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June 26, 2024

California Air Resources Board
1001 "I" Street,
Sacramento, California 95814

Submitted Electronically - Building Decarbonization Docket

Sonoma Clean Power Comments: May 29, 2024 Zero-Emission Space and Water Heater Standards Workshop

To Dana Papke-Waters,

Sonoma Clean Power Authority (SCPA) is the public power provider for Sonoma and Mendocino counties, serving a population of about a half-million. In downtown Santa Rosa, SCPA operates our Customer Center, dedicated to helping customers understand bills and learn how to transition to 100% renewable energy for their homes, businesses, and cars. SCPA is also the only power provider in California offering 100% 24/7 renewable energy generated purely from within its service territory.

It is our goal to expand SCPA's renewable portfolio while advancing decarbonizing technologies for all our customers. SCPA is dedicated to evidence-based decision making, and we appreciate every opportunity to support the State of California's achievement of its carbon neutrality and air quality goals.

Introduction

SCPA appreciates the opportunity to provide feedback on the proposed statewide zero-emission space and water heater standards. The appliance standards and transition timelines recently adopted by the Bay Area Air Quality Management District (BAAQMD)¹ and South Coast Air Quality Management District (SCAQMD)² represent

¹ Rules 9-4: Nitrogen Oxides from Fan Type Residential Central Furnaces and 9-6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters. Adopted March 15, 2023. Available at <https://www.baaqmd.gov/en/rules-and-compliance/current-rules>

² Rule 1146.2. Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters. Amended June 7, 2024. Available at: <https://www.aqmd.gov/home/rules-compliance/rules/recent-actions>

foundational attempts to decrease greenhouse gas emissions from buildings while simultaneously improving air quality.

It is our belief that a transition to these zero-emission technologies has the potential to bring widespread change throughout the energy system. Such a shift requires careful consideration of customer safety, energy burden and affordability, and of systemwide energy resource management. Through years of research, data collection, and project analysis, SCPA has evaluated transitional technologies, studied the impacts to our customers, and developed approaches for this transition which may be useful as you develop pathways for California.

It is with this background that Sonoma Clean Power respectfully offers the following comments to the California Air Resources Board's (CARB) May 29th workshop and responses to its request for feedback in the Appendix. It is our hope that we may serve as a resource to CARB as the regulation continues to develop.

Recommendations

(1) SCPA recommends continued evaluation of the proposed "Concept B" to align timeframes with recent decisions and market maturity.

SCPA supports the development of staggered, regional timelines. SCPA believes that Concept B offers more flexibility to structure a tiered compliance timeframe supported by evidence of market development and technological maturity. A flexible approach under Concept B provides a shapable pathway to statewide compliance while allowing for flexibility needed to address complex interactions between product availability, workforce development, grid reliability needs, and air quality concerns at the regional scale. Additionally, Concept B would allow special consideration of regions like the North Coast of Mendocino County, which currently experience multi-day power outages every year during the heating season.

Adoption of regionally-appropriate timelines based on the air quality, infrastructural, and economic needs of local communities would best enable effective and equitable implementation of CARB's rule. CARB should consider how to implement key regulatory considerations according to the longer timelines articulated by the assessed needs of California's most impacted communities.

(2) SCPA recommends that CARB explicitly incorporate parallel efforts by the California Energy Commission (CEC) to ensure that the proposed regulation is implemented alongside other market-influencing initiatives.

Last October, the CEC developed a monumental agreement with 10 heating, ventilation and air conditioning (HVAC) equipment manufacturers to significantly expand production capacity.³ This effort is intended to help California achieve its Clean and Healthy Buildings goal of installing 6 million heat pumps by 2030.⁴ This represents a significant shift in the current state of the market, and a scale-up of this magnitude will be required to ensure the state can achieve its building decarbonization goals for new and retrofitted structures.

CARB's regulation will be properly shaped through integrated planning efforts that examine the current state of the market and identify the education and training requirements. Coordinating regulatory timelines with market expansion efforts will allow the necessary time for labor and workforce development while mitigating costs. Otherwise, the rapid growth rates of product demand and building decarbonization may place California in a position where, for example, we have expanded zero-emission appliance manufacturing, but lack the qualified workforce to install appliances.

