May 13, 2022

Austin Hicks
South Coast Air Quality Planning Section
California Air Resources Board

Re: 2022 State SIP Strategy Draft Environmental Analysis

Dear Mr. Hicks:

On behalf of Bradford White Corporation (BWC), we would like to thank you for the opportunity to comment on the California Air Resource Board (CARB) Appendix B - Draft Environmental Analysis for the proposed 2022 State Strategy for the State Implementation Plan.

BWC is an American-owned, full-line manufacturer of residential, commercial, and industrial products for water heating, space heating, combination heating, and water storage. In California, a significant number of individuals, families, and job providers rely on our products for their hot water and space heating needs.

The 2022 Draft Environmental Analysis proposes a zero-emission standard for space and water heating in the report Chapter 2, Section 5(b). In addition, it proposes additional building and appliance emission standards in report Chapter 2, Section 5(f), as referred to below:

- 5(b) Zero-Emission Standard for Space and Water Heating: 2025-2030
    - Appendix B - Draft Environmental Analysis for the proposed 2022 State Strategy for the State Implementation Plan states on page 26, "Reasonably foreseeable compliance responses associated with the Zero-Emission Standard for Space and Water Heaters would be accommodated within the footprint of existing manufacturing facilities. It is expected that manufacturing needs for new heaters would largely be met by the existing market, and no new infrastructure or manufacturing facilities would be anticipated to be required."

- 5(f) Additional Building and Appliance Emission Standards: Under staff review
    - Appendix B - Draft Environmental Analysis for the proposed 2022 State Strategy for the State Implementation Plan states on page 38, "Reasonably foreseeable compliance responses associated with the Additional Building and Appliance Emission Standards would be accommodated within the footprint of existing manufacturing facilities and would be implemented through an increased rate of appliance turnover. It is expected that manufacturing needs for new heaters would largely be met by the existing market, and no new infrastructure or manufacturing facilities would be anticipated to be required. Turnover may result in recycling or scrapping of old appliances or selling appliances to areas outside of California"

We have concerns that the magnitude of the transition proposed by CARB will place significantly more stress on an already constrained supply chain under the proposed timeline and does not adequately take

into account several factors that may hinder the ability of the state to transition successfully. The proposed phase-out timeline of five years beginning in 2025 and full adoption by 2030 is overly optimistic. We respectfully request more information from CARB on how it concluded that existing manufacturing facilities can accommodate the annual volume of zero-emission water heating equipment needed in California based on normal equipment turnover.

California may be on the forefront by setting this target, however, other states and countries are working on similar plans to decarbonize and reduce emissions. Thus, contributing to a much larger demand for these products than California alone. CARB must consider global demand for heat pump water heaters (HPWH), not just California, in their assessment to determine a feasible timeline for transitioning the state to only allow the sale and distribution of zero-emission water heating technology.

HPWH technology currently only represents a very small portion of the California and overall United States' markets. Like any new technology, it will take time for the supply chain to scale up. In California and across the United States, several collaborative efforts are taking place with manufacturers, industry stakeholders, state regulators, and the U.S. Department of Energy to make this transition successful. Most notably, the California Energy Commission (CEC) opened a docket, 22-DECARB-01 that specifically addresses the state's heat pump goals, supply chain, and programs.

The CEC held the first staff workshop for docket 22-DECARB-01 on April 5, 2022, where multiple stakeholders presented, including manufacturers, on the challenges and opportunities associated with meeting the statewide goal of six million heat pumps installed by 2030. Several common themes emerged from the workshop, including investment in programs and infrastructure, HPWH application in existing homes and commercial buildings, business certainty and supply chain barriers, and transitioning to low global warming potential (GWP) refrigerants.

Investment in programs and infrastructure

The state has recently funded three programs (i.e., BUILD, TECH, SGIP) aimed at increasing market share and understanding the barriers to installing heat pump technology. These programs are designed to identify installation barriers in new construction, retrofit, and most importantly, fuel substitution applications. The programs go beyond incentives and focus on contractor training, financing, and supply chain. Given the currently low market share of heat pump technology and these programs being in their initial kickoff stage, CARBS's proposal to begin market transformation in 2025, will likely overlook installation, technology, and financing challenges that have yet to be identified and outpace the market's ability to adopt HPWH technology.

