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Additional submitted attachment is included below.

To: **California Energy Commission, Docket 23-DECARB-03**

From: Rebecca Rothman, VEIC

Date: March 26, 2024

Subject: Response to California Energy Commission's 2024 Building Energy Action Plan Workshop

Dear California Energy Commission,

VEIC is pleased to submit the following comments in response to the California Energy Commission's 2024 Building Energy Action Plan Workshop, and the listed questions across technical discussion areas. VEIC is a nonprofit whose mission is to generate the energy solutions the world needs. VEIC has extensive expertise in energy efficiency, building decarbonization, transportation electrification, and demand management for a clean and flexible grid. Across our work decarbonizing buildings and transportation, we center equity and affordability to ensure that all people and communities can participate in the clean energy transition. VEIC respectfully submits the following comments on the California Energy Commission's (CEC) request for public comment as follow-up to the March 12, 2024 public workshop on the 2024 Building Energy Action Plan.

The California Energy Commission has solicited feedback on the following technical sections, some of which will be covered through a "full discussion" and some of which will be covered through "limited discussion". VEIC is providing comments here in response to the following two technical topics for discussion:

- Decarbonizing manufactured housing
- Refrigerant recovery and recycling

Technical Section: Decarbonizing Manufactured Housing

- *The Building Energy Action Plan will cover: Characterization of the building stock (quantity, age, cost, geographical distribution); Energy profile and decarb opportunities; Decarbonization barriers including equity considerations; Strategic approaches and costs for decarbonizing manufactured homes.*
- *The CEC is seeking additional information on: Successful initiatives from other states and countries; Equipment cost and installation cost specific to manufactured housing; Emerging technologies and approaches for manufactured housing.*

VEIC has led and worked on multiple programs implementing decarbonization and energy efficiency for manufactured housing stock in multiple states. While a focus on this building stock within decarbonization programs is relatively nascent, VEIC encourages and welcomes the Commission to consider lessons learned from the CalNEXT program's 2023 Mobile and Manufactured Housing Market Characterization Study (see: **VEIC - Mobile and Manufactured Housing Market Characterization Study).** VEIC is a member of the program team for CalNEXT, which funded and managed this project in partnership with AESC and Ask Energy.

While the report does not include cost data for specific measures, VEIC tea would like to draw attention to the project's work offering:

- A market characterization study collecting and summarizing housing and household characteristics for manufactured housing in California;
- An analysis of the key barriers and opportunities for electrification of manufactured housing, including codes and standards, permitting challenges, split incentive issues, metering challenges, electric panel upgrade likelihood and cost, and more;
- Decision making tree to advise program administrators when to consider replacement vs retrofit;
- Recommendations for stakeholders for how to best classify and serve manufactured housing within decarbonization programs.

The Market Characterization Study includes significant detail related to the Energy Action Plan topics of characterization of the building stock (quantity, age, cost, geographical distribution), and energy profile and decarb opportunities for the building stock. VEIC encourages the Commission to look at the report in detail as it builds out the Building Energy Action Plan.

Additionally, VEIC is involved in multiple other emerging technologies/pilot programs outside of California that we believe will produce useful data on measure costs for manufactured housing, and welcome collaboration with the Commission to share relevant data as it emerges. VEIC also encourages the Commission to also draw learnings from the following other successful initiatives from other states - including the Energy Trust of Oregon's manufactured housing replacement program (**https://www.energytrust.org/residential/manufactured-home-replacement/**).

Technical Section: Refrigerant Recovery and Recycling

- *The Building Energy Action Plan will cover: Upcoming standards to phase out high GWP refrigerants; implementing SB1206, which requires CARB to develop a strategy to transition away from HFCs by 2035; current practices for refrigerant recovery and recycling, and refrigerant market structure.*

- *The CEC is seeking additional information on: Emerging refrigerant technologies and practices that will support the transition away from HFCs; barriers to adopting environmentally friendly refrigerants and best practices for refrigerant recovery and recycling programs.*

VEIC has led and worked on multiple projects and pilots related to phasing out high-GWP refrigerants, and elevating market adoption of emerging near-zero refrigerant technologies. This includes another project completed as a partner in the CalNEXT program – a Variable Refrigerant Flow (VRF) Refrigerant Management Market Assessment (see: **CalNEXT - VRF Refrigerant Management Market Assessment.pdf (veic.org)).** The Market Study examined the suitability of continuing to incentivize VRF technology within utility energy efficiency portfolios, considering its impact on greenhouse gas (GHG) emissions and refrigerant usage. As excerpted from the report:

> "The findings in this report indicate that the total refrigerant load across California's building stock for existing HVAC systems (residential and commercial combined) is 58,217,452 pounds, with residential buildings accounting for 48,866,000 pounds of refrigerant, and commercial buildings accounting for 9,351,452 pounds of refrigerant. Further, based on informed leak rate assumptions, this report estimates the annual GHG impact of refrigerant leaks across these sectors to be approximately two million metric tons (MMT) of CO2e, with the largest contribution coming from residential central air conditioning (CAC) systems and commercial packaged single-zone air conditioning (AC) systems.
>
> Overall, this report's analysis suggests that that the operating efficiency of VRF technology may not be as advertised, and that given the challenges in independently verifying the efficiency and leak rates of VRF systems in real-world installations, there is a need to suspend VRF incentives and further examine the next generation VRF systems against HFC reduction targets set by California Air Resources Board (CARB) and consideration of alternative and emerging HVAC systems that can safely use near zero GWP refrigerants like R-290 as solutions for space heating and cooling decarbonization in the future."

An October 2023 CalNEXT analysis – the Propane Air to Water Heat Pump Market Study (see: **VEIC - Propane Air to Water Heat Pump Market Study)** - also evaluated the potential CO2e impact here of the R-290 monobloc air to water heat pumps as a potential decarbonization retrofit solution for California's residential sector. It demonstrates that this technology—as a replacement option for central and window air conditioning and fossil fuel heating systems—is likely the fastest means of achieving the State's HFC reduction targets of 7.5 million MTCO2e by 2030, while also supporting the potential to load shift from high-carbon hours of grid operation to low carbon periods.

Additionally, in February 2024, VEIC provided detailed comments to CEC in response to the **EPIC Low GWP Heat Pump Solicitation Concept 23-ERDD-01** that details our position on supporting funding for natural refrigerant heat pump technologies as a true decarbonization solution for California and the need to incentivize additional workforce development opportunities for HVAC technicians, plumbers, pipefitters, and boiler-focused mechanical contractors to transition into a new, climate-friendly technology market.

VEIC is currently advising on the design and development of an effective refrigerant recovery and recycling program for VT and has engaged key stakeholders in New York in response to the NY Department of Environmental Conservation's Express Rule 494 that outlines statewide requirement. As a sample of priorities and recommendations, the VEIC teams' general recommendations support a NYS DEC 494 ruling that:

- Ensures adoption of EPA regulations at the state level and help to ensure HFC phasedown efforts are enforced;
- Moves refrigerant management activities (equipment inventory, leak reporting and record keeping) from a passive voluntary effort to an active compliance requirement for refrigerant users;
- Drives the development of a robust HFC inventory through managed data collection and provides visibility for a state into how effective and impactful a refrigerant management program and policies can be;
- Requires automatic leak detection systems;
- Shifts the market focus towards reclaimed refrigerants and provides heightened incentivizes to market actors to help build reclaimed refrigerant market, but is realistic in recognizing likely shortages in near term for refrigerants such as R-404A and R-507A;
- Recognizes the need to stimulate refrigerant recovery at the level needed to service existing equipment across a state.
    - In addition to providing heightened incentives, states can also adopt an extended producer responsibility plan (as adopted in Australia, Canada and elsewhere) that requires refrigerant/product producers to incentivize recovery of refrigerants;
- Provides clear, consistent communication, and active guidance about how to set up an effective refrigerant management program;
- Identifies clear penalties for non-compliance or use of prohibited substances;
- Supports direct adoption of naturals whenever possible as investment in these technologies will be the least costly for users over the long term and also deliver the maximum CO2e reduction benefit;
- Provides flexibility to businesses in disadvantaged communities and ensure that grant programs are available to support those experiencing economic hardship, but ensure there are clear details in the criteria around how to validate "economic hardship" to prevent misuse of variance;
- Supports a robust refrigerant management program by requiring a regularly updated inventory of refrigerants being used to ensure responsible management of these gases.

Additionally, in evaluation of refrigerant recovery program design elements within the realm of state CPRG applications, VEIC has communicated strong support for CPRG plans that actively support elements such as:

- Providing early, short-term incentive to return refrigerant to a reclaimer;
    - Including supportive funding that can increase the market value of reclaimed refrigerant and increase contractor engagement in recovery.
- Providing empty recovery cylinders to contractors and incentivize recovery machines;

- Developing model contract language for refrigerant contractors to ensure best practices are followed;
- Supporting facility management education around refrigerant management and recovery efforts.

Thank you for the opportunity to comment.

Sincerely,

Rebecca Rothman

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VEIC

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