SCPA launched a contractor outreach and training program in 2022 that has successfully and significantly expanded the number of local contractors conducting gas-to-heat pump installations in our service territory. Parallel statewide efforts would be prudent to ensure that workforce development scales with demand.

CARB should coordinate closely with the CEC to monitor market conditions, analyze emerging risks to appliance markets, and develop flexible policies to ensure that equipment becomes available at the right times, or that any emerging equipment and workforce development barriers do not result in increased pricing. Proactively reducing such constraints while providing compliance flexibility for customers will serve to minimize cost impacts, maximize emissions benefits, and foster natural growth in technology adoption rates.

³ "Top Global Building Appliance Manufacturers and Distributors Commit to Help California Achieve Six Million Heat Pump Goal." California Energy Commission. October 10, 2023. Available at: <https://www.energy.ca.gov/news/2023-10/top-global-building-appliance-manufacturers-and-distributors-commit-help>

⁴ Letter to California Air Resources Board Chair Randolph. Office of Governor Gavin Newsom. July 22, 2022. Available at: <https://www.gov.ca.gov/wp-content/uploads/2022/07/07.22.2022-Governors-Letter-to-CARB.pdf>

(3) SCPA recommends that CARB work with CEC to estimate the total impacts to grid reliability.

SCPA believes that an effective zero-emission appliance regulation must be done on a timeline that is synchronous with the necessary grid upgrades to support it.

Rapid regulated adoption of zero-emission space and water heating appliances will generate significant electric system load shift with distinctive load profile changes, both hourly and seasonally. Our forecasts indicate that while this shift offers opportunities for continued decarbonization, it is also critical to understand the grid impacts associated with increased adoption and the secondary impacts to long term system needs.

Observed and forecasted load shift within SCPA service territory notes that switching from gas heat to electric heat pump both deepens residential winter season electricity consumption and simultaneously introduces new summer cooling for homes that previously did not have air conditioning. This introduces a new public health benefit for tolerating extreme heat, but also introduces new grid reliability challenges and expenses at a time when California is struggling with both issues.

There is significant uncertainty surrounding exactly how new heating and cooling load will modify total load shape. Our projections indicate that over 67,000 residences in our service territory will expect to see new air conditioning capability. This is likely to increase electrical consumption by nearly 28,000 MWh for cooling alone. Additionally, this new air conditioning load is likely to appear during times of elevated summer demand, when emissions-intensive backup or reliability resources are more likely to be dispatched. Any new seasonal load may create reliability challenges that need to be understood alongside grid enhancement timelines and demand-response program development.

The assumptions derived from this rulemaking will be used to identify system needs, model system impacts, and implement mitigation strategies across the integrated planning efforts at the CEC, California Public Utilities Commission (CPUC), and California Independent System Operator. Prior to establishing statewide compliance timelines, CARB should coordinate across agencies to interpret how conversion mandates will impact household energy costs and affect the electric grid in new ways we should consider.

(4) A draft regulation should include a robust equity framework that considers household needs and grid constraints when establishing compliance timeframes.

There is a considerable equity problem introduced with fuel-switching projects today, largely due to the complexity of individual projects, dependency upon multiple trades, permitting, and energization timelines – all spanning across multiple days, weeks, or even months in some cases.

For a working household, these compounding processes create two problems: (1) Many households are unable to stay at home over many days to coordinate with multiple contractors; (2) A lack of prior experience or training leaves many households unfamiliar with the ins and outs of managing a complex and expensive home project. These realities are often overlooked as requirements are developed. But SCPA's experience implementing appliance installation projects recognizes these factors as two of the largest barriers to widespread electrification.

SCPA has also reviewed available grid data and recognizes that some of the most overloaded circuits exist in vulnerable communities. It is notable that larger distribution system upgrades will likely be required to upgrade panels, energize households, and provide reliable service within impacted communities. Such distribution grid upgrades often take many years to complete.

