March 4, 2022

California Air Resources Board
Clerk's Office
1001 I Street
Sacramento, California 95814

RE: COMMENTS IN RESPONSE TO DRAFT 2022 STATE STRATEGY FOR THE STATE IMPLEMENTATION PLAN

A. O. Smith appreciates the opportunity to submit comments to the California Air Resources Board (CARB) regarding its Public Workshop on the Draft 2022 State Strategy for the State Implementation Plan (SIP) held on February 24, 2022. The Draft 2022 State Strategy for the SIP Strategy identifies the proposed measures, associated emission reductions, and other elements needed to support attainment of the 70-ppb ozone standard, including reducing emissions through use of zero-emission technologies and cleaner product formulations. Our comments are limited to the draft measure for residential and commercial buildings, in particular CARB's proposed measure to set an emission standard for space and water heating equipment that would go into effect in 2030.

About A. O. Smith

A. O. Smith is a global leader applying innovative technology and energy-efficient solutions to products manufactured and marketed worldwide. Our company is one of the world's leading manufacturers of residential and commercial water heating equipment and boilers, as well as a manufacturer of water treatment and air purification products. Along with its wholly owned subsidiaries, A. O. Smith is the largest manufacturer and seller of residential and commercial water heating equipment, high efficiency residential and commercial boilers, and pool heaters in North America.

As a leading manufacturer of both residential and commercial heat pump water heaters (HPWHs), A.O. Smith has a keen interest in this Draft 2022 State Strategy for the SIP update. The path to achieving carbon neutrality will require several changes in California. HPHWs will

play a vital role in two key California policy priorities – reducing the carbon footprint of our buildings as the state transitions water heaters from primarily gas-fired to electric and helping to manage the integration of increasing amounts of renewable energy as HPWHs may shift load and serve as thermal energy storage devices.

HPWHs and grid-interactive electric storage water heaters offer the ability to provide thermal storage serving as a battery for assisting the integration of renewable energy into local distribution grids in both residential and commercial applications. Flexible demand [or smart] water heaters, which include grid-interactive electric resistance storage water heaters and HPWHs, have additional controls that allow the utility or third-party aggregator to control their energy use (e.g., load shifting) during the course of the day. Within a given local territory, a fleet of water heaters can be controlled to be a flexible energy storage system that can adjust the load on the grid. Given that every home in the state has a water heater, grid-interactive water heaters can play a key role in load management and carbon reduction within the built environment.

Building Electrification Requires Significant Investments

In order to reach carbon neutrality across the entire building stock in California, a massive investment will be required from both the public and private sectors given California's current building and electric grid infrastructure. In the 2022 Draft 2022 State Strategy for the SIP, CARB proposes to develop a measure to require 100 percent of sales of new space and water heating equipment sold in California to meet the zero-emission standard by 2030. While this would not require immediate retrofitting of existing buildings, some buildings may need to be retrofitted to use the new technology.[1]

In California, about 75 percent of homes (or 9.75 million) were built before 1990. Older homes are less likely to have adequately sized electric panels to accommodate all electric appliances.[2] In addition to the cost of the electric appliance, an older home may also require an electric service upgrade to the home or building. The California Energy Commission (CEC) estimates that a panel upgrade can cost between $2,500 - $4,000[3] and would likely be borne by the home or property owner. In a scenario where every house built before 1990 requires an electric panel upgrade, an investment between $25 - $40 billion dollars would be required. Another study on building electrification by the not-for-profit organization, Pecan Street, found that it would cost approximately $100 billion to upgrade electric panels in the residential sector

[1] CARB, *Draft 2022 State Implementation Plan*, January 31, 2022, pg 87.
[2] California Energy Commission. *California Building Decarbonization Assessment - Final Commission Report*, August 13, 2021, pg 109.
[3] Building Decarbonization Coalition. *Towards an Accessible Financing Solution*. June 2020, pg 14.

across the country. Regardless of the exact amount, it's important to note that just one component of electrification, updating the main electrical panel of a home, will require a tremendous financial investment. The figures shared here do not even account for the cost of upgrading electric appliances that in many cases are more expensive than their gas counterparts. According to the Building Decarbonization Coalition, the cost to electrify low-to-moderate income (LMI) households in California would require investments in the magnitude of $72 - $150 billion over the next several decades.[4]

The investment would need to be exponentially larger if a requirement of 100 percent of sales of new space and water heating equipment sold in California by 2030 was enacted. Therefore, it is critical that CARB consider the economic impacts of retrofitting millions of households and commercial buildings and the need for sustained programs and incentives for property owners and businesses. Consistent and long-term funding for greenhouse gas (GHG) reduction programs and incentives is essential in aiding consumers in making different purchasing decisions and accepting new technologies.

