DOCKETED	
Docket Number:	21-BSTD-02
Project Title:	2022 Energy Code Update CEQA Documentation
TN #:	238749
Document Title:	Earthjustice and Sierra Club DEIR Comments
Description:	N/A
Filer:	System
Organization:	Earthjustice and Sierra Club
Submitter Role:	Public
Submission Date:	7/8/2021 3:10:23 PM
Docketed Date:	7/8/2021

Comment Received From: Earthjustice
Submitted On: 7/8/2021
Docket Number: 21-BSTD-02

Earthjustice and Sierra Club DEIR Comments

Additional submitted attachment is included below.

Docketed in 21-BSTD-02

July 8, 2021

Docket No. 21-BSTD-02

California Energy Commission
1516 Ninth Street
Sacramento, California 95814

Re: Comments on the Draft Environmental Impact Report for the Proposed 2022 Update to Building Energy Efficiency Standards (Title 24, Part 6)

Earthjustice and Sierra Club appreciate the opportunity to provide comments on the Draft Environmental Impact Report ("DEIR") for the 2022 Update to the Building Energy Efficiency Standards ("2022 Building Code" or "Project") under the California Environmental Quality Act ("CEQA"). As set forth in our comments on the Notice of Preparation, all-electric buildings result in air quality, climate and public health benefits and are essential for California to meet its decarbonization objectives.[1] Earthjustice and Sierra Club continue to support a 2022 Building Code that assumes both heat pump space and water heating in standard building designs and at a minimum incorporates improvements identified in our June 3rd comments on the Draft Express Terms.[2] These DEIR comments focus on a series disingenuous claims in a May 21st letter submitted by Holland & Knight asserting that electrification would increase Project impacts.[3]

[1] Docket No. 21-BSTD-02, *Earthjustice and Sierra Club Scoping Comments*, TN #237462 (Apr. 15, 2021).
[2] Docket No. 21-BSTD-01, *NRDC, RMI, Sierra Club, Earthjustice Comments on Express Terms for 2022 Code*, TN #238139 (June 2, 2021) ("NOP Comments").
[3] Docket No. 21-BSTD-02, *Comments in Response to the Comment Letter Submitted by Earthjustice and Sierra Club for the 2022 Energy Efficiency Standards (TN # 237461)*, TN #237871 (May 21, 2021) ("Holland & Knight Letter"). While the Holland & Knight comments do not identify a particular client on behalf on whom the comments are submitted, Southern California Gas Company's most recent General Order 77-M reports indicate Holland & Knight is among the outside law firms it retains. *See* Vasquez & Company LLP, S*an Diego Gas & Electric Company and Southern California Gas Company Independent Accountant's Report On Applying Agreed-Upon Procedures General Order No. 77-M Year Ended December 31, 2020*, at 32, https://www.socalgas.com/sites/default/files/SoCalGas_Annual_2020_REDACTED_GO-77-M.pdf.

1. Greenhouse Gas Benefits of Building Electrification.

Regarding the GHG benefits of all-electric construction, the Holland & Knight letter first takes issue with Sierra Club and Earthjustice's reliance on a 2019 Energy+Environmental Economics ("E3") Study finding that all-electric homes have lower GHG emissions than mixed fuel homes on the grounds that the study assumed low-GWP refrigerant use in 2030 and 2050. As an initial matter, the study found substantial GHG reductions from all-electric homes under 2020 conditions using refrigerants used today.[4] It is also reasonable to assume deployment of low-GWP refrigerants by 2030. The California Air Resources Board ("CARB") is required under Senate Bill 1383 (2016) to reduce emissions of hydrocarbon gases by 40 percent by 2030 and CARB is already working to achieve this mandate. Regarding air source heat pumps used for space heating and cooling, CARB is finalizing regulations requiring use of refrigerants with a GWP of no greater than 750,[5] far less than the GWP of the R-410A refrigerant referred to in the Holland & Knight letter. Moreover, because the air conditioning systems in mixed-fuel homes would have otherwise used similar refrigerants, there is little relative difference in emissions from refrigerant leakage when comparing mixed-fuel and all-electric homes since air source heat pumps provide both space heating and cooling and displace the need for the air conditioning systems used in mixed-fuel homes.

