

DOCKETED	
Docket Number:	19-BSTD-03
Project Title:	2022 Energy Code Pre-Rulemaking
TN #:	232712
Document Title:	Rocky Mountain Institute & Redwood Energy Comments - Rocky Mountain Institute & Redwood Energy comments on 2022 Energy Code
Description:	N/A
Filer:	System
Organization:	Rocky Mountain Institute & Redwood Energy
Submitter Role:	Public Agency
Submission Date:	4/10/2020 2:49:01 PM
Docketed Date:	4/10/2020

*Comment Received From: Rocky Mountain Institute & Redwood Energy
Submitted On: 4/10/2020
Docket Number: 19-BSTD-03*

Rocky Mountain Institute & Redwood Energy comments on 2022 Energy Code

Please see attached joint comments from Rocky Mountain Institute and Redwood Energy.

Additional submitted attachment is included below.



April 10, 2020

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

Re: Comments on Docket No. 2019-BSTD-03 (2022 Energy Code Pre-Rulemaking), March 26, 2020 Workshop

Dear Commissioners and Staff:

Rocky Mountain Institute (“RMI”) and Redwood Energy respectfully submit the following comments on the California Energy Commission’s (“CEC” or “Commission”) March 26, 2020 Workshop regarding the 2022 Energy Code Pre-Rulemaking. RMI is an independent, nonpartisan nonprofit whose mission is to transform global energy use to create a clean, prosperous, and secure low-carbon future. Redwood Energy is a Zero Net Energy residential design firm that focuses on low-income subsidized housing for working families, senior citizens, veterans and the homeless.

Throughout this proceeding, the CEC has acknowledged its vital role in helping the state to achieve its climate change goals. In the presentation materials at the March 26, 2020 workshop, the Commission affirmed that “[t]he purpose of establishing new metrics for the 2022 Standards and beyond is to align the Building Standards with the state’s climate change goals.”¹ Nonetheless, the current CEC approach falls short of the steps necessary to achieve the state’s climate goals, meet the state’s air quality requirements, and protect the health of the most vulnerable Californians.

Many other commenters are thoughtfully engaging with the technical details of the Commission’s most recent proposals and making sensible recommendations to improve the CEC’s analysis. To the extent the CEC remains committed to its current path, the Commission should incorporate those comments, particularly those of the Natural Resources Defense Council and Sierra Club.

RMI’s comments take a step back from the technical details of the most recent workshop to look at the bigger picture and describe how the Commission’s current path places it on a trajectory to fall short of the state’s climate, clean air, and equity goals.

¹ Mazi Shirakh et al., Staff Workshop Update on 2022 Standards Life Cycle Costing, Metrics, & Weather Files, TN#232660, slide 9 (Mar. 26, 2020), available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=232660&DocumentContentId=64722>.



In order to put California on a path to achieve its climate goals, as well as to restore clean and healthy air to all Californians, including the state’s most vulnerable communities, the CEC cannot continue to allow for a rapid build out of the state’s fossil gas infrastructure. Instead, the Commission should:

- commit to an all-electric building code starting with the 2022 Standards, and
- set a stricter ventilation standard based on the best available science that eliminates potentially harmful levels of gas stove pollution at all times and protects the most sensitive populations.

Falling Short on Climate Goals

Realizing the gravity of the harms from climate change, California has set ambitious goals to decarbonize the state. By 2030, the state must reduce greenhouse gas emissions to 40% below 1990 levels, and by 2050, to 80% below 1990 levels.² The state must also achieve net carbon neutrality economy-wide by 2045.³ The California Air Resources Board (“CARB”) has laid out a Scoping Plan detailing how the state plans to meet its 2030 goals.⁴

However, recent research by Energy Innovation has found that the Scoping Plan will not achieve enough reductions for California to meet its 2030 goals. The current trajectory will “reduce 2030 emissions by more than 100 [million metric tons (‘MMT’)] of [carbon dioxide equivalent (‘CO₂e’)] but leave emissions about 25 MMT of CO₂e above the 2030 target.”⁵

CARB’s current Scoping Plan has no path toward reducing greenhouse gas emissions from buildings.⁶ Meanwhile, California is adding more new gas customers faster than any other state, having added over 270,000 new gas customers between 2013 and 2018.⁷

By continuing to allow gas installations in new construction, the Commission will be pushing California even farther away from meeting its greenhouse gas reduction goals. On the other hand, if the Commission adopts an all-electric building code for

² CAL. HEALTH & SAFETY CODE § 38,566; Exec. Order No. S-3-05 (June 1, 2005).

³ Exec. Order B-55-18 (Sept. 10, 2018).

