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Sierra Club, CBE, and CEJA Comments on SB 100 Demand Scenarios Workshop

Additional submitted attachment is included below.

August 21, 2024

California Energy Commission
715 P Street
Sacramento, CA 95814

Submitted online via comment submittal portal

RE: Sierra Club, Communities for a Better Environment, and California Environmental Justice Alliance Comments on Senate Bill 100 Demand Scenarios Workshop

Dear Commissioners,

On behalf of Sierra Club, Communities for a Better Environment ("CBE"), and California Environmental Justice Alliance ("CEJA") and our more than half a million members and supporters statewide, thank you for the opportunity to comment on the California Energy Commission's ("CEC" or "Commission") 2025 Senate Bill ("SB") 100 Demand Scenarios Workshop. We continue to support California's goal to achieve a 100% renewable and zero-carbon electricity sector by 2045[1] or earlier and to support resource planning that will lead to substantial reductions in the need for gas plants in local capacity areas by 2035.[2]

The demand scenarios represent a critical opportunity to reduce or flatten future demand through beneficial electrification of the transportation, buildings, and industrial sectors through demand flexibility ("DF"), distributed energy resources ("DER"), and programmatic incentives. With these comments, the Sierra Club, CBE, and CEJA make the following recommendations to the Commission regarding its planned land use approach:

[1] Cal. Pub. Util. Code § 454.53.
[2] Cal. Pub. Util. Code § 454.57(e).

1. Adjust hydrogen demand projects to reflect climate safeguards and lower the projected hydrogen demand in the Policy Scenario and Policy Scenario (Augmented DER & DF) to reflect limited end uses for this energy-intensive and expensive resource;

2. The Energy Efficiency and Fuel Substitution Findings highlight the demand reduction benefits of these measures but overlook the considerable additional near-term reliability and non-energy benefits of these resources;

3. The Commission should maximize distributed energy resources, like rooftop solar, battery storage, and front-of-meter resources to decrease overall electric demand and reduce reliance on fossil fuels; and

4. The Commission should incorporate measures to expand Vehicle-to-Grid potential by ensuring utilities plan the substation and grid infrastructure improvements to keep up with electrification end uses.

The above recommendations will ensure that the 2025 SB 100 Joint Agency Report ("SB 100 Report") reflects both the requirements of SB 100 as well as other state climate and environmental law.

1. Adjust Hydrogen Demand Projects to Reflect Climate Safeguards and Lower the Projected Hydrogen Demand in the Policy Scenario and Policy Scenario (Augmented DER & DF) to Reflect Limited End Uses

The Commission should incorporate hydrogen safeguards into every scenario and consider at least one scenario that considers only very limited end-uses of hydrogen. Hydrogen production methods, transportation options, and end-uses vary widely in their potential environmental, climate, and cost impacts, and nearly all these critical details were glossed over at the Demand Scenarios Workshop. By all accounts, hydrogen production, transportation and end use will be energy-intensive and expensive compared to alternate resources. Accordingly, Sierra Club, CBE, and CEJA urge the Commission to incorporate low hydrogen demand into at least one of its demand scenarios so that the Commission can evaluate the tradeoffs between a hydrogen-heavy pathway and an alternative pathway that relies on limited end-uses of hydrogen.

A. The Commission should include climate safeguards in every SB 100 scenario to ensure greenhouse gas benefits.

On hydrogen production, the SB 100 Report should only consider electrolytic hydrogen produced exclusively by renewable energy following the three-pillar framework below. The

Commission's presentation noted moderate and higher levels of hydrogen driving electrolysis.[3] However, it is not clear from the presentation whether the Commission is projecting that all hydrogen planning is likely to be produced by electrolysis, but this is critical to ensuring that hydrogen production does not increase overall greenhouse gas emissions. Advocates have defined three pillars to ensure that green hydrogen does not result in an increase in economy-wide emissions:[4]

1. Additionality: The renewable energy (e.g., wind, solar power) used to produce hydrogen should be new, not existing; this protects against a situation where hydrogen producers buy up existing renewable energy capacity, competing with other beneficial electrification end uses, and trigger incremental gas generation, thereby decreasing the overall greenhouse gas benefits. Given that California needs record-breaking renewable energy deployment to meet SB 350 and SB 100 goals, this is a critically important consideration.