Contrary to the Holland & Knight letter's reference to a report from 2017 to support a general assertion that "not every end-use sector has low-GWP options commercially available today," the California Public Utilities Commission ("CPUC") has noted that "HWPH models that use R-744, which has a GWP of one, are [] available in the US market," are the primary refrigerant for split HPWH systems, and operate at higher efficiencies than R-134a, a higher-GWP HPWH refrigerant, in all temperature conditions.[6] The Holland & Knight letter also appears to question the veracity of Sierra Club and Earthjustice's comments noting the use of R-134a as the primary refrigerant currently used in HPWHs and the limited leakage during its operational lifetime. These same facts have been reaffirmed by the CPUC in its recent HPWH Staff Proposal, which similarly notes that R-134a is "the dominant refrigerant used in HPWHs" and "HPWH refrigerant leakage is minimal during installation and operation, as the units are factory-sealed at the manufacturing plant."[7] Holland & Knight also ignores the benefits of avoided methane leakage from all-electric homes. Holland & Knight's suggestion that GHG

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[4] E3, *Residential Building Electrification in California*, at vi (Apr. 2019) ("E3 Residential Building Electrification in California Report"), https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf.

[5] CARB, *Resolution 20-37: Proposed Amendments to Prohibitions on Use of Certain Hydorfluorocarbons in Stationary Refrigeration, Chillers, Aerosols-Propellants, and Foam End-Uses Regulation* (Dec. 10, 2020), https://ww3.arb.ca.gov/board/res/2020/res20-37.pdf.

[6] CPUC, *Administrative Law Judge's Ruling Providing Proposal, Requesting Comment, and Updating Procedural Schedule*, at 10–11 (Apr. 16, 2021), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M377/K729/377729072.PDF.

[7] *Id.* at 10.

emissions of all-electric homes are higher than mixed fuel homes due to leakage of high global warming pollutants is without merit.

In addition, the Holland & Knight letter's reliance on several "studies" that purportedly refute the position that all-electric homes have lower GHG emissions than mixed-fuel homes is highly misleading. The letter's first citation is to an Opinion piece in a newspaper. As support for the statement that "converting fuels, such as natural gas, to electricity to meet home demands is less efficient than directly using natural gas and results in higher GHG emissions," the letter cites to a publication by Stanford's Natural Gas Initiative, whose members include ExxonMobil, American Petroleum Institute, and SoCalGas, which makes no such claim. Indeed, this publication was not a study, but rather a description of the results of a multi-player web-based game where participants "played the role of generating companies in electricity markets" exploring the continued need for gas-fired peaker plants under high-renewable penetrations. Similarly, the statement in the National Institute of Standards and Technology study that a mixed fuel home has lower environmental impacts compared 2015 International Energy Conservation Code ("IECC") compliant homes in Maryland. Not only is Maryland's grid substantially more carbon-intensive than California's, but 2015 IECC standards utilize much less efficient electric resistance water heating than the HPWHs contemplated under the 2022 Code. Reliance on this study is therefore wholly inapposite for evaluating impacts of all-electric construction in California. The Holland & Knight letter then wrongly claims that the CEC has shown that "California buildings that rely on natural gas generate substantially lower GHG emissions on average than buildings that rely on electricity" based on a CEC presentation finding that the number of hours of the year where electricity is cleaner than gas will increase from 40 percent in 2019 to 70 percent in 2030. The hours of the year where grid electricity is cleaner than gas is separate from the relative GHG emissions from mixed-fuel versus all electric buildings because heat pumps use much less energy than gas alternatives due to their superior efficiency. For example, under federal efficiency standards, gas furnaces must have an annual fuel utilization efficiency ("AFUE") of 80 percent, equivalent to a coefficient of performance ("COP") of 0.80.[8] In contrast, the minimum standard for a split system heat pump is a heating seasonal performance factor ("HSPF") of 8.2, or a COP of 2.4,[9] three times the efficiency of a gas furnace. As properly observed in Earthjustice and Sierra Club's NOP Comments, the superior

[8] 10 C.F.R. § 430.32; Dandelion, Coefficient of Performance ("COP"), https://dandelionenergy.com/resources/coefficient-performance-cop (last visited June 5, 2021) (noting that AFUE and COP "are both calculated using a very similar division formula, the only difference being terminology.").

[9] *Id.*, *See, e.g.*, Russell's, *HSPF: Compare the Ratings When You're Going for a Heat Pump System* (Sept. 15, 2011), https://www.russellshvac.com/2011/09/15/hspf-compare-the-ratings-when-youre-going-to-a-heat-pump-system#:~:text=If%20you%20want%20to%20compare%2C%20you%20can%20convert,2.93%20times%20as%20much%20energy%20as%20it%20consumes (HSPF converted to COP by multiplying HSPF by 0.293).

efficiency of HPWHs results in significant GHG savings compared to mixed-fuel homes, which will increase as the grid is increasingly decarbonized.

