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SoCalGas Comments on CEC's November 3 Workshop on Nonresidential Ventilation and Infiltration Proposals

Additional submitted attachment is included below.

Tim Carmichael
State Agency Relations Manager
State Government Affairs
925 L Street, Suite 650
Sacramento, CA 95814
Tel: 916-492-4248
TCarmichael@semprautilities.com

November 18, 2020

Commissioner Andrew McAllister
California Energy Commission
Dockets Office, MS-4
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Comments on the November 3rd Workshop on Nonresidential Ventilation and Infiltration Proposals, Docket #19-BSTD-03

Dear Commissioner McAllister:

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide comments on the new kitchen range hood ventilation requirements proposed at the November 3, 2020, the California Energy Commission (CEC) workshop on Nonresidential Ventilation and Infiltration Proposals. SoCalGas supports the need for new ventilation standards that are clear, grounded in science, and applied consistently regardless of fuel type. SoCalGas is concerned that the proposed requirements for kitchen range hoods have undergone significant changes in the past month without the opportunity for public engagement or sufficient vetting. Accordingly, SoCalGas offers the following comments and observations on the proposed kitchen range hood ventilation standards.

1. The revised kitchen range hood ventilation standards are based on preliminary and incomplete analysis.
2. The CEC's proposal complicates the Building Code, which could create consumer confusion and increase costs.
3. The CASE Report includes misleading statements regarding health impacts and cooking with natural gas stoves.

1. <u>The revised kitchen range hood ventilation standards are based on preliminary and incomplete analysis.</u>

a. The CASE Report and staff recommendations on air capture efficiency requirements have evolved without meaningful opportunities for stakeholder input.

The CEC is proposing a significant change to the code regarding kitchen range hood air flow and capture efficiency and has provided limited opportunity for input from key stakeholders. In their

October 16th letter, the Association of Home Appliance Manufacturers (AHAM) noted the importance of basing Rule development on a consensus process.[1] While, the American Gas Association (AGA) requested a second workshop on Indoor Air Quality, where they could provide insight on national efforts that could inform "the decision-making process in California."[2]

The newest proposal presented at the November 3rd workshop is based on preliminary analysis by Lawrence Berkeley National Laboratories (LBNL), which was first submitted to the docket on November 2nd.[3] Accordingly, key stakeholders did not have sufficient time to review the submittal to the docket before participating in a workshop that was held the next day. Furthermore, this new analysis has not been peer reviewed or published. The methodology and conclusions of this study should be vetted before using it as the basis for code changes.

The CEC's proposal has changed dramatically from the Draft Codes and Standards Enhancement (CASE) Initiative for Multifamily Indoor Air Quality report, published in May 2020, that is also based on work by LBNL.[4] The Draft CASE report proposed a new air capture efficiency of 70% with an alternative compliance path based on air flow rate of 250 cfm. The report did not differentiate between electric and natural gas cook tops. The driving factor for the new standard was to reduce exposure to particulate matter (PM), which is produced from both electric and gas stove types and during cooking from the food and oils being cooked.

Then, the Final CASE report, published in October 2020, added unnecessary complexity to the code. It recommended the creation of a series of requirements based on unit size and now differentiates between electric and natural gas cooktops without adequate scientific support. The Final CASE Report includes similar requirements (200 cfm air flow rate) for gas and electric ranges for large units greater than 1000 square feet and higher air flow requirements for smaller units (250 cfm for electric and 290 cfm for natural gas ranges), again without adequate scientific support.[5]

Finally, the Staff Presentation on November 3rd recommended significantly lower requirements for kitchen hood ventilation over electric ranges and further increased the requirements for hoods over natural gas ranges, relative to the recommendations in both the Draft and Final CASE reports.[6] The Staff recommendation now decreased the requirement for ventilation of electric cooktops to a range of 110 cfm to 160 cfm, based on unit floor area.[7] While, increasing the