2. Regional Alignment: The renewable energy used to produce green hydrogen needs to connect to the same grid region to align with production; this prevents a situation where California gas plants might be used to produce hydrogen while utilities claim credit from out-of-state renewables. This ensures that California investments in hydrogen produce local air quality improvements.

3. Time Matching: This requirement ensures that hydrogen does not place any additional demand on the grid that cannot be met outside of the hours when renewables are generating electricity; without this protection, hydrogen could be produced using output from gas plants, thereby eliminating the greenhouse gas benefits of electrolytic hydrogen fuel.

Without these protections, electrolytic hydrogen production could result in considerably more greenhouse gas emissions than using hydrogen derived from fossil-fuels.[5] Environmental justice communities have developed principles regarding hydrogen that expand beyond these three pillars, and which the SB 100 Report should consider in its hydrogen assumptions.[6]

Slide 9 from the Demand Scenarios Project Inputs suggests that the Commission has not incorporated a requirement that the modeled hydrogen demand is met exclusively by electrolytic

[3] CEC, *Demand Scenarios Project, Inputs for Senate Bill 100 Analysis* at Slide 7 (Aug. 7, 2024), *available at* https://efiling.energy.ca.gov/GetDocument.aspx?tn=258362&DocumentContentId=94378 [hereinafter "CEC Demand Scenarios Project Inputs"].
[4] *See* PSE Healthy Energy, *Green Hydrogen Proposals Across Cal.* at 76 (May 21, 2024), *available at* https://www.psehealthyenergy.org/wp-content/uploads/2024/05/Green-Hydrogen-Proposals-Across-California.pdf.
[5] *Id.* (citing Ricks, W., Xu, Q., & Jenkins, J. D. (2023). Minimizing Emissions from Grid-Based Hydrogen Prod. in the United States. *Env't Rsch. Letters*, 18(1), 014025, *available at* https://iopscience.iop.org/article/10.1088/1748-9326/acacb5).
[6] Asian Pac. Env't Network et al., *Equity Principles for Hydrogen* (Oct. 10, 2023), *available at* https://www.cbecal.org/wp-content/uploads/2023/10/Equity-Hydrogen-Initiative-Shared-Hydrogen-Position-1.pdf.

hydrogen, and it includes a footnote describing that "the [hydrogen] electrolysis load is not included in the hourly 8760 loads by planning area for any Demand Scenario" but will rather be considered as a "separate input into the [production cost model] which will determine the hourly impacts through the dispatch process."[7]

Given that the primary motivation behind SB 100 is to mitigate the worst effects of climate change, the Commission needs to incorporate the aforementioned guardrails into every SB 100 scenario, including its demand scenarios.

B. Lower the projected hydrogen demand in the Policy Scenario and Policy Scenario (Augmented DER & DF) to reflect limited end uses for this energy-intensive and expensive resource.

Hydrogen is an expensive fuel, even after accounting for federal and state incentives, and the Commission should consider at least one demand scenario that models limited end uses of hydrogen as a point of comparison. Currently, the Commission's demand scenarios include only two levels of hydrogen demand: moderate and high.[8] The high scenario incorporates some additional hydrogen demand from medium- and heavy-duty trucking.[9]