The Holland & Knight letter also grossly overstates the potential effect of electrification of new construction on peak electric demand by referring to studies examining electrification of California's entire building stock and ignoring low-carbon solutions that are already being implemented, such as increased energy storage deployment, that reduce the carbon intensity and need for gas-generation to meet electric demand during peak periods. In the Draft AB 3232 Assessment, the CEC evaluated the impacts of various building decarbonization scenarios, including a "moderate" scenario that assumed 100 percent electrification of new construction *and* 50 percent electrification upon appliance burnout and 5 percent early retirement of gas appliances.[10] Under this scenario, which included substantial additional electrification beyond new construction, the impact of winter and summer peak load was less than two percent.[11]

2. Public Health and Air Quality Benefits of Building Electrification.

The Holland & Knight letter critiques a study by Lin et al. ("Lin Study") which reviewed the links between gas stoves and childhood asthma and attempts to assert that gas appliances do "not contribute in any significant way to indoor air pollution."[12] In fact, **t**he clear relationship between gas stoves, increased NO_2 levels in homes and increased incidence of asthma is thoroughly detailed in peer reviewed literature.[13] The Lin Study is peer-reviewed, well-executed and sound.[14] Furthermore, findings from additional studies are consistent with the conclusions found in the Lin Study.

The Lin Study is a robust analysis that reviewed 1,064 studies before arriving at its conclusions. This is in addition to other peer-reviewed literature that establishes a link between gas cooking and health effects. In 2016, the EPA made the conclusive finding that there is a causal relationship between short-term exposure to NO2 and respiratory effects such as asthma

[10] CEC, *California Building Decarbonization Assessment - Draft Staff Report*, at 49 50 (May 2021), https://www.energy.ca.gov/event/workshop/2021-05/commissioner-workshop-draft-building-decarbonization-assessment.
[11] *Id.* at 228.
[12] Holland & Knight Letter at 12.
[13] Kathleen Belanger et al., *Household Levels of Nitrogen Dioxide and Pediatric Asthma Severity*, 24 Epidemiology no. 2, 320–330 (Mar. 2013) ("Belanger Study"), https://doi.org/10.1097/ede.0b013e318280e2ac; Docket No. 19-BSTD-03, *RMI, Redwood Energy, Guttman and Blaevoet, Mothers Out Front, NRDC, Sierra Club Response to SoCalGas on Indoor Air Quality*, TN #234934-1 (Sept. 28, 2020); Docket No. 19-BSTD-03, *RMI, Sierra Club CA, EHDD Architecture – EHDD Comments on Sept 30, 2020 Indoor Air Quality Workshop*, TN #235287 (Oct 16, 2020).
[14] Weiwei Lin et al., *Meta-Analysis of the effects of indoor nitrogen dioxide and gas cooking on asthma and wheeze in children*, 42 Int'l Journal of Epidemiology (Dec. 2013) ("Lin Study"), https://doi.org/10.1093/ije/dyt150.

attacks.[15] They also found there is likely to be a causal relationship between a long-term exposure to NO2 and respiratory effects including the development of asthma.

Meta-analyses, such as the Lin Study, aggregate multiple studies to provide a more precise estimate of the effect size, or the strength of the relationship between two variables (in this case, gas cooking and asthma). An advantage of the meta-analysis methodology is that it increases the generalizability of the results of individual studies. The results of the Lin Study support and build upon a previous meta-analysis conducted in 1992 by Hasselblad et al which, at that time, served as the basis for the World Health Organization (WHO) indoor and outdoor NO2 guideline.[16] Both the Lin and Hasselblad studies conclude that there is a relationship between gas cooking and respiratory effects, like asthma.

