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Dana Papke Waters  
Staff Air Pollution Specialist  
California Air Resources Board  
P.O. Box 2815  
Sacramento, CA 95812-2815

**Subject: Comments on February 28, 2024 Zero-Emission Space and Water Heater Workshop**

Dear Ms. Waters:

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide public comments on the California Air Resources Board's (CARB) February 28, 2024, Zero-Emission Space and Water Heater Workshop. As CARB notes, about a quarter of California's greenhouse gas (GHG) emissions come from buildings, including from direct combustion of fuels, electricity consumption and refrigerants.<sup>1</sup> Reductions in building emissions are essential to achieve Assembly Bill 1279 (AB 1279) goals of carbon neutrality by 2045. California's experience in this process can be instructive for other states and nations as the world forges a sustainable energy system at midcentury and beyond.

SoCalGas supports policies incentivizing the adoption of zero-emissions appliances and equipment as part of a broader strategy to achieve GHG reductions, provided such policies are feasible, permitted by federal law, cost-effective, and commercially available. However, SoCalGas has concerns that the proposed rule effectively bans certain appliances covered by the federal Energy Policy and Conservation Act (EPCA).

Under a recent ruling by the Ninth Circuit, *California Restaurant Association v. City of Berkeley*, 89 F.4th 1094 (9th Cir. 2024) the Court held that EPCA preempts all regulations "that relate to 'the quantity of [natural gas] directly consumed by' certain consumer appliances at the place where those products are used." *Id.* at 1101. "[A] regulation on 'energy use' fairly encompasses an ordinance that effectively eliminates the 'use' of an energy source." *Id.* at 1102. Similar to the

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<sup>1</sup> [https://ww2.arb.ca.gov/our-work/programs/building-decarbonization#:~:text=Residential%20and%20commercial%20buildings%20are,greenhouse%20gas%20\(GHG\)%20emissions.](https://ww2.arb.ca.gov/our-work/programs/building-decarbonization#:~:text=Residential%20and%20commercial%20buildings%20are,greenhouse%20gas%20(GHG)%20emissions.)

Berkeley ordinance, the effect of the proposed rule is to reduce the quantity of gas consumed by EPCA-covered appliances to zero. Under *Berkeley*, States and localities cannot avoid EPCA's preemption provisions "by doing *indirectly* what Congress says they can't do *directly*." *Id.* at 1107 (emphasis in original).

Putting EPCA aside, our comments address the following: 1) CARB's pledge not to limit use or repair of existing space and water heaters will help low-income families and should be maintained; 2) The 2030 zero-emissions goal for all new sales is too ambitious for commercial heating units, which have significant replacement costs; 3) CARB should utilize a life-cycle analysis to accurately capture GHG emissions from electric heating; 4) The deployment of zero-emissions GHG space heating is impacted by high electricity prices, among other factors; and, 5) Clarification regarding zero-emission fuel cell technologies.

### **I. CARB's pledge not to limit use or repair of existing space and water heaters will help low-income families and should be retained.**

At the workshop, CARB stated that it will not limit the use or repair of existing space and water heaters. This approach should be retained because the cost of replacement with zero-emissions technologies is significant. Estimates vary, but a 2023 survey found that the cost of installing a heat pump in California ranges from \$7,000 to more than \$20,000, while the costs for electric water heater installation can range from \$2,000 to \$7,000.<sup>2</sup> Most units are replaced at the end of their useful life, typically when circumstances demand it. While, nationally, heat pump adoption is correlated more with geography than income,<sup>3</sup> there is a correlation between electric heat pump adoption and lower electricity rates (see section IV). Without significant public engagement, most Californians will not become aware that they can only purchase a zero-emissions appliance until their existing unit is no longer functioning.<sup>4</sup> Even with incentives this can be a burdensome cost to many families. Remaining flexible on the repair of existing heaters enables Californians, many of whom struggle financially, to delay replacement of an aging but functional appliance until it is financially viable for them.