CARB will need to be able to fund the necessary improvements to infrastructure, as well as early adoption of HPWH technology if this transition will be successful. CARB should work to establish a statewide funding program for homeowner and business electrical upgrades and work with utilities to modernize vulnerable portions of the electrical grid. Additionally, CARB should establish and fund a technical advisory committee, similar to the one proposed by the Bay Area Air Quality Management District. The technical advisory committee's role would be to study all available HPWH technology, commercial and residential, and evaluate for performance in a variety of climate zones and building types. Through the advisory committee work, CARB can better evaluate market readiness for technology and have a more comprehensive understanding of where adoption barriers may exist. These findings should be made publicly available.

HPWH Application in Existing Residential and Commercial Buildings

Though existing buildings represent the bulk of the opportunity to decarbonize the state, much of the existing building stock is not constructed to today's building standards. Therefore, it increases the complexity of retrofitting to zero-emission water heating. It is imperative to include a broad group of stakeholders, including manufacturers, in the conversation regarding how to transition existing building stock to zero emission water heating technology. Without a broader group of stakeholders involved in these conversations, CARB may overlook crucial barriers to retrofitting buildings, including electrical infrastructure, space constraints, technology limitations, opportunities for new technology applications, and cost considerations to the customer.

The state has made considerable inroads in advancing HPWH technology in residential new construction through the adoption of the 2022 Title 24 Energy Code, which favors HPWH technology. Even so, this only accounts for a small proportion of the annual installations needed to meet state emission reduction goals. Further, the state has set aside nearly $300 million in incentives in addition to already established local and utility programs to encourage early adoption of HPWH technology in existing homes. While this is a crucial step towards transitioning the state towards zero-emission water heating technology, it does not address the larger problem of emergency replacements.

Over 90% of residential water heater replacements are done on an emergency basis where the water heater has failed and is not necessarily easily or cost effectively repaired. It is essential that ample products are available, and customers need to be able to have these products installed as timely as possible to satisfy their needs. This would be unlikely if manufacturers do not have the right product mix, and those products are not stocked by local distributors, forcing the consumer to wait.

Having the right products available for the right application is only one piece of the puzzle. As mentioned above, barriers such as electrical infrastructure and space constraints can add to the complexity and cost of replacement and place a significant and unfair burden on the customer who is simply trying to restore hot water service. If CARB chooses to adopt the proposed timelines, then CARB must also ensure there is a robust program and funding in place to help property owners prepare for the transition well in advance of needing a new water heater.

While the state is off to a good start increasing adoption of residential HPWH technology, the commercial sector has not been addressed with the same attention level, increasing the barriers to transition in this sector. The recently adopted 2022 Title 24, California Energy Code does not address HPWHs in existing commercial and nonresidential buildings, largely because there are very few commercially available products on the market today.

There has not been adequate cost-effectiveness analysis completed on adopting all-electric replacements in existing commercial and nonresidential buildings. For a cost-effectiveness analysis to be comprehensive there needs to be a sizeable population of existing installations in which to evaluate. Installations of HPWH technology outside of the residential building space are few and far between, and there is not enough data to thoroughly conduct a feasibility study. This is particularly true when considering the diversity of building types in existing commercial and nonresidential buildings.

Currently, statewide decarbonization programs do not offer incentives for commercial electric water heating equipment. Most recently, the California Public Utilities Commission (CPUC) released its proposed program guidelines for the Self Generation Incentive Program (SGIP), which explicitly recommends against offering incentives for electric HPWH technology for commercial and nonresidential

applications. The CPUC staff, and supporting public comments, cite the primary reason as nonresidential HPWH technology not being commercially available to support market transformation currently.

A shift to require that existing commercial and nonresidential buildings be retrofitted to use all electric water heating technology will require significant time, money, and collaboration by manufacturers and plumbing trade associations to train the workforce to ensure quality installations. This is an effort that will take many years to come to fruition, as new technology becomes commercially available, likely extending well beyond 2030.