⁴ CALIFORNIA AIR RESOURCES BOARD, CALIFORNIA’S 2017 CLIMATE CHANGE SCOPING PLAN (2017), available at https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf

⁵ ENERGY INNOVATION, INSIGHTS FROM THE CALIFORNIA ENERGY POLICY SIMULATOR at v (2020), available at https://energyinnovation.org/wp-content/uploads/2020/01/Insights-from-the-California-Energy-Policy-Simulator_1.16.20.pdf.

⁶ CALIFORNIA AIR RESOURCES BOARD, *supra* note 4, at 62.

⁷ U.S. Energy Information Administration, Number of Natural Gas Customers: California (2018), available at www.eia.gov/dnav/ng/NG_CONS_NUM_DCUSCA_A.htm



the 2022 cycle, greenhouse gas emissions will decrease by nearly 1.3 million metric tons per year by 2030,⁸ helping the state move closer toward achieving its climate goals.

Failing to Meet Outdoor Air Quality Goals

The vast majority of Californians live in communities where it is regularly unsafe to breathe,⁹ and the burning of fossil fuels in buildings is a major contributor to this problem. Last year, from the day that Los Angeles’s school children got out of school to the day they returned in the fall, it was unsafe to breathe outdoors.¹⁰ This pollution has profound human health and economic impacts on all Californians. Forty of California’s 58 counties are designated as areas that are in non-attainment of the National Ambient Air Quality Standards.¹¹

Emissions of nitrogen oxides (“NO_x”)—including nitrogen dioxide (“NO₂”)—from burning fossil fuels in buildings are a significant contributor to California’s air pollution woes. The burning of gas produces NO₂ pollution, and NO_x is also a precursor to other dangerous pollutants, including both ozone and fine particulates (“PM_{2.5}”).¹² Buildings in California release 107 tons of NO_x per day, nearly as much as the 118 tons/day of NO_x from all the state’s light-duty vehicles, and six times as much as the 18 tons/day from power plants.¹³

⁸ This calculation is based on a Rocky Mountain Institute impact analysis using data on newly permitted housing, housing type, gas consumption per new home, gas and electricity emissions intensity. See U.S. Census, Building Permit Survey (2018), <https://www2.census.gov/econ/bps/>; U.S. Census, Characteristics of New Housing (2018), <https://www.census.gov/construction/chars/microdata.html>; U.S. Energy Information Administration, Residential Energy Consumption Survey (2015), <https://www.eia.gov/consumption/residential/data/2015/>; Carnegie Mellon University, Scott Institute for Energy Innovation, Power Sector Carbon Index (Apr. 10, 2020), <https://emissionsindex.org/#chart-2-view-3>.

⁹ See U.S. Environmental Protection Agency, News Release, *EPA Takes Action to Ensure California Meets Nation’s Air Quality Standards* (Sept. 24, 2019) (“California has the worst air quality in the United States, with 82 nonattainment areas and 34 million people living in areas that do not meet [National Ambient Air Quality Standards]”), available at <https://www.epa.gov/newsreleases/epa-takes-action-ensure-california-meets-nations-air-quality-standards>.

¹⁰ See California Air Resources Board, Air Quality and Meteorological Information (AQMIS2) Home Page, South Coals Air Basin, Daily Max 8 Hr Overlapping Avg Ozone, 2019, <https://www.arb.ca.gov/aqmis2/display.php?year=2019&report=AREA1YR&statistic=DMOL8N&o3pa8=SC¶m=OZONE&submit=Get+the+Data&ptype=aqd&std15=y> (Apr. 10, 2020).

¹¹ See Environmental Protection Agency, Current Nonattainment Counties for All Criteria Pollutants, <https://www3.epa.gov/airquality/greenbook/ancl.html> (Mar. 31, 2020).

¹² California Air Resources Board, Nitrogen Dioxide & Health (2020), available at <https://www2.arb.ca.gov/resources/nitrogen-dioxide-and-health>

¹³ California Air Resources Board, 2016 SIP Emission Projection Data, 2012 Estimated Annual Average Emissions Statewide (2019), available at https://www.arb.ca.gov/app/emsmv/2017/emsumcat_query.php?F_YR=2012&F_DIV=-4&F_SEASON=A&SP=SIP105ADJ&F_AREA=CA#AREAWIDE



Moreover, emissions from buildings are now the largest cause of pollution-related premature deaths in the state—larger than transportation, larger than industry, larger than electricity generation.¹⁴

Against this backdrop, allowing the use of gas in new buildings means more asthma attacks, more missed school days, and more health costs. Without substantially reducing these NO_x emissions from buildings, California cannot hope to meet its air quality standards. While shifting to all-electric new construction would avoid adding to the problem, continuing to permit gas appliances in new construction would further increase NO_x pollution, moving the state further away from reaching its air quality goals.