[1] AHAM October 16, 2020, Comment letter TN 235281. "CEC should not adopt standards that have not been approved through a consensus process. This would include Nominal Installed Flow in HVI 920-2020 and Capture Efficiency as defined in HVI 917. The ASHRAE Range Hood Metrics working group (RHMWG) was not a consensus process. It only was conceptual and directional, and then the group disbanded."
[2] AGA October 16, 2020, Comment letter TN 235283. "AGA would look forward to participating in future events related to this rulemaking since while the topic is one before the State of California, national efforts in which AGA is active or at least working with could well serve the decision-making process in California."
[3] LBNL October 27, 2020, Technical Memo. TN 235477 posted November 2, 2020.
[4] Draft CASE Initiative for Multifamily Indoor Air Quality, p. 17 available at: https://title24stakeholders.com/wp-content/uploads/2018/10/MF-IAQ_Draft-CASE-Report_Statewide-CASE-Team.pdf
[5] Final CASE Initiative for Multifamily Indoor Air Quality, see Table 2. TN 235290
[6] Staff Presentation at November 3, 2020, Workshop, see slide 87. TN 235505
[7] Based on Staff Presentation on November 3, 2020, it is likely that the current models of hood ventilation would meet this proposed requirement for electric stoves.

requirements for natural gas cooktops to a range of 250 cfm to 280 cfm, based on unit floor size. These significant changes in the values in such a short period of time without adequate scientific support suggest the analysis requires further review and consideration before adopting a change that will significantly alter requirements for ventilation of natural gas ranges and not necessarily support public health.

b. Relying on preliminary and inconsistent research that has not yet been adequately reviewed is not an appropriate basis upon which to base new ventilation codes and standards.

The CEC should not adopt a standard until the analysis has been adequately reviewed and parties have had an opportunity to provide additional technical information for CEC's consideration. As noted above, AHMA and AGA have both requested additional workshops to broaden the record on kitchen hood ventilation standards and the need to have a consensus approach to Rule development.

The LBNL analysis underlying the CASE Report and Staff Recommendation is inconsistent and has changed several times in 2020, with the latest revision made public the night before the Staff presentation on revised kitchen range hood ventilation standards. Given the significant impact on the building code, the CEC should more fully vet this analysis and consider additional analysis before changing the code.

It is important that the underlying study appropriately analyzes potential impacts from current stock of new appliances. The LBNL analysis appears to consider a range of natural gas equipment, including ranges with standing pilots. New ranges with standing pilots have not been sold since 2009.[8] While, these models may still be in some existing homes, it is not appropriate to include such models in the analysis of a new construction standard.

c. The current staff proposal is inconsistent with the broader body of health studies and guidance on indoor air quality, cooking emissions, and ventilation.

The CEC has based the higher ventilation standard in new construction for natural gas cooking reflected in the Final CASE Report and the Staff Recommendation on November 3rd on an unfounded presumption that natural gas cooking increases asthma symptoms because natural gas cooking is a source of nitrogen dioxide (NO_2).[9] While there have been multiple studies on Indoor Air Quality and the health impacts of cooking, including studies commissioned by the CEC, the CASE Report cited two studies (Logue et al., 2011;[10] Belanger et al., 2013[11]) in their discussion of adverse health effects from $PM_{2.5}$ and NO_2. For the statement "homes with gas stoves have 50 percent to 400 percent higher concentrations of NO_2 than homes with electric

[8] Code of Federal Regulations coverage of residential cooking appliance energy efficiency prescriptive requirements under 10 CFR 432.32(j) See pp. 510-511.
[9] P. 48 of Final CASE report
[10] Logue JM, Price PN, Sherman MH, Singer BC. 2011. A Method to Estimate the Chronic Health Impact of Air Pollutants in U.S. Residences. Berkeley: LBNL. This study was published the following year under the same authors' names and title in the journal Environmental Health Perspectives (120: 216-222).
[11] Belanger KM, Holford TR, Gent JF, Hill ME, Kezik JM, Leader BP. 2013. "Household levels of nitrogen dioxide and pediatric asthma severity." Epidemiology 320-330.

stoves,"[12] the CASE report cited US Environmental Protection Agency (EPA) (2008).[13] It is important to note that the time frame and conditions for these studies may not be relevant for standards being adopted for new construction in California.

Belanger et al. (2013) studied 1,342 asthmatic children, age 5-10 years, who lived in cities and towns with gas lines in Connecticut and western Massachusetts. This study was conducted during 2006-2009 and did not compare children with asthma symptoms to children without asthma symptoms. It cannot address whether gas cooking caused asthma or even whether gas cooking was the source of increased NO_2 levels indoors. The authors also identified socioeconomic status as an important potential confounder. When the authors included socioeconomic variables in the model, the risk of more severe asthma symptoms was attenuated.[14] Given these study limitations and the change in California kitchen range hood ventilation standards since 2009 as well as the federal change in gas cooking appliances to eliminate standing pilots in 2009, this study has limited applicability to the new construction standards in California in 2022.

