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Including Geothermal in the Equitable Building Decarbonization Direct Install Program

Please see the attached comments from a coalition of multiple geothermal heat pump industry organizations.

Additional submitted attachment is included below.



June 30, 2023

David Hochschild, Chair
California Energy Commission
715 P Street
Sacramento, CA 95814

Subject: Comments on Equitable Building Decarbonization Direct Install Program: Draft Guidelines - Docket 22-DECARB-03

Thank you for the opportunity to comment on the draft guidelines for the Equitable Building Decarbonization Direct Install program. The Equitable Building Decarbonization program provides a critical opportunity to provide low- and moderate-income (LMI) households with the benefits of all-electric heating and cooling and ensure that California's transition to clean and renewable buildings benefits all Californians. The California Geothermal Heat Pump Association, the Geothermal Exchange Organization, Dandelion Energy, EnerTech Global, GeoTility, Major Geothermal, Meline Engineering, and Orca Energy support the proposed framework for the Direct Install Program along with the below recommendations, and we look forward to engaging with the California Energy Commission ("the Commission") on the Statewide Incentive Program as those guidelines are developed

Geothermal (ground source) heat pumps (GSHPs) provide the lowest operating cost of any heating and cooling system, and represent a key opportunity to further reduce energy cost burdens for LMI households. The Direct Install program should therefore include geothermal heat pumps as an approved measure to ensure the long-term energy savings are available to households that could most benefit from the high efficiency of geothermal systems.

Summary of Comments

- Geothermal heat pumps can save residents hundreds of dollars per year, while decreasing emissions by 60% or more.
- Geothermal systems have the highest efficiency of any heating and cooling system – California must ensure that these energy savings are accessible to the households that need them the most.
- Geothermal systems provide significant electric grid benefits, reducing summer peaks without meaningfully increasing winter peaks.
- The Direct Install program should include geothermal heat pumps as an eligible measure under the program guidelines.
- The Commission should clarify that propane and delivered fuel customers are also eligible for heat pump installations under the Direct Install program.

Background: The Benefits of Geothermal Heating and Cooling Systems

Geothermal heat pumps are among the most efficient ways to heat and cool buildings, according to the EPA.¹ They are also the lowest cost way for homeowners to heat and cool their homes. As such, geothermal heat pumps represent a key technology for advancing energy affordability and value, supporting the growth of the green economy, and achieving economy-wide decarbonization without meaningfully increasing peak demand.

- Geothermal heat pump systems have the potential to reduce carbon emissions from homes by 65% as compared to conventional propane systems and 60% compared to methane gas systems² – and heat pump emissions will decline to even further as California decarbonizes its electric grid in line with state goals.³
- Residents will typically save hundreds of dollars each year when switching to a geothermal heating and cooling system – factoring in both their savings in fuel and air conditioning costs they are no longer paying, and the electricity costs to run the heat pump. California must ensure that these energy savings are accessible to those households that need them the most.
- Geothermal heat pumps can decrease electricity usage by 30% or more compared to an air source heat pump system over the course of a year. Geothermal heat pumps will also draw a peak load of only one half to one third of an air source heat pump system on the coldest and hottest days each year, providing significant savings in electric grid infrastructure requirements.
- Geothermal heat pumps therefore offer significant electric grid benefits, as they decrease summer peaks and don't meaningfully increase winter peaks.
- The increased electric demand provided by geothermal heat pumps generates savings for other electric rate-payers – a study by the New York State Energy Research and Development Authority (NYSERDA) estimated the value of this cost shift benefit to all ratepayers to be over \$7,000 for each single family home electrified with geothermal heat pumps.⁴
- Geothermal heat pumps can also meet 100% of the heating needs of a home or building, without any fossil fuels or auxiliary electric heat for back-up, even in the coldest climate zones in the state.
- Geothermal systems have a longer equipment life expectancy than other systems. The ground loop will last the life of the home and the heat pump's expected service life is 20-25 years. Traditional air conditioning and natural gas furnace life expectancy is much shorter at 10-15 years.

¹ “Geothermal Heat Pumps,” Energy Star, U.S. Environmental Protection Agency, accessed March 8, 2023, https://www.energystar.gov/products/geothermal_heat_pumps

²Savings calculated by Dandelion for Fresno, California; methodology available on Dandelion's website: <https://dandelionenergy.com/environmental-impact>

³ Clean Energy, Jobs, and Affordability Act of 2022, September 16, 2022, SB1020, https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB1020

⁴ Geothermal heat pumps increase electric demand and utility revenue by far more than the additional costs of providing that electricity; this surplus is then returned to customers through lower electricity rates for all rate-payers. Geothermal systems therefore have the added benefit of effectively underwriting the electric usage of other electric customers and reducing overall costs for all consumers. This is in contrast to other renewable technologies which can reduce overall grid demand and leave other rate-payers, particularly low- and moderate-income households, footing the infrastructure bill to sustain the grid. See: *New Efficiency: New York, Analysis of Residential Heat Pump Potential and Economics*, NYSERDA, January 2019, p., S-3, <https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/PPSER/NYSERDA/18-44-HeatPump.pdf>

