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**Daikin Comments on Request for Information-Equitable Building
Decarbonization Program**

Additional submitted attachment is included below.



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January 20, 2023

Mr. J. Andrew McAllister, Ph.D.
Commissioner
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512
Re: Docket Number 22-DECARB-03

(Submitted electronically to Docket Number 22-DECARB-03: Daikin Comments on Request for Information-Equitable Building Decarbonization Program)

Dear Commissioner McAllister:

Daikin U.S. Corporation (“Daikin”) hereby submits the following comments in response to the Request for Information on Equitable Building Decarbonization Program. Daikin U.S. Corporation is a subsidiary of Daikin Industries, Ltd., the world’s largest air conditioning equipment manufacturer. The Daikin Group includes Daikin Applied and Daikin North America LLC.

I. Introduction

Daikin appreciates the California Energy Commission’s (CEC) work towards a clean and equitable energy future for California through implementation of innovative energy policies. Daikin also agrees that decarbonizing the state’s existing buildings, especially by enabling low to mid-income households to decarbonize their homes with no or minimum financial burdens, is critical for the well-being of the future state residents and beyond. As an HVAC systems manufacturer offering a variety of controls solutions, Daikin hereby submits the following comments to the questions listed in the RFI document ([all in blue font](#)).

II. Daikin Response

II-1. Direct Install Program Criteria

- 1) AB 209 directs CEC to establish a direct install program that shall be “at minimal or no cost for low to moderate income residents” and defines direct install program as an “energy efficiency, decarbonization, or load flexible solution provided directly to a consumer at minimal or no cost through a third-party implementer.” “Low-to-moderate income” is defined in section 50093 of the Health and Safety Code as persons and families whose income does not exceed 120 percent of area median income, adjusted for family size and amended from time to time by the U.S. Department of Housing and Urban Development. The CEC is considering segmenting the state into different regions for the purposes of this program and requesting proposals from program implementers to implement the program across these regions.

The CEC is preliminarily planning to allocate 66 percent of total budget funds – up to approximately \$610 million – to the direct install program. While this is a significant amount of funding relative to previous decarbonization investments in existing buildings in California, it is a small amount relative to the need in the sector. The program will be able to cover only a small fraction of the millions of potentially eligible households. Program criteria used to prioritize and score proposals will need to be both flexible enough to meet the needs of the different regions of the state and sufficiently uniform to establish appropriate baselines and metrics for implementation.

- a. What criteria should be weighed more heavily or prioritized when scoring program proposals?

Decarbonization impact/implementation cost ratio. As mentioned above, affordability is a must-meet criteria. So a threshold should be set for the ratio to ensure the solution is accessible to the targeted population.

To effectively execute above, we believe it’s important to look for a strategy that doesn’t make perfect the devil of good such as heat pump implementations that are low cost (heat pump water heater swap outs using existing technology and simple ductless heat pumps that displace gas heating) and remove a majority, if not entirety,



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of the building carbon usage. A project that first identifies homes for their ability to produce easy wins using these low cost and available technologies, then selects installing contractors for their ability to execute these relatively simple installations.

- b. The CEC plans to require the use of meter data and analytical-based tools to prioritize and target participant households and measures through the lens of greenhouse gas (GHG) emissions, energy usage, and bill impacts. Should the CEC require all proposals to include independent, data-driven targeting of participants and eligible measures, or should the CEC itself contract to provide a single, program-wide tool to target participants and eligible measures that program administrators would be required to use?

Daikin believes that CEC should provide a single, program-wide tool.

- c. Should low-income and moderate-income households be incentivized at different levels? If so, how should that be approached?

Daikin believes that incentives themselves won't be sufficient support for low-income households. For that reason, low-income households do not participate in incentive programs. Low-income households should benefit from 100% paid for direct installation.

For mid-income households, partial coverage of the installation costs should be sufficient. Perhaps, based on the percentage of the household income compared to the program eligibility threshold (120 percent of area median income, adjusted for family size and amended from time to time by the U.S. Department of Housing and Urban Development).

- 2) To optimize program funds, CEC may offer preference for proposals that layer incentives or leverage other programs.
 - a. What best practices, program elements, or state actions would facilitate layering or leveraging different program offerings?

A best practice would involve a community partner acting as prime contractor for installation project management. This prime contractor could be responsible for offering the homeowner many incentives. This prime contractor could also coordinate with the utility and state programs to issue or handle the incentives to reduce any out-of-pocket costs to the homeowner.

- b. Should layering or leveraging other programs be a requirement for proposals or a prioritization when scoring proposals?

Layering (or the offering of multiple incentives to the homeowner) should be prioritized simply because that should enable securing more budget but not requirement. It is one element in the scoring.

