scientific understanding of the health impacts of cooking with a gas stove on children and children with asthma.

1. **Peer reviewed literature shows overwhelming evidence that gas stoves are a source of indoor pollution, which increases the risk and severity of respiratory illnesses like asthma in children**. Multiple peer-reviewed studies over that last 30 years have shown that homes with gas stoves have significantly higher NO_2 levels than homes with electric stoves.[2] [3] [4] [5] These exposures are important because the Environmental Protection Agency (EPA) Integrated Science Assessment (ISA) for Oxides of Nitrogen –Health Criteria states that asthma incidence is "associated with... NO_2 averaged over multiple years (study means: 14 to 28 ppb)." And "evidence for short-term NO_2 exposure supports a relationship between long-term NO_2 exposure and asthma development because it indicates that repeated increases in exposure may be important." [6] [7]

   In a review of peer-reviewed literature, NO_2 concentrations and the presence of a gas stove are associated with more severe symptoms in children with asthma and increased risk of respiratory illnesses like asthma in children.[8] [9] [10] In a prospective study in Massachusetts and Connecticut, it found a dose-response between NO_2 and asthma severity in children with asthma starting at concentrations as low as 11 ppb.[11]

   The ISA states that "the effect estimates for indoor NO_2 were generally larger than those reported in the studies of outdoor NO_2 and Belanger et al. (2013) provided evidence for a concentration-dependent increase in NO_2 -related symptoms. These indoor NO_2 exposures may be part of a different mix of air pollutants than is NO_2 in the ambient air and support an independent effect of NO_2."[12]

   After reviewing the literature, other regulatory bodies, including Health Canada, have adopted stringent guidelines for indoor air quality thresholds for short- and long-term exposure (90 ppb and 11 ppb, respectively). Health Canada has also adopted more stringent ambient air quality standards for outdoor NO_2: 60 ppb beginning in 2020, decreasing to 42 ppb in 2025.[13]

2. **Children's exposure to gas cooking stoves is substantial in California**. Two-thirds of households in California use gas cooking stoves[14] and children spend more than 65% of their time in their place of residence.[15]

3. **Indoor NO_2 from gas cooking stoves often exceeds national air quality standards.** Modeling studies of homes with gas stoves in California show indoor nitrogen dioxide levels often exceed ambient air quality standards[16] [17] and controlled measurement of NO_2 from gas cooking stoves found moderate use of natural gas cooking burners without ventilation can yield NO_2 exceeding ambient air standards.[18]

Further, improved energy efficiency standards for newly constructed buildings may put children at increased risk from gas stove air pollution unless ventilation standards or an all-electric code are adopted. A modeling study showed efforts to improve energy efficiency without repairing kitchen exhaust fans or eliminating gas stoves would lead to 20% more childhood asthma events.[19]

4. **Lack of protection for sensitive receptors like children.** National ambient NO_2 standards are not protective of sensitive populations like children with asthma. In a prospective study in Massachusetts and Connecticut, it found a dose-response between NO_2 and asthma severity in children with asthma starting at as low as 11 ppb.[20] This is of particular concern to California where the prevalence of pediatric asthma is above the national average.[21] As many as one in four children have asthma in some California counties.[22]

Children with asthma are more vulnerable to NO_2 pollution and asthma rates are higher in communities of color and low-income communities. In California, asthma disproportionately affects Black, Latinx and low-income children. Asthma-related emergency department visits and hospitalizations are more than three times higher for Black children and Latinx children have a higher rate of emergency department visits for asthma than white children.[23]

5. **Low-income children may be exposed to higher levels of household NO_2.** Factors that are associated with higher levels of NO_2 exposure including smaller unit size, higher occupant density, and inadequate ventilation, are more common in lower-income, multifamily buildings.[24] Researchers have found that gas stoves without properly vented exhaust hoods are common in inner-city households, including in Baltimore.[25] And in homes where gas stoves are used for cooking and heating – a practice more common in low-income households – children's risk of respiratory illnesses were found to be higher.[26]

6. **Ventilation can mitigate the health risk of gas cooking stoves, but exhaust fans are not widely used**. Externally vented exhaust fans can decrease household NO_2 levels and can reduce the risk of respiratory symptoms if they are used.[27] [28] [29] Over-the-stove exhaust fans vented to the outdoors are recommended to reduce gas stove pollution by the Consumer Product Safety Commission[30] and the Environmental Protection Agency[31] but more public education about the health benefits of adopting this intervention is needed. Respondents to a California web-based survey reported using exhaust fans about one-third of the time when cooking dinner and less for other meals.[32]

7. **Cost savings to California.** Policies that reduce gas stove pollution have the potential to save the state and families money. In California, asthma costs are estimated at $11.3 billion per year.[33] This includes direct health care costs, work and school days lost, and productivity lost due to premature death. Charges for asthma hospitalizations alone in 2010 were over $1 billion.[3] Medicare and Medi-Cal cover 65% of asthma hospitalizations and 50% of asthma emergency department visits in California.[34]

Implementing policies that reduce household gas stove pollution will help California reduce the risk of childhood asthma, asthma symptoms and asthma-related emergency department visits. The CEC should: 1) set ventilation standards that ensure sensitive populations like children and children with asthma will be protected from the health risks of gas stove pollution; 2) require retrofits to comply with new construction requirements; 3) set new indoor air guidelines for NO_2 concentrations that are protective of sensitive populations like children and 4) ensure that policy solutions address the legacy of environmental injustice and ensure that low-income communities, and Black, Indigenous, and people of color communities (BIPOC) do not bear the burdens of implementing building decarbonization strategies.

Sincerely,

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