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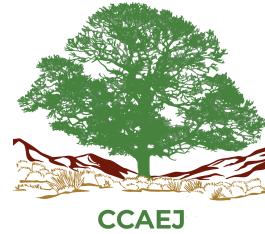
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Women For: Orange County
Working for a Better World.



SIERRA CLUB



March 9, 2023

U.S. Congressmember Katie Porter
2151 Michelson Drive, Suite 195
Irvine, CA 92612

Senator Dave Min
2151 Michelson Dr. Ste 258
Irvine, CA, 92612

Assemblymember Cottie Petrie-Norris
19712 MacArthur Boulevard, Suite 150
Irvine, CA 92612

Donald Wagner, Chair of the Board of Supervisors
400 W Civic Center Dr
Santa Ana, CA 92701

Supervisor Katrina Foley
400 W Civic Center Dr
Santa Ana, CA 92701

Irvine Mayor Khan and City Council Members
1 Civic Center Plaza
Irvine, CA 92606

Via email

Re: SoCalGas hydrogen/gas blending experiment at UC Irvine

Dear Congresswoman Porter, Senator Min, Assemblymember Petrie-Norris, Chair Wagner, Supervisor Foley, Mayor Khan and Irvine City Council Members,

We are a coalition of organizations and advocates dedicated to climate and social justice in Orange County. **As an elected representative of Irvine, we ask you to join us in publicly opposing the SoCalGas proposal before the California Public Utilities Commission (CPUC) to spend nearly \$13 million in ratepayer dollars to pipe, blend and burn a dangerous, experimental, and toxic mix of hydrogen and methane gas in ovens, furnaces, water heaters, dryers, and boilers in UC Irvine’s “Mesa Arts Building, Mesa Court Housing (29 halls and 3 towers), Mesa Office Building, Alumni Center, art studios, and a food court.”¹ Mesa Court is a 2,500-student freshman dormitory.**

There is no need to incur all the uncertainty, costs, health, and safety risks that come with these hydrogen blending experiments when electrification is an available, safe, pollution-free option for decarbonizing buildings today.

The proposed project will expose students and faculty to unacceptable safety and health risks, ignoring a mountain of research on the safety, health, climate, and environmental justice risks associated with burning hydrogen in buildings, as documented recently by the American

¹ Prepared Direct Testimony of Kevin Woo On Behalf Of Southern California Gas Company (SoCalGas’ Hydrogen Blending Demonstration Project), p. 5, III. Project Description
https://www.socalgas.com/sites/default/files/Chapter2-Technical_Presentation-SoCalGas_Project.pdf.

Medical Association,² Physicians for Social Responsibility,³ Sierra Club,⁴ NRDC⁵ and Earthjustice.⁶ SoCalGas ignored those well-documented concerns when it stated in its application that there are no relevant safety concerns⁷ and no need for hearings⁸ to review the evidence. SoCalGas says it will “collect data” on gas pipes, leakage and safety during the experiment, but nothing in the application or in reality guarantees that UC Irvine students and faculty will be safe from explosions or leaks of poisonous gasses from the project. Any equipment that burns hydrogen also creates lung-damaging NOx pollution, and the UC Irvine proposal relies on blending hydrogen and methane in combustion appliances.

The proposed project would, “begin with an initial hydrogen blend level of 5% and up to 20% over time,”⁹ blending hydrogen into 80-95% methane, an extremely potent greenhouse gas. It is unclear from the application how the electricity to power the hydrogen electrolyzers will be produced, but if it is produced using dirty, fossil fuel-based grid electricity, then emissions from hydrogen generation will far outweigh any emissions reductions achieved by the hydrogen blend.