Similarly, the EPA (2008) assessment predates these changes in ventilation and natural gas ranges. The EPA (2008) assessment specifically notes "[h]omes with gas appliances with pilot lights emit more NO_2, resulting in NO_2 concentrations ~10 ppb higher than in homes with gas appliances with electronic ignition (Lee et al., 1998; Spengler et al., 1994)."

Logue et al. (2011) reported the chronic health impacts (measured as disability-adjusted life-years (DALYs) lost), are highest from indoor $PM_{2.5}$, and there are lesser impacts from chronic exposure to indoor NO_2.[15] This is consistent with other reports that $PM_{2.5}$ impacts are greater than for NO_2 and that controlling for the effects of $PM_{2.5}$ will have a greater benefit than controlling for NO_2.

Furthermore, the CASE report fails to clearly acknowledge that other factors inherent to stove cooking contribute more significantly to $PM_{2.5}$ emission rates than the energy source. As summarized by another relevant study, O'Leary et al. (2019),[16] the primary factors that affect stove cooking emissions include:

> 1) Cooking method. "Dry, water based, and oil-based cooking process all have very different emission rates, and oil-based methods, such as frying, have the highest (Torkmahalleh et el., 2017b). Similarly, burned food, grilling/broiling, and frying are found to have the highest mean emission rates (He et al., 2004; Olson et al., 2006; Fortmann et al., 2001). Higher emission rates are found from stir frying than pan frying,

[12] P. 48 of Final CASE report
[13] US EPA. 2008. Integrated Science Assessment (ISA) for Oxides of Nitrogen – Health Criteria (Final Report, Jul 2008). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/071, 2008.
[14] Higher NO2 concentrations were found in homes of minority children and mothers with less education and these children were less likely to use maintenance medication. This suggests that these children may potentially experience more severe asthma symptoms if their asthma is not being well managed.
[15] Logue JM, Price PN, Sherman MH, Singer BC. 2012. A method to estimate the chronic health impact of air pollutants in US residences. Environ Health Perspect 2012 120:216-222.
[16] O'Leary, C., Kluizenaar, Y., Jacobs, P., Borsboom, W., Hall, I., and B. Jones. 2019. Investigating measurements of fine particle (PM2.5) emissions from the cooking of meals and mitigating exposure using a cooker hood. Indoor Air 29, 423–438.

attributable to higher temperatures (Lunden et al., 2015). Higher particle numbers and mass concentrations at higher cooking temperatures are found by some (Buonanno et al., 2009) but not all (Evans et al., 2008) maybe because the oil smoke point, the temperature at which the oil visibly smokes, was not reached."

2) Ingredients. "There is evidence that ingredients influence $PM_{2.5}$ emissions, and oil type is perhaps the most significant (Buonanno et al., 2009; Buonanno et al., 2011). The oil smoke point is important, but so are the composition and water content (Torkmahalleh et al., 2017b; Torkmahalleh et al., 2012; Torkmahalleh et al., 2017a). Emission rates from the heating of different cooking oils have been found to vary (Torkmahalleh et al., 2012; Li et al., 2017). Corn, coconut, and olive oils are found to have higher emission rates than from soybean, safflower, canola, and peanut oils (Torkmahalleh et al., 2012). This difference was mostly related to the smoke point of the oils, except that olive oil generated $PM_{2.5}$ at the same temperature as corn and coconut oils despite having a higher smoke point. In contrast, corn and soybean oils are found to have a lower emission rate than rapeseed and sunflower oils (Li et al., 2017)."

3) Non-essential additives, such as seasonings. "In controlled laboratory tests, the addition of sea and table salt to canola oil reduced the $PM_{2.5}$ emission rate. A similar test reduced emission rates by 56% when salt was added to corn oil (Torkmahalleh et al., 2017c)."

4) Food type. "A positive correlation is found between the fat content of foods and their emission rate (Buonanno et al., 2009; Buonanno et al., 2011; Vu et al., 2015). Additionally, the water content of foods could impact particle size distribution when grilling ground beef (Torkmahalleh et al., 2017a)."