Use of electrolytic hydrogen should be limited to certain industries that cannot be readily electrified. For example, Sierra Club supports the decarbonization of industries that currently rely on carbon-intensive fuels (including gray or blue hydrogen) by switching to green hydrogen. However, there are many industries where electrification – rather than hydrogen fuel switching – represents the least-cost pathway to decarbonization, including buildings, light- and medium-duty vehicles, and power plants. These end uses would require dedicated hydrogen transportation and combustion infrastructure to avoid pipe and appliance embrittlement, leakage, and safety risks.[10] Hydrogen combustion in power plants poses a clear risk, as hydrogen combustion technology can currently only incorporate a 5-20% hydrogen feedstock with remaining volume coming from methane; hydrogen combustion turbines capable of burning 100% hydrogen are not yet commercially available.[11] Hydrogen-methane blended power plants retain most of the greenhouse gas and air pollutant emissions as gas plants as methane remains the main underlying fuel. Frontline communities should not be subjected to these impacts under the guise of climate benefits.

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[7] CEC Demand Scenarios Project Inputs at Slide 9.
[8] *Id.* at Slide 7.
[9] *Id.*
[10] Energy Transitions Comm'n, *Making the Hydrogen Econ. Possible: Accelerating Clean Hydrogen in an Elec. Econ.* at 20-21 (Apr. 2021), *available at* https://energy-transitions.org/wp-content/uploads/2021/04/ETC-Global-Hydrogen-Report.pdf.
[11] Cara Fogler, *Hydrogen: Future of Clean Energy or a False Sol.?*, Sierra Club (Jan. 4, 2022), *available at* https://www.sierraclub.org/articles/2022/01/hydrogen-future-clean-energy-or-false-solution.

The electricity demand required to meet even the moderate demand scenarios is incredible. In the year 2050, the electrolytic demand to meet the Policy Scenario is over 50,000 gigawatt-hours ("GWh").[12] For comparison, the demand scenario with the highest level of energy efficiency measures for the same year could result in only approximately 20,000 GWh of energy savings. The impact of the projected hydrogen demand underscores the necessity for the Commission to consider a scenario with lower hydrogen demand to better understand the cost and resource capacity impacts.

2. The Energy Efficiency and Fuel Substitution Findings Highlight the Demand Reduction Benefits of These Measures but Overlook the Considerable Additional Near-Term Reliability and Non-Energy Benefits of These Resources

While not the primary focus of this report, the non-energy benefits of energy efficiency, fuel switching, and transportation electrification are enormous and should be acknowledged in the final report. The additional energy efficiency and fuel substitution measures described in the Policy Scenario (Augmented DER and DF) included additional achievable energy efficiency ("AAEE") and additional achievable fuel substitution ("AAFS") 4 measures, meaning measures that are "likely to occur but still in planning phases."[13] These results showed dramatic reductions in the net impact of projected electricity demand over both the near- and long-term.[14] For the following reasons, Sierra Club, CBE, and CEJA urge the Commission to further underscore the benefits of these additional AAEE/AAFS 4 measures in its final report and to ultimately include these measures as part of its base case scenario.

First, the long-term electricity savings from AAEE/AAFS 4 measures were significant and could decrease the urgent need to deploy additional renewable energy and energy storage resources. Pursuing the AAEE/AAFS 4 measures resulted in nearly 7,000 GWh of lower projected electricity demand by 2050 than the alternative scenarios.[15] The 2022 California Air Resources Board ("CARB") Scoping Plan calls for multiple consecutive years of record-breaking renewable energy and energy storage deployment,[16] and the projected 7,000 GWh of avoided electricity demand would incrementally reduce the deployment pressure. Sierra Club, CBE, and CEJA expect that the upcoming cost analysis will reflect the savings associated with decreased energy deployment requirements, but the context of projected electricity development underscores the importance of pursuing additional achievable energy efficiency and fuel switching measures.

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[12] CEC Demand Scenarios Project Inputs at Slide 9.
[13] CEC, *Additional Achievable Energy Efficiency (AAEE) & Additional Achievable Fuel Substitution (AAFS) for the Demand Scenarios Project & SB 100* at Slide 5 (Aug. 7, 2024), *available at* https://efiling.energy.ca.gov/GetDocument.aspx?tn=258358&DocumentContentId=94377.
[14] *Id.* at Slides 10, 12.
[15] *Id.* at Slides 10-12.
[16] Cal. Air Res. Bd., *2022 Scoping Plan for Achieving Carbon Neutrality* at 202 (Nov. 16, 2022), *available at* https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp.pdf.

