Submitted online and via FedEx

June 24, 2022

Liane M. Randolph, Chair
Board Members
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

Re: Center for Biological Diversity Comments on Draft 2022 Scoping Plan Update

Dear Chair Randolph and Members of the California Air Resources Board:

These comments are submitted on behalf of the Center for Biological Diversity (the "Center") regarding the Draft 2022 Scoping Plan Update ("draft Scoping Plan" or "Scoping Plan").

Governor Gavin Newsom has called climate change an "existential threat" and stated that "no challenge poses a greater threat to our way of life, prosperity, and future as a state than climate change." Furthermore, Governor Newsom has declared that California "must do everything possible to accelerate our climate targets and increase the pace of action to transition to a low-carbon future." We agree wholeheartedly with these sentiments. However, the draft Scoping Plan proposal fails to achieve either the pace or the scale of emission reductions that climate science tells us are needed.

Specifically, the draft Scoping Plan fails to meaningfully assess opportunities for achieving carbon neutrality by 2035, as Governor Newsom directed the Air Resources Board to do and as is more in line with the need for rapid emission reductions. The draft Scoping Plan developed alternatives that included a 2035 carbon neutrality goal and tended to minimize problematic measures like CCS and bioenergy. However, those alternatives were undermined by the inclusion of massive buyback programs for fossil fuel vehicles and natural gas appliances, rather than accelerating the phaseout of these emissions sources, resulting in both exorbitant costs and unnecessary delays in action. The draft Scoping Plan also relies on a highly speculative volume of GHG reductions from a mix of measures—CCS, bioenergy, and direct air capture—with highly dubious climate benefits, many with substantial and known risks of negative impacts to human health and the environment.

The science is clear that the climate crisis demands much greater greenhouse gas reductions, with a greater focus on near-term reductions, than are proposed in the draft Scoping Plan. Furthermore, these goals must be based in emissions reductions, not the pursuit of a speculative carbon neutrality. This will require an accelerated transition away from fossil-fuel energy

systems and an accelerated adoption of proven, cost-effective, zero-emission solutions that alleviate the disproportionate harm of fossil fuel extraction and combustion.

To adequately address the climate crisis and the closely related public health and environmental justice crises the Scoping Plan must provide a plan that achieves rapid emissions reductions in the near-term, prioritizes emission reductions and achieving near-zero emissions over carbon neutrality, and does not rely on speculative and problematic measures like CCS, bioenergy, and direct air capture. The following measures are based on the components of Alternatives 1 and 2, which included many of these objectives, but modified to achieve the needs of the climate, the people, and the state of California.

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I. THE SCOPING PLAN SHOULD PHASE OUT FOSSIL FUEL EXTRACTION AND TRANSITION TO 100% CLEAN RENEWABLE ENERGY BY 2030.

California is one of the country's top oil producers. The oil and gas industry drills in our neighborhoods, pollutes our air, soil, and water, harms public health, and fuels the escalating climate crisis, with harms falling first and worst on Latinx, Black, Indigenous, and low-income communities, perpetuating environmental racism. To protect public health and avoid the worst climate catastrophes, a robust body of scientific research has established that no new fossil fuel production and infrastructure can be permitted, and the U.S. must end existing oil and gas production by 2031, for a reasonable chance of limiting global temperature rise to 1.5°C. The Scoping Plan should make clear that California must immediately halt the permitting of any new fossil fuel production and infrastructure, and promptly end all oil and gas operations within at least 3,200 feet from homes, schools, and other sensitive locations in line with the Governor's commitment to stop drilling in that buffer zone. California should phase out all fossil fuel production in the state by 2030.

Further, California must transition off fossil fuel electricity to 100% renewable, just energy by 2030, consistent with climate science and equity, prioritizing distributed renewable energy resources and storage. The Scoping Plan should set the most ambitious goals and propose sufficient investment to overcome barriers to electrification in the hardest-to-serve communities to achieve this.

A. California Should Phase Out Fossil Fuel Extraction by 2030.

CARB must increase the ambition and urgency of the proposed oil and gas extraction phaseout. The draft Scoping Plan's Proposed Scenario reduces the emissions from oil and gas extraction by 85% below 2020 levels in 2045, without any 2030 target. This level of reduction is less ambitious than the goal of phasing out extraction that Governor Newsom directed CARB to consider, and according to recent research, falls short of what is necessary to ensure temperature rise does not exceed 1.5°C.

For example, a recent report found that, for a 50% chance of staying within a 1.5°C carbon budget, there can be no new fossil fuel development and 40% of developed fossil fuel reserves need to stay in the ground.[1] Another recent report agreed that there can be no new fossil fuel production for a 50:50 chance of staying within 1.5°C temperature rise, and added that the UN's equity framing of 'common but differentiated responsibility' requires wealthier nations with economies less dependent on oil and gas revenues to lead the way with high rates of closure and early phase-out dates. This means that, for the U.S. (and 18 other wealthy nations with the highest capacity for a just transition), oil and gas production must be cut by 74% by 2030 with

[1] Trout et al, Existing fossil fuel extraction would warm the world beyond 1.5 °C, Environmental Research Letters (2022), https://iopscience.iop.org/article/10.1088/1748-9326/ac6228/pdf.

zero production by 2034.[2] For this reason, California's proposal to end oil and gas production in 2045 is called out in the study as compatible only with the lowest ambition temperature scenario studied; it falls "far short" of what is necessary to stay within a 1.5°C carbon budget.[3]

CARB should analyze how the state can best bring about a managed decline in oil and gas extraction that is aligned with Paris Agreement-aligned climate goals. State agencies have the opportunity to transition the sector over time in a way that protects workers and communities if they start now. For example, if CalGEM stopped issuing new drill permits now, that would lead to far greater emissions reductions by 2030 than waiting until that date. Based on information available in 2018, Oil Change International found that denying new well permits would lead to an average annual decline in oil extracted of 10% for the period of 2019 to 2030.[4] The 560 million barrels of additional oil extracted by new wells would produce just over 360 million metric tons of carbon dioxide equivalent (CO_2e) pollution over that period. The 2018 Oil Change International report also describes how implementing a buffer zone around homes, schools, and hospitals would lead to an additional drop in production. The nearly 14,700 active oil and gas wells within a 3,200-foot public health setback were responsible for about 24% of production in 2019-2020.[5] Phasing out existing wells in the public health setback would align CalGEM's actions with the recommendations of its Scientific Advisory Panel and avoid prolonging the health and safety harms that communities have been subjected to. CARB should have identified how far these actions, which a wide range of environmental justice and conservation groups have urged the state to consider, would go toward meeting climate goals, and identified further actions as necessary for alignment.

The draft Scoping Plan states that it is "not feasible to phase out oil and gas production fully by 2045" due to remaining demand for transportation, including for sectors subject to federal jurisdiction, such as interstate locomotives, marine, and aviation.[6] The draft goes on to state that were oil and gas extraction fully phased out, this future petroleum demand would be met through increased crude imports, likely from South America.[7] As an initial matter, the Scoping Plan should be more transparent about assumptions driving the relationship between demand and production, and more attentive to research that every barrel of oil left undeveloped results in a reduction in global oil and gas consumption, with associated decreases in GHG pollution. Courts

[2] Calverley, D., & Anderson, K., Phaseout Pathways for Fossil Fuel Production Within Paris-compliant Carbon Budgets (2022), https://www.research.manchester.ac.uk/portal/files/213256008/Tyndall_Production_Phaseout_Report_final_text_3_.pdf.
[3] *Id.* at 54.
[4] Oil Change International, The Sky's Limit California (2018), https://priceofoil.org/content/uploads/2018/05/Skys_Limit_California_Oil_Production_R2.pdf.
[5] Ferrar, Kyle, Implications of a 3,200-Foot Setback in California, FracTracker Alliance (Apr. 6, 2022), https://www.fractracker.org/2022/04/implications-of-a-3200-foot-setback-in-california/ (in 2019, wells within the setback produced 36,818,994 bbls of oil/condensate, 23.54% of the total 156,402,018 bbls; in 2020, wells within the setback produced 36,818,994 bbls of oil/condensate produced 33,789,523 bbls of oil/condensate, 23.86% of the total 141,638,219 bbls).
[6] Scoping Plan at 78.
[7] *Id.* at 79.

have rejected vague agency findings of perfect or near-perfect fossil fuel substitution.[8] As summarized by experts at the Stockholm Environment Institute:

> The oil market is [] highly global, with oil readily traded among countries, and substantial infrastructure in place to do so. The U.S. both imports and exports oil, and world and domestic oil prices very closely track each other (U.S. EIA 2016). For this reason, we expect that changes in U.S. oil production would affect an integrated global oil market, an assumption also made by many other analysts that have looked at changes in U.S. oil supply (Bordoff and Houser 2015; Rajagopal and Plevin 2013; Allaire and Brown 2012; Metcalf 2007; IEc 2012). Though in the past the oil market could be strongly influenced by cartel behavior among a small number of producers, many analysts now see the market as more likely to behave competitively (The Economist 2016; U.S. EIA 2016), meaning that increases or decreases in supply do translate into shifts in prices and, in turn, consumption.[9]

Analyses show that leaving U.S. oil and gas undeveloped increases oil prices and decreases global consumption and GHG emissions. For example, one study found that for every barrel of oil kept in the ground in California, roughly one-half barrel of oil will remain in the ground globally. The benefits are even greater when considering a corresponding decrease in fossil fuel demand in California.[10] This yields a net reduction in global oil consumption of between 0.6 and 0.2 barrels, "as consumers respond to the small price increase by making shifts in their vehicle purchases, driving habits, and other decisions."[11] Another analysis of the effects of removing subsidies for U.S. oil production found that decreases in U.S. oil supply would result in substantial decreases in global oil consumption.[12] The model estimated that a decrease of 600,000 barrels per day in U.S. oil supply, resulting from a drop in U.S. oil production due to subsidy removal, would lead to a decrease in global oil consumption of 300,000 to 500,000 barrels per day.[13] In the model, the decreased U.S. oil supply is only partially replaced by other sources of U.S., OPEC, and other rest-of-world supply. In short, each U.S. barrel not developed

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[8] *Ctr. for Biological Diversity v. Bernhardt*, 982 F.3d 723, 738 (9th Cir. 2020) (rejecting illogical conclusion that in the no action alternative foreign sources of oil will substitute for reduced outer continental shelf supply and increase greenhouse gas emissions); *WildEarth Guardians v. Bureau of Land Mgmt.*, 870 F.3d 1222, 1234 (10th Cir. 2017); *Mid States Coalition for Progress v. Surface Transportation Board*, 345 F.3d 520, 549 (8th Cir. 2003); *Sovereign Iñupiat for a Living Arctic v. Bureau of Land Mgmt.*, No. 3:20-cv-00290-SLG, 2021 U.S. Dist. LEXIS 155471, at *22 (D. Alaska Aug. 18, 2021); *Montana Environmental Information Center v. U.S. Office of Surface Mining*, 274 F.Supp.3d 1074, 1098 (D. Mont. Aug. 14, 2017); *High Country Conservation Advocates v. U.S. Forest Service*, 52 F. Supp. 3d 1174, 1197-98 (D. Colo. 2014).

[9] Erickson, P. & Lazarus, M., How would phasing out US federal leases for fossil fuel extraction affect CO_2 emissions and 2°C goals?, Stockholm Environment Institute, Working Paper No. 2016-2 at 23 (2016).

[10] Erickson, P. & Lazarus, M., How Limiting Oil Production Could Help California Meet Its Climate Goals, Stockholm Environment Institute, Discussion Brief (2018) at 2, 8.

[11] *Id.* at 2.

[12] *See generally* Metcalf, G., The Impact of Removing Tax Preferences for U.S. Oil and Gas Production, Council on Foreign Relations (2016); *see also* Erickson, P., Rebuttal: Oil Subsidies—More Material for Climate Change Than You Might Think (Nov. 2, 2017).

[13] Metcalf 2016 at 16, Tbl. 2.

would result in a net reduction in global oil consumption of 0.5 barrels to 0.8 barrels.[14] In sum, numerous scientific and economic analyses show that the assumption of perfect substitution for California oil production—and corresponding justification to continue extraction in California—is unreasonable.

Moreover, the estimates of oil and gas extraction in the draft Scoping Plan are linked to transportation demand scenarios where certain sectors have not made the needed transition to zero carbon fuel sources. As explained in Section IV on aviation below, it is unreasonable and irresponsible to assume that such a small percentage of these fleets will stop burning fossil fuels. The interrelation between extraction and demand in these sectors highlights how important it is for CARB to take action rather than disclaim responsibility and leave regulation to the federal government.

B. California Should Transition to 100% Renewable, Just Energy by 2030.

Consistent with climate science and equity, California must transition off fossil fuel electricity and to 100% renewable, just energy by 2030.[15] This is consistent with the domestic carbon reductions necessary to meet the U.S.'s equitable fair share to limit global warming to 1.5°C, without carbon market mechanisms.[16] In order to meet this target, however, the Scoping Plan must set the most ambitious goals and highlight the available and potential investment to overcome barriers to electrification, especially in the hardest to serve communities.

Instead, in what can be described as an outcome of fossil fuel lobbying efforts,[17] CARB proposes to build 10 GW of new gas generating capacity, equivalent to 33 new large gas plants.[18] CARB is also making this proposal at the same time that the CPUC,[19] the CEC,[20] and the Governor's

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[14] *Id.*

[15] See e.g. United Nations Secretary General, Amid Backsliding on Climate, the Renewables Effort Now Must be Tripled (April 4, 2022), https://www.un.org/sg/en/content/sg/articles/2022-04-04/amid-backsliding-climate-the-renewables-effort-now-must-be-tripled.

[16] Global 100% RE Strategy Group*, Joint declaration of the global 100% renewable energy strategy group* (2021) https://global100restrategygroup.org/.

