



March 27, 2024

California Air Resources Board
1001 I Street
Sacramento, California 95814

[Submitted electronically via: <https://ww2.arb.ca.gov/public-comments/zero-emission-space-and-water-heater-february-28-2024-workshop-public-comments>)]

Re: Zero-Emission Space and Water Heating Proposal

To Whom It May Concern:

On behalf of Bradford White Corporation (BWC), we would like to thank you for the opportunity to comment on California Air Resource Board's (CARB) zero-emission space and water heating proposal presented on February 28, 2024.

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. We have compiled our comments and questions to the CARB proposal below.

General

BWC participated in the February 28, 2024, public meeting and has reviewed the preliminary proposal. We observe that the proposal is largely based on implementation dates proposed by the South Coast Air Quality Management District (SCAQMD) and the Bay Area Air Quality Management District (BAAQMD) in their own zero NOx proposed rules covering water heaters and boilers up to 2,000,000 Btu/hr input. While these two districts represent a sizeable portion of the space and water heating market for California, we anticipate that aligning statewide implementation dates with BAAQMD and SCAQMD will further exacerbate the regulatory challenges manufacturers will have to respond to, both at the federal and state levels. Additionally, consumers will have to plan for significant investments in their properties to prepare for zero-emission equipment. Emergency replacements will be especially challenging for consumers to navigate and may leave households and businesses without hot water for an extended period of time depending on the extent of the retrofits needed.

Existing Buildings

Water heating and boiler equipment is not limited in application to residential buildings, as is the primary focus of CARB's proposal. While it is imperative that CARB be thorough in their evaluation of residential

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applications for zero emission products, we believe CARB needs to conduct additional evaluation for commercial applications. Commercial applications are especially challenging as a single commercial water heater or boiler model could be used in a wide variety of applications ranging from hotels/motels, restaurants, office buildings, gymnasiums, etc. Keeping this in mind, each application has its own unique challenges that must be accounted for by engineers, contractors, and installers. While zero emission replacements may technically be feasible in these buildings, many come with increased installation challenges and costs to building owners, numerous of which are significant. We have outlined, below, a common example of challenges that installers and contractors face when engaging in this type of work:

Replacing a Commercial (100 Gallon, 199,999 Btu/hr) Gas-fired Storage Water Heater

This example demonstrates the work and complication that is often involved when current commercially available electric water heater product(s) could be used in lieu of a commercial gas-fired storage water heater that matches the specifications in the above subject line. These products are commonly sold for use in smaller hotels/motels, restaurants, gymnasiums, and office buildings.

	Commercial Gas-fired Storage Water Heater	Commercial ASME Tank Electric Water Heater	(2) Heavy Duty Commercial Tank Electric Water Heater	Medium Duty Commercial Tank Electric Water Heater plus 200-gallon Storage Tank
Input	199,999 Btu/hr (58.59 kW)	81 kW	30 kW per unit	18 kW
Amperage Requirement	5.5A	98A	36A each	22A
Recovery (100°F Rise)	235 GPH	334 GPH	124 GPH each	74 GPH
Footprint (in)	77.63"H x 28.25" W	60.88"H x 32.5" W	50.44" H x 30.5" W per unit	63" H x 30.88"W plus 78"H x 32" W storage tank
Piping	Uses existing	Uses existing	Multiple units piped in reverse return	Commercial electric paired with storage tank

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	Commercial Gas-fired Storage Water Heater	Commercial ASME Tank Electric Water Heater	(2) Heavy Duty Commercial Tank Electric Water Heater	Medium Duty Commercial Tank Electric Water Heater plus 200-gallon Storage Tank
Installation Challenges compared to Gas		Equipment cost premium, potential cost to upgrade electrical service and panel, increased footprint, requires ASME product, increased operation cost	Equipment cost premium, increased footprint, potential cost to upgrade electrical service and panel, additional labor and materials for piping, increased operation cost	Equipment cost premium, increased footprint, ASME product, increased cost of piping, recirculation pump (cost), increased operation cost
Product Link	<u>EF120T199</u>	<u>CEA80-81kW</u>	<u>CEHD50-30kW</u>	<u>E32-120R-18kW plus 200 gallon storage tank</u>

While the example above highlights that commercially available electric products can be used to replace gas products or installed in new construction, this tradeoff comes at a premium cost for the equipment and will require additional installation considerations to function properly, including significant cost implications to upgrade the building.