Additionally, the creation of partnerships with utility and other incentive programs should be a second and separate scoring element. Especially for low-income homeowners, as mentioned above, their implementation costs most likely need to be entirely eliminated (for mid-income homeowners, partial coverage should be sufficient). So the homeowner will need their out-of-pocket cost to be eliminated or reduced by budling incentives.

- 3) The inclusion of both low-income and moderate-income households allows flexibility for proposals that want to electrify specific neighborhoods or communities.

- a. What program elements, geographic targeting, or state actions would facilitate this approach?

Using community organizations as the prime contractor would facilitate community targeting; conceivably these community organizations would know their neighborhoods and communities best.

- 4) AB 209 authorizes the CEC to require tenant protections in participating rental properties.



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- a. What tenant protections could be applicable in all regions of the state?

Daikin believes that no new tenant protections would be required; the specific appliances used in a rental property are currently the responsibility of the property owner, and the process of changing these out are usually well covered in leases or state procedure. For multi-family rental properties, it will be critical for the program to make simple changeouts of water heaters and HVAC as mentioned earlier. If an improvement involves major retrofits, it could likely trigger issues between property owners and tenants.

- b. Who would be responsible for enforcing the agreements?

The implementer.

- c. What programs should the CEC look to for examples of effective building retrofit and decarbonization programs with tenant protection requirements?

No specific comment.

II-2. Direct Install Third-Party Implementers and Solicitation Scoring

- 5) AB 209 defines “third-party implementer” as “non-commission staff under contract to the commission who propose, design, implement or deliver Equitable Building Decarbonization Program activities.” Proposals from third-party implementers that include at least one community-based organization and employ workers from local communities shall be prioritized.

- a. How should the CEC segment the state for a multiple-implementer solicitation (e.g., by climate assessment regions, climate zone, groupings of air districts, counties, etc.)? Are there other ways to segment the state to provide geographic diversity and advance equity?

No specific comment though Daikin is not opposed to use multiple implementers.

- b. What opportunities for workforce development should be considered, encouraged, or leveraged?

HVAC contractor training to install HPs since many of them are currently hesitant to deviate from installing standard AC+GF systems which they are used to. This should help overcome the like-to-like culture and boost the market penetration of heat pumps in California. It is important to highlight that any contractor participating in a contract should be required to have manufacturers installation and service training

- c. Should maximum incentives – at building, unit, and/or region – be established? If yes, at what level(s)?

Daikin believes that “maximum incentives” would be a good idea. This could result in funneling technologies and sites toward simple, easy wins.

- 6) Preference for participation in the direct install program shall be given “where the building meets one or more of the following criteria: (1) the building is located in an under-resourced community; (2) the building is owned or managed by a California Native American Tribe or a California Tribal organization; (3) the building is owned by a member of a California Native American Tribe.”

- a. How can the CEC best facilitate awareness for residents and building owners within under-resourced communities to encourage program participation?

- Developing an easy-to-use and easy-to-access tool, which enables the building owners in such communities to quickly understand how much money they are saving in both short and long-terms.
- Adding promotion/ads in their utility bills with a link to the program?



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- b. Are there any unique considerations that should be taken into account when developing program criteria or reviewing proposals for decarbonizing homes on Tribal lands?

No specific comment.

- c. Should CEC issue a Tribal-only solicitation to fulfill items (2) and (3) more effectively?

Daikin suggests polling the tribes. If the tribes request it, yes. If they do not, no.

- 7) While designing the criteria and solicitations for the regional decarbonization programs, CEC is considering offering an initial phase of the Equitable Building Decarbonization Program to support or expand currently active decarbonization programs with established infrastructure and demand. These programs may be more limited in geographic scope or decarbonization activities than what is expected from the regional programs.

- a. Should other currently active building decarbonization programs be allowed to compete for funding from the Equitable Building Decarbonization Program?

Daikin does not see any reason how that will help the Equitable Building Decarbonization Program.

- b. Should the CEC fund decarbonization programs that have existing infrastructure in an initial phase to allow for the Program to quickly decarbonize homes and provide benefits to residents?

Yes

II.3. Direct Install Eligible Equipment and Measures

8) The statutory direction on eligible measures is broad: “Projects eligible to be funded through the direct install program include installation of energy efficient electric appliances, energy efficient measures, demand flexibility measures, wiring and panel upgrades, building infrastructure upgrades, efficient air conditioning systems, ceiling fans, and other measures to protect against extreme heat, where appropriate, and remediation and safety measures to facilitate the installation of new equipment.” The CEC plans to require the use of meter data driven analytical tools to inform what measures should be prioritized based on GHG reduction, energy reduction, and bill impacts.

a. What specific equipment and measures should be prioritized?