[17] Bacher, Dan, *Western States Petroleum Association spent $17.5 M on CA lobbying over 3 years, $952,367 in 2022*, Daily Kos, May 6, 2022, https://www.dailykos.com/stories/2022/5/6/2096432/-Western-States-Petroleum-Association-spent-17-5-M-on-CA-lobbying-over-3-years-952-367-in-2022 ("Altogether, WSPA, Chevron, Sempra and other oil and gas corporations and trade associations pumped a a total of $6 million into advancing the fossil fuel industry agenda in 2022's first quarter.")

[18] CARB Draft Scoping Plan: AB32 Source Emissions Initial Modeling Results (March 15, 2022), https://ww2.arb.ca.gov/sites/default/files/2022-03/SP22-Model-Results-E3-ppt.pdf (stating "[i]n Alt 3 scenario, model builds ~90 GW of solar and ~40 GW of batteries to meet SB100 retail sales target. All gas remains online and ~10 GW of new gas is built.").

[19] *See e.g.* Cal. Pub. Util. Comm'n, Natural Gas 101 and Policies for a Just Transition Webinar (2022), https://www.cpuc.ca.gov/events-and-meetings/webinar-natural-gas-101-03-16-2022.

[20] *See e.g.* Cal. Energy Comm'n, The Challenge of Retail Gas in California's Low- Carbon Future (2020), https://www.energy.ca.gov/sites/default/files/2021-06/CEC-500-2019-055-F.pdf (in particular determining that "building electrification is likely to be a lower-cost, lower-risk long-term strategy compared to renewable natural gas (RNG, defined as biomethane, hydrogen and synthetic natural gas, methane produced by combining hydrogen and carbon.")

Office[21] are exploring avenues for a Just Transition from fossil fuels. In so doing, CARB has not only violated the environmental justice provisions of AB 32, SB 32 and AB 197, jeopardizing the opportunity to meet our SB 32 target, but also ignores the CPUC's Loading Order,[22] disregards essential elements of the Governor's Comeback Plan, and omits other efforts at the national and state levels to achieve our climate goals. These efforts include President Biden's recent action to authorize use of the Defense Production Act (DPA) to accelerate domestic production of clean energy technologies, and the CPUC and CEC's current efforts to achieve our climate and equity goals through a high distributed energy resources (DER) future.

It would be arbitrary, capricious, and contrary to the state's climate and equity policies for the Scoping Plan to include the full suite of investment dollars available for dirty and false solutions, but not for clean energy solutions. This is particularly the case for the clean electricity generation sector that CARB recognizes as the "backbone to support deep decarbonization across California's economy."[23] In this regard, and as explained in Section III below, CARB must also revise the draft Scoping Plan to correct the fallacy of "other clean energy options such as hydrogen or renewable natural gas."[24] An adequate cost-effectiveness framework that considers the full range of social costs and non-energy benefits ("NEBs") would show that these false solutions are cost *in*effective given their significant local impacts on residents of disadvantaged communities (DACs). Finally, in order to address a significant barrier to electrification, particularly in DACs, CARB must recognize and designate the CPUC's authority to set "just and reasonable rates" as an important measure to meet our climate and equity goals.

i. CARB Must Revise the draft Scoping Plan to Include Federal Investment in Real and Equitable Clean Energy Solutions.

In June 2022, the Biden Administration took executive action to authorize the Defense Production Act to accelerate domestic production of clean energy technologies. The Department of Energy can now use the DPA to rapidly expand American manufacturing of five critical clean energy technologies:

- Solar panel parts like photovoltaic modules and module components;
- Energy efficiency measures;
- Heat pumps;
- Equipment for making and using clean electricity-generated fuels, including electrolyzers, fuel cells, and related platinum group metals; and

[21] Cal. Governor, Executive Order N-79-20 (2020); Office of Planning and Research, *California's Just Transition Roadmap*, https://opr.ca.gov/economic-development/just-transition/rodmap.html (last visited June 23, 2022).
[22] *See* Cal. Pub. Util. Comm'n, *Integrated Resource Plan and Long Term Procurement Plan (IRP-LTPP)*, https://www.cpuc.ca.gov/irp/ (last visited June 23, 2022) ("[Procurement] plans must adhere to State Policies, including the Loading Order, which mandates that energy efficiency and demand response be pursued first, followed by renewables and lastly clean-fossil generation." The Draft Scoping Plan fails to adequately include energy efficiency, demand response and other renewable energy options, hindering any efforts for the CPUC to develop adequate and just procurement plans.)
[23] Draft Scoping Plan at 156.
[24] *Id.* at 157.

- Critical power grid infrastructure.[25]

Implementation of this executive action also requires collaboration with environmental justice advocates and representatives and the creation of significant local economic benefits to encourage deployment for community development in cities and rural areas, and overall "empower the clean energy transition in low-income communities."[26] This action will also complement other efforts at the federal level, such as the Department of Energy's goal to reduce the cost of grid scale, long duration energy storage by 90% by 2030.[27]

Similarly, the crux of the Governor's Comeback Plan aims to deploy sufficient clean energy resources to specifically address reliability.[28] This requires leveraging DERs, including the full range of energy efficiency, demand response options, and storage; yet the draft Scoping Plan omits an adequate analysis of any of these resources. Notably, these are the same resources that the Environmental Justice Advisory Committee (EJAC) has recommended CARB deploy. The benefits of and potential for DERs to meet our climate and equity goals are detailed further below.

It is arbitrary and capricious for CARB to highlight an illusory need for fossil fuel resources, yet omit significant investment and analysis of viable clean energy solutions in the draft Scoping Plan, especially given the long-term outlook that the Plan presents and commits the State. Moreover, CARB must correct these omissions to send the appropriate market signals for clean energy investment. For instance, as detailed in the SB 100 Joint Agency Report:

> One key area of innovation is in long-duration storage technologies. While there are 4.5 GW of pumped hydro energy storage in California, new longer-duration energy storage systems (for example, 100 or more hours of energy storage) are in the development phase and may be deployed within the next *decade with the right market signals*. Longer-duration storage technologies, such as advanced batteries, thermal energy storage, liquid air energy storage, and compressed air energy storage, can support reliability and further promote achievement of SB 100 goals."[29]

[25] *See* White House, Fact Sheet: President Biden Takes Bold Executive Action to Spur Domestic Clean Energy Manufacturing (June 6, 2022), https://www.whitehouse.gov/briefing-room/statements-releases/2022/06/06/fact-sheet-president-biden-takes-bold-executive-action-to-spur-domestic-clean-energy-manufacturing/.
[26] *Id*.
[27] Energy.gov, Secretary Granholm Announces New Goal to Cut Costs of Long Duration Energy Storage by 90 *Percent* (July 14, 2021) https://www.energy.gov/articles/secretary-granholm-announces-new-goal-cut-costs-long-duration-energy-storage-90-percent.
[28] Governor Newsom, California Comeback Plan (July 2021), https://www.gov.ca.gov/wp-content/uploads/2021/07/CA-Comeback-Plan-Electricity-System-of-the-Future.pdf.
[29] Cal. Energy Comm'n, Cal. Pub. Util. Comm'n, CARB, SB 100 Joint Agency Report (Mar. 15, 2021) at 109 (emphasis added), *available at* https://www.energy.ca.gov/sb100#anchor_report.

The Proposed Scenario for electricity generation, unless revised to adequately consider and conform to other state and national clean energy efforts, will simply impose additional barriers to achieving our climate and equity targets.

ii. CARB Must Revise the draft Scoping Plan to Include Federal Investment in Real and Equitable Clean Energy Solutions.

Climate science requires California to pursue clean electricity generation with proven renewable technologies, including solar, wind, and geothermal, but exclude waste incineration and other combustion-based technologies; bioenergy including biomass, biofuels, factory farm gas, landfill gas, and wood pellets; new nuclear; and new, large-scale and ecosystem-altering hydropower, and all market-based accounting systems like offsets. Prioritizing DERs, including rooftop and community solar and storage and microgrids, brings substantial benefits for energy democracy, electricity affordability, climate resilience, and local economic recovery. Furthermore, DERs are a critical component to meeting our climate and equity goals, in particular by 2030, but lacking in the draft Scoping Plan.

The 2021 Joint Agency Report showed that it is possible to eliminate all combustion resources by 2045.[30] That analysis, however, did not include DERs. Including DERs can accelerate our progress, in particular to meet SB 32. DERs can theoretically generate enough power to meet U.S. electricity needs multiple times over.[31]

DERs can also cure feasibility issues raised by the SB 100 core scenario. For instance, adequate deployment of rooftop solar can minimize the need for the estimated million acres of land to meet the SB 100 core scenario's proposal for utility-scale solar. Utility-scale solar also presents significant land use impacts to biodiversity and species and eliminates opportunities for natural carbon sinks. DERs similarly avoid the siting and affordability impacts of new transmission lines. Backlogs in interconnection queues for utility-scale resources, compounded by the time necessary to plan and build transmission creates a bottleneck preventing necessary buildout by 2030, the critical decade for GHG reduction.

DERs can achieve several environmental and community benefits, such as local economic benefits including job creation, improvements to public health including decreased air and groundwater pollution, resiliency, affordability, and as detailed above, avoided significant land use, biodiversity, and species impacts. For instance, growing local solar and storage would save California ratepayers $4 billion a year, adding up to $120 billion over the next 30 years.[32] This is important, as the draft Scoping Plan notes that even with the SB 100 directive, the difference between retail sales and total load, due in large part to "pumping loads and transmission,

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[30] *Id.* at 93.

[31] Lopez, Anthony et al., U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis. National Renewable Energy Laboratory (2012), https://www.seia.org/sites/default/files/resources/NREL%20Renewable%20Resource%20in%20States%20Study.pdf .

[32] Vibrant Clean Energy, Role of Distributed Generation in Decarbonizing California by 2045 (July 2021) at 6, https://www.vibrantcleanenergy.com/wp-content/uploads/2021/07/VCE-CCSA_CA_Report.pdf.

distribution, and storage losses" warrants new fossil fuel generation.[33] A high-DER future, however, will eliminate this difference. In order to allow for informed decision-making, CARB must make the appropriate revisions in the draft Scoping Plan and the accompanying Environmental Assessment.

Given the importance of DERs and the scale of the problem, it is certainly a step in the right direction for the CEC and CPUC to have recently committed to collaborate efforts to achieve a high-DER future.[34] AB 32 requires CARB to coordinate efforts with the CEC and CPUC. CARB must therefore correct the draft Scoping Plan to reflect such coordination and include an adequate analysis of DERs as a critical solution to meeting our climate and equity goals.[35] In doing so, CARB can set a target for the electricity generation sector in line with climate science and the requirements of SB 32.

iii. CARB Must Revise the draft Scoping Plan to Include an Adequate Consideration of Social Costs.

Absent the full picture of social costs and non-energy benefits required by AB 197 and other climate policies, it is simply not possible for the Board to adequately weigh the cost-effectiveness of each alternative scenario and compare with the Proposed Scenario. Until CARB considers the additional costs to society of GHG reduction measures, CARB cannot meet its mandates under either AB 32 or the California Environmental Quality Act to allow for informed decision-making.

Since at least 2017, CARB has been aware of additional costs to society other than avoided social costs of GHGs:

> There are additional costs to society outside of the SC-CO_2, including costs associated with changes in co-pollutants, the social cost of other GHGs including methane and nitrous oxide, and costs that cannot be included due to modeling and data limitations. The IPCC has stated that the IWG SC-CO_2 estimates are likely underestimated due to *the omission of significant impacts that cannot be accurately monetized, including important physical, ecological, and economic impacts*. CARB will continue engaging with experts to evaluate the comprehensive California-specific impacts of climate change and air pollution.[36]

[33] Draft Scoping Plan at 163.
[34] *See* Cal. Energy Comm'n, In the Matter of Distributed Energy Resources in California's Energy Future, Order Instituting Informational Proceeding, Docket No. 22-OII-01, available at https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=22-OII-01; Cal. Pub. Util. Comm'n, Rulemaking 21-06-017 (e.g., Order Instituting Rulemaking to Modernize the Electric Grid for a High Distributed Energy Resources Future (July 2, 2021), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M390/K664/390664433.PDF).
[35] Cal. Health and Safety Code § 38501(f).
[36] CARB, California's 2017 Climate Change Scoping Plan (2017) at 41.

Despite that commitment to continue evaluation of these additional and "significant" costs to society, CARB states in this current draft, five years later:

> Additional factors beyond the cost per metric ton that could be considered include continuity with existing laws and policies, implementation feasibility, contribution to fuel diversity and technology transformation goals, *and health and other benefits to California*. These considerations are not reflected in the cost per metric ton estimates presented [in the Scoping Plan].[37]

In 2017, CARB made an illusory commitment to continue work on determining these additional costs to society. This time around, CARB does not even go that far and simply states that these additional costs are not included. There is no indication of when CARB will analyze the social costs of GHG reduction measures, as required by AB 197.

In addition, the use of BenMap does not cure this error. BenMap only determines public health benefits of GHG reductions. It does not determine the public health impacts of GHG reduction methods. In other words, while BenMap may detect public health benefits associated with capturing GHGs, BenMap cannot detect the local air and water pollution associated with the process of capturing those GHGs. The purpose of AB 197 was to ensure that CARB could make those determinations so as to not exacerbate disproportionate impacts in environmental justice communities, as required by AB 32. It is noteworthy that the EJAC has consistently recommended that CARB include an analysis of these social costs, yet CARB has consistently not addressed that concern which precludes informed decision-making.

For instance, by not analyzing the lifecycle impacts or local impacts of GHG reduction measures, the Board is blind to the following impacts:

- Increased groundwater contamination from the expansion of dairy herd sizes in the production of biofuels and associated water supply impacts.
- The significant local impacts, including potential hazards and air quality deterioration, of CCS.[38] It is also notable that "the [electricity generation sector target] does not include any additional load to implement CO_2 removal through CCS [carbon capture and storage] or direct air capture."[39] CARB cannot proceed with this proposal without knowing the extent of the additional load which could jeopardize meeting our SB 100 target.