Similar projects have been rejected elsewhere due to environmental justice, health, safety, cost and feasibility concerns. In 2022, UC San Diego moved the hydrogen/methane project location proposed for UCSD graduate student housing to a non-residential location that will use a hydrogen fuel cell (which does not involve combustion or dangerous NOx emissions), and a similar proposal in Oregon was canceled.¹⁰

² American Medical Association House of Delegates resolution, Informing Physicians, Health Care Providers, and the Public of the Health Dangers of Fossil-Fuel Derived Hydrogen, 2022, <https://www.ama-assn.org/system/files/a22-438.pdf>

³ Physicians for Social Responsibility, “Hydrogen use in homes would fuel climate change, increase health and safety risks from gas system,” June 2022
<https://psr.org/hydrogen-use-in-homes-would-fuel-climate-change-increase-health-and-safety-risks-from-gas-system/>

⁴ Sierra Club, “Hydrogen: Future of Clean Energy or a False Solution?” Jan. 2022,

<https://www.sierraclub.org/articles/2022/01/hydrogen-future-clean-energy-or-false-solution>

⁵ Natural Resources Defense Council, “Hydrogen in Buildings: The Poster Child of Tech-Crastination,” September 07, 2021,

<https://www.nrdc.org/experts/rachel-fakhry/hydrogen-buildings-poster-child-tech-crastination>

⁶ Earthjustice, “Reclaiming Hydrogen for a Renewable Future,” at 27–30, Aug. 2021,

<https://earthjustice.org/features/green-hydrogen-renewable-zero-emission>

⁷ Joint Application Of Southern California Gas Company (U 904 G), San Diego Gas & Electric Company (U 902 G), And Southwest Gas Corporation (U 905 G) To Establish Hydrogen Blending Demonstration Projects, Page 14, iii. Issues to be Considered and Relevant Safety Considerations and p. 15, section d Safety

https://www.socalgas.com/sites/default/files/A22-09-XXXJoint_IOU_Hydrogen_Blending_Demonstration_Application.pdf

⁸ Ibid, Page 14, ii Need for Hearings

⁹ Prepared Direct Testimony of Kevin Woo On Behalf Of Southern California Gas Company (SoCalGas’ Hydrogen Blending Demonstration Project), p. 2, I. Purpose

https://www.socalgas.com/sites/default/files/Chapter2-Technical_Presentation-SoCalGas_Project.pdf.

¹⁰ *Register-Guard*, “NW Natural cancels west Eugene hydrogen blending project,” Nov. 3, 2022

<https://www.registerguard.com/story/news/2022/11/02/nw-natural-cancels-west-eugene-hydrogen-blending-project/69612987007/>

Sierra Club and Earthjustice lawyers have filed a protest¹¹ against the proposal citing “numerous and wide-ranging safety-related concerns” identified in many studies of hydrogen/methane blending as well as other concerns.

None of the high school students who recently applied to UC Irvine, current students, faculty or neighboring families whose lives will be put at risk by this experiment gave their consent to be used as test subjects for the project. California law requires consent and a description of any risks prior to human experimentation.¹²

SoCalGas is the largest industrial funder of engineering research at UC Irvine, providing \$7 million or 14% of their industrial funding in the last ten years. A study published recently in the journal *Nature* finds that favorability toward “natural” gas in academic research is tied to the funding sources of university energy centers.¹³

UC Irvine professor and hydrogen proponent Jack Brouwer and SoCalGas lobbyists continue to spread misinformation about the facts and dangers of the proposal within UC Irvine and in the wider Irvine community. Brouwer told Associated Students of UC Irvine (ASUCI) students at their Feb. 28 board meeting, “I can guarantee you it will be safe,” and “The CPUC has to approve before UCI can engage with SoCalGas to negotiate what we will do.”¹⁴ In fact, the project involves numerous and well-documented safety and health risks, and if the CPUC approves the project, there will no longer be a meaningful opportunity for students to change or stop it, so the project must be stopped now.

Greenwashed Gas Industry Delay

This proposal is an attempted lifeline for the fossil fuel industry, and part of a larger gas industry campaign to maintain its profits while delaying necessary building electrification policy, which is the only feasible pathway to building decarbonization that meets the climate crisis.

Although gas industry representatives and hydrogen advocates claim their goal is to demonstrate hydrogen’s use for energy storage, their proposal and technical presentation¹⁵ clearly propose to burn methane blended with hydrogen in UC Irvine freshman dorms and other buildings. Gas industry representatives also proposed hydrogen/methane blending as an alternative to building electrification to the City of Irvine last year.

