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VIA EMAIL

Diedre Tanenberg
Public Affairs Assistant Coordinator
Commission on the Environment
City of San Francisco
1455 Market Street, Suite 1200
San Francisco, CA 94103
diedre.tanenberg@sfgov.org

To the Commission on the Environment:

We are writing to support Supervisor Mandelman's proposed ordinance requiring all-electric buildings for new construction. Local jurisdictions across the state have amended their reach codes or introduced ordinances to decarbonize their building sectors, and San Francisco has the opportunity to emerge as a leader in this movement by taking a strong stance against fossil fuels and requiring all-electric construction in all new building projects.

We commend Supervisor Mandelman and the numerous stakeholder groups he engaged for taking the initiative to develop and introduce this important legislation. In addition, to more fully realize the health, climate and economic benefits of electrification and ensure that any exemptions to this important requirement are under legitimately exceptional circumstances, we ask that the following changes be made to strengthen the ordinance and implementing regulations:

1) eliminate the blanket exemption for commercial kitchens delaying compliance until 2022;
2) eliminate the feasibility exception to the electric-ready requirement;
3) expand and clarify the definition of "Mixed-Fuel Buildings" in the ordinance to include laboratory and industrial buildings, as well as decorative uses of gas; and
4) provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest.

The Ordinance Will Protect the Health and Safety of San Francisco Residents

Gas appliances in buildings make up a quarter of California's nitrogen oxide (NO_x) emissions from natural gas. NO_x is a precursor to ozone and particulate matter, which are key pollutants to curb in order to comply with state and federal ambient air quality standards. Electrifying buildings will help reduce NO_x and ground level ozone, improving *outdoor* air quality and benefiting public health. A recent study from the UCLA Fielding School of Public Health found that immediate replacement of all residential gas appliances with clean electric alternatives would result in 354 fewer deaths, 596 fewer cases of acute bronchitis, and 304 fewer cases of chronic bronchitis *annually* in California due to improvements in outdoor air quality alone—the monetized equivalent of $3.5 billion in health benefits per year.[1]

Electrification of fossil fuel appliances will also immediately improve *indoor* air quality and health. On average, Californians spend 68 percent of their time indoors, making indoor air quality a key determinant of human health.[2] The combustion of gas in household appliances produces harmful indoor air pollution, specifically nitrogen dioxide, carbon monoxide, nitric oxide, formaldehyde, acetaldehyde, and ultrafine particles, often in excess of the levels set out by the California Ambient Air Quality Standards and the National Ambient Air Quality Standards.[3,]

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[1] Zhu, *et al., Effects of Residential Gas Appliances on Indoor and Outdoor Air Quality and Public Health in California*, UCLA Fielding School of Public Health (April 2020).
[2] Klepeis *et al., The National Human Activity Pattern Survey (NHAPS): A Resource for Assessing Exposure to Environmental Pollutants*, J. EXPO. ANAL. ENVIRON. EPIDEMIOL., Vol. 11(3), 231-52 (2001).
[3] *See, e.g.*, Logue *et al., Pollutant Exposures from Natural Gas Cooking Burners: A Simulation-Based Assessment for Southern California*, ENVIRON. HEALTH PERSP., Vol. 122(1), 43-50 (2014); Victoria Klug & Brett Singer, *Cooking Appliance Use in California Homes—Data Collected from a Web-based Survey*, LAWRENCE BERKELEY NATIONAL LABORATORY (Aug. 2011); John Manuel, *A Healthy Home Environment?* ENVIRON. HEALTH PERSP.,

[4] The California Air Resources Board warns that "cooking emissions, especially from gas stoves, have been associated with increased respiratory disease."[5] Young children and people with asthma are especially vulnerable to indoor air pollution, and the negative health impacts associated with gas appliance use disproportionately affect low-income residents, who are often renters rather than homeowners and tend to live in smaller spaces, resulting in higher concentration of indoor air pollutants.[6]

Chronic exposure to air pollution has also been linked to poor health outcomes during the COVID-19 crisis.[7] A study from the Harvard T.H. Chan School of Public Health analyzed data from more than 3,000 counties across the United States to assess the link between long-term average exposure to air pollutants and COVID-19 death rates. The study found that "an increase of only y 1 μg/m3 in $PM_{2.5}$ is associated with an 8% increase in the COVID-19 death rate," meaning even small increases in long-term exposure to particulate matter can translate into significant increases in county-wide death rates from the virus.[8] This data is a stark reminder of the devastating effects that air pollution has on affected communities, and underscores the need for major urban centers like San Francisco both to uphold existing safeguards against air pollution and to take a strong stance moving forward to protect the health and safety of their residents.

