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Earthjustice Comments on 2025-2026 Gas R&D Budget Plan

Additional submitted attachment is included below.

EARTHJUSTICE

February 21, 2025

California Energy Commission
Docket No. 23-ERDD-02
715 P Street
Sacramento, CA 95814

Re: Docket 23-ERDD-02: Comments on the Gas R&D Program FY 2025-2026 Proposed Budget Plan Workshop

Earthjustice appreciates the opportunity to submit these comments in response to the February 7, 2025 Gas R&D Program FY 2025–2026 Budget Plan workshop. The California Energy Commission's ("CEC") 2025–2026 Gas R&D Budget Plan correctly focuses resources on projects that support decommissioning of gas infrastructure and reductions in the building sector's reliance on gas. Earthjustice strongly supports these initiatives, which are consistent with the 2024 Joint Agency Staff Paper issued by the CEC, California Public Utilities Commission ("CPUC"), and California Air Resources Board ("CARB") calling for interagency collaboration to facilitate California's transition away from gas. With regard to the "entrepreneurial ecosystem" research initiative for next year's budget plan, the CEC should prioritize market transformation projects for industrial electrification of lower-temperature process heat use cases. For industrial use cases that cannot currently be feasibly electrified in the near-term, the CEC should focus on catalyzing technological development for electrifying higher-temperature process heat with a longer-term goal of making electrification of those use cases feasible. To the extent the CEC looks at alternative gaseous fuels for the interim period, the CEC should ensure that life-cycle emissions of both greenhouse gases ("GHGs") and criteria pollutants, as well as other localized environmental impacts to Environmental and Social Justice ("ESJ") communities associated with the production of "low-carbon fuels" such as biomethane and hydrogen, are taken into account before subsidizing technologies or strategies reliant upon these fuels, and should develop guardrails to protect communities from those harms.

1. Initiative 1: Social Science Research for Gas Decommissioning in the Mid and Long Term

Earthjustice supports the CEC's social science research initiative, which will explore barriers to electrification, provide location-specific data, and inform efforts to promote fuel-switching and address barriers. This data collection will complement agencies' and utilities' increasing efforts to encourage zonal decarbonization projects, which depend in part on voluntary customer buy-in. It can also inform design and implementation of energy efficiency

programs and measures intended to promote customers' transitions away from gas end use equipment.

In particular, the "advanced geographic analysis" planned for the research initiative will be a valuable overlay to the gas distribution system maps that gas utilities are required to generate this year pursuant to Senate Bill ("SB") 1221. Utilities' SB 1221 maps will identify locations of potential gas distribution line replacement projects; city, county, and census tract boundaries; locations of disadvantaged communities ("DACs"), Tribes, and priority neighborhood decarbonization zones, as well as other reporting requirements currently being set by the CPUC. CEC research that ties barriers to adoption, consumer experiences, and benefits and impacts of electrification with geographical areas can help identify areas that would be good candidates for zonal projects, as well as areas that are good candidates for geo-targeted programs addressing barriers to electrification prior to pursuing large-scale zonal projects.

At the workshop, CEC staff requested comments addressing barriers to converting residential and commercial buildings away from gas, as well as "promising technological directions to facilitate affordable conversion from gas."[1] Barriers and solutions that the CEC should explore within this research initiative include:

a. Structural or infrastructure constraints

Structural or infrastructure constraints can affect residents seeking to electrify in a number of ways. For example, a homeowner seeking to replace a gas water heater with a heat pump water heater ("HPWH") may not have sufficient space in their home for the replacement without making structural changes to the area where the HPWH would be housed. Similarly, someone seeking to replace a gas range with an electric radiant or induction range may find that the switch requires upgrades to the wiring to support a 240 volt range. Homeowners seeking to fully electrify their homes may be told they need to upgrade their electrical panel, or even in rare cases that their increased electrical load would trigger a need for ahead-of-the-meter, utility-side electrical service upgrades to the infrastructure serving their home. These upgrades can easily make an electrification project financially infeasible to a customer.

