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*Comment Received From: Teresa Cheng*  
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**Industrious Labs, Earthjustice, Sierra Club, The 2035 Initiative at UCSB Comments on Draft Scoping Order for 2026 IEPR**

Please see the attached comments on the 2026 IEPR Update Draft Scoping Order from Industrious Labs, Earthjustice, Sierra Club, and The 2035 Initiative at UC Santa Barbara.

*Additional submitted attachment is included below.*



**EARTHJUSTICE**



**Industrious  
Labs**



**SIERRA  
CLUB**

March 25, 2026

*Submitted Electronically*

California Energy Commission  
Docket Number 26-IEPR-01  
715 P Street  
Sacramento, CA 95814-5512

**Re: Comments on the Draft Scoping Order for the 2026 Integrated Energy Policy Report Update (26-IEPR-01)**

Dear Chair Hochschild, Vice Chair Gunda, and Commissioner Gallardo,

On behalf of the undersigned organizations, we appreciate the opportunity to comment on the California Energy Commission's ("CEC") Draft Scoping Order for the 2026 Integrated Energy Policy Report ("IEPR") Update. In these comments, we recommend that the electricity demand forecast include assumptions about industrial electrification demand to properly account for current and anticipated zero-emissions standards that are spurring industrial electrification. We also support advancing assessments on how geothermal development in California can directly decarbonize industrial process heat. We are concerned that without properly assessing industrial electrification demands and geothermal opportunities, the IEPR will not adequately serve decision-makers or the public who rely on it for critical decisions on California's diverse energy needs.

**I. The Electricity Demand Forecast Should Include Conversion of Existing Industrial Process Heat from Combustion-Based to Electric**

Industrial electrification is a necessary strategy for achieving the state's ambitious climate and air quality goals. California's industrial sector is the second-largest source of climate-warming emissions and a major contributor to the state's air quality crisis, releasing significant amounts of criteria air pollutants. However, there is growing momentum to electrify low- to medium-temperature industrial heat processes that heavily rely on fossil-fuel-fired boilers. As the state with the most industrial boilers and the largest manufacturing base in the country, California has significant underutilized electrification potential.<sup>i</sup> Over 1.2 million workers producing the everyday goods we love and depend on, such as coffee, medicines, bread, paper, and glass, have helped make the state's economy the fourth largest in the world.<sup>ii</sup> There is growing interest in electrifying process heat to maintain the state's competitiveness while meeting climate and air quality commitments.

Opportunities for near-term electrification in low- and medium-temperature heating applications exist across nearly every county in California. The electricity demand forecast should account for anticipated increases in electricity demand from such transitions. For example, electrifying three key industrial sectors in California (i.e., food processing, paper manufacturing, and chemical manufacturing) without load shifting could result in a combined demand of 21 GW during system peak hours in the summer.<sup>iii</sup>

**A. California’s air quality crisis and existing air regulations have already spurred industrial electrification.**

Industrial facilities face increasingly stringent air regulations, which are likely to result in higher electricity demand across California. As of last month, California had 40 counties in nonattainment with federal air quality standards for all criteria pollutants out of 58 counties in total.<sup>iv</sup> Air Quality Management Districts are increasingly considering zero-emissions standards in their rulemaking processes in order to meet National Ambient Air Quality Standards (“NAAQS”) and avoid severe sanctions and consequences for the state. For example, at a recent Board Meeting, South Coast Air Quality Management District (“SCAQMD”) staff highlighted substantial State Implementation Plan (SIP) obligations and the significant emission reductions needed to comply with the NAAQS.<sup>v</sup> Additionally, as SCAQMD explained in 2022, the only way for California’s most polluted air basin to achieve the required emission reductions is “through extensive use of zero-emissions technologies across all stationary and mobile sources.”<sup>vi</sup> Facilities facing compliance costs have a strong incentive to switch to electric industrial heat pumps, thermal batteries, and resistance heating. California must plan for the anticipated increase in electricity demand as more combustion equipment transitions to zero-emissions alternatives.