The Ordinance is a Critical Step in Fighting the Climate Emergency

Stationary energy use represents a major source of greenhouse gas ("GHG") emissions, much of which comes from gas end uses, such as space and water heating. In *Residential Building Electrification in California*, E3 determined that "electrification is found to reduce total greenhouse gas emissions in single family homes by approximately 30 to 60 percent in 2020, relative to a natural gas-fueled home."[9] Moreover, "[a]s the carbon intensity of the grid decreases over time, these savings are estimated to increase to approximately 80 to 90 percent by 2050, including the impacts of upstream methane leakage and refrigerant gas leakage from air conditioners and heat pumps."[10]

Building electrification brings significant GHG reductions, not only due to the energy mix on the grid, which was, in PG&E's and CleanPowerSF's service territories, respectively, 85

Vol. 107(7), 352-57 (1999); Mullen *et al.*, *Impact of Natural Gas Appliances on Pollutant Levels in California Homes*, LAWRENCE BERKELEY NATIONAL LABORATORY (2012).
[4] Zhu, *et al.*, at 12-13.
[5] California Air Resources Board, *Combustion Pollutants* (last reviewed Jan. 19, 2017), https://www.arb.ca.gov/research/indoor/combustion.htm.
[6] Zhu, *et al.*, at 10.
[7] Wu, *et al.*, *Exposure to Air Pollution and COVID-19 Mortality in the United States: A Nationwide Cross-Sectional Study*, Harvard T.H. Chan School of Public Health (updated April 24, 2020).
[8] *Id.*
[9] E3, Residential Building Electrification in California at iv (Apr. 2019), https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf.
[10] *Id.*

and 89 percent carbon-free in 2018,[11] but also because heat pump technology is extraordinarily efficient. Rather than needing to generate heat through the combustion of fossil gas, heat pumps extract existing heat from the surrounding environment. Because electricity is used to move heat around rather than to create it, heat pump water heater ("HPWH") efficiency is far greater than 100 percent (energy services delivered are much greater than energy input). Accordingly, HPWHs use much less energy to heat water,[12] and HPWHs generate significantly less GHGs than even the most efficient gas water heating.[13]

Industry leaders have shown that all-electric construction is feasible for all building types, from single-family residences to large, commercial buildings.[14] For example, Stanford University has converted its campus from a system reliant on a fossil-fuel-based combined heat and power plant to a mix of grid-sourced electricity and an electric heat recovery system that uses heat pump technology to store thermal energy and to meet the campus's space and water heating needs, reducing the GHG impact of its roughly 12 million square feet of building stock by 68% below peak levels.[15] Similar all-electric retrofits and new construction have been adopted for large-scale corporate campuses like Tesla and Google, among others.[16] These resounding success stories support a comprehensive gas ban that covers all building types, avoiding a slow, piecemeal transition.

The Ordinance Will Develop the Local Workforce

Building electrification will also spur development of the local workforce for jobs that will be critical in California's broader energy transition. For example, in Sacramento Municipal Utility District territory, where all-electric buildings are quickly becoming the default for new developments, demand for specialized plumbers and HVAC technicians is expected to grow enormously. The region expects to install more than 300,000 heat pump space heaters in the next 15 to 20 years.[17] Additionally, a 2019 study from the UCLA Luskin Center for Innovation found that electrification of 100 percent of California's existing and new buildings by 2045 would generate new jobs for more than 100,000 full time construction workers and up to 4,900