The CPUC has begun to explore options for addressing these types of concerns in Phase 4 of its Building Decarbonization Rulemaking, R.19-01-011. In a July 2024 staff report, CPUC Energy Division staff explained that panel and service upsizing is often over-recommended due to the different ways that households' peak demand is calculated by electricians, and that data Staff collected from 1,480 homes in PG&E service territory showed that households' average utilized panel capacity was only 34 percent, often meaning significant amounts of household appliance load could be added without upsizing.[2] The staff report recommended looking into the use of Meter Socket Adapters ("MSAs"), which are devices "installed between the utility meter

[1] Docket No. 23-ERDD-02, TN#261559, *Gas R&D Program FY 2025-26 Budget Plan*, at slide 18 (Feb. 7, 2025) ("Workshop Presentation").
[2] CPUC, R.19-01-011, Phase 4A Staff Proposal, at 15–23 (July 18, 2024) ("Building Decarb Phase 4A Staff Proposal"), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M536/K015/536015666.PDF.

and the meter socket in the customer's service entrance equipment" that can provide various load management functions.[3] MSA installation is both faster, cheaper, and simpler than panel or service upsizing, and could be a promising technological strategy to avoid unnecessary electrical upgrades.

In addition to reducing unnecessary panel or service upsizing recommendations, the CPUC is considering adopting a policy to apply common facility cost treatment to service upsizing work that is triggered by building electrification.[4] Service upsizing refers to increasing the capacity of the service line on the utility side of the meter, or other relevant utility infrastructure, such as transformers, rather than customer-owned, behind-the-meter equipment like the electrical panel. Common facility cost treatment means that the costs of that utility-side upsizing work would be socialized through rates rather than charged to the individual customer whose increased load triggered the need to upsize. The CPUC has applied common facility cost treatment to service upsizing costs triggered by installation of electric vehicle ("EV") charging equipment since 2011 as a way to offset costs that are prohibitive at an individual level but negligible when socialized through rates, and it has facilitated adoption of EVs and their chargers without resulting in significant ratepayer impacts.[5] While not a "technological direction," this policy could substantially reduce costs for customers who find themselves in the rare position of triggering a service upsize.

CEC social science research examining customer attitudes, experiences, and awareness around these structural or infrastructure-related barriers could be useful to determine whether customers are being unnecessarily deterred from pursuing electrification due to upgrade costs or misconceptions about upgrade costs. The research could also look at whether customers would be willing to pursue these upgrades if common facility cost treatment was applied. It is worth noting that years of utility data regarding subsidies for EV charging service upsizes show that these utility-side infrastructure upgrades have been triggered extremely rarely, and they are even less likely to be triggered by fuel-switching a residential appliance than they are by installing EV charging equipment that draws a lot of power.[6] This research could illuminate the extent to which outsized public perception of these costs is deterring residential electrification, and whether measures currently under consideration at the CPUC will be sufficient. The CEC should also look into whether development and availability of electrification technologies that can plug into a 120 volt outlet would alleviate some of these concerns, and how these products can be

[3] *Id.* at 23, 28–30.
[4] CPUC, R.19-01-011, Assigned Commissioner's Amended Scoping Memo and Ruling, at 6–8, Attach. A 2–4 (July 1, 2024), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M534/K700/534700375.PDF.
[5] *See* CPUC, R.19-01-011, Comments of Sierra Club, California Environmental Justice Alliance, and Natural Resources Defense Council on Assigned Commissioner's Amended Scoping Memo and Ruling and Phase 4A Staff Proposal, at 4–8 (Aug. 7, 2024), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M537/K639/537639341.PDF.
[6] *See id.* at 7–8.

supported and deployed.[7]

b. Multifamily residential and renter barriers

In addition to the structural and infrastructure-related constraints discussed above, multifamily buildings may have additional physical barriers to adoption of central systems in existing buildings, and building-wide electrification of all units may result in substantial increases in load that might be more likely to trigger infrastructure upsizing than that of a single-family home. This research should look into barriers specific to multifamily residential properties as distinct from single-family homes, including mixed-use buildings that have both commercial and residential units.