[37] Draft Scoping Plan at 123.
[38] *See e.g.* Cal. Env't Justice Alliance, 128 Scientists and Academics Urge Governor Newsom and the California Air Resources Board to Fix Flawed Scoping Plan That Sets Back California's Climate Goal, Press Release (June 14, 2022), https://caleja.org/2022/06/press-release-128-scientists-and-academics-urge-governor-newsom-carb-to-fix-flawed-scoping-plan/.
[39] Draft Scoping Plan at 161.

- The health and safety costs presented by hydrogen produced from steam methane reformation, gasification, or pyrolysis of biogas and biomass.[40]

Finally, the fossil fuel electricity system is fundamentally damaging to wildlife. Fossil fuel production, transmission, generation, and waste disposal activities cause a wide array of harms to species and ecosystems, such as destroying and fragmenting wildlife habitat, reducing water supplies often in water-stressed areas, causing air, noise, and light pollution; contaminating surface and ground water; and facilitating the spread of ecologically disruptive invasive species,[41] with similar harms in the offshore marine environment.[42] For many species, harms from the fossil fuel-based energy system have led to mortality, changes in behavior, population declines, disruptions to community composition, and loss of ecosystem function.

Pursuant to AB 32, AB 197, and CEQA, CARB must include an analysis of these additional costs to society in the Scoping Plan and the environmental review of the Scoping Plan.

iv. CARB Must Include the CPUC's Ratemaking Authority as a Measure to Achieve Our Climate and Equity Targets.

> The grounding intention of regulation over the electricity system was an obligation to serve the general public interest by delivering reliable, affordable electricity indiscriminately to all communities in exchange for providing private utilities a sufficient rate of return and a monopoly on service territory. However, the public interest has been impacted by the energy system in devastating ways unforeseen by those who forged the original regulatory structure. In reckoning with chronic energy injustice, it is plain that the public interest, as related to the energy system, lacks protection in profound ways—and thus raises foundational questions about the proper scope and definition of "public interest." Lawmakers and regulators *possess the authority to address these issues pursuant to their foundational mandate to serve the public interest in the regulation of utilities*.[43]

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[40] *See e.g.* American Medical Association, Resolution 438 Informing Physicians, Health Care Providers and the Public About the Dangers of Fossil-Fuel Derived Hydrogen (2022), https://www.ama-assn.org/system/files/a22-refcmte-d-report-annotated.pdf.

[41] Butt, Nathalie et al., Biodiversity risks from fossil fuel extraction, 342 Science 425 (2013); Brittingham, Margaret C. et al., Ecological risks of shale oil and gas development to wildlife, aquatic resources and their habitats, 48 Enviro. Sci. and Tech. 11,034 (2014); Pickell, Paul D. et al., Monitoring forest change in landscapes under-going rapid energy development: challenges and new perspectives, 3 Land 617 (2014); Souther, Sara et al., Biotic impacts of energy development from shale: research priorities and knowledge gaps, 12 Frontiers in Ecol. and the Enviro. 330 (2014); Allred, Brady W. et al., Ecosystem services lost to oil and gas in North America, 348 Science 401 (2015); Harfoot, Michael B. et al., Present and future biodiversity risks from fossil fuel exploitation, 11 Conserv. Letters 12,448 (2018).

[42] Venegas-Li, Rubén et al., Global assessment of marine biodiversity potentially threatened by offshore hydrocarbon activities, 25 Global Change Bio. 2009 (2019).

[43] Future Electric Utility Regulation, Advancing Equity in Utility Regulation Future Electric Utility Regulation Report No. 12 (2021) at 77 (emphasis added).

The draft Scoping Plan recommends, "California could explore the best ways to keep electricity prices low to encourage [electrification] . . . [which] may entail further legislative action, such as changes to the rules governing all-electric baselines and other such ratemaking guidance.[44] CARB must correct this to recognize the CPUC's broad authority independent of additional legislative action. The CPUC has broad authority to maintain just and reasonable rates.[45] This authority extends to ensuring that rates are a viable tool to meet our climate goals. CARB must recognize this authority, especially as the SB 350 Barriers Study is clear that affordability is a significant barrier to electrification, especially in DACs.

In addressing affordability, the CPUC has recently identified the problem that "by having a set rate of return, IOUs are inherently incentivized to make investments to drive an increase in their rate base and therefore, their profitability."[46] This profit incentive runs contrary to our climate goals, where unnecessary fossil fuel infrastructure and related transmission buildout also unnecessarily increase rates. This profit incentive also runs contrary to the CPUC's Rate Design Principles which include the goal of "reducing pollution and GHGs, and reducing energy and infrastructure cost."[47]

Furthermore, these Principles guide the Commission's maintenance of just and reasonable rates. Certainly, "just and reasonable rates involves a balancing of investor and the consumer interest."[48] Whether a rate is "just and reasonable" consists of evaluating both the consumer and investor's perspective. Although the concept of "just and reasonable" includes the utilities recouping operating costs, the concept also requires a balancing of the public interest.[49] Moreover, the Legislature is clear that this public interest includes:

- Reduction of health and environmental impacts from air pollution, and
- Reduction of GHG emissions related to electricity and natural gas production and use, and at the same time,
- The creation of high-quality jobs or other economic benefits, including in DACs.[50]

Maintenance of just and reasonable rates must therefore play a critical part in driving the achievement of a clean energy economy in California. In regard to social costs, rates can similarly not be just unless they factor in externalities.[51] It is important for CARB to recognize

[44] Draft Scoping Plan, Appendix F Building Decarbonization at 33.
[45] Cal. Pub. Util. Code § 451.
[46] Cal. Pub. Util. Comm'n, Utility Costs and Affordability of the Grid of the Future (2021), https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/office-of-governmental-affairs-division/reports/2021/senate-bill-695-report-2021-and-en-banc-whitepaper_final_04302021.pdf.
[47] Cal. Pub. Util. Comm'n, Decision on Residential Rate Reform for Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company and Transition to Time-of-Use Rates, 15-07-001 (July 3, 2015) at 31, https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M153/K110/153110321.PDF.
[48] Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591, 603 (1944).
[49] See e.g. Jersey Central. Power & Light v. FERC, 810 F. 2d 1168, 1177 (D.C. Cir. 1987).
[50] Cal. Pub. Util. Code § 740.8.
[51] *See* Boyd, William, Just Price, Public Utility, and the Long History of Economic Regulation in America (2018), https://openyls.law.yale.edu/bitstream/handle/20.500.13051/8274/WilliamBoydJustPricePubli.pdf?sequence=2.

the CPUC's broad authority and not place the burden on consumers to simply react to climate policies, which has unfortunately created additional barriers to the achievement of more aggressive targets, for instance in building decarbonization. Instead, if California is to meet its ambitious climate policies, it must also ensure that corresponding regulations, and just and reasonable rates, are equally ambitious. CARB must revise the draft Scoping Plan to include measures reflecting the CPUC's authority to maintain just and reasonable rates in furtherance of our climate and equity policies.

II. THE SCOPING PLAN SHOULD REQUIRE FASTER TIMELINES AND MORE AMBITIOUS TARGETS FOR BUILDING AND VEHICLE ELECTRIFICATION, SUSTAINABLE CONSTRUCTION AND TRANSPORTATION.

A. California Should Set Clear and More Ambitious Benchmarks for Sustainable Construction and Building Electrification.

Energy use in buildings, through the use of electricity and natural gas, is responsible for a quarter of California's climate pollution, second only to transportation.[52] Given the long lifespan of buildings, California cannot afford to miss the window of opportunity to electrify building end uses where possible. CARB properly acknowledges that ending fossil fuel gas infrastructure for new construction and incentivizing the electrification of existing buildings are both vital to California's climate plan. While these goals are lofty, the draft Scoping Plan fails to set clear benchmarks or identify the resources necessary to achieve rapid electrification. Absent such benchmarks, the Plan risks locking-in carbon intensive options for several decades.

New development has more capability and capacity to reduce emissions, so the Plan must require new buildings, particularly those with a delayed buildout, to take more aggressive steps toward reducing emissions.[53] At minimum, the Plan should phase out sales of new gas appliances by 2025 and ensure a full decommissioning of the gas distribution system well before 2045. CARB should also require the California Energy Commission to adopt a plan to prohibit natural gas infrastructure for newly constructed and renovated buildings. The "2022 Title 24 Building Energy Efficiency Standards," while vital to meeting California's climate goals, allow new development to rely on natural gas, which further entrenches California's reliance on the gas industry for decades to come and sets up opposition to zero-emissions technology.[54] In a recent study, CARB noted that that, after factoring in upstream methane emissions, natural gas can

[52] Rachal, Maria, California takes a first-of-its-kind step on building decarbonization, Smart Cities Dive (Aug. 12, 2021), https://www.smartcitiesdive.com/news/california-energy-commission-adopts-building-decarbonization-changes/604762/; University of California, Berkeley Center for Law, Energy, and the Environment, California Climate Policy Fact Sheet: Building Energy Efficiency, https://www.law.berkeley.edu/wp-content/uploads/2019/12/Fact-Sheet-Building-Energy-Efficiency.pdf (last visited June 15, 2022).
[53] Energy and Environmental Economics, Inc., Residential Building Electrification in California (2019), https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf.
[54] Rachal 2021.

actually be more harmful to the climate than traditional fossil fuels, such as diesel.[55] Many cities —such as Berkeley, San Francisco, San Jose, and Oakland — have already taken clear steps to prohibit new natural gas infrastructure and make electric appliances standard, demonstrating the feasibility of these measures.

But as the Plan notes, new buildings will represent only between one third to one half of the total building stock in California by midcentury.[56] Most of the buildings that will be standing in 2050 have already been built.[57] Accordingly, the Proposed Plan must also speed up its timeline to transform existing building stock. The near-term $622.4M for a statewide direct-install building retrofit program for low-income households is necessary, but it falls far below the needed investment to retrofit all existing buildings, and the Plan lacks any clear benchmark to guide future investments and incentive programs.[58] Rapidly electrifying buildings is a cost-effective path to achieving emission reductions. Consistent with statewide goals,[59] the Proposed Plan should establish a clear target, such as to retrofit at least 50 percent of commercial buildings by 2030.

B. California Should Set More Ambitious Targets for Sustainable Transportation, Including Public Transit and Electrification.

i. VMTs, Public Transit, and Land Use

The draft Scoping Plan's target for the transportation sector is insufficient. Transportation accounts for a whopping 50% of statewide GHG emissions. Yet the Plan aims for a paltry 22% reduction in vehicle miles travelled (VMT) by 2045. The Plan should at minimum include a 30% reduction in VMT by 2035.

The draft Scoping Plan must also commit to deeper investments in the expansion and electrification of mass transit, which empowers people to move away from private transportation. The lithium-ion cells that power most electric vehicles rely on raw materials — like cobalt, lithium and rare earth elements — have been linked to grave environmental and human rights

[55] CARB, Technical Analysis of End of Useful Life Scenarios (Apr. 5, 2022), https://ww2.arb.ca.gov/sites/default/files/2022-04/CARB%20-%20End%20of%20Useful%20Life%20Scenarios%20-%20STWD%20Summary_ADA.pdf, citing International Council on Clean Transportation, A comparison of nitrogen oxide (NOx) emissions from heavy duty diesel, natural gas, and electric vehicles (2021), https://theicct.org/sites/default/files/publications/low-nox-hdvscompared-sept21.pdf.
[56] Draft Scoping Plan at 170.
[57] Lucon O., D. et al., Chapter 9 Buildings, In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., et al. (eds.), 2014], https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter9.pdf; Mahajan, Megan, How to Reach U.S. Net Zero Emissions by 2050: Decarbonizing Buildings, Forbes, Nov. 5, 2019, https://www.forbes.com/sites/energyinnovation/2019/11/05/reaching-us-net-zero-emissions-by-2050-decarbonizing-buildings/?sh=4dc9fef3569d.
[58] Draft Scoping Plan at 171.
[59] Cal. Pub. Util. Comm'n, *Zero Net Energy*, https://www.cpuc.ca.gov/ZNE/ (last visited June 15, 2022).

concerns.[60] Public transportation will result in reductions at lower costs, minimize the global environmental costs of rare metal mining, and lead to air quality co-benefits and more livable communities.[61]

Getting urban development right is crucial to solving the climate crisis. Low-density, sprawl development has devastating impacts across the board, including on wildlife habitat and biodiversity, climate change, water supply, water quality, and aesthetics. It forces residents to drive farther distances and also results in the permanent loss of our wild and open places, which themselves serve as a carbon sink. Strategies to dramatically reduce VMT must include limiting new large-scale development in areas that generate disproportionately high levels of VMT, including areas far from existing job centers. The Plan should prioritize efforts to urge regional transportation plans and sustainable communities strategies to contain such development, which holds no place in California's climate future.

CARB must also coordinate with state and other local agencies to ensure that all new housing and commercial projects – especially those approved far from urban centers – are required to build adequate refueling infrastructure. Housing projects proposed now are typically slated for completion in decades, yet these projects lack 100% Zero Emission Vehicle (ZEV) charging capacity. CARB must push for ZEV charging capacity in public, commercial spaces in low-income, minority areas as well to ensure a just, equitable transition.

California is in desperate need of new affordable housing close to existing public services. To encourage such infill development, regional housing need allocations should be adjusted to prioritize high opportunity areas in the built environment and reduce allocations in areas with high environmental hazards and cultural resource areas. Of course, any policies should be mindful about the unintended consequences of higher-density development and ensure policies are in place to guarantee a tenant "right of return" after redevelopment, at the same rent as before, with rental assistance during redevelopment in the same neighborhood.

ii. Medium- and Heavy-Duty Vehicles and Warehouses

The Scoping Plan should advance the phase out of new combustion medium and heavy-duty vehicle (MD/HDV) sales to 2035, which is consistent with CARB's Mobile Source Strategy.[62] Heavy-duty vehicles alone account for 20 percent of California's GHG emissions.[63] Delaying any phase out until 2040, as the draft Scoping Plan suggests, allows new, polluting trucks to stay on the roads well beyond 2050.