Second, the near-term impacts of the AAEE/AAFS 4 measures in the Augmented DER and DF scenario include potential reliability benefits. In the previous years, the California grid has faced a very tight market for resources that can provide necessary capacity to meet demand. The state faced brief rolling outages during the 2020 summer peak as well as near outages during the 2022 summer. The state government has gone to extreme lengths to avoid reliability issues in recent years, including overriding environmental and environmental justice ("EJ") concerns to extend the retirement deadlines for the Ormond Beach Generating Station and the Diablo Canyon Nuclear Generating Station.[17] In addition, the Governor suspended air permit requirements for carcinogenic diesel backup generators and gas power plants and spent $3 billion in taxpayer funding to build and preserve additional gas plant capacity. These extreme reliability measures harm environmental justice communities, public health, the environment, and taxpayers. Instead of pursuing expensive, dirty, and damaging supply side resources, Sierra Club, CBE, and CEJA urge the Commission to prioritize measures that will reduce or shift near-term electricity demand. While the California Independent System Operator ("CAISO") projects that California is unlikely to face reliability issues this summer (largely due to large deployments of battery storage), reliability continues to be a primary focus for California energy agencies. Accordingly, any near-term energy savings – including AAEE/AAFS 4 measures – should and must be prioritized.

Additionally, prioritizing energy efficiency and demand response measures aligns with California's Loading Order as established by the California Public Utilities Commission ("CPUC").[18] As part of the state's Energy Action Plan, the CPUC defined the Loading Order for which resources should be pursued first, explicitly prioritizing procurement of energy efficiency and demand response resources to meet energy demand, followed by renewable resources and distributed energy resources, and finally, fossil fuel generation.[19]

Last, the non-energy benefits of pursuing AAEE and AAFS 4 measures should also be acknowledged in the final report. The fuel-switching benefits, in particular, hold enormous public health benefits that are unlikely to be fully captured by the Commission's cost-savings analysis later this year. For example, in its April Health Benefits Analysis presentation to the Commission, CARB showed that the primary health benefits stemmed from measures aimed at

[17] *See* State Water Res. Control Bd., *Final Amendment to the Water Quality Control Pol'y on the Use of Coastal and Estuarine Waters for Power Plant Cooling* (Aug. 15, 2023), *available at* https://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/docs/otc-policy-2023/otc-final-amendment.pdf (extending the retirement deadline for the Ormond Beach Generating Station from Dec. 31, 2023 to Dec. 31, 2026, to support grid reliability and the Electricity Supply Strategic Reliability Reserve Program). *See, generally*, CPUC, D.23-12-036, Decision Conditionally Approving Extended Operations at Diablo Canyon Nuclear Power Plant Pursuant to Senate Bill 846 (Dec. 14, 2023), *available at* https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M521/K496/521496276.PDF.

[18] CPUC, D.14-03-004, Decision Authorizing Long-Term Procurement for Local Capacity Requirements Due to Permanent Retirement of the San Onofre Nuclear Generating Stations at 6-7, n.3 (Mar. 13, 2014), *available at* https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M089/K008/89008104.PDF.