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[11] PG&E, Corporate Responsibility and Sustainability Report: 2019, at 38. Available at: http://www.pgecorp.com/corp_responsibility/reports/2019/assets/PGE_CRSR_2019.pdf; CleanPowerSF Power Draft Power Content Label: 2018. Available at: https://www.cleanpowersf.org/s/2018-CleanPowerSF-PCL.pdf.
[12] See Pub. Util. Code § 397.6(k)(3) (a measure of SGIP success and impact is the "amount of energy reductions measured in energy value.").
[13] See Pub. Util. Code § 379.6(k)(1) (a measure of SGIP success and impact is the "amount of reductions of emissions of greenhouse gases.").
[14] Redwood Energy, *Zero Carbon Commercial Construction: An Electrification Guide for Large Commercial Buildings and Campuses* (2019). Available at: https://www.redwoodenergy.tech/wp-content/uploads/2019/09/Pocket-Guide-to-Zero-Carbon-Commercial-Buildings-2nd-Edition.pdf
[15] Stanford University, *Stanford Energy Systems Innovations Fact Sheet*. Available at: https://sustainable.stanford.edu/sites/default/files/SESI_Condensed_factsheet2017.pdf. *See also* Stanford University, *Energy and Climate Plan*. Available at: https://sustainable.stanford.edu/sites/default/files/E%26C%20Plan%202016.6.7.pdf.
[16] Redwood Energy, at 3-4.
[17] Justin Gerdes, *Experts Discuss the Biggest Barriers Holding Back Building Electrification*, Greentech Media (Sept. 19. 2018), https://www.greentechmedia.com/articles/read/here-are-some-of-the-biggest-barriers-holding-back-building-electrification#gs.fBEBKJy2.

full time manufacturing workers.[18] While gas distribution jobs would decrease, they are projected to be replaced by almost double the amount of full time jobs in electricity generation and distribution.[19] Further, because California imports 90 percent of its natural gas from out of state, it can reduce gas imports first while preserving in-state gas industry jobs, which will ease the strain of industry transition on gas industry workers.[20] The UCLA study stresses that planning—including implementing and enforcing clear building codes and standards—will be crucial in protecting workers through an industry transition that is already underway.[21] Recognizing the widespread energy transition already underway statewide, San Francisco has an opportunity to lead California's major urban centers by developing a robust, comprehensive local legal framework to support electrification and generate thousands of good, green jobs for its residents.

In light of this, we commend the introduction of an all-electric construction ordinance, not only as a response to the climate emergency, but also in support of new jobs and the health and safety of the people of San Francisco. To fully realize these benefits, avoid unnecessary stranded asset consequences of continued buildout of gas infrastructure, and ensure the City's actions are commensurate with the urgency of the climate crisis, it is critical that any exemptions to all-electric new construction be as narrowly tailored as possible and avoid the potential for loopholes. We therefore urge the following modification to the ordinance and implemented code to ensure exemptions are in legitimately exceptional circumstances.

1. **Eliminate the blanket exemption for commercial kitchens delaying compliance until 2022.** Restaurant workers who spend hours working in commercial kitchens daily are at particularly high risk for the negative health effects of gas stoves. Additionally, because this ordinance affects only new construction, this exemption does not stand to benefit existing local small businesses, but rather, caters to developers seeking to build brand-new commercial spaces. This exemption does not protect the interests of the local restaurant owners and will delay the transition to a fully decarbonized building stock with no balancing benefit in the public interest. An all-electric requirement with no categorical exemptions or delays is commensurate with the urgency of the climate crisis.

2. **Eliminate the feasibility exception to the electric-ready requirement and make fully electric-ready construction a baseline requirement for new construction.** To avoid creating obstacles to future electrification, any new construction project that is found exempt from the all-electric requirement due to infeasibility must be required, as a baseline, to adhere to an electric-ready design, *i.e.*, to install sufficient electric service, conduit, and wiring to facilitate full building electrification in the future.

[18] UCLA Luskin Center for Innovation, *California Building Decarbonization: Workforce Needs and Recommendations*, at ES-iv (Nov. 2019).
[19] *Id.*
[20] *Id.* at 24-25.
[21] *Id.* at 27-28.

An electric-ready requirement as an interim step will ensure that developers do not push gas-reliant projects through the exemption process for physical infeasibility, which will ultimately be costly and burdensome to retrofit.