¹¹ A. 22-09-006 *Sierra Club Protest To Application Of Southern California Gas Company (U 904 G), San Diego Gas & Electric Company (U 902 G), And Southwest Gas Corporation (U 905 G) To Establish Hydrogen Blending Demonstration Projects*, Sept. 8, 2022, <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M497/K621/497621760.PDF>

¹² California Health & Safety Code §24172, Experimental subject’s bill of rights, https://oag.ca.gov/sites/all/files/agweb/pdfs/research/safety_24172.pdf

¹³ *Nature*, “Favourability Towards Natural Gas Relates To Funding Source Of University Energy Centres,” Nov. 10, 2022, <https://www.nature.com/articles/s41558-022-01521-3>

¹⁴ ASUCI Senate Meeting, Feb. 28, 2023, discussion of hydrogen resolution, see 2:07:40 <https://www.facebook.com/associatedstudentsuci/videos/927438974959773>

¹⁵ Prepared Direct Testimony of Kevin Woo on Behalf of Southern California Gas Company (SoCalGas’ Hydrogen Blending Demonstration Project), Purpose, p. 1, Sept. 2022 https://www.socalgas.com/sites/default/files/Chapter2-Technical_Presentation-SoCalGas_Project.pdf

SoCalGas Record of Harm to the Community

SoCalGas has proven that it cannot be trusted to safeguard community health or safety. In 2015, SoCalGas was responsible for the largest methane gas leak in U.S. history,¹⁶ which dumped 100,000 tons of toxic chemicals into the air north of Los Angeles for months, forcing more than 8,000 families to flee their homes. Last year, SoCalGas and Sempra paid \$1.8 billion to settle with thousands of residents sickened by the blowout.¹⁷

The SoCalGas proposal for UC Irvine would add risks to already-leaky and dangerous SoCalGas pipes and products. **A recent CPUC-funded study by UC Riverside found that metals and alloys used in methane gas transmission systems experienced “hydrogen induced embrittlement” when exposed to hydrogen gas, and that plastic pipes also become brittle and susceptible to explosions when used for hydrogen blending levels equal to what is proposed in the UC Irvine experiment.**¹⁸ The UC Riverside study states, “As the percentage of hydrogen increases, end-use appliances may require modifications, vintage materials may experience increased susceptibility, and legacy components and procedures may be at increased risk of hydrogen effects.” The SoCalGas proposal states it will inject hydrogen into steel and gas pipes at UC Irvine and that UC Irvine’s gas pipeline system was built in the 1970s.

Here are some of the risks that SoCalGas and UC Irvine left out of their proposal:

Explosions/safety: Hydrogen is highly explosive and prone to leakage

- Hydrogen is one of the lightest molecules in the universe, so it leaks more easily than already-leaky methane gas. When it leaks, hydrogen ignites more quickly and easily than gas.¹⁹
- Hydrogen is four times as explosive as methane.²⁰ Existing pipelines and appliances can’t handle large quantities of hydrogen, and injecting hydrogen into steel pipes causes them to become brittle and more likely to explode.
- U.S. government scientists at the National Renewable Energy Laboratory (NREL) last year found that blending hydrogen into the gas network could affect

¹⁶ *Los Angeles Times*, “Porter Ranch leak declared largest methane leak in U.S. history,” Feb. 25, 2016 <https://www.latimes.com/science/sciencenow/la-sci-sn-porter-ranch-methane-20160225-story.html>

¹⁷ *Los Angeles Times*, “SoCalGas agrees to pay up to \$1.8 billion in settlement for 2015 Aliso Canyon gas leak,” Sept. 27, 2021,

<https://www.latimes.com/california/story/2021-09-27/so-cal-gas-settles-over-huge-aliso-canyon-gas-leak>

¹⁸ University of California, Riverside final report prepared for the CPUC, “Hydrogen Blending Impacts Study,” filed July 18, 2022,

<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M493/K760/493760600.PDF>.

¹⁹ U.S. Dept of Energy, Safe Use of Hydrogen, webpage accessed Feb. 2023,

<https://www.energy.gov/eere/fuelcells/safe-use-hydrogen#:~:text=Specifically%2C%20hydrogen%20has%20a%20wide,design%20of%20safe%20hydrogen%20system>.