Further, the CEC should look into barriers, benefits, attitudes, and impacts of electrification among residential renters. Residents who rent their homes have little to no choice regarding adoption of electrification measures, as building owners make decisions about built-in appliances and systems common to the building. The CEC should gather input from renters as well as owners of multifamily residential buildings about interests and barriers related to transitioning off of gas. The CEC should also collect ideas about technologies that could potentially deliver decarbonization benefits to renters without requiring structural changes to the home, disruptive building-wide construction that could temporarily displace residents, or even approval and involvement from the building owner in some cases. For example, the CPUC is currently considering an application for the first tranche of Market Transformation Initiatives submitted by the California Market Transformation Administrator ("CalMTA"), which include window-unit room heat pumps and 120v induction cooktops and ranges.[8]

c. Up-front costs and bill impacts

Costs are a concern for customers seeking to electrify even if their new equipment does not trigger any structural or infrastructure upgrade costs. Research about equipment affordability, market share, installation costs, and availability could be useful to paint a clearer picture of how substantial these barriers are and how they can be mitigated.

Additionally, research regarding bill impacts of electrification in different utility service territories and under different rates can inform efforts to reform rates or offer new rates that can mitigate operational cost impacts of electrification. It could also be useful to gather data about public perceptions and misgivings regarding bill impacts to compare with the data about how big the impacts actually are. The research initiative could also aim to generate ideas for ways to

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[7] *See, e.g.*, CPUC, A.24-12-009, Application of Pacific Gas and Electric Company (U 39 M) on Behalf of the California Market Transformation Administrator (U-1399-E) for the Approval of the Initial Tranche of Statewide Energy Efficiency Market Transformation Initiatives (Dec. 20, 2024) (seeking approval of market transformation initiatives that would advance the market share, affordability, and availability of 120v room heat pumps that fit into windows, and 120v, battery-equipped induction cooktops and ranges right-sized to meet the space constraints of multifamily properties) ("CalMTA Application"), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M550/K500/550500737.PDF.

[8] *See id.*

minimize and mitigate these impacts.

Finally, the CEC should seek data about the age of appliances in California homes, with this data linked to the buildings' locations. This kind of data would dovetail well with the SB 1221 maps to identify areas that would be good targets for zonal electrification projects if appliance replacements are imminent in numerous homes. This may be particularly identifiable in multi-family properties where all of the units' appliances were installed at the same time and may be starting to reach end-of-life. Customers facing financial barriers to up-front costs can benefit from participating in zonal projects where their efficient, electric replacement appliances are subsidized with money that would have otherwise been spent by the utility to replace a gas distribution pipeline.

d. Resilience concerns and potential resilience benefits

The CEC should gather and analyze information regarding resilience concerns and opportunities for resilience benefits when transitioning buildings off of gas. For example, the research could look at the frequency, location, and duration of Public Safety Power Shutoff ("PSPS") events and the impacts of PSPS events on the operation of both electric and gas equipment, as well as gathering feedback on Californians' experiences with gas and electric system impacts during emergencies and equipment choices they have made in response. This research could also look at the impact of gas infrastructure to worsen emergencies such as wildfires and earthquakes.

In addition to impacts, the research should explore the potential for battery-equipped electrification technologies, such as battery-equipped induction ranges, to provide resiliency during power shutoffs, and the resiliency benefits of equipment like distributed solar generation systems and microgrids as well as the current distribution of those benefits from both geographic and demographic perspectives.

e. Customer attitudes and unfamiliarity with technologies

Customer attitudes and unfamiliarity with relevant technologies, such as heat pumps and induction cooking equipment, present a known barrier to electrification. In particular, gas cooking equipment can present a final barrier for buildings that are otherwise fully electrified—or where the owner would be willing to fully electrify space and water heating equipment—if owners or occupants are unwilling to switch to electric radiant or induction cooking equipment. Cooking anecdotally appears to be more of a sticking point for many people who have more personal or emotional connections to their cooking equipment than they do for equipment like water heaters or HVAC equipment.