Business Certainty for Manufacturers and Supply Chain Barriers

In 2019, the Washington Department of Commerce (DOC) enacted a regulation making it the first state to require demand response capabilities for electric storage water heaters. Under the regulation, heat pump water heaters sold and installed in the state had to be demand response capable by January 1, 2021, followed by the same mandate for electric resistance water heaters on January 1, 2022. Since this regulation being finalized, supply chain challenges, caused largely by the COVID-19 pandemic, have made it difficult for manufacturers to produce a sufficient quantity of compliant products.

In response, the Washington DOC has enacted an emergency rule that temporarily delayed the enforcement of the regulation until March 1, 2022, for both heat pump and electric resistance storage water heaters. And a second delay was issued to delay the enforcement until June 29, 2022. Oregon had a similar experience as Washington, as the Oregon Department of Energy (ODOE) has delayed the enforcement of demand response controls for electric and HPWH equipment and is presently considering extending this delay until July 1, 2023.

While many supply chain barriers are external and out of the control of manufacturers, there are several requirements in place within California that will impede adoption of HPWH technology. See below:

- JA-13 requirement for connected HPWHs. While JA-13 was originally included as an extra compliance option in the Title 24 energy calculations, it has since been included in rebate programs like SGIP. JA-13 compliance adds functionality to HPWHs, which in turn adds cost. At this time, it is a feature being required without a clear pathway for how it will be used by the state to control water heaters. These challenges are further compounded when considered along with the Washington and Oregon case studies detailed above.
- Northwest Energy Efficiency Alliance's (NEEA) Advanced Water Heating Specification (AWHS). This specification was originally designed to ensure HPWH performance in cold climates but has since been adopted by the state as the governing standard for HPWHs. The AWHS continues to raise the bar on efficiency and other requirements that are not necessarily tied to increasing efficiency or reducing emissions.
    - New construction experiences the greatest hurdle. The Title 24 energy designer must specify a make and model HPWH, which then must be installed by the plumbing contractor. This eliminates the ability for the plumber to solicit bids for multiple HPWH brands and models.

Many supply chain barriers add cost and uncertainty to the manufacturer and end customer. As we identified above, there are barriers that can be removed to help drive market demand with the currently available products and help the state work towards its emission reduction goals. Similar to how the state

must balance efficiency, demand response, storage, and emission reduction goals, manufacturers must also take into account how these goals amount to added features, benefits, and costs

Transitioning to Low GWP Refrigerants

While BWC recognizes that refrigerants play a role in reducing the state's emissions, transitioning to low GWP refrigerants, in an expedited timeframe is problematic for HPWHs. One of the main arguments for transitioning to low GWP refrigerants is to enable the HPWH to deliver higher water temperatures (i.e., 150°F or greater). The state suggests driving the HPWH industry towards CO_2 technology in a relatively short timeframe. While CO_2 is a low GWP refrigerant that can achieve higher stored water temperatures to help reduce the grid's peak demand at times, this same objective can be achieved with other refrigerants and technology. For example, certain compressor technology exists today that would allow common refrigerants to produce delivered water temperatures up to 150°F or higher, while still achieving relatively high efficiency values.

Driving the industry down to a GWP limit of 150 will also continue to increase the already high cost of HPWHs compared to other water heating equipment and further hinder market adoption. Low GWP refrigerant is significantly more expensive than what is being used today, requires special equipment and training for installers to utilize, and some refrigerants may also be flammable. With relatively few commercial HPWH options available in the market today, CARB should not limit manufacturer's ability to innovate by further regulating refrigerants for these products, at this time.

In closing, we would like to reiterate the need for CARB to work with manufacturers to determine how to accomplish transitioning to zero-emission water heating equipment across all sectors. We fully understand the state's goals to reduce emissions and want to play a part in ensuring it is successful in doing so.

BWC thanks CARB for the opportunity to provide feedback on the Draft Environmental Analysis for the proposed 2022 State Strategy for the State Implementation Plan. Please let me know if you have any questions or would like to schedule a meeting to discuss our comments further.

Sincerely,

Bradford White Corporation

Eric Truskoski
Senior Director of Government and Regulatory Affairs

Cc: R.B. Carnevale; L. Prader; R. Wolfer; M. Corbett