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[60] Koetsier, John, US Needs 10X More Rare Earth Metals to Hit Biden's Electric Vehicle Goals, Forbes, Sept. 29, 2021, https://www.forbes.com/sites/johnkoetsier/2021/09/29/us-needs-10x-more-rare-earth-metals-to-hit-bidens-electric-vehicle-goals/?sh=26feead83e41.

[61] Vandyck, T. et al., Air quality co-benefits for human health and agriculture counterbalance costs to meet Paris Agreement pledges, 9 Nat Commun 4939 (2018), https://doi.org/10.1038/s41467-018-06885-9.

[62] CARB, Mobile Source Strategy (Oct. 28, 2021) at 68, https://ww2.arb.ca.gov/sites/default/files/2021-12/2020_Mobile_Source_Strategy.pdf.

[63] UC Davis News, *Decarbonizing California Transportation by 2045* (Apr. 21, 2021), https://www.ucdavis.edu/climate/news/decarbonizing-california-transportation-by-2045.

The draft Scoping Plan does not justify its target date of 2040 for reaching 100% ZEV sales. The Draft relies on studies that *do not even consider* more ambitious scenarios than 100% by 2035 and do not adequately explain why 2040 should be favored over 2035. There is readily available evidence that a more aggressive target date is possible, and urgency is critical to support environmental justice goals.

The draft Scoping Plan primarily relies on a study from the University of California Institute of Transportation Studies (ITS) that focuses on demand.[64] The ITS report is explicitly mentioned in the Truck ZEVs section of Table 2-2 in the draft Scoping Plan.[65] The most ambitious scenario for 100% electric HDV sales presented in the ITS report has a target year of 2035,[66] and none of the ITS report scenarios show a path to 100% by 2030.[67] The study does not provide a justification for this selection of scenario target years. Given that the report includes more extensive coverage of light-duty vehicle (LDV) electrification than MD/HDVs, we can only speculate that the authors did not feel 2030 is a credible target year given the early state of development of the ZE HDV market compared to the ZE LDV market.

However, a recent Department of Energy study from the National Renewable Energy Laboratory has found that nationwide: "ZEV sales could reach 42% of all MD/HD trucks by 2030, reflecting lower combined vehicle purchase and operating costs (using real-world payback periods)."[68] The study's findings suggest that "by 2030, nearly half of medium- and heavy-duty trucks will be cheaper to buy, operate, and maintain as zero emissions vehicles than traditional diesel-powered combustion engine vehicles."[69] If this degree of cost parity is achievable across the United States by 2030, then there may be greater adoption of ZE HDVs by 2030 than CARB assumes. Yet the ITS report assumes that only 38% of new HDV sales will be ZEVs by 2030.[70] If CARB relied on this or a similar percentage, it must justify its assumptions and its reliance on studies that did not even consider an earlier date for 100% new sales.

In its current form, the draft Scoping Plan aims for 2040 for 100% ZE HDV sales. Even if 2030 is not ultimately a feasible goal, the draft Scoping Plan, Draft EA, and UC ITS report should have provided more information to adequately justify the 2040 date. Earlier target years should not have been automatically out of contention. Moreover, the draft Scoping Plan and referenced reports do not clearly explain why the ITS report's High ZEV scenario of 100% ZE HDV sales by 2035 has been set aside in favor of 2040.

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[64] Univ. of California Inst. of Transp. Stud., *Carbon Neutrality Study 1: Driving California's Transportation Emissions to Zero*, https://www.ucits.org/research-project/2179/ (last visited June 8, 2022).
[65] Draft Scoping Plan at 58.
[66] Brown, Austin L. et al., Driving California's Transportation Emissions to Zero, Univ. of California Inst. of Transp. Stud. [hereinafter ITS Report] 157 fig.4.22 (2021), https://escholarship.org/uc/item/3np3p2t0.
[67] See *id*.
[68] Ledna, Catherine et al., Decarbonizing Medium- & Heavy-Duty On-Road Vehicles: Zero-Emission Vehicles Cost Analysis, National Renewable Energy Laboratory (2022), https://www.nrel.gov/docs/fy22osti/82081.pdf.
[69] Dep't of Energy, *DOE Projects Zero Emissions Medium- and Heavy-Duty Electric Trucks Will Be Cheaper than Diesel-Powered Trucks by 2035*, Mar. 7, 2022, https://www.energy.gov/articles/doe-projects-zero-emissions-medium-and-heavy-duty-electric-trucks-will-be-cheaper-diesel.
[70] ITS Report at 168 tbl.5.1.

For environmental justice reasons, it is very important to recognize the urgent need for 100% MD/HDV electric sales prior to 2040. As the ITS report itself makes clear, "heavy-duty trucks contribute disproportionately to air pollution, which disproportionately impacts disadvantaged communities and communities of color, and heavy-duty truck activity keeps growing."[71] Thus, the sooner HDVs in California are electrified, the better for reducing the inequities of truck-related pollution in historically disadvantaged communities.

Although the ITS report findings are useful for CARB's Scoping Plan goals, the report itself acknowledges the relative novelty of the ZE MD/HDV market and the need for further research and public messaging to promote wider vehicle electrification. For example, going forward, the ITS report recommends clearly showing that "the societal benefits of switching to ZE trucks far outweigh the costs."[72] In addition, it contends that the benefits of transitioning from conventional trucks to ZE trucks "should be quantified to formulate more efficient policies."[73] This is all the more reason why CARB should enhance its focus on ZE MD/HDVs and set more aggressive electric sales targets.

Warehouse and logistics development in particular is a well-documented source of greenhouse gas emissions and air quality degradation that can create serious, negative health outcomes for surrounding communities.[74] Particulate emissions from diesel vehicles contribute to "cardiovascular problems, cancer, asthma, decreased lung function and capacity, reproductive health problems, and premature death."[75] With the rapid increase in global trade, the Ports of LA and Long Beach have become a primary entryway for goods, processing over 40 percent of all imports into the United States, and accounting for 20 percent of diesel particulate pollutants in southern California—more than from any other source.[76] These goods are 'transloaded' before leaving Southern California, meaning that they spend some time in warehouse storage facilities before they reach their final destination.[77] This has resulted in a massive, unchecked expansion of warehouse development throughout Southern California, creating a logistics hub so massive that it is now visible from space.[78] This growth continues unchecked and is now bleeding into open space areas in Coachella Valley and elsewhere, choking airways and driving habitat loss. The Proposed Scoping Plan makes little mention of the supply chain/logistics industry, which drives these impacts. CARB must coordinate with regional planning and transportation agencies to ensure that the logistics industry is planned with intention, away from existing residential communities, and that the attendant environmental impacts are limited to the extent feasible.

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[71] ITS Report at 230.
[72] *Id*.
[73] *Id.*
[74] Betancourt, S. & Vallianatos, M., Storing Harm: The Health and Community Impacts of Goods Movement Warehousing and Logistics. The Impact Project Policy Brief Series (2012), https://envhealthcenters.usc.edu/wp-content/uploads/2016/11/Storing-Harm.pdf.
[75] Betancourt 2012 at 5.
[76] Minkler, Meredith, et al., Community-Based Participatory Research: A Strategy for Building Healthy Communities and Promoting Health through Policy Change, PolicyLink (2012).
[77] Betancourt 2012.
[78] Pitzer College, *Warehouses Visible from Space* (2022) https://www.pitzer.edu/redfordconservancy/warehouses-visible-from-space/.

iii. Light-Duty Vehicles

a. Problematic Modeling in Alternative 1 Overstates the Costs of Transitioning to Light-Duty Zero Emissions Vehicles.

Alternative 1, the most ambitious scenario CARB analyzed, reaches 100% light-duty Zero Emissions Vehicles sales by 2030 and includes the complete early retirement of internal combustion engine (ICE) vehicles by 2035. The proposed scenario (Alternative 3) reaches 100% ZEV sales by 2035 and does not include an ICE vehicle retirement policy. While Alternative 1 would eliminate all ICE cars from the road by 2035, the Proposed Alternative / Alternative 3 would leave approximately 5 million ICE vehicles on the road *ten years later*, in 2045.

Yet CARB burdened Alternative 1 with the further assumption that all ICE vehicles would be retired early with state financing, by 2035. This feature balloons the cost of Alternative 1 and makes the plan look all but infeasible. A more sensible approach would be to keep the 2030 100% ZEV sales target but drop the early retirement provision. An earlier ZEV sales target would bump up the date by which the last ICE vehicles are on the road. This captures the emissions benefits from an earlier transition without the added early retirement costs for millions of vehicles. Simply put, there will be fewer emission-spewing ICE vehicles on the road in future decades if the state stops selling them sooner. CARB should have analyzed a more feasible alternative that includes the benefits of an early transition to ZEVs without the high costs concerns of a mass ICE retirement program.

b. The Scoping Plan Should Reach 100% ZEV Sales by 2030.

California needs to achieve 100% EV sales sooner than 2035 to save millions of tons of carbon pollution, improve health outcomes across the state, and spur the industry to evolve faster both in California and in other states. Calculations show that achieving 100% EV sales by 2035 is insufficient for California to reach its mandates under SB 32 and its carbon neutrality goal by 2045, and it puts President Biden's climate goals in jeopardy as well. The difference between reaching 100% ZEV sales in 2030 versus 2035 is 256 million tons of CO_2 — enough emissions savings to keep 140,000 football fields' worth of Arctic summer sea ice from vanishing. In 2045 emissions from a 2035 target would be 11 million tons of CO_2. But they would be near zero in 2045 with a "100% by 2030" requirement. California can only meet its climate targets if all new cars and light-duty trucks sold in the state in 2030 and beyond produce zero emissions.[79]

A significant danger of a 2035 goal is that the market itself may achieve the Scoping Plan's targets on its own, in which case the plan will not drive meaningful improvements. CARB has underestimated ZEV sales in the past. In the 2017 Midterm Review, CARB staff estimated that ZEV sales would reach 8% by MY 2025. In fact, California achieved that target a full five years

[79] Fleming, John, All-Electric Drive: How California's Climate Success Depends on Zero-emission Vehicles, Center for Biological Diversity (2020), https://www.biologicaldiversity.org/programs/climate_law_institute/pdfs/All-Electric-Drive-California-zero-emissions-vehicles-report.pdf.

early, in 2020. The market is poised for a steep growth rate, having expanded by 50% in just one year (from 7.8% in 2020 to 12.4% in 2021). CARB believes that manufacturers will over-comply with ZEV requirements in the Advanced Clean Cars II Rule through 2025, and that "there will literally be millions of excess ZEV credits and over 100,000 PHEV credits under the existing standards after the 2025 model year."[80] Given the ambitious scale of automakers' EV plans, CARB must not again underestimate the potential of the ZEV market to grow rapidly in the coming years. Instead, it must hold automakers to clear targets, rather than trust their bold but unenforceable promises.

This holds even more true in light of the proposed weakening of the Advanced Clean Cars II Rule. CARB is proposing several 15-day changes that will reduce emissions savings from that rule, including lowering the ZEV durability requirement at the behest of automakers and proposing even more credits for hydrogen vehicles.[81] The Scoping Plan cannot rely on ACC II to drive the needed improvements in the ZEV sector. Instead, the Scoping Plan must tighten the requirements elsewhere to make up for the proposed weakening of ACC II. And that will be difficult to do, since electrifying the passenger fleet is one of the more straightforward ways to drive emissions gains.

c. The Scoping Plan Should Prioritize Equity.

In speeding EV adoption, CARB must ensure low-income communities and communities of color have greater access to electric vehicles. These communities have been worst hit by on-road, drilling, and refinery pollution, and emphasis should be placed on ensuring that these same communities benefit from new zero-emission technology first and foremost. Accordingly, the Scoping Plan should secure **mandatory** equity commitments while promoting purchase incentives, charging infrastructure, and practical and accessible shared mobility in environmental justice communities. These commitments should not be countable against the rule's other stringency targets.

d. The Next Clean Cars Rule Must Require a Minimum of 7% Annual Emissions Reductions from New Gas-Powered Cars and Trucks.

The next car standards must ensure that the remaining fossil-fuel vehicles sold this decade are cleaner. Most vehicles that are sold in the next few years will be gas-powered vehicles, and these light duty trucks and cars will remain in operation for as long as 20 years. Therefore, CARB should mandate a 7% annual improvement in emissions, up from the roughly 5% annual improvement of the Obama standards. Because this 5% annual improvement has already been declared achievable by CARB and others, and because CARB itself has stated that this 5% could be strengthened, a slight increase to 7% is eminently feasible, especially because many auto companies are not fully using technology that already exists to make petroleum cars less polluting.

[80] CARB, Advanced Clean Cars II Rule: Initial Statement of Reasons (April 2022), https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/accii/isor.pdf at 44.
[81] CARB, ACC II Updated Draft Regulation Documents (June 9, 2022), https://ww2.arb.ca.gov/resources/documents/acc-ii-updated-draft-regulation-documents.

iv. California's Clean Vehicle Fleet Cannot be Built with Dirty Mining.

Metals mining is one of the world's dirtiest industries, responsible for at least 10% of greenhouse gas emissions. Mining is linked to environmental destruction, freshwater contamination and depletion, human rights abuses, forced displacement, loss of livelihood, violent conflict, unsafe working conditions, and illicit financial flows in many parts of the world. As California leads the way to a clean energy future, we can reduce the risk of harm from metals mining by requiring EV manufacturers to maximize recyclability, minimize toxicity, conduct mandatory due diligence on their supply chains, and where new mining is necessary, require that it be done following the best standards for environmental protection and respect for human rights via independent, third-party verification.