Demonstration and educational offerings can be useful to address this roadblock when it comes to customers with misconceptions or a general lack of information about a given technology, removing or mitigating the preference for a gas product simply because they are already familiar with it or because gas has performed better for them than older, outdated electric products. At the workshop, one commenter noted that being able to try out an induction cooktop

for a study was very helpful in getting to know the technology, and that they chose to participate in the study after a friend converted to induction. Lending programs, such as those offered by Pacific Gas and Electric ("PG&E") and Southern California Edison ("SCE"), could be useful to this research initiative.[9] A number of entities and municipalities across California offer similar induction cooktop lending programs, such as the cities of Piedmont,[10] San Jose,[11] Morgan Hill,[12] and San Mateo,[13] among many others. The CEC should leverage any data already collected through these programs about customer attitudes, demographics, and feedback, and seek to collaborate with entities administering them to collect more data specifically tailored to inform this research initiative.

There are also cultural barriers regarding residential and commercial cooking of certain foods (common examples include tortillas and food prepared in woks, among others) with electricity rather than a flame or, in the commercial context, with specialized equipment that has historically not been available in electric models. This research initiative should seek to connect with communities for whom this is a concern and work with both professional chefs and non-professionals who prepare these foods regularly to develop solutions and ideas for products that can meet culturally diverse cooking needs without locking buildings into gas infrastructure that could otherwise be a candidate for electrification. To the extent that technological solutions already exist but are not financially accessible or available in the market, the research initiative should identify these technologies as potential targets for market support through utility energy efficiency programs, particularly in the commercial context, to support small businesses like family-owned restaurants in adopting these technologies without a disproportionate financial burden.

2. Initiative 2: Pilot Projects to Advance Gas Decommissioning

Earthjustice supports Initiative 2, which seeks to establish pilot projects for zonal decommissioning of the gas distribution system. With regard to the questions posed at the workshop on Initiative 2, Earthjustice's comments on Initiative 1 above detail many of the technical challenges for residents, renters, and businesses in the transition off of the gas system, as well as resources that may be helpful to support the transition. Research conducted pursuant to Initiative 1 will also shed light on what the most salient challenges are and what may be the

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[9] *See* SCE, Energy Efficiency Lending Programs, https://sce.myturn.com/library/; PG&E, Induction Cooktop Loaner Program, https://pge-induction.myturn.com/library/.
[10] City of Piedmont, Induction Cooktop Lending Program, https://piedmont.ca.gov/services___departments/public_works/sustainability_division/cooktop_lending_program.
[11] City of San Jose, Induction Cooktop Checkout Program, https://www.sanjoseca.gov/your-government/departments-offices/environmental-services/climate-smart-san-jos/induction-cooking.
[12] City of Morgan Hill, Induction Cooktop Loaner Program, https://www.morganhill.ca.gov/2399/Induction-Cooktop-Loaner-Program.
[13] City of San Mateo, Induction Cooktop Loaner Program, https://www.cityofsanmateo.org/4625/Induction-Cooktop-Loaner-Program.

best solutions for different groups experiencing different challenges.

Questions at the workshop highlighted third party studies previously funded by the CEC to identify and develop potential zonal electrification pilots in both Northern and Southern California.[14] The CEC should build on this existing work by moving forward with pilots identified in those studies. Staff at the workshop noted that this research initiative was established prior to the adoption of SB 1221, and that the SB 1221 mapping tools can augment the development of pilots. Earthjustice supports the use of the SB 1221 mapping tool to identify additional opportunities and potential sites for pilots, and also notes the substantial work and time underlying the pilot development contained in the studies referenced above. In addition to that work, the pilots themselves will require multi-year implementation timelines. For example, the Northern California study lays out a two-phase, five to ten-year deployment plan for pilots.[15] Given these timelines and the amount of resources and analysis that went into the studies identifying these sites, the CEC should not wait to identify new sites before allocating at least a portion of this research initiative's funds to moving forward with these already-designed pilots.