²⁰ Physicians for Social Responsibility, “Hydrogen Pipe Dreams: Why Burning Hydrogen in Buildings is Bad for Climate and Health,” at 13, June 2022,

<https://psr.org/resources/hydrogen-pipe-dreams-why-burning-hydrogen-in-buildings-is-bad-for-climate-and-health/> (“In the United Kingdom, a comprehensive risk assessment conducted by Hy4Heat evaluating a theoretical methane-hydrogen blend predicted that **the number of explosions per year and the risk of injuries from in-home explosions would be four times higher with a 20 percent blend of hydrogen compared to methane alone.**”)

the molecular structure of plastic gas pipes and has the potential to nearly double the volume of leakage. NREL researchers also found large gaps in data around the effects of hydrogen blends in gas infrastructure such as pipelines — even when using plastic pipes, which have long been touted by the gas industry as a safe way to transport hydrogen blends.²¹

Health: Air pollution from burning hydrogen in home appliances brings major health risks

- A 2022 meta-analysis of lung-damaging nitrous oxides (NOx) emissions from combustion of hydrogen/methane gas blends found hydrogen blends over 5%–20% led to NOx emission increases of 7%–30%.²² The UC Riverside Study also cautioned that combustion of a hydrogen blend can increase NOx emissions.
- Burning 100% hydrogen creates six times more lung-damaging NOx than burning methane gas alone.²³
- These risks recently prompted the American Medical Association to adopt a resolution warning of health risks from hydrogen blending in home appliances.²⁴
- Long-term safety risks of household hydrogen appliances are unknown and haven't been studied adequately.²⁵
- Despite the well-established NOx risks of hydrogen combustion, the SoCalGas/UCI application to the CPUC barely discusses this issue or mentions NOx. UCI and SoCalGas fail to offer a plan for monitoring, reporting, and mitigating NOx emissions.²⁶

Hydrogen increases environmental injustice

- Research has demonstrated that pollution from hydrogen fuel could widen inequality gaps.²⁷

²¹ National Renewable Energy Laboratory, “Hydrogen Blending into Natural Gas Pipeline Infrastructure: Review of the State of Technology,” Oct. 2022, <https://www.nrel.gov/docs/fy23osti/81704.pdf>

²² *Elementa: Science of the Anthropocene*, “Emissions of NOx from blending of hydrogen and natural gas in space heating boilers,” at 7, 11, May 31, 2022, <https://doi.org/10.1525/elementa.2021.00114>.

²³ *International Journal of Hydrogen Energy*, “Investigations on performance and emission characteristics of an industrial low swirl burner while burning natural gas, methane, hydrogen-enriched natural gas and hydrogen as fuels,” Jan. 11, 2018, <https://www.sciencedirect.com/science/article/abs/pii/S0360319917319791>.

²⁴ American Medical Association House of Delegates resolution, Informing Physicians, Health Care Providers, and the Public of the Health Dangers of Fossil-Fuel Derived Hydrogen, 2022, <https://www.ama-assn.org/system/files/a22-438.pdf>

²⁵ Physicians for Social Responsibility, “Hydrogen use in homes would fuel climate change, increase health and safety risks from gas system,” June 2022 <https://psr.org/hydrogen-use-in-homes-would-fuel-climate-change-increase-health-and-safety-risks-from-gas-system/>

²⁶ See generally Test. Ch. 1. See also Testimony Chapter 4, *Prepared Direct Testimony of Kevin M. Lang on Behalf of SW Gas (SW Gas’ Hydrogen Blending Demonstration Project)*, Sept. 8, 2022, “Test. Ch. 4”, https://www.socalgas.com/sites/default/files/Chapter4-SWG_Technical_Presentation.pdf.

²⁷ *Nature*, correspondence from Dr. Alastair Lewis, “Pollution from hydrogen fuel could widen inequality,” July 31, 2021, <https://www.nature.com/articles/d41586-021-01926-8>

- Even green hydrogen used for electricity generation creates NOx when combusted, and those impacts would deepen inequalities for low-income communities of color.²⁸
- Research from Stanford University finds that gas stoves constantly leak pollution into our most-used living spaces, exposing people to disease-triggering pollutants. Research has shown that more than ¾ of methane emissions occur while stoves are off because gas fittings, stove connections, and in-house gas lines leak.²⁹ Cooking with methane gas is closely linked with childhood asthma—a disease suffered by people of color and lower-income groups at much higher rates than the rest of the population.³⁰
- Hydrogen projects also carry very high costs which would be forced on customers already struggling to afford rising energy rates.

Fossil fuels: most hydrogen is made from fossil fuels.