Application of HPWHs for the Current Built Environment

A. O. Smith recommends a pragmatic approach to reach electrification goals, and we look forward to working with CARB and other state agencies in this regard. As noted during CARB's Scoping Plan Update workshop, the age, and characteristics of some of the existing building stock can prove challenging to completely electrify. In addition to a panel upgrade, space constraints of an older home can make it difficult to install a HPWH. Most gas water heaters are placed inside a small closet, whereas a HPHW requires more space for the appliance to function efficiently and as intended. Given that some homes may lend themselves to a cheaper, faster, and overall easier transition to electrification, A. O. Smith recommends a system of prioritization to help target homes that are immediately ready for replacement while continuing to develop plans for buildings that are harder to electrify. In the State of New York, for example, some local jurisdictions are pursuing a stepwise approach for building electrification by completing energy audits of buildings (residential and commercial) as a first step to identify, tier, and prioritize which buildings can transition to all-electric end-uses ahead of others.

Retrofitting existing commercial buildings has similar issues as retrofitting a residential home: type and size of equipment, age of the building, and space constraints. However, the primary challenge in commercial applications is being able to match the customers hot water needs (i.e., load) in converting from a gas-fired product to a HPWH. In certain applications, the

[4] CEC *California Building Decarbonization Assessment - Final Commission Report*, August 13, 2021, pg 84.

economics of the conversion will not be favorable, including the potential to increase the annual operating costs to the business owner or property owner. According to a report on the assessment of building decarbonization by the CEC, small business owners and property owners of small and medium size commercial buildings could incur retrofit costs of up to $40,000.[5] Therefore, ensuring the correct application of the equipment will be critical. A. O. Smith recommends a stepwise approach to reaching electrification goals by allowing high efficiency gas condensing equipment to be used in limited cases where there is no viable electric alternative. Using hybrid heat pumps with options for gas/electric back-up may also be necessary for certain space constrained and larger thermal load applications, such as health care facilities, in certain areas of the state.

Providing Manufacturers with Business Certainty

The CEC assumes a turnover rate of 7 percent in water heaters in existing single-family homes and multi-family units, which equates to 861,000 water heaters being replaced annually.[6] To capture even 10 percent of this market means installing 86,000 units per year. The number of HPWH units sold annually across the entire country in 2020 was approximately 100,000.[7] To convert the entire annual California market of water heaters to HPWHs would require up to a ten-fold increase in HPWH manufacturing capacity to address the North American market. These figures are meant to illustrate that meeting California's demand for HPWHs at even a modest pace would require significant ramp up of manufacturing and potentially further strain global supply chains for components. This sort of increase takes time to orchestrate as new manufacturing capacity and production lines must be created. As stated in previous comments, having a clear and reliable policy scheme will be necessary to provide manufacturers with the business certainty needed to make the massive investments required to increase manufacturing capacity at this unprecedented scale.

Transitioning to Low Global Warming Potential Refrigerants in HPWHs

Today's typical HPWHs currently use a small amount (i.e., "charge") of hydrofluorocarbon (HFC) refrigerants that are used in refrigerators, air-conditioners, and space-heating heat pumps. A. O. Smith, like many appliance manufacturers that utilize heat pump technology, continue to evaluate next generation HFC technology for use in our equipment, including transitioning to low-GWP refrigerants. We agree that we must do all we can to lower

[5] CEC Draft 2021 Integrated Energy Policy Report Volume I: Energy Efficiency and Building, Industrial, and Agricultural Decarbonization, pg 16.
[6] ibid.
[7] ENERGY STAR® Unit Shipment and Market Penetration Report Calendar Year 2020 Summary, pg 6.

the GHG emissions profile of equipment. The marketplace for broad-based and cost-effective low-GWP refrigerants for water heating continues to evolve - driven primarily by international agreements, such as the Montreal Protocol, the recently enacted American Innovation and Manufacturing (AIM) Act of 2020 at the federal level, California's action directed by Senate Bill (SB) 1383, and the regulations promulgated by CARB, as well as larger users of refrigerants such as the space cooling and automobile industry. We request that CARB examine refrigerant regulations to reduce the allowable GWP of refrigerants over time, in consultation with HPWH manufacturers and other market actors. Given the implications of the AIM Act on the refrigerant supply chain, A. O. Smith respectfully asks for adequate time to plan, source, build and test any new products designed to meet or exceed California's HFC regulatory requirements.

Conclusion

A. O. Smith appreciates the opportunity to provide comments on these important policy matters. We urge CARB to take a pragmatic, clear and reliable approach as it builds upon the state's decarbonization strategy to reach its GHG reduction goals. In addition to having consistent programs that provide incentives and consumer awareness and education on HPWHs, we urge continued agency coordination to align federal, state, and local policies and rules to help achieve California's climate goals.

We look forward to working with CARB as the Scoping Plan process moves forward and collaborating with CARB and other stakeholders to design a program that helps achieve our GHG reduction goals as effectively as possible.

Sincerely,

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