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**AO Smith Comments - Workshop on the Role of Energy Efficiency
in Building Decarbonization**

Additional submitted attachment is included below.



September 7, 2021

California Energy Commission
California Energy Commission
Dockets Office, MS-4
1516 Ninth Street
Sacramento, California 95814

RE: Comments to California Energy Commission Workshop on the Role of Energy Efficiency in Building Decarbonization; Docket # 21-IEPR -06

A. O. Smith appreciates the opportunity to submit comments to the California Energy Commission (CEC) Workshop on the Role of Energy Efficiency in Building Decarbonization held on August 24, 2021. The workshop focused on the role energy efficiency can play in helping the state meet its climate goals in a least-cost manner, how energy efficiency programs should best be measured and evaluated, and how program metrics can balance energy efficiency savings and greenhouse gas (GHG) emission reductions. As a leading manufacturer of heat pump water heaters (HPWHs), which play a key role in building decarbonization, A. O. Smith appreciates the opportunity to provide comments.

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

The CEC California Building Decarbonization Assessment Report identifies seven strategies to reach the state goal of reducing an additional 40 percent of GHGs by 2030 and carbon neutrality by 2045. Among the seven strategies is a reduction of building GHG emissions which include replacing gas appliances and equipment in buildings with energy efficient electric appliances. This strategy can offer both efficiency savings and GHG reductions, as well as air quality co-benefits. For a residential building, this would include things like HPWHs and electric vehicle (EV) charging equipment. The stacking of these technologies can provide serious efficiencies and GHG reductions, especially when paired with onsite renewable generation, such as rooftop solar.

California is on a path towards an all electric requirement for new buildings relatively soon. 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 - \$4,000² 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 to upgrade this critical piece of equipment. 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

¹ California Energy Commission. *California Building Decarbonization Assessment - Final Commission Report*, August 13, 2021, pg 109.

² Ibid. pg 85.

magnitude of \$72 - \$150 billion over the next several 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. As the CEC looks at ways to increase energy efficiency in existing residential and commercial buildings, we request that CEC 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

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.

heating loads. In order to meet California's GHG reduction goals, we need consistent programs and incentives to provide the value proposition to property owners and businesses.

A. O. Smith supports the CEC efforts to increase energy efficient buildings within California's built environment and appreciates the opportunity to weigh in on these important policy matters. We stand ready to work with the CEC to offer technical expertise and assist the CEC in achieving its climate policy goals. Please do not hesitate to contact us further if you have any questions.

Respectfully,

A handwritten signature in black ink, appearing to read "Joshua C. Greene". The signature is fluid and cursive, with a long horizontal stroke at the end.

Joshua C. Greene
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