Additionally, upgrades to service entrances or panels can take many months – time that households do not feel they have when they are without hot water or heat. Customers are already facing significant delays in connecting new homes, and these extended timelines have even been seen for existing homes that have recently switched to electric appliances. SCPA notes that over 35 organizations sent a letter last April urging the Legislature to address this interconnection crisis.⁵

Finally, it is critical to ensure that any compliance obligation does not result in inequitable enforcement or penalty distribution in low-income or disadvantaged communities. Many households within vulnerable communities are already facing a disproportionate energy burden caused by increasing rates and inflated costs for appliance repair or replacement. While it is essential to ensure a transition away from combustion appliances with unhealthful indoor air quality, we must be sure that we

⁵ East Bay Community Energy Comments on May 9, 2023 Interconnection Workshop. East Bay Community Energy. Docketed: May 24, 2023. Available online at: <https://efiling.energy.ca.gov/GetDocument.aspx?tn=250310&DocumentContentId=85042>

do not place insurmountable financial burdens on populations unable to make such high-cost investments. Any enforcement resulting from this regulation must not impose penalties that deepen the legacy of historical inequities that we are trying to repair today.

(5) Ensure technology transition costs and household energy burden impacts are accurate and transparent

Zero-emission space and water heaters provide a critical technological pathway to building decarbonization and local air quality improvement. The health and environmental benefits of the suite of zero-emission appliance technologies also offer a measurable means of reducing indoor air pollutants and safety risks associated with indoor combustion appliances.⁶

And while the growth of this industry shows promise, SCPA acknowledges that these technologies are still in early stages of development and deployment. In addition, California's high cost of electricity means that a majority of SCPA's customers who have switched to electric appliances for all home uses have seen an ongoing total energy cost increase. As a result, SCPA believes the true scope of structural cost increases resulting from increased electrification is not fully recognized, and that such costs present a significant burden on low-income, disadvantaged, and otherwise under resourced households.

SCPA understands that significant investments will be required in pursuit of the State's collective clean energy and air quality goals. However, we believe that we must be clear and upfront about these costs to ensure that we are acting to mitigate impacts to our most vulnerable communities. CARB should ensure that this regulation considers the full scope of impacts that any California household will face over the implementation timeline.

Conclusions

SCPA recognizes the public health, environmental, and economic advantages of California's carbon neutrality goals. The clean energy transition is essential to combat climate change, maintain public health and safety, expand equitable access to

⁶ *Literature Review on the Impacts of Residential Combustion*. American Lung Association. July 10, 2022. Available at: https://www.lung.org/getmedia/2786f983-d971-43ad-962b-8370c950cbd6/ICF_Impacts-of-Residential-Combustion_FINAL_071022.pdf

necessary energy resources, and to ensure that everyone who looks to California as a leader in this sector can benefit from our groundbreaking work.

It is critical to ensure that we pursue attainment of these targets to protect the well-being of Californians and our planet. In doing so, we must also be cognizant of how we ask our customers and residents to bear the costs and growing pains of this transition, and whether the electrical grid is physically prepared to support this rapid transition. As a guiding light, we must make all efforts to mitigate these impacts to our most vulnerable populations.

Thank you for your consideration. Please reach out at any time to discuss these comments, our responses, or any aspect of this regulation where we may be of service.

Sincerely,

A handwritten signature in black ink, reading "Geof Syphers". The signature is fluid and cursive, with a large loop at the top and a long, sweeping underline.

Geof Syphers
Chief Executive Officer
Sonoma Clean power Authority
gsyphers@sonomacleanpower.org

Appendix:

Responses to Requested Feedback:

I. Manufactured Housing: What are reasonable compliance dates for equipment certified for manufactured housing?

The complex regulatory and program structures surrounding manufactured housing and mobile homes warrant additional consideration as this regulation is developed.

SCPA recommends that CARB actively coordinate its efforts with the CPUC, which is opening proceedings for its Mobile Home Utility Conversion Program. Coordination between this requirement and CARB's proposal is imperative to protect this particularly vulnerable set of California ratepayers.

CPUC's Mobile Home Utility Conversion Program mandates investor-owned utilities (IOUs) to convert 50% of all master-metered mobile home parks to direct utility service by 2030, including repairing and replacing natural gas infrastructure. This means installing stranded natural gas assets up until the day of CARB's implementation date. These same gas distribution assets are likely to become increasingly expensive to manufactured homeowners as other residential segments disconnect natural gas services, thereby leaving associated system costs with some of California's most vulnerable populations.