### **II. The 2030 zero-emissions GHG goal for all new sales is too ambitious for commercial units, which have significant replacement costs.**

Replacing commercial gas-fueled equipment with electric driven equipment is a major undertaking, requiring additional construction to accommodate equipment location and new power supply requirements. Due to these factors, the cost-effectiveness of transitioning existing buildings to zero-emissions space and water heating equipment can vary significantly. Consequently, these potentially significant incremental costs must be included in CARB's evaluation of this proposed regulation's cost-effectiveness.

In January, SoCalGas asked the consulting firm Ramboll to apply the South Coast Air Quality Management District's (South Coast AQMD) cost-effectiveness analysis technique of the proposed zero-emission NO<sub>x</sub> standard for Large Water Heaters, Small Boilers and Process Heaters to get a better understanding of the actual installation costs associated with the transition to electric

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<sup>2</sup> <https://www.sfchronicle.com/bayarea/article/bay-area-gas-appliance-ban-full-cost-17843287.php>

<sup>3</sup> Lucas W. Davis, "The Economic Determinants of Heat Pump Adoption," National Bureau of Economic Research. Available at <https://www.nber.org/papers/w31344>

<sup>4</sup> [https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-and-1146.2/scaqmd-par-1146-2-letter\\_3\\_14\\_24.pdf?sfvrsn=6](https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/rule-1146-1146.1-and-1146.2/scaqmd-par-1146-2-letter_3_14_24.pdf?sfvrsn=6)

water heaters and boilers at our facilities. The analysis shows that for the commercial units at our facilities:

- With design and engineering costs and electrical infrastructure upgrade costs (including the concrete cutting and trenching referenced in SoCalGas' March 9, 2024 comment letter submitted to South Coast AQMD<sup>5</sup>) included in the cost effectiveness (CE) calculations for new zero-emission units, replacing five natural gas units with electric resistance heaters and boilers incurred an incremental installation cost of approximately \$1.81 million, while installing heat pumps resulted in even higher costs of \$1.89 million. This is significantly higher than the incremental installation cost assumptions in South Coast AQMD Staff's CE calculations.
- The cost to install zero-emission units are significantly higher than the South Coast AQMD's \$349,000 cost-effectiveness threshold when all installation cost components are considered based on the CE analysis conducted.

While these calculations will vary among facilities, there will be cases like this where it will not be practical or financially viable to retrofit existing buildings with zero-emissions space and water heating equipment.<sup>6</sup> CARB's eventual regulations should incorporate measures to handle situations where such zero-emissions equipment is not feasible or where power supply to a facility is unavailable. In cases where installing zero-emissions units is not feasible, facilities should be allotted more time to transition or allowed to utilize transitional alternatives, such as lower-emitting technologies. We recommend that Staff reach out to contractors to evaluate several different replacement scenarios to get a holistic cost estimate of commercial unit replacement.

### **III. CARB should utilize a life-cycle analysis to accurately capture GHG emissions from available replacement technologies.**

At the workshop, CARB said that it is considering defining "zero-emission" as meaning no GHG emissions emitted during operation of space and water heaters at the building site. A life-cycle analysis would more accurately capture overall GHG emissions, given that, as CARB also acknowledged, zero-emission technologies like heat pumps may result in increased use of hydrofluorocarbon (HFC) refrigerants with attendant leakage. The 2022 Scoping Plan recognized that heat pumps currently still rely upon refrigerants with high global warming potential and that suitable replacements with low warming potential are "still nascent" and reliant upon new building codes. HFC emissions represent the fastest growing category of GHG emissions in California.<sup>7</sup> It is in the public interest for CARB to evaluate total GHG emissions of heating and cooling space and water in their overall regulation to reduce emissions.

While regulatory processes at state and federal levels are encouraging better refrigerants or reclaimed HFC refrigerant use (for example SB 1206 and SB 1383 in California), they currently do not address refrigerant leakage. As such, a life cycle analysis will not only devote the appropriate attention to the high warming potential of refrigerants, but it will also encompass the GHG emissions associated with the energy required to operate electric units, providing the most accurate calculus possible for the trade off in replacing gas-powered heaters. This analysis will

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<sup>5</sup> SCAQMD 1146.2 Comment letter docket, [Comment Letters \(aqmd.gov\)](https://www.aqmd.gov/comment-letters)

