

DOCKETED	
Docket Number:	19-BSTD-03
Project Title:	2022 Energy Code Pre-Rulemaking
TN #:	234999
Document Title:	Indoor Air Quality Hearing Staff Slides
Description:	This document includes the slides from the Building Standards Office staff presentation given at the September 30 hearing and panel discussion on indoor cooking, air quality, and kitchen ventilation.
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Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	10/1/2020 11:30:36 PM
Docketed Date:	10/2/2020

Commissioner Hearing on Indoor Cooking, Ventilation, and Indoor Air Quality

Pre-Rulemaking Hearing and Panel Discussion



Presenters: Peter Strait, Supervisor, Standards Development

Date: September 30, 2020



Background

- Recent advances in the understanding of pollutants generated by indoor cooking, including research published by UCLA and by Lawrence Berkeley National Laboratory (LBNL), have called into question the sufficiency of existing kitchen ventilation standards.
- Several public advocates, including the Sierra Club, have requested a hearing based on these studies and a summarizing paper published by the Rocky Mountain Institute.
- A portion of LBNL's research characterizing the capture efficiency of range hoods led to development of the ASTM E3087 test standard. The ASHRAE 62.2 Range Hood Working Group made recommendations for development of Home Ventilating Institute (HVI) rating procedures based on this new standard, resulting in HVI 917.



Problem Statement

- Pollutants resulting from indoor cooking activities, including nitrogen oxides, carbon monoxide, and fine particulates, can reach levels that affect human health.
- Minimum standards for kitchen ventilation, and specifically for kitchen range hoods, may not reduce the risk of exposure to harmful amounts of these pollutants to a sufficient degree.
- Fan noise may contribute to occupants avoiding use of hoods.
- Staff are therefore seeking to create a rulemaking record that:
 - establishes the need for greater stringency based on scientific data, and
 - supports adoption of specific, enhanced minimum standards.



Sections Affected

Energy Code sections:

- Section 120.1(b)2 – applies ASHRAE 62.2 requirements to attached dwelling units.
- Section 150.0(o) – applies ASHRAE 62.2 requirements to low-rise and detached dwelling units.

ASHRAE sections:

- ASHRAE 62.2 Section 5 – specifies a minimum airflow rate of 100 CFM.
- ASHRAE 62.2 Section 7.2 – specifies a three sone maximum on sound.



Regulatory Context

- Ventilation and filtration standards have been a longstanding component of the Energy Code.
 - Reference to ASHRAE 62.2 (2007) was added to the 2008 Energy Code.
- Ventilation standards apply throughout both residential and nonresidential buildings.
 - ASHRAE 62.1 covers nonresidential buildings.
- Ventilation standards address both under- and over-ventilating.
- Ventilation standards cover a multitude of equipment types and ventilation approaches.



Panelist Presentations





CEC Authority and Options





Authority to Adopt Standards

- The Energy Commission is authorized and directed to “reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy” by, among other things, adopting building efficiency standards (Public Resources Code § 25402 et seq.)
 - Energy spent on ventilation is necessary; energy spent on ineffectual ventilation is wasteful and inefficient.
 - Updating ventilation standards to an appropriate, necessary level falls within this authority and is consistent with statutory direction to consider IAQ impacts as a part of developing standards.
- Options must fall within this authority to be adopted by the CEC.



Preliminary Criteria

Staff has identified the following criteria as potentially shaping any proposed standard:

- Rating metric, meaning potentially basing a standard on the ASTM Capture Efficiency (CE) metric versus using an appropriate cubic feet per minute (CFM) of airflow as a proxy for pollutant removal.
- Cooking energy source, meaning a potential distinction between natural gas and electric cooking equipment;
- Dwelling size, meaning a potential distinction between single-family and multifamily dwellings or based on a square footage threshold;
- Sone, meaning potentially increasing the stringency of maximum sound level requirements in addition to capture ability.



Criteria 1: Rating Metric

Staff is aware that the amount of air moved by a kitchen range hood fan is only one factor in its ability to capture cooking pollutants and combustion gasses.

ASTM E3087-18 establishes a Capture Efficiency metric that takes a holistic look at the effectiveness of over-the-range devices in capturing and removing pollutants. This metric is proposed for inclusion in ASHRAE 62.2, though has not been added to that standard. Most equipment has not yet been rated using this new metric.

Staff is interested in hearing from stakeholders whether this new metric should be used as the basis for an updated standard, if a proxy CFM value should be used, or if both options should be available (i.e., must achieve either a target CE value or a target CFM).



Criteria 2: Energy Source

Cooking releases fine particulate matter that is known to be harmful to public health, as well as volatile organic compounds. Cooking using a combustion fuel such as natural gas additionally releases nitrogen oxides that can have immediate impacts such as triggering asthma in sensitive individuals, as well as some quantity of carbon monoxide.

Staff need to consider a standard stringent enough to address all pollutants. However, a standard sufficient to protect against combustion byproducts may be overly stringent if applied to electric-only cooking.

Staff are interested in hearing from stakeholders whether a separate, lower standard should be available for dwellings that do not provide natural gas (or other combustion fuels) for cooking.



Criteria 3: Size

The concentration of indoor pollution resulting from cooking relates directly to the total air volume of the indoor space. As noted in studies and by commenters, multifamily dwellings, which tend on average to be smaller than detached single-family dwellings, are therefore more likely to have more impacted IAQ after the same cooking event.

Staff need to consider a standard stringent enough to address this case. However, a standard sufficient to protect smaller multifamily dwellings may be overly stringent if applied to larger single family dwellings.

Staff is interested in hearing from stakeholders whether a separate, lower standard should be available for single-family residences or for dwellings above a minimum size.



Criteria 4: Sone

Staff is aware of research indicating that occupants can be inconsistent in the use of kitchen range hoods even if the equipment is available. One factor in the choice to use or not use an available hood is the noise the hood generates during operation.

The current requirement to be rated at no more than three sone at “working speed” is roughly equivalent to 43 decibels, or half the level of noise of an operating refrigerator or dishwasher. However, fans will be much noisier at higher speeds, such as those needed to ventilate a large (three burner plus oven) cooking event.

Staff is interested in hearing from stakeholders whether a more stringent sone limit should be considered alongside capture improvements.



Action Items

- Staff will follow up on this hearing by preparing a draft proposal to update kitchen ventilation and range hood requirements, with consideration of the public record resulting from this hearing.
- Staff will host a future workshop to present resulting draft regulatory language to stakeholders and the public.
- Staff are hosting separate, additional workshops on other proposed amendments to the Energy Code, including workshops on electric technologies and building approaches.
- Stakeholders and members of the public are asked to submit any written comments by **October 16, 2020**.



Questions?



Comments For Today's Workshop

Please submit written comments to the public docket for the 2022 pre-rulemaking period, available at the following link:

<https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=19-BSTD-03>

Due date for comments is October 16, 2020 by 5:00 PM