Additionally, mobile homes fall under the auspices of California's Housing and Community Development Department (HCD). This means that mobile homes are covered by building permits with unique rules. HCD requires full electrical plan drawings, whereas most jurisdictions require simple load calculations. This process requires significantly more work and forethought to electrify, thereby reducing the number of electricians that can complete the permit requirements.

Mobile homes panel sizes range from 50-100 amps. A 50-amp panel is common and likely inadequate for full electrification, even with smart devices. There are several innovative strategies and some promising technologies - including circuit sharers, circuit pausers and smart panels - to manage peak load on 100-amp panels. However, these technologies are in the early stages of testing and implementation and are neither universally understood by trades and building officials, nor are they widely available for installation. The barriers to manufactured housing electrification are significant enough that major stakeholders have vocalized that the most

straightforward approach may be a complete home replacement.⁷ This solution, while efficient, fails to consider affordability or homeowner ability to acquire a new structure for the sake of electrification.

II. Rural and/or Under-Resourced Areas: What are the special considerations of regulating space and water heaters in rural and under-resourced areas?

Rural communities comprise a considerable fraction of SCPA's service territory. SCPA conducted a Residential Community Needs Assessment Survey within our Empower (under resourced) communities; survey results noted that the primary customer priorities were reduced expenses, improved affordability, and protection against outages. SCPA is happy to extend an ongoing offer to CARB staff to provide or review data on this subject if-and-when valuable. With this context, SCPA would like to highlight several key considerations for regulating space and water heaters in rural communities.

CARB must consider potential risks to health and safety created by electrification in regions experiencing frequent or multi-day power outages. In general, rural regions face a considerably greater outage incidence, both in terms of duration and frequency.⁸ PG&E's 2022 Electric Reliability Report shows that outage data for the Sonoma Region in 2022 was nearly five times greater than urbanized areas like San Francisco; PG&E's Humboldt Region was approximately twenty times greater.⁹ Additionally, System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) outage trends for the whole of Pacific Gas & Electric service territory are also increasing.¹⁰

This is of critical importance as we consider fostering increased transition to zero-emission appliances in rural regions. Service interruptions or outages - both in winter and in summer - mean that many customers would lose the ability to heat or cool their residences at times that can impact public health and safety. Many rural homes maintain propane storage tanks to fuel both appliances and/or operate back-up

⁷ R.18-04-018 Phase 2B Staff Proposal. California Public Utilities Commission, Energy Division. July 25, 2024. Available at: <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M515/K355/515355350.PDF>

⁸ 2022 Annual Electric Reliability Report. Pacific Gas and Electric Company. July 15, 2023. Available at: <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/infrastructure/electric-reliability-reports/2022-pge-annual-electric-reliability-report.pdf>

⁹ Ibid.

¹⁰ Electric Reliability Reports. Pacific Gas and Electric Company. Website: <https://www.pge.com/en/about/pge-systems/electric-systems/electric-reliability-reports.html>

power generation. The costs of propane relative to electricity will be of interest to rural residents as they consider the value of transitioning to zero-emission appliances or maintaining existing combustion systems.

SCPA encourages CARB to implement fuel switching requirements only when power reliability on a circuit is sufficient to make threats to public health and safety extremely rare.

SCPA also asks CARB to make exceptions for back-up heating options or dual-fuel systems to increase the likelihood for code compliance and reduce the risk of cheating in California's rural communities.

Additionally, licensed contractors are scarce in rural communities. Sourcing, transporting, delivering, and installing zero-emission appliances all pose significant challenges to regions of the state that currently lack competitive contractor markets. Rural communities often face the same or similar economic vulnerabilities to disadvantaged communities in more urbanized regions, and the high costs of equipment and fuel-switching seen in our pilot projects may prove inequitable and financially burdensome to many rural customers.

III. Provide an overview of zero-emission technology types, costs, and adoption rates to include in the modeling work for estimating emission reduction and cost impacts for the regulatory proposal.

SCPA served as an early proponent of these technologies and successfully utilized our Advanced Energy Center to implement a \$9.8 million grant award from the California Energy Commission testing our hypothesis that adoption of zero-emission space and water heater technology would decrease total costs for consumers.

Unfortunately, across the multiple thousand home electrification projects implemented through our Advanced Energy Center, only a minority of projects saw total cost reductions. Most households experienced a sustained increase in total energy costs.