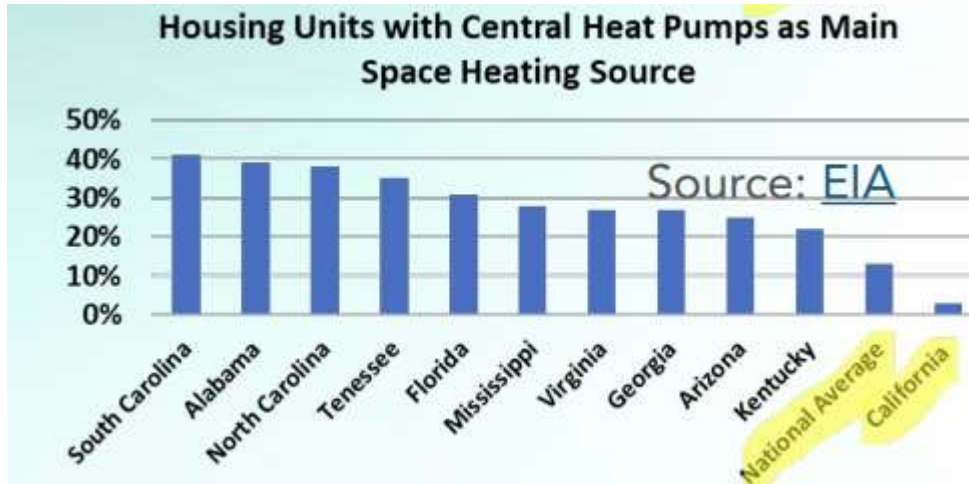
<sup>6</sup> [South Coast AQMD 1146.2 Comment Letter from various trade associations.](#)

<sup>7</sup> CARB Scoping Plan, 2022, p. 237-240.

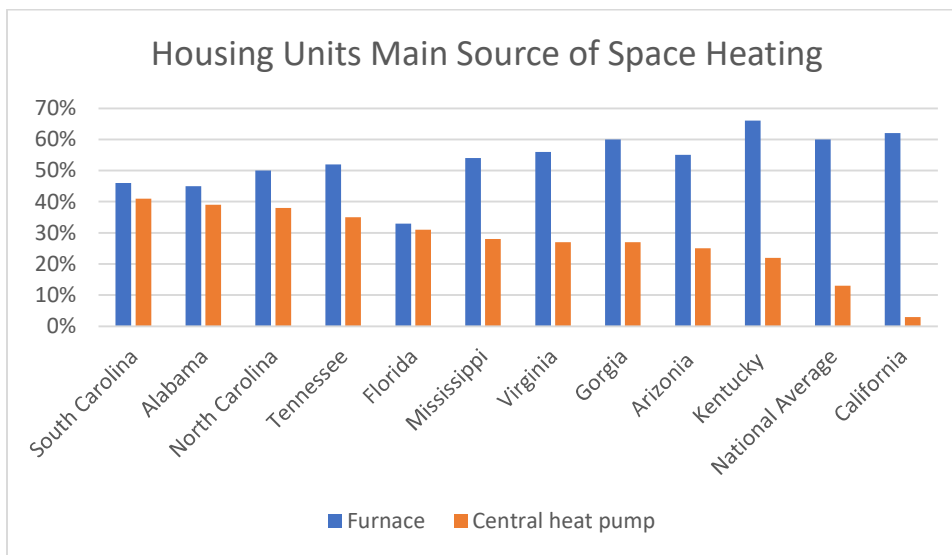
help policymakers balance the varying factors regarding GHG emissions for different heaters, expense, timeline, and public appetite for change.

**IV. The deployment of zero-emissions GHG space heating is impacted by high electricity prices, among other factors.**

During the workshop, CARB presented the following figure, which makes it look like California is far behind in zero-emissions appliance deployment, as compared to a handful of selected states and the national average.<sup>8</sup>