Additionally, the 2020 work by LBNL, which is the underpinning of the CEC's proposal to establish different standards for gas and electric kitchen hood ventilation, is premised on the idea that a higher capture efficiency is necessary for NO_2 emissions in order to avoid exceeding 1-hr average concentration of 100 parts per billion (ppb) of NO_2. However, it is unclear from the studies cited by the CEC that the higher capture efficiency and associated air flow rate will have a material impact on health because the studies cited by the CEC do not address 1-hr average exposures to NO_2.[17] As such, this proposal may add cost without improving health.

As noted in SoCalGas' October 13th letter, the consistent findings of the peer-reviewed and widely accepted body of research have indicated that the emissions associated with cooking will be mitigated with standard ventilation. Indeed, the largest study on childhood asthma, Wong

[17] Belanger et al. (2013) used passive samplers and sampled NO_2 over a one-month duration. The authors reported "One limitation of the passive monitoring method is that it results in an integrated average NO_2 concentration and does not allow for measurement of peak exposures." The authors reported a relationship between average daily NO_2 exposure and severity of asthma symptoms. Passive monitoring also did not allow for the identification of the source of NO_2 (the authors did not report the percentage of children who lived in houses that used gas or electric stoves for cooking and the authors do not address whether gas stoves were also used for heating.) Whether elimination of gas cooking would result in a decrease in the severity of asthma symptoms cannot be determined from this study.

(2013) showed no relationship between natural gas cooking and asthma.[18] Also, as noted in our previous comment letter, the 2020 new homes study by LBNL found that NO_2 levels in new homes were similar to the results of the 2009 new homes study. Importantly, LBNL's 2009 study was primarily in homes with electric cooking and the 2020 study was done exclusively in homes with natural gas cooking.[19]

The CEC is proposing new ventilation standards that go beyond the guidance from health and air quality standards recommended by national and international organizations. The US EPA and World Health Organization (WHO) have indicated that ventilation will mitigate exposure to pollutants associated with cooking. They have not, however, recommended different standards for electric and natural gas ranges. CEC should confer with national experts on air quality standards to review LBNL's work before establishing a new ventilation standard for California.

2. The CEC's proposal complicates the Building Code, which could create consumer confusion and increase costs.

The CEC has stated the importance of simplifying Codes and Standards. However, the current proposal to create two new, separate ventilation standards for electric and gas stoves does not follow that direction to simplify code. Rather, it exacerbates the issue by creating more complexity.

During the November 3rd workshop, Staff indicated their proposal will increase costs for natural gas kitchen range hoods, especially for smaller units. The incremental cost is noted as $140 for a hood with an air flow rate in the 100 - 250 cfm range, which would be required for units larger than 1,000 sq ft. The incremental cost for smaller units would be $270. Given the current housing shortage in California and the growing concerns about housing affordability, the CEC must consider the impact of adding costs to new housing units. Specifically, the CEC is required to consider relevant factors, including the impact of housing costs, when evaluating cost-effectiveness.[20]

3. The CASE Report includes misleading and unsupported statements regarding health impacts and cooking with natural gas stoves.

There are numerous comments in the CASE Report that suggest a causal relationship between natural gas cooking and emissions. SoCalGas has attached Appendix A providing examples of language that is inaccurate or has not been substantiated by the facts cited in the Report. SoCalGas requests the CEC review these comments and make appropriate edits to the document so as not to mislead the public about natural gas cooking. The list of comments in Appendix A are not exhaustive, but rather representative of our concerns with language in the CASE report.

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[18] Wong GW, Brunekreef B, Ellwood P, et al. Cooking fuels and prevalence of asthma: a global analysis of phase three of the International Study of Asthma and Allergies in Childhood (ISAAC). The Lancet. Respiratory Medicine. 2013 Jul;1(5):386-394. DOI: 10.1016/s2213-2600(13)70073-0.

[19] SoCalGas October 16, 2020, comment letter TN 235288

[20] Cal. Public Resources Code Section 25402(b)(3).

Conclusion

SoCalGas offers our constructive feedback to further the CEC's objective to improve indoor air quality by revising ventilation requirements for kitchen range hoods. However, we are concerned that this process has been influenced by narratives rather than informed by facts. The recently proposed revisions to the kitchen range hood ventilation standards point to the need for additional research and analysis to make sound, properly vetted recommendations to change ventilation requirements for new construction.

SoCalGas urges the CEC to provide an opportunity to hear additional viewpoints from the appliance manufacturers and industry experts to better inform a decision that will have significant cost implications for new buildings. We look forward to a constructive public process and offer our support in the development of consistently applied new ventilation standards based on scientific consensus.