Our findings suggest that in most cases, total energy bills increased unless other home retrofits - such as insulation improvements, window replacements, and thermal envelope sealing - were completed to lower energy costs at the same time. However, high upfront conversion costs far exceed a reasonable breakeven point for the vast majority of customers. Additionally, the need for electric panel upgrades in many

cases further compounds costs and provides technical barriers for conversion of older structures.

Data from our projects indicate an installation costs range between \$16,000 - \$30,000 for Air-Sourced Heat Pump HVAC systems, and between \$5,000 - \$8,000 for heat pump water heater systems. These costs reflect an early-stage market, current equipment availability, and the small workforce qualified to install this equipment.

SCPA's estimates for home electrification also indicate high upfront switching costs. Our forecasts - based on data collected within our service territory - project that total residential electrification costs within Sonoma and Mendocino counties could exceed \$6 billion, with average per meter costs exceeding \$27,500 and annual bill increases on the order of \$440 per residence.¹¹ Altogether, this translates to an estimated cost of ~\$2,025 per MT CO₂e avoided, presuming zero-emission electric generation powers these appliances.

It's critical to understand that these estimates are built around the current state of the market. In time, increased equipment availability and expansion of a qualified workforce has the potential to decrease upfront costs. However, projected increases to electric rates resulting from economy-wide decarbonization over a short timeframe suggests likely increases in total home energy costs to operate these appliances – especially while customers continue to pay for both gas and electric distribution systems.

IV. Request for Alternatives: Pursuant to SB 617, CARB welcomes public input on alternatives to the draft regulatory proposal discussed in this workshop.

Research shows that technology - like other innovations - tends to follow an "adoption curve" led by a small percentage of early adopters and ending with a conservative group of "laggards" that require code enforcement to embrace innovative changes.¹²

As is expected with many energy efficiency or renewable energy innovations, SCPA has seen the highest adoption rate (65%) for zero-emission appliances among our net energy metering customers. This group is generally comprised of high-income households with the means to be early adopters of efficient technologies and with experience leveraging incentive dollars and/or financing projects at lower costs. For

¹¹ Estimate includes installation costs associated with induction stoves.

¹² Rogers Everett, M. (1995). Diffusion of innovations. *New York*, 12.

others further along the adoption curve, cost of adoption plays a critical role in moving the needle. It is essential for sufficient time to pass so the industry can develop the manufacturing, contractor networks and certification, and technologies – like smart panels – to evolve before moving from this wealthy “early adopter” phase to a larger group of middle-income and low-income households.

SCPA’s experience implementing zero-emission technology programs leads us to support CARB’s assertion in 2022 Scoping Plan Update – that properly-crafted incentives are critical in fostering adoption and constructing a sustainable building decarbonization market.¹³ Equity can only occur if market penetration is thorough, and technologies reach the most impacted households. Currently, too few incentives are available to those with the highest energy burden, there is a critical lack of support for complex home renovation management, and the first costs and ongoing energy costs of transition remain too high to justify a universal mandate in the near term.

For this reason, SCPA recommends that CARB consider a voluntary program structure with a zonal approach for “hard-to-electrify” regions. Such a program could establish regional targets with timelines structured around the necessary grid reliability improvements, incentives, rebates, and zero-interest financing availability. This approach could be tailored to empower equity customers or customers with medical or safety needs to transition at a time when they are not significantly harmed. This could further enable early-stage market development and foster proof of concept success stories while also respecting the equity and safety needs of vulnerable populations and obtaining CARB’s greenhouse gas and criteria air pollutant mitigation goals. A voluntary program approach also minimizes the costs of and need for the State to enforce provisions of the regulation with potential to adversely affect low-income and disadvantaged communities.

Additionally, the deployment of incentives could be timed to align market maturity, infrastructure availability, and workforce development with the GHG and air quality goals in regulated air districts like BAAQMD and SCAQMD. Proper incentives that foster adoption in rural, under resourced, and existing dual-fuel households will encourage electrification in equity-focused segments where premature mandatory regulations might have adverse financial and/or safety impacts.

¹³ 2022 Scoping Plan for Achieving Carbon Neutrality – Appendix F. California Air Resources Board. November 2022. Available at: <https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-appendix-f-building-decarbonization.pdf>