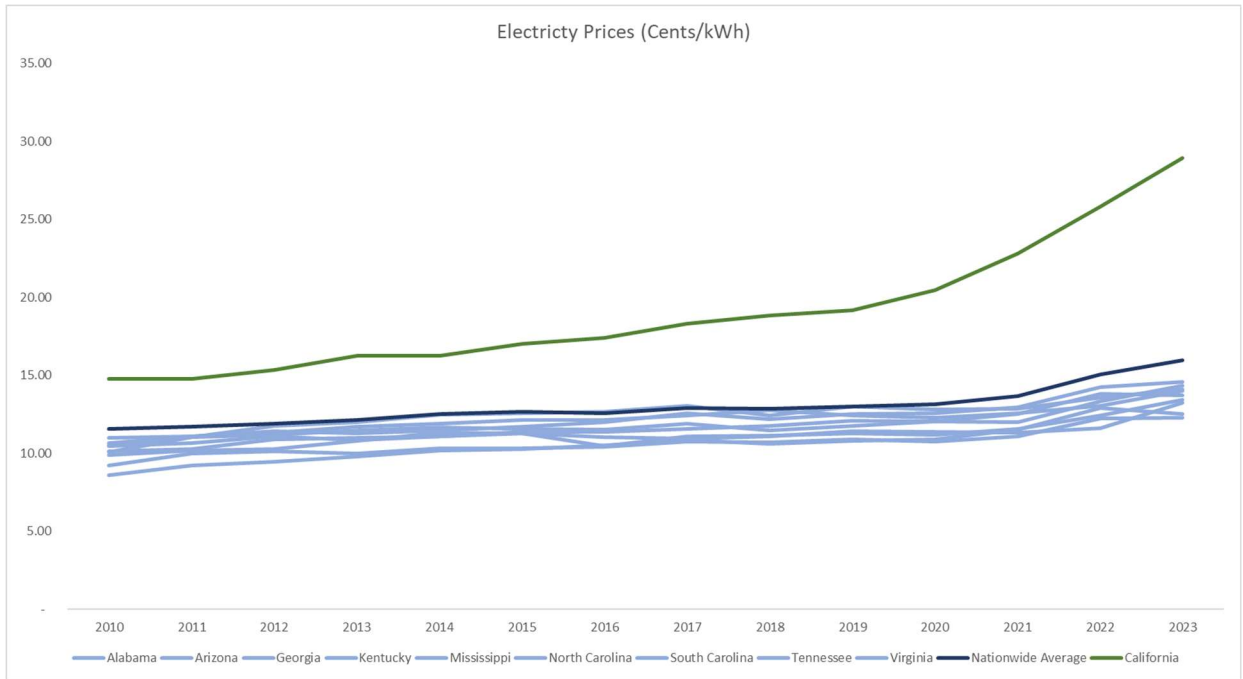
It is unclear why those individual states were chosen to represent the nation as a whole. Notably, the EIA data referenced for the above graphic includes data on furnaces as the main source of space heating. The following figure depicts those same states and the national average for furnaces as the main sources of space heating, which tends to reflect more modest differences between these states.<sup>9</sup>



<sup>8</sup> CARB February 28, 2024, Public Workshop: Zero-Emission Space and Water Heater Standards; Slide 27

<sup>9</sup> EIA; [Highlights for space heating in U.S. homes by state, 2020](#).