Heat pumps (in fact, the above should replace the word “efficient air conditioning systems” with “efficient heat pumps”), especially variable speed heat pumps with low GWP refrigerant, as well as heat pump water heaters. The most cost-effective way to boost building decarbonization through fuel switch but also to deviate the HVAC market from minimum efficiency centric to higher efficiency. Also, scoring should be used to address low-GWP refrigerants.

b. What, if any, equipment standards or certifications should be considered as requirements?

Nothing specific. However, Daikin proposes to not include EER for any HVAC efficiency requirements. EER is specifically targeted by utilities to manage peak energy demand in summer. However, California is a winter-peaking state. Therefore, sizing of heat pumps will be based on the heating load unlike air conditioners that are installed based on the cooling load. In other words, it is very unlikely that installed heat pumps will operate full load even during the hottest time of the years. Requiring EER will become significant obstacles for advanced energy efficient heat pumps, such as variable speed heat pumps, to be effectively utilized.



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- c. What unique equipment and measures should be considered for different building segments, i.e., existing single-family, multi-family, and mobile/manufactured homes?

Daikin believes there needs to be a study of building stocks per sector (quantity and sizing/capacity etc.) and the types of HVAC (Central AC, Central HP, Window AC, PTAC, Electric Furnace, Gas Furnace, Baseboard Heat etc.) and water heaters (gas storage, electric storage, gas tankless, electric tankless, and heat pump water heaters) are used for such sectors. Then using the study to outline for each sector, we can target replacement solutions out of such options that are preferred and the criteria relative to cost, performance etc.

- d. How should the CEC consider equipment and measures that mitigate impacts from extreme heat, wildfires, or local air pollution but increase individual energy use (e.g., installing a heat pump heating and cooling system in a home that previously did not have an air conditioner)? How does this align with the legislative direction that the program shall “reduce the emissions of greenhouse gases”?

Since comparable models of heat pumps and air conditioners are very similar in construction and appearance, the added cost of a heat pump is relatively small. To make a heat pump using a variable speed technology is preferred because the variable speed compression-based models use less energy, are loaded with less refrigerant, and generally use less materials to make. Additionally, the incremental cost to make a variable speed heat pump (compared to a non-variable (single speed/two-stage) heat pump) is decreasing quickly. Therefore, to reduce greenhouse gasses, the best option is to focus on heat pumps using a variable speed technology and which are charged with low-GWP refrigerant.

- e. Should the CEC consider unique portfolios, technologies, and measures to reflect California regional diversity, such as different climate zones, electric utilities or community choice aggregator providing service, technology performance, electric reliability, wildfire risk, etc.

Climate zones need to be considered. For instance, in warmer parts of the state, backup electric heaters should not be necessary. Even in the coldest part of the states (CZ16?), cold climate heat pumps can sufficiently provide heating. In other words, backup electric heaters should be unnecessary throughout the state, and there should be climate-based measures to minimize the use of any backup heaters. For instance, the program should mandate the operation switch-point from heat pumps to backup heating to be appropriately set as contractors still commonly set it much higher than should be (ex: 40F or above) to minimize call-backs.

To implement above, CEC should create regional contractor and industry advisory groups to help create any regional technical specification or portfolio. This will lead to local buy in and also be creating reasonable portfolios.

9) This program offers a significant opportunity to advance load flexibility in the residential sector and across the state. Load flexibility or load management provides residents with the ability to shift their energy usage in response to hourly energy prices, GHG emissions, or 5 grid conditions. This can provide savings on consumer bills, as well as provide grid reliability support.

- a. What load flexibility requirements should be included in the direct install program, and which load flexibility measures should be prioritized?

OpenADR. There should also be incentives provided for AHRI1380-capable thermostats to enable DR with minimum sacrifice in end user comfort and more reliable load curtailment.

10) AB 209 includes mobile homes as eligible buildings. The ability to decarbonize existing mobile and manufactured homes depends on factors such as location (mobile home park or rural), ownership, size, age, condition, access to electricity, and access to appropriately sized efficient-electric equipment.

- a. What considerations should be taken for mobile or manufactured homes that are different from other eligible buildings?



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Daikin believes that most manufactured homes are “all electric”, however they rely on electric resistance for water heating and space conditioning. Also typically, the space conditioning is not very energy efficient. Therefore, replacing such existing HVAC systems with energy efficient heat pumps is in needs. However, this might be more effectively able to be addressed by existing energy efficiency programming, not decarbonization programming.

- b. What programs focused on retrofitting or decarbonizing mobile and manufactured homes or mobile home parks could offer recommendations or lessons?

Energy Trust of Oregon has significant experience adding heat pumps to manufactured homes. Daikin believes that both NEEA and Bonneville Power Administration also do.

II-4. Incentive Program

11) The CEC is directed to establish and administer a statewide incentive program for low-carbon building technologies such as heat pump space and water heaters and other efficient electric technologies. A minimum of 50 percent of the funds allocated “shall benefit residents living in under-resourced communities.” Incentives for manufacture, distribution, sale, and installation; financing; and direct purchase of equipment are all under consideration.