The Workshop Presentation also asks: "Besides electricity, what other clean energy sources should we consider as safe and effective fossil gas alternatives?" Although some workshop participants suggested the CEC consider pilots involving hydrogen and biomethane, the CEC should reject these suggestions because they would fail to advance the stated goals for the gas decommissioning pilots. The CEC presentation correctly notes that recent studies have shown "decommissioning paired with targeted electrification can provide net benefits to gas and electric ratepayers" and that pilots can test the technical, social, and economic feasibility of this strategy.[16] The CEC should not divert funding in its scarce budget from this vital research to research on biomethane and hydrogen strategies that do nothing to decrease dependence on gas infrastructure. If anything, these strategies threaten to prolong dependence on the gas system by requiring increased investments in gas infrastructure that could become stranded in a least-cost decarbonization scenario. Moreover, as explained below, neither hydrogen nor biomethane can reasonably be considered safe and effective replacements for fossil gas for the vast majority of methane customers.

a. *Hydrogen*

Hydrogen is not an effective substitute for fossil gas because, under the gas utilities' optimistic estimates, it could reduce the GHG emissions from gas-fired appliances by less than 7

[14] *See* CEC-500-2024-073, *An Analytical Framework for Targeted Electrification and Strategic Gas Decommissioning: Identifying Potential Pilot Sites in Northern California's East Bay Region*, (June 2024) ("Northern California Study"), https://www.energy.ca.gov/sites/default/files/2024-06/CEC-500-2024-073.pdf; RAND, *Strategic Pathways for Decommissioning of Portions of Natural Gas Infrastructure in Southern California*, (Apr. 18, 2024), https://www.laregionalcollaborative.com/past-projects (Project Closeout Meeting Presentation slides available at link).

[15] Northern California Study at 30, Figure 8: Proposed Phased Approach for the Deployment Plan.

[16] Workshop presentation at slide 20.

percent.[17] Hydrogen is a dead-end solution for decarbonizing the building sector because there is not enough biomethane from legitimate waste streams available to replace the remaining >93% of the heating value in the gas utilities' most ambitious vision for a methane/hydrogen blend.[18] Further, pursuing hydrogen as a decarbonization tool for end-uses with electric alternatives would unnecessarily increase health and safety risks and costs.[19] End-use equipment that combusts hydrogen—whether alone or in a blend with methane—emits NOx, making the use of hydrogen in combustion equipment inconsistent with the widespread transition to zero-emission technologies that is necessary for achieving health-based air quality standards in California's most polluted air basins.[20] Additionally, because hydrogen production is energy-intensive, any GHG reductions at the point of combustion are offset by the emissions of the production process, unless the hydrogen is produced by new, onsite zero-emissions generation (*i.e.*, wind or solar power) or using renewable energy credits from nearby additional renewable generation matched on an hourly basis to the time that the hydrogen production occurs.[21]

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[17] *See* CPUC, A.22-09-006, Joint Amended Application of Southern California Gas Company (U 904 G), San Diego Gas & Electric Company (U 902 G), Pacific Gas and Electric Company (U 39 G), and Southwest Gas Corporation (U 905 G) to Establish Hydrogen Blending Demonstration Projects, at 10 (Mar. 1, 2024) (seeking CPUC approval of hydrogen blending pilot projects and stating that "at a 20% hydrogen blend by volume, the typical carbon dioxide (CO_2) reduction potential of hydrogen is 6.3%."), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M526/K506/526506591.PDF.

[18] Sasan Saadat et al., *Rhetoric vs. Reality: The Myth of "Renewable Natural Gas" for Building Decarbonization*, at 11–12 (July 2020), https://earthjustice.org/wp-content/uploads/report_building-decarbonization-2020.pdf.