[19] *Id.*

the transportation and buildings sectors, with projected avoided mortality benefits from those sectors as preventing over 3,300 deaths by 2045.[20] While not separated by sector, CARB found that the Scoping Plan measures would generate approximately $199 billion in total health benefits, with $61 billion of those benefits accruing within disadvantaged communities.[21] These findings further align with research from E3 that demonstrated the most severe $PM_{2.5}$ emissions stem from the transportation and buildings sector and mapped those comparative emissions in the figure below.[22]

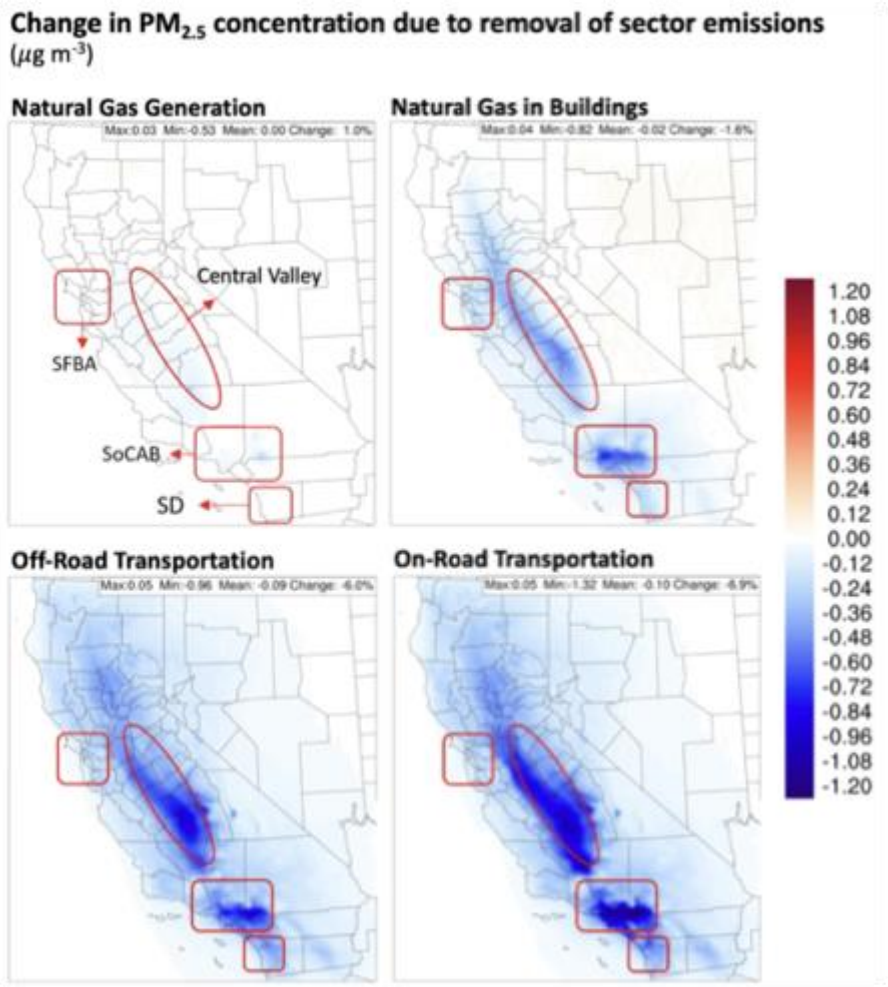

Figure 1. Change in PM2.5 concentration in 2035 due to removal of sector emissions in each scenario. Red shapes indicate air basins of interest (with highest population concentrations and currently degraded air quality).

[20] CARB, *Health Analysis Methodology and Scoping Plan Health Overview* at Slides 13-14 (Apr. 15, 2024), *available at* https://efiling.energy.ca.gov/GetDocument.aspx?tn=255710&DocumentContentId=91539.
[21] *Id.* at 14.
[22] Energy + Env't Econ. & Advanced Power & Energy Program at Univ. of Cal., Irvine, *Quantifying the Air Quality Impacts of Decarbonization and Distributed Energy Programs in Cal.* at 6 (2021), *available at* https://www.ethree.com/wp-content/uploads/2022/01/CPUC-Air-Quality-Report-FINAL.pdf.