III. THE PLAN SHOULD FOCUS MORE ON REDUCING EMISSIONS AND LESS ON FALSE SOLUTIONS.

A. Carbon Capture and Storage (CCS) is Unsafe, Ineffective, Economically Unsounds, and Unnecessary to Decarbonize California.

The Scoping Plan embraces carbon capture and storage (CCS) as a climate solution that will "shatter the carbon status quo." This embrace of CCS is misplaced. CARB should instead heed science, the real-life examples of failed CCS projects, and the concerns of dozens of community groups around the state, and recognize that CCS is, thus far, unnecessary, unproven, unsafe, and expensive. The reality is that CCS is a dangerous delay tactic championed by polluting industries—such as biomass and fossil fuels—to enable business-as-usual, all while diverting resources from the needed transition to clean, cheaper renewable energy.

We support the recommendations of the EJAC as shared during a public call on May 24, 2022. These recommendations include urging CARB to:

1. Not consider any engineered carbon removal for fossil fuel infrastructure in the 2022 Scoping Plan. To this, we would add that engineered carbon removal must also be rejected for biomass facilities (a process known as "BECCS");
2. Not encourage or allow use of captured CO_2 for use in enhanced oil recovery (EOR);
3. Require a lifecycle analysis of a project's GHG emissions through using independent experts. This analysis must include the energy and emissions associated with capturing and compressing the CO_2;
4. Prioritize direct emissions reductions over CCS;
5. Prioritize ecological solutions to naturally sequester carbon over CCS. These include soil restoration.
6. Ensure that CCS project permitting includes a rigorous analysis of health impacts. We would also note that projects must not be piecemealed and that currently, both federal and state pipeline regulations are not sufficient for CO_2.

There may be other recommendations coming out of the EJAC and other environmental justice groups and coalitions. We urge CARB to take these recommendations seriously and to genuinely consult with those who will be most impacted by CCS projects in California.

i. CCS is a false solution to the climate crisis and will not deliver the carbon reductions CARB assumes.

First and foremost, we reject the premise that CCS is a necessary—or even appropriate—approach to addressing the climate crisis and pollution burdens borne by frontline and fenceline communities. After billions of dollars of investment and decades of development, deployment of CCS has consistently proven to be ineffective, uneconomic, and unnecessary. CCS projects around the world have failed to meet their GHG emission reduction promises and have harmed people and the environment. Moreover, the types of dirty energy CCS will enable and prolong, and the infrastructure and energy required for carbon capture utilization and storage (CCUS), will cause additional pollution in communities already suffering from unhealthy air and water quality.

It is untrue that CCS is required under Intergovernmental Panel on Climate Change (IPCC) pathways to avert climate catastrophe. In its Special Report on Global Warming, the IPCC-modeled pathway with the best chance of keeping warming at or below 1.5°C makes no use of fossil fuels with carbon capture or BECCS, and limited to no use of engineered carbon removal technologies.[82] Instead, this pathway requires a rapid phaseout of fossil fuels along with *limited* carbon dioxide removal by natural sources such as reforestation and enhanced soil remediation.

The false promise of CCS is also evident in its real-world deployment. Experience has shown that power plants with carbon capture have drastically—and repeatedly— failed to meet their CO_2 capture targets. In July 2021, Chevron, operator of Australia's only commercial-scale CCS project, admitted that its self-described "world's biggest CCUS project" failed to meet its five-year capture target of 80% CO_2, and is now seeking a deal with regulators on how to make up for millions of tons of CO_2 emitted.[83] In the United States, the Petra Nova coal-fired power plant in Texas achieved only a 50% CO_2 capture rate when the fossil fuels needed to capture and store the carbon were taken into account.[84]

These real-world failures of CCS projects don't even take into account the *lifecycle* emissions of CCS projects. And as the Institute for Energy Economics and Financial Analysis ("IEEFA") notes, the energy required to capture, transport, and inject carbon underground "materially reduces its net benefit."[85] For example, coal-fired power plants with carbon capture have an energy penalty of 25% or more, with the efficiency penalty as high as 15%.[86] These "penalties"

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[82] Center for International Environmental Law, *Confronting the Myth of Carbon Free Fossil Fuels: Why Carbon Capture is Not a Climate Solution* 2 (2021), https://www.ciel.org/wp-content/uploads/2021/07/Confronting-the-Myth-of-Carbon-Free-Fossil-Fuels.pdf [hereinafter *CIEL CCS Report*].
[83] Mazengarb, Michael, *Chevron admits failure of $3 billion CCS facility in Western Australia,* IEFFA (July 19, 2021), https://ieefa.org/chevron-admits-failure-of-3-billion-ccs-facility-in-western-australia/.
[84] Schlissel, David, *Reality of carbon capture not even close to proponents' wishful thinking,* IEFFA (Aug. 8, 2019), https://ieefa.org/reality-of-carbon-capture-not-even-close-to-proponents-wishful-thinking/.
[85] Butler, Clark, IEEFA, *Carbon Capture and Storage Is About Reputation, Not Economics* at 4 (2020), https://ieefa.org/wp-content/uploads/2020/07/CCS-Is-About-Reputation-Not-Economics_July-2020.pdf.
[86] Climate Action Network Int'l, *CAN Position: Carbon Capture, Storage, and Utilisation* at 9 (2021), https://climatenetwork.org/resource/can-position-carbon-capture-storage-and-utilisation/ [hereinafter CAN Position].

mean more fuel has to be burned to produce the same amount of power, which means higher energy costs, greater emissions of non-CO_2 air pollutants, and increased demand on the grid.[87] And any CO_2 that is stored underground risks leakage back to the atmosphere, based on the long track record of fossil fuel industry leaks and spills.[88]

In the United States, more than 95% of all CCS capacity deployed has been used for EOR, meaning "CO_2 waste products from a fossil fuel-burning activity are used to generate more fossil fuels."[89] The climate rationale for CCS evaporates if captured carbon is used to pump more oil. CCS also creates serious environmental, public health, and safety risks. For example, CO_2 leaks from pipelines pose a potential hazard for people and other animals, as "CO_2 is denser than air and can therefore accumulate to potentially dangerous concentrations in low lying areas," and "any leak transfers CO_2 to the atmosphere."[90] These risks became reality in February 2020, when a CO_2 pipeline rupture in Mississippi led to the evacuation of hundreds and hospitalization of dozens of residents,[91] with harms including extreme disorientation, unconsciousness, and seizures.[92] One study estimates that to scale, the CCS build-out—including the pipelines and infrastructure required to capture, compress, transport, and store CO_2—will need to be 2 to 4 times larger than the current global oil industry.[93]

CCS projects also can harm people because of the emission of harmful air pollutants such as fine particulate matter, ammonia, and hazardous volatile organic compounds.[94] Further, toxic chemicals like lye and ammonia are used to "capture" carbon.[95] Megatons of these dangerous chemicals must be produced, transported, and handled to operate carbon capture at scale, and

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[87] *Id*.

[88] The myth of permanent carbon sequestration is echoed in regulations that merely kick the climate problem down the road and onto future generations. Under EPA's regulations for Class VI injection wells for CO_2, for example, a permit applicant need only show that they can store CO_2 for 50 years in order to qualify for subsidies. 40 C.F.R. § 146.93. California's Low Carbon Fuel Standards doesn't fare much better, requiring only 100 years of storage. CARB, Accounting and Permanence Protocol for Carbon Capture and Geologic Sequestration under Low Carbon Fuel Standard (2018), https://ww2.arb.ca.gov/sites/default/files/2020-03/CCS_Protocol_Under_LCFS_8-13-18_ada.pdf ("'Permanent sequestration' or 'permanence' means the state where sequestered CO2 will remain within the sequestration zone for at least 100 years.").

[89] *CIEL CCS Report* at 8. Globally, 73% of the CO2 captured globally each year is used for EOR projects. Global CCS Institute, Global Status of CCS 63 (2021).

[90] IPCC, *Chapter 4: Transport of CO_2, in* Special Report on Carbon Dioxide Capture and Storage (2005), at 188 (noting that CCS "will require a large network of pipelines.").

[91] Miss. Emergency Mgmt. Agency, *Pipeline Ruptures in Yazoo County, Dozens Rushed to the Hospital* (Feb. 23, 2020), https://www.msema.org/news/pipe-ruptures-in-yazoo-county-dozens-hospitalized/.

[92] Fowler, Sarah, '*Foaming at the mouth': First responders describe scene after pipeline rupture, gas leak,* Clarion Ledger, Feb. 27, 2020, https://www.clarionledger.com/story/news/local/2020/02/27/yazoo-county-pipe-rupture-co-2-gas-leak-first-responders-rescues/4871726002/; Zegart, Dan, *The Gassing of Satartia*, Huffington Post, Aug. 26, 2021, https://www.huffpost.com/entry/gassing-satartia-mississippi-co2-pipeline_n_60ddea9fe4b0ddef8b0ddc8f.

[93] Mac Dowell, N. et al., *The role of CO2 capture and utilization in mitigating climate change*, 7 Nature Climate Change 243 (2017), https://www.nature.com/articles/nclimate3231.

[94] Kubota, Taylor, Stanford Study casts Doubt on Carbon Capture, Stanford News (Oct. 25, 2019), https://news.stanford.edu/2019/10/25/study-casts-doubt-carbon-capture/ ("Stanford Report Summary"), citing Jacobson, Mark Z., The health and climate impacts of carbon capture and direct air capture, 12 Energy Envt. Sci. 3567 (2019), https://pubs.rsc.org/en/content/articlelanding/2019/ee/c9ee02709b/unauth#!divAbstract.

[95] Cong. Research Serv., R44902, *Carbon Capture and Sequestration (CCS) in the United States* at 4-5 (2021), https://sgp.fas.org/crs/misc/R44902.pdf.

will eventually be disposed of, putting communities at risk. And because CCS enables the underlying emissions-generating activity (such as fossil fuel power generation) to continue, upstream and downstream impacts from activities such as fossil fuel extraction, refining, transport, use, and disposal will continue to harm people's health, particularly in overburdened communities.[96]

A recent study confirmed that the lifecycle pollution and social harms from CCS fossil fuel-fired powerplants result in more harm than good. The researchers examined the net CO_2 reduction and total lifecycle cost of carbon capture from a coal plus CCS power plant, and a plant that removes carbon directly from the air.[97] They "account[ed] for the electricity needed to run the carbon capture equipment, the combustion and upstream emissions resulting from that electricity, and, in the case of the coal plant, its upstream emissions," with the upstream component including leaks and combustion, mining, and fuel transportation, and found that CCS "reduces only a small fraction of carbon emissions, *and it usually increases air pollution*."[98] Because of the lifecycle pollution and the harms arising from that, the study authors recommended replacing fossil fuels with renewables such as wind or solar rather than encouraging and investing in CCUS.[99] Black, Brown, and Indigenous communities already overburdened by fossil fuel pollution and disproportionately harmed by the climate crisis are again being targeted for CCUS infrastructure. Companies in Louisiana, for example, are eyeing parts of that state for what would be among the largest CCUS projects in the world, despite those areas being heavily overburdened by decades of toxic pollution and ongoing industrial accidents.[100] California's Central Valley is also being targeted for CCUS projects, even though that area has the state's worst air quality.[101]

Along with the opposition in California, there is widespread and growing opposition to CCS from community, environmental justice, and other groups. The White House Environmental Justice Advisory Council (WHEJAC) called CCS projects a "type[] of project that will <u>not</u> benefit a community," noting that "it would be unreasonable to have any climate investment

[96] *CIEL CCS Report* at 7 (citing, for example, a Harvard study finding that fine particulate matter emitted with fossil fuel burning is responsible for millions of deaths worldwide).
[97] *Stanford Report Summary*.
[98] *Id.* (emphasis added).
[99] *Id.* ("There is a lot of reliance on carbon capture in theoretical modeling, and by focusing on that as even a possibility, that diverts resources away from real solutions. It gives people hope that you can keep fossil fuel power plants alive. It delays action. In fact, carbon capture and direct air capture are always opportunity costs.").
[100] See, e.g., Gulf Coast Sequestration, Gulf Coast Sequestration Makes Initial Filing to Obtain EPA Permit for CCS Project (Oct. 13, 2020), https://gcscarbon.com/media/gulf-coast-sequestration-makes-initial-filing-to-obtain-epa-permit-for-ccs-project/; *see also* Robinson, Andrea, *Wednesday's explosion marks second in four months for Westlake Chemical*, KPLC, Jan. 27, 2022, https://www.kplctv.com/2022/01/28/wednesdays-explosion-westlake-chemical-marks-second-four-months/; Rogers, Heather, *Erasing Mossville: How Pollution Killed a Louisiana Town*, Intercept, Nov. 4, 2015, https://theintercept.com/2015/11/04/erasing-mossville-how-pollution-killed-a-louisiana-town/.
[101] *See, e.g.*, American Lung Association, *State of the Air: Most Polluted Cities*, ,https://www.lung.org/research/sota/city-rankings/most-polluted-cities (last visited Apr. 12, 2022) (listing the nation's most polluted cities, where three of the top five are in California's Central Valley); *see also Stanford Report Summary*.

working against historically harmed communities."[102] The 1,500 member-organizations of Climate Action Network (CAN) International adopted a shared position statement declaring that the members "do[] not consider currently envisioned CCS applications as proven sustainable climate solutions."[103] CAN warned that CCS "risks distracting from the need to take concerted action across multiple sectors in the near-term to dramatically reduce emissions."[104] In July 2021, over 500 international, U.S., and Canadian organizations sent an open letter to lawmakers calling on them to reject CCS as a "dangerous distraction."[105] In presuming the buildout of CCS and focusing on streamlining permitting and expediting commercialization of the technology, CEQ's Proposed Guidance disregards these substantial and mounting concerns about the environmental and social impacts and economic feasibility of carbon capture.

ii. The Scoping Plan's Assumptions About CCS Are Faulty and Undermine Selection of the Preferred Alternative.