[19] *See* Jan Rosenow, *A meta-review of 54 studies on hydrogen heating*, Cell Reps. Sustainability, at 2, 11 (2024) https://doi.org/10.1016/j.crsus.2023.100010; Arun SK Raju, et al., *Hydrogen Blending Impacts Study*, at 7–8 (July 18, 2022) ("Safety is another major concern with hydrogen blending, mainly because hydrogen has a significantly lower ignition energy than natural gas, among other properties which also make it more hazardous . . . if the concentration of hydrogen in the gas blend is increased significantly, major changed would be required in the transmission, distribution, regulation and metering processes," and "There are several concerns with respect to the use of hydrogen-natural gas blends in household appliances . . . once concern related to potentially higher combustions temperatures with hydrogen-natural gas blends . . . [t]he resulting higher temperatures, can in turn, lead to local overheating of components, or lead to increased emissions of nitrogen oxides (NO_x)."), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M493/K760/493760600.PDF; Paul Martin et al., *A review of challenges with using the natural gas system for hydrogen*, Energy Sci. Eng. 12(10):3995–4009 (Apr. 24, 2024) ("Overall, while repurposing the natural gas system for use with hydrogen may, at first, seem appealing, the limited practicality, risks, and data gaps strongly suggest that like-for-like gas substitution provides limited benefits for increased risks . . . Considering its physical and chemical properties, hydrogen is not an effective decarbonization tool for use in homes and buildings."), http://dx.doi.org/10.1002/ese3.1861.

[20] South Coast Air Quality Management District, 2022 Air Quality Management Plan, at ES-5 (Dec. 2022), http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/final-2022-aqmp/final-2022-aqmp.pdf?sfvrsn=16.

[21] *See, e.g.*, Wilson Ricks et al., *Minimizing emissions from grid-based hydrogen production in the United States*, 18 Env't Rsch. Letters, at 7–11, Supplementary Data at 20, Supplementary Figure 19 (2023), https://iopscience.iop.org/article/10.1088/1748-9326/acacb5.

Research from the National Laboratories found that hydrogen-methane blends would leak from fossil gas pipelines at higher rates than fossil gas alone, necessitating further study and additionally detracting from GHG benefits achieved at the point of combustion due to the higher rate of methane leakage from the blend and hydrogen's global warming potential as an indirect GHG.[22] Given the costs, lack of data around critical health and safety concerns, and inability of hydrogen to decarbonize the building sector, the CEC should not expend its limited resources pursuing hydrogen strategies for this research initiative, or any research initiative targeting the building sector.

b. *Biomethane*

The CEC should also avoid investing Gas R&D dollars in biomethane pilots or strategies relying on biomethane as a "clean energy source" that can be a "safe and effective fossil gas alternative." As the CEC has acknowledged, biomethane combustion produces harmful air pollution.[23] Biomethane production methods vary depending on the feedstock, but between production and transportation, including leakage rates, it can be very emissions intensive[24] in addition to causing other environmental harms, such as water pollution. Notably, the workshop slides regarding Deferred Research Initiative 4 refer to "renewable gas from waste biomass," as a potential low-carbon fuel to explore, which could refer to a wide range of feedstocks. The CEC should not rely on a flawed assumption that biomethane derived from waste streams will inherently reduce GHGs by capturing methane that would otherwise have been released into the atmosphere.[25] Many sources of biomethane, such as biomass gasification and anaerobic digestion of manure from dairies, do not capture existing methane but instead manufacture it from various biomass sources through processes that can themselves cause environmental harms.[26] Creating markets for biomethane manufactured from these waste streams encourages continued reliance on environmentally harmful practices rather than encouraging less harmful waste management (*e.g.*, encouraging concentrated animal feeding operations ("CAFOS") to grow their herds in response to revenue streams from biomethane produced from manure lagoons, which cause harmful localized air and water pollution but could be avoided with smaller herds). The CEC must take into account lifecycle environmental impacts associated with

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[22] Pipeline Blending CRADA: A HyBlend Project Overview, Sandia National Laboratories, Pacific Northwest National Laboratories, National Renewable Energy Laboratory, and Argonne National Laboratories, H2IQ Hour, at slide 39 (Oct. 26, 2023), https://www.energy.gov/sites/default/files/2023-11/h2iqhour-10262023.pdf.