Sincerely,

/s/ Tim Carmichael

Tim Carmichael
Agency Relations Manager
Southern California Gas Company
Encl.

Appendix A

Comments on Text Excerpts in CASE Report Multifamily Indoor Air Quality

Page	Existing Text	Comments
13	"The proposed changes are new requirements for range hoods to better ensure that a kitchen exhaust system can adequately remove cooking-related pollution."	Cooking-related "pollution" infers that cooking-related emission levels are directly responsible for harmful or poisonous health effects, but evidence of a specific correlation between cooking-related emissions and adverse health effects is not well-established. Cooking-related emissions would be more appropriate terminology.
13	"Specifically, the proposal builds upon resent research from Lawrence Berkeley National Laboratory (LBNL) that estimated the minimum range hood capture efficiency needed to maintain fine particulate matter (PM2.5, for all ranges) and to maintain nitrogen dioxide (NO2, for natural gas-fueled ranges) at acceptable levels specified, depending on the size of the dwelling unit. Both pollutants have been linked to numerous health problems."	PM2.5, which is emitted while cooking regarding of the energy source, is linked to more significant health problems than NO2 (e.g., respiratory and cardiovascular impacts, whereas NO2 has only been linked to specific respiratory issues). It is inappropriate to lump both pollutants together as being linked to "numerous health problems."
15	"In addition, central ventilation shaft sealing provides IAQ benefits by improving the reliability of supply and exhaust rates, and reducing the leakage of exhausted air, which can include various pollutants such as PM2.5, NO2, volatile organic compounds (VOCs), and relative humidity (which can cause mold) into other interior spaces, including other dwelling units."	The use of "volatile organic compounds (VOCs)" in general is misleading and misrepresentative of the specific subset that may be emitted from stove cooking. The number of VOCs emitted by common household products far outnumbers the number of VOCs that may be emitted from stove cooking.
15	"Submeasure B: Kitchen exhaust minimum capture… As shown in Table 2, the requirements vary by dwelling unit size, because requirements are higher for hoods over natural gas ranges because of the nitrogen dioxide and other pollutants released."	It is unclear why "other pollutants" are mentioned here when only nitrogen dioxide is noted elsewhere in the report as deserving of higher kitchen exhaust capture (or airflow for demand-controlled hoods) over natural gas ranges. Furthermore, the requirements for minimum hood capture efficiency/airflow for PM2.5 control, for units 1,000 – 1,500 ft2 and >

		1,500 ft2, as shown in Table 2 on the next page (Page 16) are "50% CE or 175 cfm." However, in the same table on page 49 (Table 7), the minimum hood capture efficiency/airflow for PM2.5 control, for the same size units (1,000 – 1,500 ft2 and > 1,500 ft2), is "55% CE or 200 cfm." This inconsistency casts some doubt on the reliability of the information used as the basis for these requirements. Even if this inconsistency is simply due to clerical error, the basis for the minimum hood capture efficiency/airflow requirements is not sufficiently documented. As indicated on page 49, the requirements for minimum hood capture efficiency/airflow for hoods over electric ranges (for "PM2.5 control") versus hoods over gas ranges (for "NO2 control") seem to be based, in part, on simulations done by LBNL for California new homes (Chan et al. 2020) and then "personal communications with the LBNL authors" following recently conducted additional analysis that "considered more granular size ranges of dwelling units." The basis for the new, proposed requirements should be disclosed, peer-reviewed, and subject to comment.
18	"The minimum capture efficiency and airflow depend on unit size and fuel type. In general, the minimum range hood capture efficiency and airflow are higher for small dwelling units due to the smaller volume of air for dilution, and over natural gas ranges due to the nitrogen dioxide they generate."	See comment above.
19	"Submeasure B: Kitchen exhaust minimum capture - The Statewide CASE Team did not estimate cost effectiveness for the proposed kitchen exhaust system code change, because the primary purpose is improving IAQ."	The CEC must take into account both the improvement of IAQ and its mandate to achieve cost-effective energy conservation. The assertion that a proposed measure may improve IAQ does not relieve CEC's obligation to evaluate cost-effectiveness and base the improvement of IAQ on a scientifically sound basis. Rather, new