SCAQMD’s severe air quality crisis has created strong demands for electric solutions across the region, and the agency has responded to this crisis with increasingly ambitious rulemakings. In 2023, the Air District took a pivotal first step towards industrial electrification by adopting Proposed Amended Rule (“PAR”) 1153.1, a zero-emissions standard to limit air pollution from large commercial ovens.<sup>vii</sup> PAR 1153.1 was the nation’s first zero-emissions standard for stationary sources of pollution, specifically targeting emissions from food and beverage manufacturing.<sup>viii</sup> The recent technology review demonstrates that the technology for the zero-emissions requirements is technologically feasible and represents the Best Available Retrofit Control Technology (“BARCT”) standards.<sup>ix</sup> PAR 1153.1 is delivering measurable progress; for example, 66% of the smokehouses covered by this regulation are now zero-emissions.

A year after PAR 1153.1 was adopted, SCAQMD adopted PAR 1146.2, which will require zero-emissions transitions for over 1 million pieces of equipment across the region. The regulation is the country’s first zero-emissions rule for industrial boilers and water heaters; it is expected to eliminate 5.6 tons of NOx pollution per day, equivalent to the emissions from half of all

passenger cars in the region.<sup>1</sup> Both regulations demonstrate a growing trend, which is increased support for industrial electrification as a means to meet health-based air quality standards.

## **B. The IEPR Update should account for the growing demand and interest in industrial electrification.**

The IEPR electricity demand forecast should include a scenario that accounts for a regulatory trajectory. Air Districts continue to consider and pursue additional regulations targeting sources of criteria air pollutants across the industrial sector, specifically from fossil fuel-fired industrial boilers, which are major sources of NO<sub>x</sub>, SO<sub>2</sub>, and particulate matter, which contribute to cardiovascular and pulmonary illnesses.<sup>2</sup> For example, last year, the Bay Area Air Quality Management District (“BAAD”) considered including Regulation 9 Rule 7 (“Rule 9-7”) in the Strategic Plan Rule Development Schedule.<sup>3</sup> Amending Rule 9-7 to accelerate the transition to zero-emissions industrial heating technologies would bring much-needed relief to some of the most polluted Bay Area communities by reducing health-harming pollution from about 2,000 boiler units. Over 20 different environmental organizations, community-based groups, and nurses associations supported prioritizing Rule 9-7 at BAAD. Although the rule was not included in last year’s schedule, the CEC should anticipate that Rule 9-7 will advance, and plan accordingly.

Furthermore, SCAQMD is continuing to advance its efforts to clean up industrial equipment by working on rulemaking for PARs 1146 and 1146.1 (“Rules”).<sup>4</sup> The Rules’ scope will allow the Air District to clean up nearly 1,900 boilers, steam generators and process heaters. Notably, 73% of units regulated under the Rules are located within, or within one mile of, communities identified as disadvantaged by CalEnviroScreen; hence, the need and desire for these rules to prioritize zero-emissions standards. The initial BARCT assessment for the Rules showed that zero emissions is technologically feasible, but there are serious cost constraints.<sup>5</sup> For example, the fuel switch premium for electric boilers accounted for more than 94% of the total lifetime costs.<sup>6</sup>

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<sup>1</sup> SCAQMD, “Proposed Amended Rule 1146.2 Control of Oxides of Nitrogen from Large Water Heaters, Small Boilers and Process Heaters,” June 7, 2024, [https://www.aqmd.gov/docs/default-source/rule-book/recent-rules/r1146\\_2-060724.pdf?sfvrsn=8](https://www.aqmd.gov/docs/default-source/rule-book/recent-rules/r1146_2-060724.pdf?sfvrsn=8).

<sup>2</sup> Evergreen Collaborative and Sierra Club, *Embracing Clean Heat: Opportunities for Zero-Emission Industrial Boilers*, (May 2025), <https://www.sierraclub.org/sites/default/files/2025-05/embracing-clean-heat-report.pdf>.

<sup>3</sup> BAAD, “Regulation 9 Inorganic Gaseous Pollutants Rule 7 Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters,” [https://www.baaqmd.gov/~/.media/dotgov/files/rules/reg-9-rule-7-nitrogen-oxides-and-carbon-monoxide-from-industrial-institutional-and-commercial-boiler/documents/rg0907.pdf?rev=ab95f36c2dd146528f1cf3c10596bce3&sc\\_lang=en](https://www.baaqmd.gov/~/.media/dotgov/files/rules/reg-9-rule-7-nitrogen-oxides-and-carbon-monoxide-from-industrial-institutional-and-commercial-boiler/documents/rg0907.pdf?rev=ab95f36c2dd146528f1cf3c10596bce3&sc_lang=en).