In these common situations, using a heat pump water heater (HPWH) solution *may* benefit the operator by reducing utility costs and possibly avoiding a costly upgrade to the electrical panel. However, some challenges with using a HPWH is that it will require a much larger footprint, as more storage tank capacity is needed to compensate for slower hot water recovery rates, and significant air volume is needed to transfer heat effectively.

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In many existing buildings, this expanded footprint can require widening doorways or closets; partially removing walls and/or ceilings; and running electrical wiring to the install area, if needed. Additionally, commercial HPWHs¹ will have considerably higher upfront costs than their gas-fired counterparts and will likely have availability concerns as these products often have longer lead times to manufacture and may not be readily available at supply houses. These issues are especially concerning in emergency replacement situations. Residential applications also share similar challenges as outlined above for retrofitting existing buildings. Title 24, Part 6 effectively limits zero emission residential water heaters to HPWHs. HPWHs require more physical space, more ventilation, electrical circuits to be added, as well as careful consideration when sizing to meet the hot water demand of the household.

Given the unique challenges water heating applications of this kind can present, BWC suggests CARB consider including rule provisions for project “infeasibility.” SCAQMD proposed a similar exception process in their draft rule 1146.2.² This process could be administered locally by a region’s respective air district. BWC suggests the following framework as a starting point:

Where a project applicant can reasonably demonstrate that all parts and equipment required to retrofit an existing, mixed fuel building with a zero-emission water heater equipment is not:

- Commercially available;
- More costly to install than commercially available gas options (20% or more);
- Able to fit in the footprint of existing equipment;
- Able to meet the building/home water heating demand; or
- Available from suppliers within the district to replace inoperative equipment on an emergency basis.

In these cases, an exception shall be granted to use readily available gas Ultra Low NOx water heating equipment that complies with 10 ng/J for residential products and 14 ng/J for commercial products.

Implementation Timelines

BWC asks that CARB take into consideration the incredible undertaking required by manufacturers to comply with the existing Department of Energy (DOE) commercial water heater energy conservation standard (ECS) final rule,³ as well as the proposed DOE consumer (residential) water heater energy conservation standard.⁴ Federal law allows product manufacturers three years to redesign, recertify, and market commercial products that are compliant with the new requirements, and five years for residential products. BWC recommends that CARB allow at least an additional three years beyond the statutory deadlines set by the DOE as mentioned above for both residential and commercial products. These changes would help ease the burden placed on manufacturers already working towards complying at the national level and allow additional time to adjust to the California market.

¹ [Microsoft Word - 2021 WA Code Change - Heat Pump Water Heating](#)

² [Proposed Amended Rule 1146.2 \(aqmd.gov\)](#)

³ [2023-20392.pdf \(govinfo.gov\)](#)

⁴ [2023-15306.pdf \(govinfo.gov\)](#)

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As manufacturers work towards meeting the new, national regulations, many categories of water heating products will be impacted, possibly up to being required to be phased out of the market or transitioned to higher efficiency alternatives. As the product transition unfolds, consumers may be left with fewer product options to choose from to meet their water heating needs. The newer, high efficiency and zero emission products will come at a cost premium to consumers, requiring significant retrofits to replace what they previously had. For these reasons and in addition to our suggestions below, we encourage CARB to consider adopting a flexible timeline to account for potential delays in DOE rule implementation and to account for potential market supply disruptions.

Specifically, we recommend the following considerations and changes to Table II in CARB's proposal:

- **Boiler and Water Heaters < 75,000 Btu/hr equipment category** - These are in scope of a proposed DOE residential ECS rule likely to go into effect in April 2029. The DOE has not yet released their final rule for residential water heaters, but they are facing a legal obligation to do so on or before April 30, 2024. The current proposed draft of DOE's rulemaking strongly favors the use of heat pump technology for residential electric water heaters. If this DOE proposed rule is finalized as it is written now, it will require a significant undertaking by the industry to increase production of HPWHs in order to satisfy electric water heater shipments for the nation. BWC recommends CARB adopt a compliance date at least three years after the anticipated DOE effective date of April 30, 2029, to allow manufacturers enough time to increase production capacity of HPWHs.
- **Boiler and Water Heaters ≤ 400,000 Btu/hr equipment category** - These are in scope of a few different DOE commercial and residential ECS proposed and final rules. DOE has already published a final ECS for commercial water heaters⁵. As the ECS for certain commercial products, compliance is required three years after publication of the final rule and will become effective October 6, 2026. This ECS effectively will require all commercial storage water heaters to meet a 95% Thermal Efficiency. DOE published a proposed rule on August 14, 2023, that all residential gas-fired hot water boilers (300,000 Btu/hr or less) meet condensing efficiencies (95% AFUE or higher).⁶ While this residential boiler energy conservation standard is only a proposed rule at this time, DOE anticipates finalizing this proposal in July 2024. BWC recommends CARB set a compliance date for this category after October 6, 2029.
- **Instantaneous Gas Water Heater ≤ 200,000 Btu/hr category** - These are in scope of the same DOE residential ECS proposed rule for consumer water heaters and as previously stated, likely to go into effect in April 2029. The proposed residential ECS requires all products to meet condensing efficiencies. BWC recommends CARB adopt a compliance date at least three years after the anticipated DOE effective date of April 30, 2029, to allow manufacturers enough time to transition this category to zero-emission options.
- **Pool Heater ≤ 400,000 Btu/hr equipment category** - These are in scope of a DOE ECS final rule⁷ containing a new Integrated Thermal Efficiency (TE_I) metric to measure pool heater efficiency and sets the minimum TE_I for gas-fired pool heaters at 84%. Additionally in this rule, the DOE is raising the efficiency requirements for electric pool heaters to effectively require the use of heat pump technology. The final rule was published May 30, 2023, and the effectivity date is five years after

⁵ [2023-20392.pdf \(govinfo.gov\)](https://www.govinfo.gov/procurement/2023-20392.pdf)

⁶ [2023-16476.pdf \(govinfo.gov\)](https://www.govinfo.gov/procurement/2023-16476.pdf)

⁷ [Federal Register :: Energy Conservation Program: Energy Conservation Standards for Consumer Pool Heaters](https://www.federalregister.gov/documents/2023/05/30/energy-conservation-program-energy-conservation-standards-for-consumer-pool-heaters)

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that publication date. As a result, these new requirements go into effect May 30, 2028. BWC recommends CARB set a compliance date for this category after May 30, 2031.

- **The Instantaneous Water Heater > 200,000 Btu/hr category** - These are in scope of the same DOE ECS final rule for commercial water heaters discussed previously, which is effective October 6, 2026. Commercial instantaneous water heaters will effectively be required to meet a 96% Thermal Efficiency. BWC recommends CARB set a compliance date for this category after October 6, 2029

Our summary of proposed changes to compliance dates and equipment categories is contained in the following table:

Compliance Date	Product Type	Capacity/Size Limits
After April 30, 2032	Boilers and Water Heaters	< 75,000 Btu/hr
2029	Central Furnaces	< 175,000 Btu/hr
After October 6, 2029	Boilers and Water Heaters	≤ 400,000 Btu/hr
After April 30, 2032	Instantaneous Water Heaters	≤ 200,000 Btu/hr
After May 30, 2031	Pool Heaters	≤ 400,000 Btu/hr
2031	Instantaneous Water Heaters	≤ 2 MM Btu/hr
2033	High temperature (>180°F) boilers and water heaters	≤ 2 MM Btu/hr
TBD	Central Furnaces	≤ 2 MM Btu/hr

Lastly, we ask CARB to clarify in the rule that the proposed compliance dates are based on date of equipment manufacture and not by sell date. This would be consistent with how BAAQMD administers Regulation 9, Rule 6⁸ and how DOE administers their energy conservation standards.

In closing, we would like to reiterate the need for CARB to adjust compliance dates considering proposed and final rules for energy conservation standards by DOE. We recognize and support CARB's goals of reducing emissions and are pleased to provide practical suggestions to help work towards these desired outcomes. We welcome continued dialogue on this matter and would be pleased to have conversations directly with CARB staff.

Please let me know if you have any questions or would like to schedule a meeting to discuss our comments further.

Respectfully Submitted,

Bradford White Corporation

Tom Gervais
Senior Director, Regulatory Affairs

⁸ [20230315_rg0906-pdf.pdf \(baaqmd.gov\)](https://www.baaqmd.gov/20230315_rg0906-pdf.pdf)

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