- 99% of commercially available hydrogen is made from fossil fuels like gas.
- The SoCalGas proposal also ignores the reality that the project requires blending and burning 5-20% hydrogen into 80-95% methane, an extremely potent greenhouse gas that the IPCC says must be eliminated in order to prevent catastrophic climate impacts.

Climate delay: studies show hydrogen for buildings is a false solution.

- Only green hydrogen produced from 100% renewable energy can play a role in our clean energy future — but it doesn't belong in buildings. The very tiny amount of green hydrogen that is available must be preserved for hard-to-decarbonize industrial sectors.³¹
- A peer-reviewed study of 32 studies of hydrogen concluded hydrogen is unlikely to play a major role in home heating because there are too many technical difficulties to overcome to make hydrogen a viable and economic low-carbon heating fuel. The study concluded that all-electric alternatives such as heat pumps are much more efficient and less expensive.³²

²⁸ *Los Angeles Times*, “L.A. needs clean energy. Hydrogen could be the answer — or gas industry greenwashing,” March 21, 2022, <https://www.latimes.com/business/story/2022-03-21/los-angeles-needs-clean-energy-hydrogen-could-be-the-answer>

²⁹ Stanford University, published in *Environmental Science & Technology*, “Methane and NOx Emissions from Natural Gas Stoves, Cooktops, and Ovens in Residential Homes,” Jan. 27, 2022, <https://pubs.acs.org/doi/10.1021/acs.est.1c04707n>

³⁰ Asthma and Allergy Foundation of America, “Asthma Disparities in America, A Roadmap to Reducing Burden on Racial and Ethnic Minorities,” 2020, <https://aafa.org/asthma-allergy-research/our-research/asthma-disparities-burden-on-minorities/>

³¹ *ReCharge News*, “Liebreich: ‘Oil sector is lobbying for inefficient hydrogen cars because it wants to delay electrification,’” June 30, 2021, <https://www.rechargenews.com/energy-transition/liebreich-oil-sector-is-lobbying-for-inefficient-hydrogen-cars-because-it-wants-to-delay-electrification-2-1-1033226>

³² *Joule*, “Is heating homes with hydrogen all but a pipe dream? An evidence review,” Oct. 19, 2022, http://www.janrosenow.com/uploads/4/7/1/2/4712328/is_heating_homes_with_hydrogen_all_but_a_pipe_dream_final.pdf.

- In the most recent Integrated Energy Policy Report, the California Energy Commission (“CEC”) recommended electrification of end use equipment as the “perfect pathway to decarbonize buildings” because appliances like heat pumps are “substantially more energy-efficient than the combustion alternative,” and their adoption “reduces local emissions of the criteria pollutants associated with combustion.”
- To heat homes using significant volumes of hydrogen, every gas stove, furnace, and water heater in the country would have to be replaced — an astronomical cost that the gas industry leaves out of studies.³³

We have reached a place and time in the climate crisis when we must focus on solutions that actually work and are ready to scale now, and clean electrification is the only approach that meets both criteria. We are out of time for fantasy technologies that “may someday” solve the problem. This proposal is another fossil fuel industry scheme to make money by destroying our health and our future, wasting ratepayer dollars on a scam that will not decarbonize buildings while putting UC Irvine students and faculty at grave risk of injury and death.

UC Irvine’s Dean of Students recently told the ASUCI executive board that hydrogen blending is “off the table” for campus housing and dining facilities, but the proposal is still before the CPUC and neither UC Irvine nor SoCalGas has issued a public statement to clarify exactly which parts of the project are canceled or ongoing.

To protect Irvine students and families and advance climate justice, we ask you to stand with us by issuing a public statement opposing the SoCalGas/UC Irvine proposal and submitting a letter to the CPUC through the CPUC's comment form (search for proceeding A2209006 and click Add Public Comment).

Sincerely,

Hasti Soutchkashan, Executive Board, College Democrats at UC Irvine 2022-2023 and
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Associated Students of UC Irvine (ASUCI)

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Hannah Woo
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³³ *Energy Innovation*, “Assessing The Viability Of Hydrogen Proposals: Considerations For State Utility Regulators And Policymakers,” March 28, 2022, <https://energyinnovation.org/publication/assessing-the-viability-of-hydrogen-proposals-considerations-for-state-utility-regulators-and-policymakers/>

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