Indoor Air Quality Impacts on Vulnerable Communities

Furthermore, air quality impacts fall disproportionately on those Californians who are the most vulnerable. Burning gas in homes can release more NO₂ and carbon monoxide inside than the U.S. Environmental Protection Agency allows outdoors.¹⁵ According to a study by the Lawrence Berkeley National Laboratory, 12 million Californians in homes with gas stoves are breathing levels of NO₂ that would be illegal outdoors, while 1.7 million Californians are breathing levels of carbon monoxide that exceed outdoor limits.¹⁶

Living in a home with a gas stove increases the risk of asthma in children, relative to those children who live in homes with electric stoves. A gas stove in the home increases the risk of experiencing asthma symptoms by 42%.¹⁷ Meanwhile, having a gas stove increases the risk of being diagnosed with asthma by a doctor by 24%.¹⁸

Asthma rates are higher in low-income communities and communities of color; consequently, these communities may be at higher risk of harms resulting from exposure to pollution from gas stoves, as some of the most susceptible populations

¹⁴ Irene C. Dedoussi, et al., *Premature mortality related to United States cross-state air pollution*, 578 NATURE 264 (2020), available at <https://doi.org/10.1038/s41586-020-1983-8>.

¹⁵ Jennifer M Logue et al., *Pollutant Exposures from Natural Gas Cooking Burners: A Simulation-Based Assessment for Southern California*, 122 ENVIRONMENTAL HEALTH PERSPECTIVES 43 (2014), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3888569/>.

¹⁶ Jennifer M Logue et al., *Pollutant Exposures from Natural Gas Cooking Burners: A Simulation-Based Assessment for Southern California*, 122 ENVIRONMENTAL HEALTH PERSPECTIVES 49 (2014), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3888569/>.

¹⁷ Weiwei Lin et al., *Meta-Analysis of the Effects of Indoor Nitrogen Dioxide and Gas Cooking on Asthma and Wheeze in Children*, 42 INTERNATIONAL JOURNAL OF EPIDEMIOLOGY 1724 (2013), available at <https://doi.org/10.1093/ije/dyt150>.

¹⁸ See *id.*



are those with existing asthma.¹⁹ Additionally, lower income homes may be at a higher risk of exposure to gas stove pollution in the first place, as factors that contribute to higher levels of NO_x in homes are more common in low-income multifamily housing. These factors include: smaller unit size, more people per home, and inadequate ventilation.²⁰

The indoor air quality guidelines that the CEC relies upon are outdated and not sufficiently protective of the public, especially vulnerable communities. The California Air Resources Board (“CARB”) has not updated its indoor air quality guidelines for NO₂ emissions since 1994.²¹ Meanwhile, the CEC’s ventilation standards working group is proposing to apply the U.S. Environmental Protection Agency’s (“EPA”) 2016 outdoor NO_x standards for use indoors.²² Numerous scientific studies have shown that EPA’s outdoor NO_x standards are not sufficiently protective of health indoors, especially for the most sensitive populations. As a result, government officials in Canada and at the World Health Organization have adopted significantly more stringent guidelines for both indoor and outdoor air quality than EPA’s outdoor standards.²³

The CEC should base its ventilation standards on indoor air quality guidelines that reflect the latest science to protect public health, including for the most vulnerable

¹⁹ See, e.g., Michael Guarnieri & John R. Balmes, *Outdoor Air Pollution and Asthma*, 383 LANCET 1581 (2014), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4465283>; Christina M. Pacheco et al., *Homes of Low-Income Minority Families with Asthmatic Children Have Increased Condition Issues*, 35 ALLERGY AND ASTHMA PROCEEDINGS 467 (2014), available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4210655/#!po=78.0000>; Cheryl Katz, *People in Poor Neighborhoods Breathe More Hazardous Particles*, SCIENTIFIC AMERICAN (Nov. 2012), <https://www.scientificamerican.com/article/people-poor-neighborhoods-breathe-more-hazardous-particles>; Hatice S. Zahran et al., *Vital Signs: Asthma in Children – United States, 2001 – 2016*, Centers for Disease Control and Prevention Morbidity and Mortality Weekly Report (Feb. 9, 2018), <http://dx.doi.org/10.15585/mmwr.mm6705e1>; Centers for Disease Control and Prevention, Summary Health Statistics: National Health Interview Survey: 2015 at tbl. C-1 (2017), <http://www.cdc.gov/nchs/nhis/shs/tables.htm>.

²⁰ Gary Adamkiewicz et al., *Moving Environmental Justice Indoors: Understanding Structural Influences on Residential Exposure Patterns in Low-Income Communities*, 101 Am. J. Public Health S238 (2011), available at <https://www.ncbi.nlm.nih.gov/pubmed/21836112#>.