- a. How should the CEC prioritize the use of funds between these options? What market actor should be incentivized? Why?
 - There should be special incentives to installers for fuel switch.
 - There should be enough incentives for installers to fully cover the cost of panel upgrades, sizing of power line from the street to the panel, and appropriate ductwork (where applicable) adjustments.
 - As mentioned, AHRI 1380-compatible thermostats should receive premium incentives over other communicating thermostats. The incentives should be provided to installers to drive the sales.

In addition, any direct installation program, whether to under-resourced communities or well served communities, should make use of an RFP process. This will be helpful in many ways:

- Contractually bind the installing contractor to provide a specified quality, technical accuracy, installer training, etc. This can mitigate some of the deficiencies found in the workforce today.
- Allow manufacturers to compete for the business and bring the best price to market; a large “bulk” purchase also allows the manufacturer to plan for the delivery of a specific number of units.

- b. What criteria or factors beyond the reduction of direct GHG emissions should be considered when evaluating incentive options? How do these considerations benefit residents living in under-resourced communities?

Daikin believes the program should also consider the equipment’s ability to operate under demand response. Reducing GHG is important. Yet, grid-friendliness is also critical for the well-being of public. Also, Daikin highlights the importance of indirect GHG emissions, notably through the use of refrigerants. To address the issue, regulating refrigerant charge per ton of HVAC systems will play a crucial role.

- c. Where are the gaps in current incentive offerings that if addressed could advance the market for low and zero-carbon building technologies?

They don’t motivate contractors for fuel switch. Like-to-like culture still strongly persists.

Also, most incentives require an EER from the heat pump equipment. Because of this, many worthy products are disqualified because of this. At minimum, variable speed heat pumps and DR-enabled devices shouldn’t need an EER requirement.

- d. How should incentives from this project interact with other incentives such as those available from the direct install program, utility programs, tax credits, etc.?

They should interact with other key future programs such as the 2030 6M heat pump goal to accelerate HVAC fuel switch, which is one of the most significant components



to accelerate decarbonize buildings in California. All incentives in CA should be viewed as an integrated approach to decarbonize buildings in CA.

- e. What, if any, criteria should there be regarding the disposal of replaced equipment including refrigerants where applicable?

Daikin suggests including refrigerant reclamation and recycling and other component material recycling.

- f. Should CEC consider funding currently active building decarbonization incentive programs in an initial phase?

Yes, but only if they are both (a) direct install programs and (b) focused on low- and moderate-income groups.

- g. CEC aims to leverage and/or align with programs supported by the federal Inflation Reduction Act and the Infrastructure, Investment, and Jobs Act. Should CEC continue to leverage or align if it is at the cost of earlier implementation?

Yes. CEC should align with IRA's HEERA rebate program as closely as possible to secure a larger pool of money to work with.

12) The CEC will require ongoing data collection and measurement and verification to evaluate program success. This may include, but is not limited to, energy and GHG savings, bill impacts for ratepayers, number of homes retrofitted, number of people in the household affected, cost per home, occupant satisfaction, indoor air quality changes, location, and 6 other programs or funds leveraged. CEC will work to align data collection principles (fields, formats) with other programs, and share program data with the public via reports or a website. For example, the Technology and Equipment for Clean Heating (TECH) program is currently incorporating project application data, meter data, and survey data into a publicly reportable site.

- a. What data not mentioned above should be collected for tracking program performance and evaluating program success?

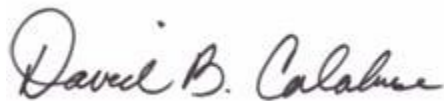
Daikin suggests track homeowner use patterns of heat pumps. Programs in other markets have learned that homeowners tend to use heat pumps in the same manner as their previous fossil fueled heating (mainly through use of thermostat setbacks). For instance, in the NEEA research paper called MAXIMIZING MINI SPLIT PERFORMANCE, they cite several studies that there are cases heat pumps can consume less energy when thermostat setback (especially by many degrees) is not used as maintain the thermal mass takes less energy than recovering it. It could be useful to have this data to correlate with energy and satisfaction.

Also, we should track heat pump installations on a point quality check (ex: 5 or 10 points). Daikin knows from programs in other areas that heat pumps can often be installed improperly, resulting in increased energy use and lower customer satisfaction. For example, typical installation fails include siting the outdoor unit in a location that exposes it to wind or water, or not adding additional refrigerant charge when needed. A commissioning report that includes between 5 to 10 key items should be required for every installation, and the data can be kept for evaluation purposes.

III. Conclusion

Daikin appreciates the opportunity to provide these comments. If you have any questions regarding this submission, please do not hesitate to contact me.

Sincerely,



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