The Holland & Knight letter's reliance on a "much larger, international study" by Wong et al. that "detected no evidence of an association between the use of gas as a cooking fuel and either asthma symptoms or asthma diagnosis" does not withstand scrutiny.[17] When analyzing existing literature, it is extremely important to include studies that have measured concentrations of NO_2. Studies without direct NO_2 measurements have a greater risk of measurement error, due to the potential for higher exposure misclassification. For example, the Belanger Study is a key epidemiological study, a yearlong large prospectus study of 1,342 asthmatic children including four in-home NO_2 measurement periods. That direct measurement study found that when asthmatic children were exposed to low levels of NO2 concentrations (as low as 11ppb), their asthma got worse. In contrast, the cited Wong et al. study in the Holland & Knight letter is not based on measured concentrations of NO_2 in the home – it was based on survey data alone. This single study is based on a self-reported global survey in which the respondents were children aged 13–14 and parents of kids aged 6–7. A main factor that could mask an association between gas cooking and asthma is that the Wong study data combined 31 countries. By combining data from 31 countries, the differences across countries in housing characteristics, ambient temperatures, and ventilation may mask the association between gas cooking and asthma. Additionally, without better isolation between geographies and types of housing and associated ventilation, it is problematic to assume the global findings are applicable to California or the United States. In short, one cross-sectional study not specific to the United States does not call into question an entire body of scientific literature that has established a clear relationship between gas stoves and respiratory health effects.

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[15] U.S. EPA. *Integrated Science Assessment (ISA) for Oxides of Nitrogen – Health Criteria*, EPA/600/R-15/068 (Jan. 2016) https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=310879.

[16] Vic Hasselblad et al., *Synthesis of environmental evidence: nitrogen dioxide epidemiology studies*, 42 Journal of Air and Waste Management, 662–71 (1992), https://www.tandfonline.com/doi/abs/10.1080/10473289.1992.10467018.

[17] Holland & Knight Letter at 12.

3. Construction and Operational Costs of All-Electric Homes.

Finally, the Holland & Knight letter makes the unsupported assertion that "[t]he Project will result in thousands of dollars in added costs for newly constructed homes, alterations, and additions making home ownership less attainable for working-class families and communities of color."[18] In fact, study after study has found all-electric homes are cheaper to build in part because they avoid the need for gas pipeline infrastructure.[19] As one builder recently stated in reporting by NPR, "his company only did its first all-electric building because an environmentally-minded developer forced them to. They thought it would cost a lot extra - turns out it's cheaper."[20] With regard to the cost of electricity, a recent study by the CPUC as part of an *en banc* by California's energy agencies on electric rates found that electrification *reduces* rates by increasing volumetric electric sales.[21] In contrast, delaying adoption of a strong electrification code until the 2025 code cycle would result in more than $1 billion of unnecessary spending on new gas connection infrastructure.[22] The CPUC study also found that all-electric new construction has equivalent energy costs to mixed-fuel homes with overall bill savings for all-electric retrofits.[23] Moreover, not only is heat pump space and water heating more efficient than gas alternatives, but because new construction now requires solar, operational costs of all-electric homes are further reduced because solar generation offsets additional electric load and complements technologies like HPWHs, which heat water for later use in the middle of the day and can be programmed to operate in even greater alignment with solar generation.

Thank you for your consideration of these comments.

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[18] Holland & Knight Letter at 13.

[19] E3 Residential Building Electrification in California Report at 55 (finding all-electric homes have "a capital cost advantage ranging from $3,000 to more than $10,000 over a mixed-fuel home" due to avoided gas infrastructure costs); RMI, *The Economics of Electrifying Buildings*, at 29 (2018), https://rmi.org/insight/the-economics-of-electrifying-buildings/.

[20] Dan Charles, *Cities' Goal to Lower Climate Emissions Could Be Blocked by Gas Utilities*, NPR (Feb. 23, 2021), https://www.npr.org/2021/02/23/970672290/cities-goal-to-lower-climate-emissions-could-be-blocked-by-gas-utilities.

[21] CPUC, *Utility Costs and Affordability of the Grid of the Future: An Evaluation of Electric Costs, Rates, and Equity Issues Pursuant to P.U. Code Section 913.1*, at 85 (Feb. 2021) ("rapid adoption of vehicle and building electrification technologies would likely have the benefit of reducing residential electric rates by 2030."), https://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/Utilities_and_Industries/Energy/Reports_and_White_Papers/Feb%202021%20Utility%20Costs%20and%20Affordability%20of%20the%20Grid%20of%20the%20Future.pdf.

[22] Denise Grab & Amar Shah, *California Can't Wait on All-Electric New Building Code*, RMI (July 28, 2020), https://rmi.org/california-cant-wait-on-all-electric-new-building-code/.

[23] CPUC, *Utility Costs and Affordability of the Grid of the Future*, at 81–82 (Feb. 20, 2021), https://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/Utilities_and_Industries/Energy/Reports_and_White_Papers/Feb%202021%20Utility%20Costs%20and%20Affordability%20of%20the%20Grid%20of%20the%20Future.pdf.

Dated: July 8, 2021

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