<sup>4</sup> SCAQMD, “Proposed Amended Rule 1146/1146.1,” <https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1146-1146-1>.

<sup>5</sup> SCAQMD, “Proposed Amended Rules 1146 & 1146.1 Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters Working Group Meeting #3,” February 2026, [https://www.aqmd.gov/docs/default-source/rule-book/proposed-rules/par-1146-1146.1/par-1146\\_wgm-3-presentation.pdf?sfvrsn=2bc6697e\\_2](https://www.aqmd.gov/docs/default-source/rule-book/proposed-rules/par-1146-1146.1/par-1146_wgm-3-presentation.pdf?sfvrsn=2bc6697e_2).

<sup>6</sup> *Ibid.* at 35.

Due to their high efficiency, the fuel switch premium for industrial heat pumps was lower and accounted for 25-49% of the total lifetime costs.<sup>7</sup> Addressing these cost barriers will require action on multiple fronts, including new electricity rate offerings for industrial customers to better incentivize grid-beneficial electrification that is already under active consideration at the California Public Utilities Commission (“CPUC”).<sup>8</sup> However, as the 2022 Air Quality Management Plan made abundantly clear, all sources of pollution in the Air Basin must be zero-emissions to achieve the required NOx reductions, which is why demand forecasting of increased industrial electricity load in the IEPR is critical.

Accurate accounting of anticipated industrial electricity demand is vital for California’s energy planning. By incorporating more accurate assumptions on industrial electrification demand into the IEPR, grid planners, utilities, and regulators will be better informed about how to best prepare for and meet climate and air quality commitments, as well as advance the deployment of clean industrial equipment. We recommend that, as part of the Scoping Order for the 2026 IEPR Update, the CEC should coordinate with CARB and Air Districts to inventory industrial combustion equipment subject to current and anticipated rules, and model the associated electricity demand. For instance, the IEPR can include an industrial electrification scenario in the 15-year electricity demand forecast, explicitly modeling load growth from industrial equipment switching driven by air quality compliance requirements in Air Districts currently considering and pursuing rulemaking.

## **II. Geothermal Resources Assessment Should Include the Potential to Decarbonize Industrial Process Heat**

We strongly support the Lead Commissioner’s proposal to include California Geothermal Resources in the 2026 IEPR Update, specifically focusing on the challenges and opportunities for geothermal development. To fully capture California’s geothermal potential, we recommend that this scope explicitly encompass both electricity generation and direct-use applications for decarbonizing industrial process heat.

Whereas conventional geothermal systems rely on rare hydrothermal reservoirs, emerging next-generation geothermal technologies can harness heat from the earth in a far broader range of locations across California for application in low- and medium-temperature industrial processes. With recent advances in deep drilling, directional boring, and wellfield design, these systems are becoming increasingly cost-competitive and ready for deployment. Next-generation geothermal systems offer several advantages for industry, including around-the-clock heat, zero-emissions, low and predictable operating costs, and heat that does not rely on natural gas or large amounts of electricity. This lowers exposure to commodity price fluctuations, reduces load on the grid (removing the need for costly grid upgrades), and improves energy resilience.<sup>x</sup>

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<sup>7</sup> *Ibid.* at 38.

<sup>8</sup> California Public Utilities Commission, *Decision Adopting Guidelines for Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company on Demand Flexibility Rate Design Proposals*, Decision 25-08-049, (August 28, 2025), <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M578/K182/578182496.PDF>.

Geothermal energy for industrial heat must consider the potential local and community impacts to ensure safe deployment. Community members should be consulted and have the opportunity to engage meaningfully in the potential development of geothermal in their communities. Furthermore, any future deployment should address seismic risks, as well as the impacts on air and water quality.

**A. Geothermal energy for direct heating has significant potential to advance the decarbonization of California’s industrial sector.**

Direct-use geothermal refers to the use of geothermal energy for heat without first converting it to electricity. Currently, many industrial facilities rely on burning fossil fuels in combustion boilers to generate low- to medium-temperature heat below 200°C (delivered via steam, hot water, or hot air) that is essential for manufacturing processes. But just as geothermal can be used to make steam to spin a turbine or hot water to heat a building, it can also supply heat for these low-to-medium-temperature heat industrial processes.<sup>xi</sup>