²¹ California Air Resources Board, *Combustion Pollutants in Your Home* (1994), available at <https://ww3.arb.ca.gov/research/indoor/combustf.htm>; see California Air Resources Board, Report to the California Legislature: Indoor Air Pollution in California 136-37, 144 (2005), available at <https://ww2.arb.ca.gov/sites/default/files/classic/research/apr/reports/l3041.pdf>.

²² Marian Goebes et al., *2022 California Energy Code (Title 24, Part 6), Multifamily Indoor Air Quality – Kitchen Range Hood Capture Efficiency Requirement* (Mar. 23, 2020), available at https://title24stakeholders.com/wp-content/uploads/2020/01/T24-2022-Submeasure-Summary_KITCHENRANGEHOOD.pdf.

²³ Health Canada, *Residential Indoor Air Quality Guideline: Nitrogen Dioxide* (2015), available at <https://www.canada.ca/en/health-canada/services/publications/healthy-living/residential-indoor-air-quality-guideline-nitrogen-dioxide.html>; World Health Organization (Regional Office for Europe), *WHO Guidelines for Indoor Air Quality: Selected Pollutants* (2010), available at <https://apps.who.int/iris/handle/10665/260127>.



populations. Specifically, the CEC should align its ventilation standards with the most up-to-date and most protective indoor air quality guidelines issued by air quality regulators.

Health Canada has set more stringent NO₂ standards, both indoors and outdoors. According to Health Canada, a “long term” indoor air concentrations of nitrogen dioxide should not exceed 11 parts per billion (“ppb”), which they say could be measured over a 24-hour period. They also set a guideline of 90 ppb over a 1-hour period specifically designed to accommodate gas stove pollution, but found that in order to fully protect sensitive populations a 1-hour standard of 27 ppb would be necessary.²⁴ For the outdoors, Health Canada set a 1-hour standard of 60 ppb starting this year, and lowering it to 42 ppb in 2025.²⁵

According to guidelines from CARB and the World Health Organization, indoor carbon monoxide levels should not exceed 9 parts per million (“ppm”) during an 8-hour period,²⁶ 20 ppm during a 1-hour period,²⁷ or 87 ppm for a 15-minute period.²⁸ Additionally, in order to protect against chronic exposure, carbon monoxide should not exceed 6 ppb (7 mg/m³) over a 24-hour period.²⁹

The CEC should ensure that its new building code does not allow gas stove pollution to occur at levels that are not protective of the most sensitive population at all times. It is not sufficient, practical or equitable to put the onus of ensuring clean air on building occupants. The CEC recognized the problem of relying on occupants to turn on ventilation in new bathrooms, and consequently required automatic ventilation in all new construction. It should do the same for gas stoves: automatic ventilation that turns off only when NO₂ and carbon monoxide levels fall below safe levels. This is especially important because appliance manufacturers and others have failed to warn building occupants that they need to turn on ventilation at all times when the gas stove is in operation, even when engaging in such seemingly innocuous activities as boiling water for kids’ mac and cheese, or baking a potato.

²⁴ See Health Canada, *supra* note 23. The guideline of 27 ppb for short term exposure is based on Health Canada’s short-term lowest observed adverse effect level (50 µg/m). For long term-exposure (at least 24-hour sampling) the maximum limit of 11 ppb was set as above this level, asthmatic children may experience a higher frequency of days with respiratory symptoms and/or medication use. Health Canada, Residential Indoor Air Quality Guideline: Nitrogen Dioxide (2015), available at <https://www.canada.ca/en/health-canada/services/publications/healthy-living/residential-indoor-air-quality-guideline-nitrogen-dioxide.html>

²⁵ See *id.*

²⁶ California Air Resources Board, Carbon Monoxide and Health, <https://ww2.arb.ca.gov/resources/carbon-monoxide-and-health> (Apr. 10, 2020); World Health Organization, *supra* note 23.

²⁷ California Air Resources Board, *supra* note 25.

²⁸ World Health Organization, *supra* note 23.

²⁹ World Health Organization, *supra* note 23.



We cannot afford to be building new buildings that will last for decades that are not safe based on the best science available today.

Need for an all-electric building code and stronger ventilation standards

California is failing to meet both its climate and air quality goals, and harmful emissions from burning fossil fuels in buildings are contributing significantly to these pollution levels. Low-income communities and communities of color are especially vulnerable to health risks from this pollution.

While cities across California are realizing the benefits of shifting away from burning gas in buildings, toward all-electric new construction, the CEC's proposal for the 2022 building code does not yet take this important step.

In order to put California on a path toward reaching its air quality and climate goals—and to avoid pushing the state further away from those goals—the Commission should adopt an all-electric building code for the 2022 cycle. The Commission should also ensure ventilation standards allow for sufficient pollutant capture and removal to ensure all new buildings are safe for the most sensitive populations at all times.

Respectfully submitted,

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