These data suggest the fuel switching measures that electrify end uses in buildings and transportation provide significant health benefits through avoided health issues and mortality. The current SB 100 methodology does not account for health and social benefits directly impacting disadvantaged and low-income communities, and as a result, disincentives holistic solutions. Accordingly, Sierra Club, CBE, and CEJA urge the Commission to refer to the considerable non-energy health benefits of the fuel switching programs in its upcoming cost analysis for the demand scenarios.

The AAEE/AAFS 4 measures would generate significant reliability and health benefits by decreasing peak load and reducing air pollution from end uses that currently rely on methane and gasoline, and it is therefore critical that the Commission attempt to quantify these benefits to the maximum extent possible in its final SB 100 Report. Sierra Club, CBE, and CEJA urge the Commission to acknowledge these benefits and incorporate these additional energy efficiency and fuel switching measures into its base case scenario in the final report.

3. The Commission Should Maximize Distributed Energy Resources, like Rooftop Solar, Battery Storage, and Front-Of-Meter Resources to Decrease Overall Electric Demand and Reduce Reliance on Fossil Fuels

Sierra Club, CBE, and CEJA support the Commission's inclusion of a High DER demand scenario but recommends that the Commission go further to maximize these resources and meet multiple legislative requirements simultaneously.

First, the Commission has a statutory responsibility to go further than just planning to retrofit behind-the-meter ("BTM") systems from net energy metering ("NEM") service turnover.[23] The Commission is tasked with multiple climate directives in addition to SB 100, including SB 887, which requires the Commission to identify resource projections that are "expected to substantially reduce, no later than 2035, the need to rely on nonpreferred resources in local capacity areas."[24] The Commission should consider an approach that targets DER incentives towards locations that currently rely on gas plants in local capacity areas, especially in disadvantaged communities, in its High DER demand scenario in order to accomplish this mandate alongside the SB 100 reporting requirement. The Commission should consider additional programs to advance DERs, such as locationally-targeted DER incentives, direct install programs, or procurement adders for utility procurement that displaces gas plant generation with local renewables. While the High DER scenario represents a good initial step, Sierra Club, CBE, and CEJA encourage the Commission to adopt a higher level of ambition for maximizing DERs.

[23] CEC, DER Augmentation Sensitivity, Behind-the-Meter Energy Storage at Slide 3 (Aug. 7, 2024), *available at* https://efiling.energy.ca.gov/GetDocument.aspx?tn=258361&DocumentContentId=94379.
[24] SB 887, Reg. Sess. (Cal. 2021-2022).

4. The Commission Should Incorporate Measures to Expand Vehicle-To-Grid Potential by Ensuring Utilities Plan the Substation and Grid Infrastructure Improvements to Keep Up with Electrification End Uses

If the Commission can expand the availability of vehicle-to-grid infrastructure, every electric vehicle ("EV") can function as a mobile battery that can offer grid support during peak and emergency grid conditions. The Commission's presentation included a description of EV capacity (V2X) availability for grid support. It includes a description of a formula quantifying functional V2X dispatch potential at each hour based on the percentage of participating drivers, the percentage of sites with technical capabilities and other metrics.[25] These metrics were considered inputs to produce the estimate for functional vehicle-to-grid dispatch potential, but it is worth noting that the Commission can influence these metrics through additional programming and planning. For example, the Commission and its sister agencies can increase the percentage of vehicle sites with the technical capabilities to offer vehicle-to-grid exports through market development, financial incentives, and building standards. Given that vehicle electrification already offers significant climate, public health, and grid balancing benefits, the Commission should and must consider additional measures to ensure that utilities are planning the substation and grid infrastructure improvements necessary to keep up with vehicle electrification.

Thank you again for considering these comments, and we look forward to continuing working with you through the SB 100 process to plan for California's renewable energy transition.

Sincerely,

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[25] CEC, SB 100 Demand Scenarios: Demand Flexibility (DF) Res. Potential at Slide 14 (Aug. 7, 2024), *available at* https://efiling.energy.ca.gov/GetDocument.aspx?tn=258363&DocumentContentId=94382.