California is one of the most promising sites in the world for industrial applications of geothermal energy. It has abundant geothermal resources, both developed and undeveloped,<sup>xii</sup> and our industrial sector also uses large amounts of heat in the low- to medium-temperature range suitable for geothermal direct use. A recent report estimates that large manufacturing facilities in California emit approximately 5.6 MTCO<sub>2</sub>e annually from process heat at temperatures technically compatible with geothermal direct heat supply.<sup>xiii</sup> Although there are not yet known applications of geothermal supplying industrial heat in California, there are proven examples of geothermal direct use for industry in Nevada, Arizona, and New Zealand.<sup>xiv</sup>

**B. The IEPR Update should include consideration of the advantages of direct-use geothermal.**

Direct-use geothermal offers a particularly valuable off-grid path to decarbonization for regions facing grid capacity constraints, including those also considering more stringent air quality regulations like in Southern California. By sourcing heat from a local energy resource, facilities can reduce pollution without expensive grid upgrades or adding new load to an already-constrained electrical system. Replacing gas-fired boilers with zero-emissions geothermal heat provides a non-combustion alternative that could help California industry comply with air quality standards without waiting for costly grid infrastructure improvements.

Geothermal energy can also provide significant economic benefits for California businesses. When a power plant uses geothermal steam, only about 10-12% of that energy is converted into electricity,<sup>xv</sup> and the remainder is dissipated through expensive cooling towers before fluid is re-injected underground. A co-located industrial facility could capture this otherwise-wasted thermal energy at very low cost, creating an economic benefit for both the power plant and the industrial user. Because geothermal carries very low operating costs, it also protects manufacturers from the price volatility that characterizes natural gas and electricity markets, a meaningful advantage for industries operating on thin margins.

As part of the 2026 IEPR Update process, we recommend the CEC utilize spatial data to identify high-potential zones for direct-use development by overlaying California's geothermal resource maps against CARB's Greenhouse Gas Reporting Program (GHGRP) data on industrial facilities with significant process heat demand. The chemicals, pulp and paper, and food and beverage sectors alone account for roughly 90% of California's industrial process heat needs under 200°C.<sup>xvi</sup>

We further recommend that the CEC include direct-use geothermal for industrial process heat as a dedicated topic in its geothermal workshop, with participation from industrial end-users, geothermal developers, air regulators, labor organizations, environmental justice advocates, and direct-use geothermal technical experts. This analysis and public process with interested and affected participants would generate evidence needed not only for the IEPR itself, but for CARB's forthcoming 2027 Scoping Plan Update, which will require quantitative support for available zero-emissions pathways for the industrial sector.

### **III. Summary of Recommendations**

In sum, we urge the CEC to incorporate the following into the Scoping Order for the 2026 IEPR Update:

1. Model industrial electrification load growth: Coordinate with CARB and Air Districts to inventory industrial combustion equipment subject to current and anticipated zero-emissions rules and include an industrial electrification scenario in the 15-year electricity demand forecast that explicitly models load growth from air quality compliance-driven equipment transitions.
2. Expand the geothermal assessment to include direct-use applications: Include analysis of direct-use geothermal for industrial process heat as a complementary pathway to geothermal for electricity generation, and conduct spatial analysis overlaying California's geothermal resource maps against CARB's GHGRP data to identify high-potential zones for direct-use development, prioritizing industrial sectors with low to medium temperature heat needs under 200°C, including the chemicals, pulp and paper, and food and beverage sectors. As part of this assessment, we recommend dedicating part of the geothermal workshop time to discuss and assess industrial direct-use applications.

### **IV. Conclusion**

The 2026 IEPR Update will shape infrastructure planning, regulatory action, market signals, and investment across California for years to come. We urge the Commission to adopt the recommendations set forth in these comments to advance California's climate goals while protecting the health and economic well-being of communities that depend on clean air and affordable energy.

Sincerely,

Teresa Cheng  
California Director, Industrious Labs

Vanessa Rivas Villanueva  
Senior Research and Policy Analyst, Earthjustice

Leah Stokes  
Associate Professor, UC Santa Barbara Policy Director, The 2035 Initiative

Kartik Raj  
Staff Attorney, Sierra Club

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<sup>i</sup> CARTO Builder, “National Map of Industrial Boilers,” 2020 Emissions Data, <https://clausa.app.carto.com/map/07d7be74-69f7-4a7f-9cd7-bb92a84b5db3?lat=33.928538&lng=-117.095029&zoom=4>.