[23] *See* CEC, *Air Quality Implications of Using Biogas to Replace Natural Gas in California*, (May 2020), https://www.energy.ca.gov/sites/default/files/2021-05/CEC-500-2020-034.pdf.

[24] Emily Grubert, *At scale, renewable natural gas systems could be climate intensive: the influence of methane feedstock and leakage rates*, 15 Environ. Res. Lett. (2020), https://doi.org/10.1088/1748-9326/ab9335.

[25] *See id.*

[26] Sasan Saadat et al., *Rhetoric vs. Reality: The Myth of "Renewable Natural Gas" for Building Decarbonization*, at 10 (July 2020), https://earthjustice.org/wp-content/uploads/report_building-decarbonization-2020.pdf.

biomethane production and combustion before considering biomethane strategies for any of its Gas R&D research initiatives, including pilots for Initiative 2 and drop-in fuels for Deferred Initiative 4.

3. Initiative 3: Networked Geothermal Heat Pumps

Earthjustice supports the CEC exploring feasibility of networked geothermal heat pumps in California. Networked geothermal systems are a promising strategy for scalable, clean heating and cooling systems that can make efficient use of waste heat and can offer workforce development and opportunities for pipefitters and other contractors who have historically worked on fossil gas systems. Several states and utilities are studying and implementing networked geothermal systems, including Iowa,[27] Massachusetts,[28] New York,[29] Minnesota,[30] Illinois,[31] Oklahoma,[32] Maryland,[33] and Pennsylvania.[34] In exploring possibilities for networked geothermal systems in California, the CEC should build off of the research and experiences of

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[27] *See* U.S. Dept. of Energy, *EERE Success Story—Iowa Geothermal System Creates Jobs, Reduces Emissions in Rural Community* (Nov. 6, 2013), https://www.energy.gov/eere/success-stories/articles/eere-success-story-iowa-geothermal-system-creates-jobs-reduces; Green Up West Union, *About Green Up West Union*, https://greenupwestunion.com/about-green-up-west-union/.

[28] *See* City of Framingham, *Eversource Geothermal Pilot Program*, https://www.framinghamma.gov/3416/Geothermal-Pilot-Program.

[29] New York Dept. of Public Service, *PSC Adopts Initial Utility Thermal Energy Networks Rules* (July 18, 2024) (explaining Public Service Commission's adoption of rules to create fair market access for utility owned thermal energy networks, among other things, and noting that twelve pilot projects are in active development), https://dps.ny.gov/news/psc-adopts-initial-utility-thermal-energy-networks-rules; New York State Energy Research and Development Authority, *Thermal Energy Networks*, (identifying NYSERDA resources for thermal energy networks, including funding, case studies, and a fact sheet explaining the community benefits of thermal energy networks) https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Communities/High-Impact-Actions/Toolkits/Thermal-Energy-Networks.

[30] *See* Frank Jossi, *Networked geothermal is catching on in Minnesota. New legislation aims to push the technology further*, Canary Media (Apr. 5, 2024), https://www.canarymedia.com/articles/enn/networked-geothermal-is-catching-on-in-minnesota-new-legislation-aims-to-push-the-technology-further; Press Release, *The Heights Awarded $4.7 Million for Geothermal Energy System*, City of St. Paul, Minnesota (Mar. 27, 2024), https://www.stpaul.gov/news/heights-awarded-47-million-geothermal-energy-system.

[31] Press Release, *Blacks in Green Selected for Funding to Deploy $9.9 Million Dollar Community Geothermal Heating and Cooling Initiative in its 2nd Year* (Dec. 17, 2024), https://www.blacksingreen.org/press-releases/ifa-financing-approval-for-gejc-3379j.