There are numerous instances of faulty reasoning leading CARB to select an alternative where CCS features prominently.

First, CARB erroneously asserts, "[c]arbon removal and sequestration will be an essential tool to achieve carbon neutrality. The modeling clearly shows, there is no path to carbon neutrality without carbon removal and sequestration."[106] As noted above, IPCC modeling presents pathways to keeping warming at or below 1.5°C with limited to no use of engineered carbon removal technologies; instead, this pathway requires a rapid phaseout of fossil fuels along with *limited* carbon dioxide removal by natural sources such as reforestation and enhanced soil remediation. The IPCC points to "uncertainty in the future deployment of CCS," and cautions against reliance on the technology, given "concerns about storage safety and cost" and the "non-negligible risk of carbon dioxide leakage from geological storage and the carbon dioxide transport infrastructure."[107] And the unproven scalability of CCS technologies and their prohibitive costs mean they cannot play any significant role in the rapid reduction of global emissions necessary for California—or countries around the world—to meet their emissions reduction goals.

Second, the Scoping Plan models assume a 90% capture rate of carbon and says that CCS is "technologically feasible." These claims do not line up with how CCS technologies have

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[102] WHEJAC, Justice40 Climate and Economic Justice Screening Tool & Executive Order 12898 Revisions: Interim Final Recommendations at 55, 58 (May 13, 2021), https://www.epa.gov/sites/default/files/2021-05/documents/whejac_interim_final_recommendations_0.pdf (emphasis original).
[103] CAN Position at 9 (2021).
[104] *Id*.
[105] Center for International Environmental Law, Letter to Joseph Biden, Nancy Pelosi & Chuck Schumer re: Carbon capture is not a climate solution (July 19, 2021), https://www.ciel.org/wp-content/uploads/2021/07/CCS-Letter_FINAL_US-1.pdf.
[106] Draft Scoping Plan at 66.
[107] IPCC, Summary for Policymakers in IPCC, Global Warming of 1.5°C: An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (2018), at 14, Section C.1.1., *see also id.* at Ch. 2.3.3 and Table 2.SM.12; *id.* at Ch. 5, Section 5.4.1.2.

performed (see examples above), or what the lifecycle analysis of CCS projects shows. A Stanford study calculated the lifecycle emissions associated with CCS projects used with energy production from fossil fuels and found that "the equipment captured the equivalent of only 10-11 percent of the emissions they produced, averaged over 20 years."[108] This research also considered the social cost of carbon capture—in other words, the resulting air pollution, potential health problems, economic costs and overall contributions to climate change—and concluded that these costs are similar to or higher than a fossil fuel plant *without* carbon capture, meaning "it is always better to use the renewable electricity instead to replace coal or natural gas electricity or to do nothing."[109]

Third, the Plan claims that CCS is "cost-effective." Neither of these claims are true. Massive tax subsidies are required to implement carbon capture and storage, and the costs of construction are significantly higher than renewable energy and storage options.[110] The federal tax credit for CCS projects (under Section 45Q of the US Internal Revenue Code, which Congress extended in December 2020) provides credits for tons of carbon sequestered. In effect, it makes "CO_2 the commodity," meaning there is an incentive to continue to pollute, and the public is paying for it—hardly a cost-effective solution. In California, companies using CCS associated with transportation fuel can claim credits from the Low Carbon Fuel Standard—another public subsidy for pollution.

Fourth, the Plan baselessly asserts that CCS is "equity-focused." By design, CCS enables an underlying emissions-generating activity (like fossil fuels or biomass) to continue by capturing some of the CO_2 it would otherwise emit. CCS therefore locks in emissions and health harms of dirty industries for decades to come. With most of California's CCS projects planned for the Central Valley, where communities are overburdened by pollution already, CCS development will make these communities bear the brunt of industries that will further pollute the air and water. And because CO_2 pipeline leaks can also be deadly, placing these pipelines and injection sites even within miles of homes, schools, and other populated areas means risking lives.[111] CARB's vague reference to EJAC concerns and the idea for a "multi-stakeholder process . . . to further understand and address" concerns is not enough, particularly when simultaneously advancing a Scenario that relies heavily on CCS.[112]

Similarly, a recent report by the Pipeline Safety Trust calls out CO2 pipelines as "dangerous and underregulated."[113] This analysis applies not only to federal pipeline regulations but also those within California. In the State, the Office of the State Fire Marshall regulates intrastate hazardous liquid pipelines, whereas the California Public Utilities Commission regulates intrastate gas

[108] Stanford Report Summary.
[109] *Id.* (noting that the social cost of coal with carbon capture powered by natural gas was about 24 percent higher, over 20 years, than the coal without carbon capture, and only when wind replaced the fossil fuel did the social cost decrease).
[110] Butler 2020.
[111] Zegart 2021.
[112] Scoping Plan at 70; *see also* page 177.
[113] Pipeline Safety Trust, Carbon Dioxide Pipelines: Dangerous and Under-Regulated (Mar. 23, 2022), https://pstrust.org/wp-content/uploads/2022/03/CO2-Pipeline-Backgrounder-Final.pdf.

pipelines.[114] But as the Pipeline Safety Trust points out, CO_2 for CCS can be in liquid, gas, or supercritical form. CO_2 in a supercritical state can be categorized as either a liquid or gas and is not currently codified under either statutory or regulatory scheme. This is a problem because, as the Pipeline Safety Trust explains:

> Carbon dioxide has different physical properties from products typically moved in hazardous hydrocarbon liquid or natural gas transmission pipelines. Those differences pose unique safety hazards and greatly increase the possible affected area or potential impact radius upon a pipeline release that would endanger the public. CO_2 pipeline ruptures can impact areas measured in miles, not feet. The way regulations currently consider and mitigate for the risks posed by hydrocarbon pipelines in communities are neither appropriate nor sufficient for CO_2 pipelines.[115]

And since *all* CCS projects require moving compressed CO_2 through pipelines, this is an immediate and alarming concern that should halt any CCS development until it is addressed.

B. BECCS Has Not Been Shown to be Carbon Negative, Comes with Numerous Risks, and Should Not be Included as a Carbon Dioxide Removal (CDR) Method in the Scoping Plan.

The Scoping Plan includes BECCS as a CDR method.[116] Specifically, the Plan states that the Proposed Scenario estimates that 5-10 $MtCO_2e$ of sequestration may be available from biomass, although "this will require the permitting, construction, and startup of new infrastructure in California."[117]

Similar to the issues with CCS described earlier in this comment, BECCS is not a climate solution, and its use will result in—at best—potential emissions savings on paper that don't match the emissions happening in reality. California must not settle for a mere victory "on paper" only with its climate goals and must therefore not recommend or rely on BECCS in the Plan.

i. BECCS Is a False Climate Solution.

BECCS has not proven to be carbon negative,[118] and the IPCC Sixth Assessment Report found that BECCS is not necessary to meet the 1.5°C Paris target.[119]

As established earlier in this letter, CCS projects have never been shown to capture anywhere near 100 percent of emissions—and in fact, the total net capture rate may be closer to 10-15

[114] Cal. Gov. Code § 51010; Cal. Pub. Util. Code § 955.
[115] Pipeline Safety Trust 2022.
[116] Scoping Plan at 75.
[117] *Id*.
[118] CAN Position.
[119] IPCC, Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, et al, (eds.), 2022], doi: 10.1017/9781009157926IPCC, at 5-8, Figure 7.11.

percent when the lifecycle of a project is considered. This does not justify building new infrastructure that will emit co-pollutants, particularly in areas like California's Central Valley. Evidence shows that like coal and oil, woody biomass is a carbon-burning form of energy production that emits carbon dioxide and contributes to the climate crisis. Biomass power plants are California's dirtiest electricity source—releasing more carbon at the smokestack than coal.[120] The average GHG emission rate for California's current electricity portfolio is about 485 pounds carbon dioxide equivalent (CO_2e) per megawatt hour (MWh).[121] In 2018, woody biomass power plants in California emitted more than *seven times* that amount, averaging 3,500 pounds CO_2e per net MWh for non-cogeneration facilities.[122]

Despite the substantial carbon pollution from biomass power, biomass proponents claim that cutting and incinerating forests is inherently "carbon neutral," i.e., that it does not cause net GHG emissions. The science simply does not support this claim. While biomass proponents try to discount the carbon released by biomass power plants by taking credit for the carbon absorbed by future tree growth, there is no requirement that forests cut down for biomass energy be allowed to regrow instead of being cut again and again, and or that forests won't be developed into other land uses. And even if trees are allowed to regrow, numerous studies show that it takes many decades to more than a century—if ever—for new trees to grow large enough to capture the carbon that was released.[123] One study concluded that the increase in atmospheric GHGs may be permanent.[124] Intact forests are a vital part of the climate solution because they pull carbon

[120] Sterman, John D. et al., Does replacing coal with wood lower CO2 emissions? Dynamic lifecycle analysis of wood bioenergy, 13 Environmental Research Letters 015007 (2018).
[121] CARB, California Greenhouse Gas Emissions for 2000 to 2018, Trends of Emissions and Other Indicators (2020 Edition) at Figure 9 (GHG Intensity of Electricity Generation); *see also* CARB, 2000-2018 Emissions Trends Report Data (2020 Edition) at Figure 9, showing the overall GHG Intensity of Electricity Generation in 2018 of 0.22 tonnes CO2e per MWh, which is equal to 485 pounds per MWh. These calculations were based on the 2020 trends report, however the 2021 edition, California Greenhouse Gas Emissions for 2000 to 2019, Trends of Emissions and Other Indicators (July 28, 2021) (Figure 9) shows a similar number (0.21 tonnes CO2e per MWh), https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2019/ghg_inventory_trends_00-19.pdf (data available for download at https://ww2.arb.ca.gov/ghg-inventory-data).
[122] Total CO2e emissions for each facility in 2018 come from California Air Resources Board Mandatory GHG Reporting Emissions data, available at CARB, *Mandatory GHG Reporting – Reported Emissions*, https://ww2.arb.ca.gov/mrr-data (last visited June 23, 2022). Data on net MWh produced by each facility in 2018 come from the Cal. Energy Comm'n, *California Biomass and Waste-To-Energy Statistics and Data*, https://ww2.energy.ca.gov/almanac/renewables_data/biomass/index_cms.php (last visited June 23, 2022). Total CO2e produced by the 9 electricity only, non-cogeneration active woody biomass facilities with available data totaled 2,127,693 metric tons, and net MWh in 2018 from these 9 facilities totaled 1,334,346 MWh, for an average of 1.59 metric tons CO2e per net MWh, equal to 3,515 pounds CO2e per net MWh. The average of 3,515 pounds CO2e per MWh includes electricity-only plants; cogeneration plants are excluded because some of their CO2 emissions are from heat-related fuel consumption. The high CO2e rate-per-MWh is similar for biomass facilities without cogeneration.
[123] *See, e.g.*, Booth, Mary S., Not carbon neutral: Assessing the net emissions impact of residues burned for bioenergy, 13 Environmental Research Letters 035001 (2018); Sterman 2018.
[124] Holtsmark, Bjart, The outcome is in the assumptions: Analyzing the effects on atmospheric CO2 levels of increased use of bioenergy from forest biomass, 5 GCB Bioenergy 467 (2012).

out of the air and provide long term, natural storage.[125] And studies show that thinning forests to control fire actually reduces forest carbon stocks and increases overall carbon emissions.[126] In addition to not being a climate solution, research has concluded that BECCS can have negative impacts on the climate, food security, biodiversity, forest ecosystems, water use, and land use rights.[127]

Biomass power is also California's *most expensive energy source*.[128] In 2018, the levelized cost of biomass power averaged $166 per megawatt hour compared to $49 per megawatt hour for photovoltaic solar and $57 for wind.[129] Adding CCS to biomass power does not help this equation, as CCS projects require *additional* expensive equipment in order to capture, compress, and inject carbon dioxide, and rely heavily on taxpayer subsidies such as through the Low Carbon Fuel Standard and/or the federal tax credit known as 45Q.

ii. BECCS Facilities Put Communities Health and Safety in Danger.

BECCS comes with the risks and harms to the climate and communities of CCS, described in detail earlier in this comment. These include emission of co-pollutants and the very serious harms associated with CO_2 pipeline leaks and ruptures.