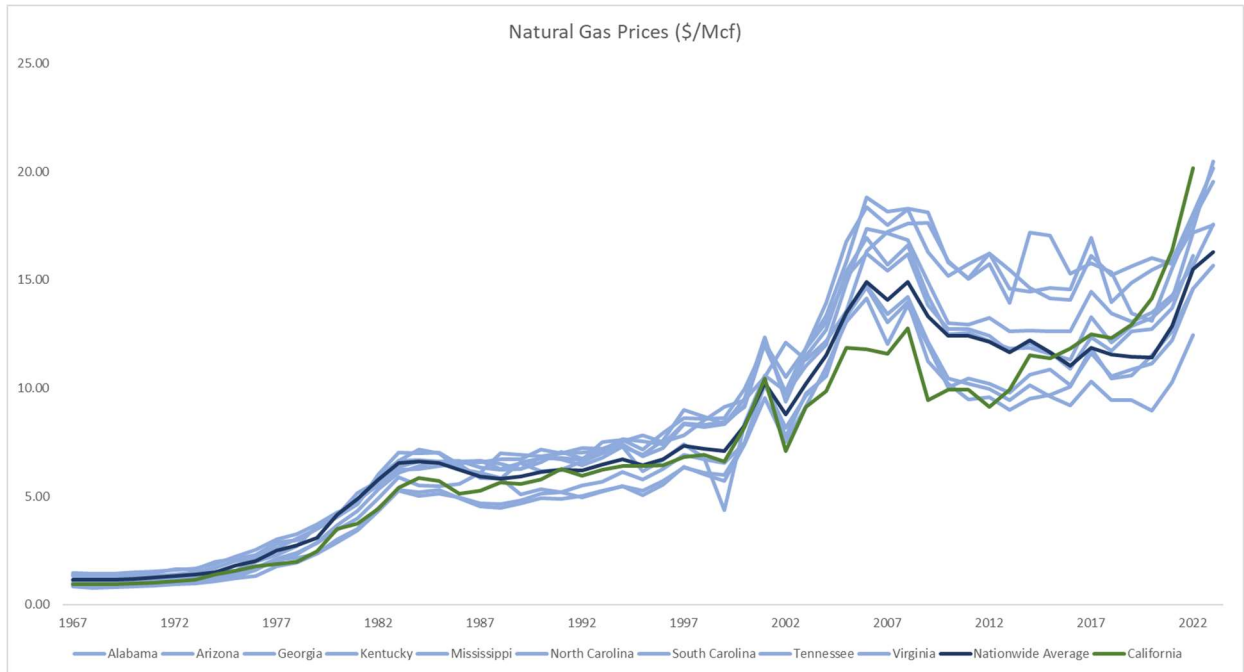
It is important to note that it is unclear what the underlying drivers are for such differences. Indeed, a 2023 study published found that “heat pump adoption is strongly correlated with geography, climate, and **electricity prices**”<sup>10</sup> (emphasis added). The figures below show the trends in average annual residential electricity prices (from 2010 to 2023)<sup>11</sup> and average residential natural gas prices (from 1967 to 2023).<sup>12</sup> Given that California has significantly higher electricity rates and moderate natural gas rates compared to the states shown above, it is not surprising that the State’s current deployment of zero-emissions options trails those states selected by CARB, in which zero-emissions options are a more affordable choice for consumers.



<sup>10</sup> Lucas W. Davis, “The Economic Determinants of Heat Pump Adoption,” National Bureau of Economic Research. Available at <https://www.nber.org/papers/w31344>

<sup>11</sup> EIA; sales\_revenue.xlsx (live.com). EIA had data for electricity prices beginning in 2010.

<sup>12</sup> EIA; Average Residential Price (eia.gov) EIA data for natural gas prices beginning in 1967.



Overall, staff should consider geography, climate, population, and electricity prices when comparing California’s adoption of zero-emissions options with other states. Such a comparison might be beneficial to inform policies such as subsidies for adaptation and assist with cost-benefit analyses.

## V. Clarification Regarding Zero-Emission Fuel Cell Technologies

At the workshop, CARB staff presented a list of zero-emission space and water heating technologies.<sup>13</sup> SoCalGas appreciates CARB’s consideration of hydrogen combustion and hydrogen fuel cells as technology types that support zero-emission water heaters. Fuel cells can, however, run on traditional natural gas and renewable natural gas as well as hydrogen to accelerate building electrification and electrify end-uses. Fuel cell technologies have the potential to run on fuels by leveraging existing gas system infrastructure to generate electricity, which could then power appliances that use electric resistance and electric heat pump technologies. It is thus unclear why fuel cell technologies would be limited to “hydrogen fuel cell” as indicated in the list presented at the workshop.

If CARB is not considering the carbon intensity of the electricity used to power the electric appliances in this rule, then the fuel input for the fuel cell technologies should also not be limited to hydrogen. To avoid prematurely smothering the fuel cell market, CARB should revise the technology list to “fuel cells” to capture the breadth of beneficial technological potential fuel cells can provide as part of the State’s comprehensive decarbonization solution.

## Conclusion

SoCalGas appreciates the chance to provide feedback on this workshop and looks forward to continued engagement on this important topic.

Respectfully,

<sup>13</sup> CARB February 28, 2024, Public Workshop: Zero-Emission Space and Water Heater Standards; Slides 25 & 26

*/s/ Kevin Barker*

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