[32] *See* University of Oklahoma, *Geothermal Energy Research is a Win for OU and Oklahoma* (Aug. 31, 2022), https://www.ou.edu/research-norman/news-events/2022/geothermal-energy-research-is-a-win-for-ou-and-oklahoma.

[33] *See* H.B. 0397 (Md. 2024) (requiring large gas companies to develop plans for thermal energy network pilots and submit them to the Public Service Commission by July 1, 2025).

[34] E3, *Business Diversification Study: Identifying Opportunities for Philadelphia Gas Works to Thrive in a Lower-Carbon Future*, at 6, 22–24 (Dec. 2021) (recommending Philadelphia Gas Works undertake a feasibility study for networked geothermal systems in Philadelphia and explaining benefits of the technology), https://www.phila.gov/media/20211207134817/PGW-Business-Diversification-Study-2021-12.pdf.

these existing efforts. For example, Massachusetts-based organization Home Energy Efficiency Team ("HEET") maintains a Geothermal Network Databank to facilitate data sharing regarding geothermal networks.[35]

To the extent that Initiative 3 seeks to identify potential sites for near- to medium-term networked geothermal pilots, it should also use the SB 1221 maps to fast-track feasibility studies and outreach in areas that are identified as candidates for gas system pruning.

4. Deferred Initiative 4: Scaling Technology to Decarbonize California's Gas Sector

Earthjustice appreciates that the CEC is collecting comments on Initiative 4 even though it has been deferred to the 2026–2027 Budget Plan. Earthjustice supports the CEC's efforts to find solutions to reduce GHG emissions from hard-to-electrify industrial use cases. However, as discussed above, the CEC should be wary of lifecycle impacts of fuels like biomethane and hydrogen, which industry participants often greenwash as "clean fuels" despite the environmental impacts of their production. Given the CEC's commitment to centering equity in these research initiatives, as well as Initiative 4's goals of reducing criteria air pollutants in addition to GHGs and reducing impacts to ESJ communities, including Tribal communities, it is critical that this initiative not be used to advance technologies or fuels whose production or use harm those already overburdened communities.

While the workshop presentation appeared to focus on market transformation projects to decarbonize use cases that cannot currently be feasibly electrified, Earthjustice encourages the CEC to use this research initiative to advance industrial electrification technologies that need market support as well. The market transformation focus of Initiative 4 is well suited to supporting near-term electrification of lower-temperature process heat in industrial food and beverage, pulp and paper, chemicals, and some glass facilities.[36] These industries are prime for electrification because they generally operate with lower process heat temperatures, and more use cases can demonstrate cost savings and encourage widespread adoption of industrial heat pumps. Deploying zero-emission technologies like industrial heat pumps and electric boilers in conjunction with thermal energy storage and on-site renewable generation can deliver significant decarbonization benefits. Initiative 4 could fund pilots to deploy those types of industrial systems and would gain operational insights, as well as information on ways to lower energy costs and mitigate electric bill impacts for industrial users through load-shifting to off-peak hours. This kind of data can help inform utilities in developing rates designed to maximize the grid benefits of these technologies while reducing costs for industrial users. In addition, the CEC should invest in developing feasible electrification options on a longer timeline for industrial use

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[35] HEET, *Geothermal Network Databank*, https://www.heet.org/databank.

[36] *See, e.g.*, ACEEE, *Electrification of U.S. Industry: Applying Lessons from Denmark*, at 7 (Dec. 2024), https://www.aceee.org/white-paper/2024/12/electrification-us-industry-applying-lessons-denmark; Jeffrey Rissman, *Decarbonizing Low-Temperature Industrial Heat in the U.S.* (Oct. 2022), https://energyinnovation.org/wp-content/uploads/Decarbonizing-Low-Temperature-Industrial-Heat-In-The-U.S.-Report-2.pdf.

cases that do not currently have electric alternatives.

Thank you for your consideration of these comments.

Sincerely,

Rebecca Barker
Senior Associate Attorney
Earthjustice