Biomass power plants are a significant source of air pollutants, harming the vulnerable communities where biomass facilities are located and worsening environmental injustice. Biomass power plants emit toxic air pollutants, including particulate matter (PM), nitrogen oxides (NOx), carbon monoxide (CO), sulfur dioxide (SO_2), lead, mercury, and other hazardous air pollutants that harm public health.[130] Biomass power plant pollution can exceed that of coal-fired power plants even when the best available control technology is used.[131] In California, biomass power plants are among the worst emitters of particulate matter and NOx.[132] Biomass

[125] Moomaw, William R. et al, Intact forests in the United States: proforestation mitigates climate change and serves the greatest good, Frontiers in Forests and Global Change, doi: 10.3389/ffgc.2019.00027 (2019).
[126] Mitchell, S.R. et al., Forest fuel reduction alters fire severity and long-term carbon storage in three Pacific Northwest ecosystems, 19 Ecological Applications 643 (2009); Campbell, J.L. & A.A. Ager, Forest wildfire, fuel reduction treatment, and landscape carbon stocks: a sensitivity analysis, 121 Journal of Environmental Management 124 (2013); DellaSala, D.A. & M. Koopman, Thinning Combined with Biomass Energy Production Impacts Fire-Adapted Forests in Western United States and May Increase Greenhouse Gas Emissions, Reference Module in Earth Systems and Environmental Sciences (2016).
[127] Heck, Vera et al., Biomass-based negative emissions difficult to reconcile with planetary boundaries, 8 Nature Climate Change 151 (2018), https://doi.org/10.1038/s41558-017-0064-y.
[128] Cal. Energy Comm'n, Staff Report, Estimated Cost of New Utility-Scale Generation in California: 2018 Update (May 2019), https://ww2.energy.ca.gov/2019publications/CEC-200-2019-005/CEC-200-2019-005.pdf at 40.
[129] *Id.* at B-12 (levelized mid-level cost of Solar PV: C-Si, Tracking 100 MW is $49), at B-18 (levelized mid-level cost of Wind 80 m Hub Height 100 MW is $57), and B-21 (levelized mid-level cost of Biomass fluidized bed boiler 20 MW is $166). The levelized cost estimates reflect the average cost per megawatt-hour for an independent developer to build and operate a power plant over the lifetime of the facility.
[130] Partnership for Policy Integrity, Air pollution from biomass energy (updated April 2011), https://www.pfpi.net/wp-content/uploads/2011/04/PFPI-air-pollution-and-biomass-April-2011.pdf.
[131] Id.
[132] For example, Roseburg Forest Products ranked as the 21st biggest stationary source of fine particulate matter out of 591 sources state-wide in 2017, according to facility-level emissions data from the CARB, *CARB Pollution Mapping Tool*, https://ww3.arb.ca.gov/ei/tools/pollution_map/pollution_map.htm (last visited June 23, 2022).

power plants also emit hazardous air pollutants, including hydrochloric acid, dioxins, benzene, formaldehyde, arsenic, chromium, cadmium, lead, and mercury.[133]

Adding CCS to biomass power is not a proven solution to the emission of harmful co-pollutants. As one Stanford study noted, CCS can *increase* air pollution and total social costs relative to the absence of CCS.[134]

Presenting a more immediate threat to health and safety is leakage of captured CO_2. At present, CO_2 pipelines are "dangerous and under-regulated," with no fix to that regulatory gap in sight.[135] This is alarming and concerning to communities that live in areas where CO_2 pipelines would likely be placed—such as the Central Valley—because CO_2 is an asphyxiant that can lead to suffocation and death, even when there is a leak into the ambient atmosphere.[136]

For these reasons, relying on BECCS to get California to meet its emissions reduction targets is bound to end in failure. Doing so—and promoting development of more biomass energy and CCS—also puts communities' health and safety at risk. The Plan must therefore cut out all reliance on, and promotion of, BECCS.

C. To the Extent the Plan Relies on Hydrogen, Only Truly "Green Hydrogen" Made From Renewables Like Wind and Solar Should Be Considered

The Plan recommends increasing use of hydrogen, but falls short of recommending truly "green" hydrogen and instead allows for dirtier, more climate-polluting forms of hydrogen that will do little to advance climate goals and reduce pollution.

In some circumstances, hydrogen can be a climate tool when it is made using 100% renewable electricity to split hydrogen from water molecules. As one paper notes, truly green hydrogen "is the only established way to produce hydrogen without emitting greenhouse gases or other health-harming pollutants."[137]

Right off the bat, though, the Plan opens the door to dirtier forms of hydrogen—and confusion over what green hydrogen truly is—by stating that "[f]or the purposes of the Draft 2022 Scoping Plan, 'green hydrogen' is *not limited* to only electrolytic hydrogen produced from renewables."[138] This plainly contrasts with the common conception of green hydrogen,[139] and the Plan offers no rationale for why it would greenwash a technology and change a commonly

[133] Partnership for Policy Integrity 2011.
[134] Jacobson 2019.
[135] Pipeline Safety Trust 2022.
[136] Zegart 2021.
[137] Earthjustice, Reclaiming Hydrogen for a Renewable Future (2021), https://earthjustice.org/sites/default/files/files/hydrogen_earthjustice_2021.pdf.
[138] Scoping Plan at i.
[139] *See, e.g.*, Columbia Climate School, *Why We Need Green Hydrogen* (Jan. 7, 2021), https://news.climate.columbia.edu/2021/01/07/need-green-hydrogen/; Robbins, Jim, Green Hydrogen: Could It Be Key to a Carbon-Free Economy?, Yale Environment 360 (Nov. 5, 2020), https://e360.yale.edu/features/green-hydrogen-could-it-be-key-to-a-carbon-free-economy; Earthjustice 2021.

understood definition. The Plan needs to adopt the common definition of green hydrogen and be clear as to which types of hydrogen it is recommending and for what purposes, as the energy used to make hydrogen has consequences for the climate and communities. In addition, green hydrogen must not include hydrogen made from biomethane or biomass—a definition pushed by industry but that doesn't match up with GHG emission goals.[140]

The Plan offers that, rather than true green hydrogen made from renewables, hydrogen can be made through "steam methane reformation of renewable or fossil gas. If steam methane reformation is paired with CCS, the hydrogen produced could potentially be zero carbon."[141] Hydrogen produced using fossil fuels is antithetical to GHG emission reduction goals. Steam methane reforming, for example, results in "gray" hydrogen and the emission of 830 million metric tons of CO_2 each year.[142] As established in this comment letter, CCS is no immediate fix to troublesome CO_2 emissions. Instead, CCS projects regularly fail to meet their targets, and their true lifecycle emissions fall short of being a true climate solution.

The Plan must not use the blanket term "hydrogen" to mean a true climate solution; only truly green hydrogen made from renewables like wind and solar can help reduce GHG emissions and other pollutants. As one group succinctly put it, "[u]sing hydrogen will not break our dependence on fossil fuels unless we quit relying on fossil fuels to produce hydrogen."[143]

D. The Draft Scoping Plan Fails to Analyze the Cap-and-Trade Program, Undermining the Plan's Role as a Blueprint for Meeting the State's Climate Targets.

Despite the fact that California's "carbon market covers about 75 percent of total greenhouse gas emissions and plays an important role in helping the state meet its 2030 emissions limit,"[144] the Scoping Plan hardly discusses cap-and-trade, punting any policy changes to the future.[145] Specifically, the draft Plan states that CalEPA will evaluate the status of the allowance supply in 2023, after the adoption of the 2022 Scoping Plan.[146] Further, the discussion of cap-and-trade in the draft Plan fails to address the significant critiques raised in the 2021 Annual Report of the Independent Emissions Market Advisory Committee (IEMAC). As the IEMAC anticipated, the lack of any real evaluation of the cap-and-trade program or related policy recommendations severely undercuts its role as an "'actionable blueprint'" for the state's climate efforts.[147]

The 2017 Scoping Plan update estimated that direct emissions would account for 385 MMT of CO_2e reductions between 2021-2030, and that the cap would backfill the remaining 236 MMT

[140] Earthjustice 2021.
[141] Scoping Plan at 69.
[142] Columbia Climate School 2021.
[143] Earthjustice 2021.
[144] Burtraw, Dallas et al., 2021 Annual Report of the Independent Emissions Market Advisory Committee (Feb. 4, 2022) at 3, https://sbud.senate.ca.gov/sites/sbud.senate.ca.gov/files/2021-IEMAC-Annual-Report.pdf [hereinafter 2021 Annual Report].
[145] Draft Scoping Plan at 86.
[146] *Id.* at 87.
[147] 2021 Annual Report at 8-9.

CO_2e in addition to the needed cumulative reductions.[148] The 2022 draft Scoping Plan estimates that cap-and-trade may only be needed to fill 44 MMT CO2e in the year 2030 alone, compared to 60 MMT CO2e in 2030 predicted by the 2017 Scoping Plan.[149] While that reduction is a positive sign, it is missing a critical uncertainty analysis, and is therefore not much more reliable than a back-of-the-envelope calculation. It is important for the Scoping Plan to identify replicable climate policy and its abatement potential as well as how to close an emissions gap with the greatest possible certainty in order to meet climate targets."[150]

Further, the Scoping Plan entirely ignores programmatic flaws that will likely undermine its ability to achieve even those reductions. For instance, the IEMAC noted a continued overallocation of allowances.[151] The Report found that "private market participants banked 321 million allowances" originating before 2021, *and* that current California and Québec regulations "indicate an additional approximately 2,996 million allowances will be made available through 2030 via free allocation and regular quarterly auctions; and that approximately 274 million more allowances are available in various government reserve and cost containment accounts."[152] The 2022 draft Scoping Plan estimates that there are 310 million unused allowances in circulation at the close of the third compliance period in 2020.[153] That is, there are currently more banked allowances than the total projected reductions expected of the cap-and-trade program in the 2021-2030 period, as estimated by the 2017 Scoping Plan. Yet the draft Scoping Plan does not grapple with the question of whether or how a surplus of allowances may serve to postpone new, onsite reductions over the next decade, or how the program should be reformed to address the oversupply of allowances to achieve in-state reductions.

Similarly, forest offsets constitute about 80% of the offset instruments in the market.[154] Yet as explained in Section V (on Natural and Working Lands) below, carbon offsets have repeatedly failed to reduce emissions, and have been criticized for failing to demonstrate additionality, provide permanence, and control for leakage and gaming.[155] Again, the draft Scoping Plan ignores the extent to which these offsets undermine in-state reductions.

Combined with these program faults is the fact that market prices for allowances have hovered near the floor at $19.70 per ton of CO_2 emissions in 2022, a defect that is not helped by the price ceiling put in place by AB 398.[156] While "prices for allowances will continue to increase at least 5 percent plus inflation year-over-year," there is no evidence supporting the draft Scoping Plan's assertion that this "send[s] a steadily increasing price signal to spur investment in onsite

[148] *Id.* at 7.
[149] Draft Scoping Plan at 87, 90.
[150] 2021 Annual Report at 11.
[151] *Id.* at 14-19.
[152] *Id.* at 17 (citations omitted).
[153] Draft Scoping Plan at 87, 90.
[154] 2021 Annual Report at 5.
[155] See e.g., Badgley, Grayson et al., Systematic over-crediting in California's forest carbon offsets program, 28 Global Change Biology 1433 (2022), DOI:10.1111/gcb.15943. *See also* 2021 Annual Report at 5-6, 30-33 (citing investigative journal articles in addition to peer-reviewed papers), 39-40.
[156] 2021 Annual Report at 3.

reductions for covered entities."[157] The price remains far below the social cost of carbon estimates—which themselves underestimate the true costs of carbon pollution—hardly a major impetus for significant onsite reductions.

The only real criticism of the program mentioned in the draft Scoping Plan is the suggestion that allowing facilities to use offsets undermines reductions in co-pollutants, especially in disadvantaged communities.[158] Again, the draft Scoping Plan simply dismisses this critique by citing one recent, limited study,[159] but ignoring another that reached a different conclusion.[160]

While the Scoping Plan should focus on achieving direct emissions reductions in California by increasing its ambitions, it is clear that CARB will continue to rely on cap-and-trade to fill in any remaining gap in necessary reductions. The cap-and-trade program is deeply flawed, however, and requires a major overhaul in order to be effective. It is unclear how the state is actually going to meet its emissions targets when it has failed to seriously grapple with these flaws in its climate roadmap.

IV. THE DRAFT SCOPING PLAN PLACES UNREALISTIC EXPECTATIONS ON AVIATION EMISSIONS REDUCTIONS FROM SUSTAINABLE AVIATION FUELS, WHILE IGNORING MORE PRACTICAL SOLUTIONS

The Scoping Plan's proposed action assumes that only 10% of aviation fuel demand is met by electrification or hydrogen in 2045, and that the rest is met by so-called Sustainable Aviation Fuels (SAFs). [161] While the Plan devotes little space to aviation, these assumptions are unreasonable. According to the Biden administration, SAFs are alternative aviation fuels derived from biomass that achieve at least a 50% reduction in lifecycle greenhouse gas emissions compared to conventional fuel. However, even if a massive quantity of such alternative aviation fuels could be generated, many of them are not, in fact, sustainable. The Plan ignores the emissions and environmental consequences associated with many of the alternative fuels being considered that would disqualify them from use. Rather than a false solution like SAFs, California—in partnership with the federal government—should focus on more practical solutions, such as operational and regulatory improvements, while plotting a course to a fully electrified aviation sector.

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[157] Draft Scoping Plan at 87.
[158] *Id.* at 86.
[159] *Id.*, citing Plummer, Laurel, et al., Impacts of greenhouse gas emission limits within disadvantaged communities: Progress toward reducing inequities, OEHHA and CalEPA (2022) (noting its own limitations, such as in "understanding the spatial use of offsets," at 50).
[160] See e.g., Pastor, Manuel et al., Up in the Air: Revisiting Equity Dimensions of California's Cap-and-Trade System (2022), https://dornsife.usc.edu/assets/sites/1411/docs/CAP_and_TRADE_Updated_2020_v02152022_FINAL.pdf (finding that while disadvantaged communities (DACs) saw some improvements in reduced co-pollutants from cap-and-trade facilities, "these improvements were less than those in non-DACs, with many of the contrasts being statistically significant.").
[161] Draft Scoping Plan at 58.

The draft plan places most of its hopes for emissions reductions on Sustainable Aviation Fuels. Yet, purported "Sustainable" Aviation Fuels can neither be relied upon to reduce aviation emissions nor to minimize environmental harm.[162] The Biden administration names municipal solid waste, wastewater sludge, animal fats, animal manure, used cooking oil and greases, algae, crop and forestry residues, wood biomass, energy crops and food crops as potential SAF feedstocks.[163] Of these, only municipal solid waste, wastewater sludge, used cooking oil, and crop residues show any potential as sustainable sources. However, because they are waste streams, their supply should remain limited since our goal as a society should be waste reduction. The remainder of proposed feedstocks are not sustainable. Food crop-based feedstocks yield GHG emissions comparable to fossil fuels, so they are not sustainable. Meanwhile, animal fats and animal manure are products of the polluting animal agriculture industry, and their use further incentivizes the industry's expansion and its environmental harms. Relying on wood biomass or forestry residues could promote forest logging, hence destroying a significant carbon sink. Finally, energy crops and algae are far from commercial readiness and at present also pose an environmental burden.