3. **Expand the ordinance's definition of "mixed-fuel buildings" to include laboratory, industrial, and decorative uses of gas.** As written, the definition of "mixed-fuel buildings" limits the application of the ordinance just to buildings using gas for "space heating or cooling, water heating (including pools and spas), cooking appliances or clothes drying appliances, [or] onsite generation of electricity," or buildings that contain "fixtures, piping systems, or infrastructure for natural gas or propane equipment *for such uses*." Amending this definition to include laboratory, industrial, and decorative uses of gas (e.g., outdoor fireplaces or lamps) will ensure comprehensive application of the ordinance, as intended, subject to the infeasibility exemption on a case-by-case basis.

4. **Provide additional limitations and transparency in the exemption process to ensure any project found exempt for infeasibility is truly in the public interest.** The current proposed process for reviewing exemptions for physical infeasibility would take place behind closed doors with no opportunity for public comment or appeal. Without additional safeguards in place, developers may take advantage of the process to advance projects that do not serve the health and safety interests of the public, including the future workers and/or residents of the proposed development. A more transparent review process will enable public engagement and greater public confidence that exemptions are limited and made only in legitimately exceptional circumstances.

Further, amending section 106A.1.17 to require that that Building Official find "sufficient evidence was submitted to substantiate the infeasibility of an All-Electric Building or Project design *without regard to financial, floor-area, or amenity-related loss unless deemed to be in the public welfare*," would prevent developers from designing projects that claim physical infeasibility to avoid using space inside the building to house the necessary equipment. This amendment ensures the focus remains on public health and welfare, rather than profit maximization for developers and landlords, while giving the Building Official discretion to determine case-specific exemptions that may serve the public interest.

Thank you for your leadership in moving San Francisco forward in realizing the many benefits of healthy fossil fuel free homes. Please do not hesitate to reach out if you have any questions, and please include us on your contact list for any further developments on the proposed ordinance.

Sincerely,

Rebecca Barker
Earthjustice

Matthew Gough
Sierra Club

Amanda Millstein, M.D.
Climate Health Now

Chris Naso
Ban Natural Gas San Francisco Campaign

Daniel Tahara
San Francisco Climate Emergency Coalition

Denise Grab
Rocky Mountain Institute

Shoshana Wechsler
Sunflower Alliance

Sean Armstrong
Redwood Energy

Barbara Sattler, RN, DrPH, FAAN
Alliance of Nurses for Healthy Environments

Laura Neish
350 Bay Area

Elena Engel
350 SF

Barry Hermanson
Sierra Club – San Francisco Bay Chapter

Maia Piccagli
Mothers Out Front San Francisco

Alexandra Nagy
Food & Water Action

Joni Eisen
San Francisco Chapter
Citizens' Climate Lobby

Josh Lee
Sunrise Movement Bay Area

Paul Wermer
Helena Birecki
Climate Reality Project

Joni Eisen
San Francisco Tomorrow

Bronwyn Barry
North American Passive House Network

Andréa Traber
Integral Group

Khanh Nguyen
PIVOT:
The Progressive Vietnamese American Organization

Bob Gould
San Francisco Bay Chapter
Physicians for Social Responsibility

Rachelle Boucher
Kitchens to Life

Saul Griffith
Otherlab

Alter Consulting Engineers

Linda Hutchins-Knowles
Mothers Out Front California

Antonio Díaz
Chris Selig
PODER
People Organizing to Demand Environmental & Economic Rights

cc: charles.sheehan@sfgov.org
Aaron.Peskin@sfgov.org
Sunny.Angulo@sfgov.org
Lee.Hepner@sfgov.org
Ahsha.Safai@sfgov.org
Suhagey.Sandoval@sfgov.org
Dean.Preston@sfgov.org
Jen.Snyder@sfgov.org
Kyle.Smeallie@sfgov.org
Rafael.Mandelman@sfgov.org
Jacob.Bintliff@sfgov.org
mandelmanstaff@sfgov.org
Deborah.Raphael@sfgov.org
Patrick.O'Riordan@sfgov.org
Board.of.Supervisors@sfgov.org
Erica.Major@sfgov.org
Sonya.Harris@sfgov.org