		building standards must strike "an appropriate balance" between IAQ objectives and energy-savings and cost-effectiveness mandates. *See* Order No. 91-0308-04, Energy Resources Conservation and Development Commission (1991 WL 135465), March 8, 1991.
20	"…the Statewide CASE Team found compliant products were on average more expensive than non-compliant products at these high airflows, which are required for small dwelling units, and particularly with natural gas ranges. However, research has highlighted higher airflows are needed to maintain acceptable IAQ in these scenarios."	See comment above.
47	"Cooking-related pollution carries various health risks, and there is a growing body of research that highlights the health impacts from cooking-related pollution. Cooking over any type of cooktop (natural gas or electric) releases ultrafine and fine particles such as particulate matter 2.5 micrometers or smaller (PM2.5), as well as other irritants and potentially harmful gases including formaldehyde, acetaldehyde, acrolein, and polycyclic aromatic hydrocarbons (Singer and Chan 2018). The use of natural gas burners and ovens also releases nitrogen dioxide (NO2) and carbon monoxide (CO)."	Cooking over any type of cooktop releases potentially harmful irritants and gases. Improvements to minimum capture efficiencies would be needed irrespective of the energy source.
48	"NO2 also causes other deleterious health effects. For example, a study found that asthmatic children are at higher risk for more severe asthma symptoms at low levels of NO2 and that the risk rises as levels of NO2 rise (Belanger 2013). Another study found that homes with gas stoves have 50 percent to 400 percent higher concentrations of NO2 than homes with electric stoves (EPA 2008). CO is released by natural-gas stoves and also produces deleterious health effects. However, past research found that NO2 and PM2.5 safe levels were often exceeded from cooking and cooking equipment, while CO typically was not (Singer, Pass and Delp 2017), (Logue, et al. 2014). Consequently,	This infers that gas cooking contributes to an increased risk of more severe asthma symptoms. As previously commented, evidence of a direct association of gas stove use with increased asthma symptoms is conflicting and inconsistent.

	this analysis followed the example of Lawrence Berkeley National Laboratory (LBNL) simulations (Chan, et al. 2020) and developed requirements to maintain PM2.5 and NO2 levels at acceptable concentrations, because these should also be protective for CO."	
48-49	"It is particularly important that kitchen exhaust systems in multifamily dwelling units effectively remove kitchen exhaust, since these residences can have their air degraded by both their own kitchen pollution and from pollution transferred from adjacent units. The Statewide CASE Team investigated the effectiveness of kitchen range hoods in removing pollutants. Range hoods are devices that include a fan above or next to the stove or cooktop and serve to remove pollution from cooking."	See comment above re: page 15.
51-52	"Because the scope of this Final CASE Report is multifamily indoor air quality, this Final CASE Report does not explicitly include recommendations for single family dwelling units. However, the Statewide CASE Team recommends that the Energy Commission provide the same range hood requirements for single family dwelling units as what is proposed here to ensure adequate kitchen ventilation."	It is unclear why the Statewide CASE Team has advocated for the same range hood requirements for single family dwelling units as multifamily units after they have made the case that ventilation requirements differ by size of dwelling units, and given that indoor air quality impacts to single family dwelling units are different (e.g., unlike multifamily units, single family dwelling units do not have their air degraded from pollution transferred from adjacent units).
97	"3.2.3.4 Impact on Building Owners and Occupants. This measure would provide improved IAQ to occupants, because it increases the amount of pollutants removed through the kitchen range hood. Section 2.2.2 describes pollution from cooking and gas ranges, and Section 2.2.1 describes related health impacts. The proposed requirements for Title 24, Part 1 Section 10-103 specify that builders provide information to building operators and occupants for the operation of any local exhaust fans, including range hoods."	Again, this infers that gas cooking contributes to an increased risk of more severe asthma symptoms. Evidence of a direct association of gas stove use with increased asthma symptoms is conflicting and inconsistent.

175	"6.2.5 Other Non-Energy Impacts. This submeasure would provide significant IAQ benefits. As detailed throughout this report, the kitchen exhaust minimum capture measure would improve IAQ by reducing pollution released by cooking—both the act of cooking and natural gas ranges—which can cause respiratory illnesses, cardiovascular disease, and other health problems."	"Pollution released by cooking" infers that cooking-related emission levels are directly responsible for harmful or poisonous health effects, but evidence of a specific correlation between cooking-related emissions and adverse health effects is not well-established. Evidence of a direct association of gas stove use with increased asthma symptoms is conflicting and inconsistent.