<sup>ii</sup> Governor Gavin Newsom, “California is now the 4th largest economy in the world,” April 23, 2025, <https://www.gov.ca.gov/2025/04/23/california-is-now-the-4th-largest-economy-in-the-world/>.

<sup>iii</sup> *Unlocking Industrial Electrification in California: Strategies for Electricity Rate Design and Policy Reform*, ACEEE, Industrious Labs, Sierra Club, and Synapse Energy Economics, December 2025, <https://cdn.sanity.io/files/xdjws328/production/fb6c554ca1bc47bf39191326669b6d45375bc09e.pdf>.

<sup>iv</sup> EPA, Current Nonattainment Counties for All Criteria Pollutants, February 28, 2026, <https://www3.epa.gov/airquality/greenbook/ancl.html>.

<sup>v</sup> South Coast Air Quality Management District, Background on State Implementation Plan Requirements, (February 2026), [https://www.aqmd.gov/docs/default-source/agendas/governing-board/2026/2026-feb6-021.pdf?sfvrsn=78e0697e\\_5](https://www.aqmd.gov/docs/default-source/agendas/governing-board/2026/2026-feb6-021.pdf?sfvrsn=78e0697e_5).

<sup>vi</sup> South Coast Air Quality Management District, 2022 Air Quality Management Plan, (December 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>.

<sup>vii</sup> SCAQMD, “Proposed Amended Rule 1153.1 Emissions of Oxides of Nitrogen from Commercial Food Ovens,” <https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1153-1>.

<sup>viii</sup> Adrian Martinez, “I’ll Take the Muffin, But Hold the Methane,” Earthjustice, July 31, 2023, <https://earthjustice.org/experts/adrian-martinez/ill-take-the-muffin-but-hold-the-methane>.

<sup>ix</sup> SCAQMD, “Technology Check-In for Rule 1153.1 – Emissions of Oxides of Nitrogen from Commercial Food Ovens,” February 2026, [https://www.aqmd.gov/docs/default-source/rule-book/proposed-rules/1153-1/1153-1-technology-check-in.pdf?sfvrsn=a05c6a7e\\_4](https://www.aqmd.gov/docs/default-source/rule-book/proposed-rules/1153-1/1153-1-technology-check-in.pdf?sfvrsn=a05c6a7e_4).

<sup>x</sup> Nathan Mariano et al., *Unlocking Next-Generation Geothermal Heat for Industry* (The 2035 Initiative, UC Santa Barbara July 2025),

<https://static1.squarespace.com/static/61dc554a6c6b0048e8e90538/t/686c8053d6ca854834a13004/1751941209586/The+2035+Initiative+%7C+Unlocking+Next-Generation+Geothermal+Heat+for+Industry.pdf>.

<sup>xi</sup> *Id.*

<sup>xii</sup> Clean Air Task Force, *Unlocking California's Geothermal Potential: A Strategic Opportunity for Clean, Firm Power*, (June 2025), <https://cdn.catf.us/wp-content/uploads/2025/06/23162128/california-geothermal-report.pdf>.

<sup>xiii</sup> ACEEE et al., *Unlocking Industrial Electrification in California*, 3.

<sup>xiv</sup> ThinkGeoEnergy, *Utilising Geothermal Energy for Dehydrating Onions – A Unique Plant in Fernley, Nevada*, (September 2, 2019), <https://www.thinkgeoenergy.com/utilising-geothermal-energy-for-dehydrating-onions-a-unique-plant-in-fernley-nevada/>; ThinkGeoEnergy, *Copper Extraction Project in Arizona Aims to Harness Geothermal Heating*, (May 13, 2024), <https://www.thinkgeoenergy.com/copper->

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[extraction-project-in-arizona-aims-to-harness-geothermal-heating/](#).; ThinkGeoEnergy, *New Zealand Tissue and Toilet Paper Company Shifts to 100% Geothermal*, (March 12, 2025), <https://www.thinkgeoenergy.com/new-zealand-tissue-and-toilet-paper-company-shifts-to-100-geothermal/>.

<sup>xv</sup> Zarrouk & Moon, "Efficiency of geothermal power plants: A worldwide review", *Geothermics*, (July 2014), <https://www.sciencedirect.com/science/article/abs/pii/S0375650513001120>.

<sup>xvi</sup> ACEEE et al., *Unlocking Industrial Electrification in California*, 16.