Given these benefits, geothermal heating and cooling should play a major role in equitable building decarbonization for California. Multiple studies have shown that one in every four heat pumps installed should be geothermal to help minimize grid infrastructure costs.⁵ This would mean 1.5 million geothermal heat pumps for California by 2030.⁶ The Direct Install program provides a critical pathway to support this goal and ensure that LMI households are able to access the long-term energy savings of geothermal systems.

Geothermal heat pumps can support all home types – from single-family homes to duplexes and townhomes to large multi-family buildings, and in each case they provide significant energy savings over any alternative heating and cooling system. While geothermal systems have higher initial installation costs than comparable air source heat pump alternatives, the long term operating savings and the electric grid benefits more than compensate for the added initial expenses, making geothermal the lowest overall lifecycle cost of any system.⁷ The availability of federal rebates of up to \$8,000 for heat pumps for LMI households can further offset the up-front costs, making geothermal systems even more affordable for the Direct Install program.

Geothermal Heat Pumps Should Be Included in Eligible Measures

The current Direct Install program guidelines exclude geothermal heat pumps – possibly unintentionally – and the Commission should ensure that the final guidelines allow for geothermal installations where appropriate. The current draft guidelines allow for “heat pump[s] for space heating and cooling,” with the requirement that the heat pumps “must meet the highest efficiency tier (not including any advanced tier) established by the Consortium for Energy Efficiency (CEE).”⁸ The CEE efficiency tiers are only applicable to air source heat pumps, however, which therefore excludes geothermal systems. The ENERGY STAR program provides energy efficiency requirements for geothermal heat pumps⁹ which provide an effective alternative to the CEE tiers, and the Commission should include geothermal heat pumps which meet the ENERGY STAR requirements as an eligible measure under the direct install program.

The Commission should also update the definition of a heat pump currently contained in the glossary¹⁰ to specify it includes both air source and ground source heat pumps. The definition should also be clarified to emphasize that heat pumps can provide both heating and cooling.

⁵ The Brattle Group study for Rhode Island modeled 33% of heat pumps as geothermal in their mixed-fuel scenario analysis. The New York Climate Action Council Scoping Plan modeled 22-23% of heat pumps as geothermal heat pumps (see Scoping Plan, Appendix G: Integration Analysis Technical Supplement, Annex 2: Key Drivers and Outputs, December 2021, <https://climate.ny.gov/resources/scoping-plan/>) and the 2019 Department of Energy GeoVision analysis identified market potential for 28 million geothermal heat pumps installed by 2050 (see <https://www.energy.gov/eere/geothermal/geovision>).

⁶ To meet the goal of 6 million heat pumps by 2030, established by Governor Gavin Newsom, letter to California Air Resources Board, July 22, 2022, <https://www.gov.ca.gov/wp-content/uploads/2022/07/07.22.2022-Governors-Letter-to-CARB.pdf>

⁷ The Brattle Group, Heating Sector Transformation in Rhode Island: Pathways to Decarbonization by 2050, Pages 40, <https://www.brattle.com/reports/heating-sector-transformation-in-rhode-island>

⁸ Draft guidelines, Table 4, p. 12.

⁹ https://www.energystar.gov/products/heat_pumps_geothermal/key_product_criteria

¹⁰ Draft guidelines, p 25.

Homes Using Propane for Space and Water Heating Should be Eligible for Heat Pumps

The draft guidelines currently allow for heat pump installations only “as a replacement for gas-fired heating equipment;”¹¹ it is unclear whether this is intended to include propane customers. Liquid propane stored in a tank converts to a gas when it leaves the tank for combustion, but propane furnaces are not traditionally characterized as “gas-fired” equipment. Propane customers already have some of the highest energy burdens in the state, and a single family home switching from propane to geothermal heat pumps can save over \$800 per year in heating and cooling costs. Allowing direct installation of heat pumps for propane customers would provide immediate economic benefits to LMI households and even greater carbon emissions impacts than for methane gas conversions. The Commission should therefore clarify the guidelines to ensure that propane customers are also eligible for heat pump installations under the Direct Install program.

Conclusion

Geothermal heat pumps represent a key technology to support California’s transition to clean, renewable heating and cooling for all California residents. By ensuring that the Equitable Building Decarbonization program includes geothermal heat pumps, the Commission can ensure that LMI families will benefit from high-efficiency, low-cost systems while also minimizing electric grid impacts.

Respectfully submitted,

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¹¹ Draft guidelines, Table 4, p. 12.