September 3, 2021

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

**RE: COMMENTS IN RESPONSE TO 2022 SCOPING PLAN UPDATE - SCENARIO CONCEPTS TECHNICAL WORKSHOP**

A. O. Smith appreciates the opportunity to submit comments to the California Air Resources Board (CARB) Public Workshop: 2022 Scoping Plan Update - Scenario Concepts Technical Workshop held on August 17, 2021. Presentations included a primer on the modeling tools as well as scenario design options to reach carbon neutrality by 2035 and 2045 for various sectors. As a leading manufacturer of heat pump water heaters (HPWHs), which play a key role in building decarbonization, A. O. Smith has a keen interest in this Scoping Plan update. We encourage CARB to complete the Scoping Plan update in a timely manner so that subsequent regulations related to decarbonization can be initiated to quickly address greenhouse gas (GHG) reductions goals. Our comments here focus on the residential and commercial building decarbonization.

**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 subsidiary, Lochinvar LLC, 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.

HPWHs 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

electricity 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 electric storage water heaters offer a natural ability to provide forms of thermal storage serving as a battery for the grid in both residential and commercial applications. Flexible demand [or Smart] water heaters, which include grid-enabled electric resistance storage water heaters and HPWHs, have additional controls that allow the utility or third-party aggregator to control their energy use 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, smart water heaters can play a key role in load management within the built environment.

**Comments in Response to the Workshop**

As presented at the CARB workshop, the path to achieving carbon neutrality - by 2035 or 2045 - will require a number of changes in California. A. O. Smith appreciates CARB's effort to examine a wide range of options, including scenarios in which the state accelerates meeting its carbon neutrality goal ahead of schedule and potential actions needed to achieve that goal. In examining each of these scenarios, A. O. Smith recommends that CARB look at all factors, including infrastructure challenges, that each option entails as it relates to residential and commercial building decarbonization.

Conventional wisdom suggests that California is on a path towards an all electric requirement for new buildings by 2026. However, new building construction makes up a small percentage of all the building stock in the state. In California, about 75 percent of homes (or 9.75 million) were built before 1990 and older homes are less likely to have adequately sized electric panels to accommodate all electric appliances.[1] An electric panel upgrade may cost between $2,500 - $4,000[2] which would be borne by the home or property owner. In a scenario in which every house built before 1990 requires an electric panel upgrade, it would cost approximately $25 - $40 billion dollars. These costs present a huge barrier to electrification. 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 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 to 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

[1] California Energy Commission. *California Building Decarbonization Assessment - Final Commission Report*, August 13, 2021, pg 109.
[2] Ibid. pg 85.

decades.[3] Consistent and long-term funding for GHG reduction financial programs and incentives are going to be essential in aiding consumers in understanding how to make different purchasing decisions and accept new technologies.

**A Stepwise Approach to Reducing the Carbon-Intensity of Water heating Systems in Existing Buildings**

A report by the Advanced Water Heating Initiative estimates that the California statewide market for unitary water heaters, including both new construction and retrofits, is around 800,000 units per year. To capture even 10 percent of this market means installing 80,000 units per year. 80,000 units per year is approximately the amount of HPWHs units sold annually across the entire country.[4] To convert the entire annual California market of water heaters to HPWHs would require a ten-fold increase of nationwide HPWH manufacturing capacity. 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 have vast impacts on the supply chain. This sort of increase takes time to orchestrate as new manufacturing capacity and production lines must be created. A pragmatic, 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.

A. O. Smith built an analytical tool that can assist decision makers, as well as our customers, in understanding water heating solution scenarios based on state and local energy data, and site conditions when contemplating or navigating building decarbonization policies. Based on our analytic tool, A. O. Smith recommends allowing high efficiency gas condensing equipment to be used as a stepping-stone in commercial replacement applications as part of a managed transition to an electrified built environment. Using hybrid heat pumps with options for gas/electric back-up will be necessary for certain space constrained and larger thermal load applications for at least the next decade in certain areas of the state.

**Conclusion**

Any transition away from utilizing natural gas for space and water heating, to electricity exclusively, presents significant challenges from physical infrastructure and electricity grid modernization to consumer awareness and acceptance. We request that CARB take into consideration: (1) the economics of retrofitting millions of households and commercial buildings and (2) the need for high-efficiency gas non-electric backup sources for large space and water heating loads. In order to meet CARB and California's GHG reduction goals, we need consistent programs and incentives to provide the value proposition to property owners and businesses.

---

[3] Building Decarbonization Coalition. *Towards an Accessible Financing Solution*. June 2020, pg 14.
[4] Advanced Water Heating Initiative Unitary Heat Pump Water Heaters Working Group Report 2020. *Building Demand for Heat Pump Water Heaters.* pg 14.

Despite the challenges we cite here in our comments, we believe that addressing these issues expediently is critical. We commend CARB for starting this Scoping Plan process and look forward to seeing it completed in a timely manner as outlined at the workshop. We very much look forward to working with CARB to design a program that helps achieve our GHG reduction goals as efficiently as possible.

A. O. Smith appreciates the opportunity to provide comments on these important matters. We look forward to collaborating with CARB as the Scoping Plan process moves forward.

Sincerely,

Joshua C. Greene
Vice President, Government and Industry Affairs
A. O. Smith Corporation
jcgreene@aosmith.com