According to research conducted by the Center for Biological Diversity, after eliminating feedstocks that fail to meet certain sustainability criteria, only 4% to 38% of a 35-billion-gallon demand for aviation fuel nationwide would be met by SAFs in 2050. Since the path for the U.S. to scale up feedstock production is highly uncertain, SAFs cannot be expected to satisfy 90% of California's aviation fuel demand if truly sustainable feedstocks are to be used. Thus, the claim that SAFs can decarbonize the aviation industry is a destructive falsehood and must be rejected.

On the other hand, the Scoping Plan drastically underestimates the emissions reductions that can come from increased electrification of flights.[164] Electric commercial flight is on the horizon and strong, technology-forcing standards can speed the development and deployment of this important technology. With continued advancement, all short-haul flights could be electrified by 2040 and all long-haul flights by 2045. In 2018 one-third of passenger CO_2 emissions occurred on short-haul flights of less than 1,500 km (810 nautical miles), one-third on medium-haul flights of between 1,500 km and 4,000 km (2,160 nautical miles), and one-third on long-haul flights greater than 4,000 km.[165] Assuming this breakdown is representative of future U.S. emissions trends, electrifying short-haul flights by 2040 could reduce emissions by over 30%. Meanwhile a 2018 study found that, assuming strong progress in battery technology, electric aircraft could cover a 2,222 km (1,200 nautical mile) range, thus replacing more than 80% of global aircraft

[162] *See generally*, Fleming, John, Center for Biological Diversity, The Biofuels Myth: Why "Sustainable Aviation Fuels" Will Not Solve Aviation's Emissions Problem, *forthcoming*.
[163] U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy, Sustainable Aviation Fuels (last visited Feb.24, 2022), https://www.energy.gov/eere/bioenergy/sustainable-aviation-fuels.
[164] *See generally*, Fleming, John, Flight Path: A Trajectory for U.S. Aviation to Meet Climate Goals, Center for Biological Diversity (2020), https://www.biologicaldiversity.org/programs/climate_law_institute/pdfs/Flight-Path-A-Trajectory-for-U-S-Aviation-to-Meet-Global-Climate-Goals.pdf.
[165] Graver, Brandon et al., CO2 emissions from commercial aviation, 2018, International Council on Clean Transportation (2019), https://theicct.org/sites/default/files/publications/ICCT_CO2-commercl-aviation-2018_20190918.pdf.

departures while reducing fuel use and direct CO_2 emissions by around 40%. This would depend on a battery with an energy density above 800 Wh/kg.[166]

Battery technology is rapidly advancing. A battery with the energy density sufficient to be competitive with current aircraft propulsion systems for regional and larger commercial flight could be available as early as 2030.[167] From there, to reach the necessary battery density to electrify long-haul flights by 2045, we will have to improve existing battery and aircraft technologies and perhaps embrace new ones. If combined with 3.5% annual fuel efficiency improvements starting in 2020, electric aircraft targets in 2040 and 2045 would reduce cumulative emissions by 3.2 and 3.4 billion tons CO_2 eq by 2040 and 2045, respectively.[168] The draft Scoping Plan undervalues this potential for electrified flight and is thus stifling potential emissions savings.

Additionally, there are other opportunities available to reduce emissions from aviation. According to the International Council on Clean Transportation, California is "especially well-positioned" to provide financial and policy support (such as research and development assistance) for zero-emission aviation, due to the startups located in the state.[169] California could also charge differential landing fees, or offer certain take-off and landing priority, based on the fuel efficiency of aircraft, in order to prioritize newer, cleaner aircraft.[170] Finally, California could encourage "modal shift" policies, which can replace a portion of intrastate flights by developing alternatives, such as high-speed rail. The Scoping Plan should have explored these possibilities in more depth, instead of placing unrealistic demands on the false promise of SAFs.

V. THE DRAFT SCOPING PLAN PROPOSED SCENARIO FOR NATURAL AND WORKING LANDS IS DANGEROUS AND COUNTER-PRODUCTIVE, AND MUST BE REVISED TO PRIORITIZE DIRECT EMISSIONS ACROSS ALL NON-NWL SOURCES AND ECOSYSTEM PROTECTION.

The Scoping Plan's Proposed Scenario for Natural and Working Lands (NWL) is gravely inadequate to maintain and increase the existing carbon storage and sequestration on these lands. In particular, the Proposed Scenario's massive ramp-up of cutting and habitat clearance of forests and shrublands would be harmful to the climate, biodiversity, and communities, and must be rejected.

The Scoping Plan must prioritize ambitious *direct* emissions reductions across all non-NWL sectors to achieve near zero emissions by 2035, without including offsets from NWL that justify

[166] Schafer, A.W. et al., Technological, economic and environmental prospects of all-electric aircraft, 4 Nature Energy 160 (2018).
[167] Berger, Roland, Aircraft Electrical Propulsion—Onwards and Upwards (2018), available at: https://www.rolandberger.com/en/Publications/Electrical-propulsion-ushers-in-new-age-of-innovation-in-aerospace.html.
[168] Fleming 2020, Flight Path report at 16.
[169] Zheng, Xinyi & Dan Rutherford, Reducing Aircraft CO2 Emissions: The role of U.S. Federal, State, and Local Policies, ICCT (2021), https://theicct.org/sites/default/files/publications/Aviation-CO2-US-feb2021.pdf at 7.
[170] *Id.*

pollution elsewhere. At the same time, the Scoping Plan and Proposed Scenario must prioritize ecosystem protection policies that meet the state's goal to conserve at least 30% of California's land and coastal waters by 2030 by increasing protection of forests, shrublands, wetlands, and other ecosystems that act as enormous carbon storehouses that pull carbon dioxide out of the air, easing the climate crisis, in addition to providing many other benefits such as wildlife habitat, recreation, flood and erosion control, and clean air and water. Because forest ecosystems provide critical carbon storage and sequestration, the Scoping Plan must prioritize alternatives for forests that stop deforestation and forest degradation on public lands, reduce cutting on private lands, and support managed wildfire.

CARB's Proposed Scenario for forests and shrubland calls for a massive ramp up of logging, thinning, and habitat clearance that will reduce carbon stocks and sequestration, increase carbon emissions, fail to reduce wildfire intensity or keep communities safe, and undermine California's climate goals. CARB must reject this dangerous and counter-productive Proposed Scenario. CARB must instead rely on the best-available science, conduct robust modeling that corrects the fatal flaws in its current modeling for forests and shrublands, and evaluate alternatives that will actually maintain and increase carbon storage, while protecting California's climate, communities, and biodiversity, as science and justice require.

The Scoping Plan must analyze and set more ambitious targets for pesticide reduction and organic agriculture. California must also collaborate with Indigenous Peoples and Indigenous Nations to uplift and support traditional land practices such as cultural burning.

A. The Scoping Plan Must Prioritize Ambitious Direct Emissions Reductions Across Non-NWL Sectors to Achieve Near Zero Emissions by 2035, Without Including Offsets from NWL that Justify Pollution Elsewhere.

The Scoping Plan must prioritize ambitious *direct* emissions reductions across all *non-NWL* sectors to achieve near zero emissions by 2035 since this is the most certain and effective way to confront the climate crisis and reduce the pollution harming communities. Any reductions in carbon emissions achieved in the NWL sector must be *additional to*, not instead of, these direct emissions reductions. Policies to reduce emissions from NWL must not include carbon offsets that justify pollution elsewhere and disproportionately harm communities of color and low-income communities, causing them to bear the brunt of pollution and worsening environmental injustice.[171] Carbon offsets have repeatedly failed to reduce emissions, and have been criticized for failing to demonstrate additionality, provide permanence, and control for leakage and gaming.[172] Offsets can result in violations of the rights of Indigenous Peoples.[173]

B. The Scoping Plan NWL Alternatives and Proposed Scenario Must Prioritize Ecosystem Protection Policies that Meet the State's Goal to Conserve at Least

[171] Cushing, L. et al., Carbon trading, co-pollutants, and environmental equity: Evidence from California's cap and trade program (2011-2015), 15 PLoS Med e1002604 (2018).
[172] See e.g., Badgley 2022.
[173] Carbon Market Watch, The Clean Development Mechanism: Local Impacts of a Global System (October 2018).

30% of California's Land and Coastal Waters by 2030, Which Will Provide Significant Climate and Biodiversity Benefits.

Executive Order N-82-20 set the goal to conserve 30% of the State's NWLs and coastal waters by 2030. However, the Scoping Plan fails to include policy measures that increase protection of forests, shrublands, wetlands, and other ecosystems to achieve this goal. Increasing ecosystem protection is critical for addressing the interlinked climate and extinction crises, since these ecosystems act as enormous carbon storehouses that pull carbon dioxide out of the air, easing the climate crisis, in addition to providing many other benefits such as wildlife habitat, recreation, flood and erosion control, and clean air and water.

Instead, the NWL alternatives including the Proposed Scenario call only for "no land conversion of forests, shrublands/chaparral, or grasslands." Preventing land conversion does not equate to protecting ecosystems and their biodiversity, integrity, function, and carbon storage. The Scoping Plan alternatives should model increased levels of ecosystem protection—including increased amounts of protected areas of these vital ecosystems where protection means supporting ecosystem diversity, function, and carbon storage—as a key policy across the NWL land types.

C. The Scoping Plan Must Prioritize Alternatives for Forests that Stop Deforestation and Forest Degradation on Public Lands, Reduce Cutting on Private Lands, and Support Managed Wildfire.

Because forest ecosystems provide critical carbon storage and sequestration, the Scoping Plan must prioritize alternatives that stop deforestation and forest degradation on public lands, reduce cutting on private lands, and support managed wildfire. Protecting existing forests from logging/thinning and allowing logged forests to continue to grow and reach their full biological carbon sequestration potential is a highly and immediately effective, low-cost approach to removing carbon dioxide from the atmosphere.[174] Growing existing forests intact to their ecological potential—termed *proforestation*—maximizes forest biological carbon sequestration and is critical for limiting global warming to 1.5°C.[175]

On private forestlands, CARB should model longer harvest rotations, avoidance of clearcutting and other intensive forms of tree removal, and the retention of larger trees, all of which allow forests to accumulate more carbon. A comprehensive study by Law et al. (2018) concluded that lengthened harvest cycles on private lands and restricting logging/thinning on public lands are the most effective management measures for increasing net ecosystem carbon balance.[176]

[174] Buotte, P.C. et al., Carbon sequestration and biodiversity co-benefits of preserving forests in the western United States, 30 Ecological Applications e02039 (2020) https://esajournals.onlinelibrary.wiley.com/doi/10.1002/eap.2039; Moomaw 2019.
[175] Moomaw 2019.
[176] Law, B.E. et al., Land use strategies to mitigate climate change in carbon dense temperate forests, 115 PNAS 3663-3668 (2018), https://www.pnas.org/content/115/14/3663.

CARB should also model managed wildland fire in which land managers decide to allow lightning-caused fires to burn in order to protect carbon storage, enhance natural heterogeneity, increase forest health and resilience, and benefit wildlife. Schoennagel et al. (2018) highlighted that "[m]anaging rather than aggressively suppressing wildland fires can promote adaptive resilience as the climate continues to warm."[177]

D. The Proposed Scenario for Forests and Shrubland Calls for a Massive Ramp up of Logging, Thinning, and Habitat Clearance that Will Reduce Carbon Stocks and Sequestration, Increase Carbon Emissions, Fail to Reduce Wildfire Intensity or Keep Communities Safe, and Undermine California's Climate Goals.

Forests, shrublands, and grasslands make up approximately 91% of all California NWL carbon stocks, as noted in the Scoping Plan, with forests as the dominant providers of carbon storage. Therefore, prioritizing forest, shrubland, and grassland management activities that protect carbon storage and sequestration, while also protecting community safety and biodiversity, is key.

Instead, the Proposed Scenario calls for a massive ramp-up in deforestation, forest degradation and habitat clearance of 2 to 2.5 million acres of forest, shrublands, and grasslands every year. The best-available science shows that this alternative will reduce forest and shrubland carbon storage and sequestration; increase overall carbon emissions; and fail to reduce wildfire intensity, keep communities safe, or protect public health—thereby undermining California's climate, biodiversity and public safety goals.

CARB must reject this dangerous and counter-productive Proposed Scenario. CARB must instead rely on the best-available science, conduct robust modeling that corrects the fatal flaws in its current modeling for forests and shrublands, and evaluate alternatives that will actually maintain and increase carbon storage, while protecting California's climate, communities, and biodiversity, as science and justice require.

i. CARB's Own Modeling Shows That the Proposed Scenario Focused on Thinning and Logging Results in Lower Forest Carbon Storage Than Alternative 1 or BAU Across Years, Including 2040-2049.

CARB's own modeling results indicate that increased forest management under the Proposed Scenario focused on thinning/logging is detrimental to forest carbon storage. Under alternatives 2, 3 (proposed scenario), and 4 representing increased management of ~1M acres/year, 2 to 2.5M acres/year and ~5 to 5.5M acres/year respectively, total forest biomass stock from years 2040-2049 is less than under business-as-usual management, defined as the level of management between 2001-2014, and less than in Alternative 1 which models a low-level management approach for forests that includes continuing current levels of fire suppression and doing defensible space work. Table 22 of Appendix I, which shows "carbon stocks in forest biomass, and harvested wood products (MMT C)" over time, reports the highest average carbon stocks

[177] Schoennagel, Tania et al., Adapt to more wildfire in western North American forests as climate changes, 114 PNAS 4582 (2017), https://www.pnas.org/content/114/18/4582.

during 2040-2049 for Alternative 1 (1188 MMT C), second highest for BAU (1186 MMT C), and lowest stocks for Alternatives 2 (1165), 3 (1179) and 4 (1159).[178] Even the Scoping Plan briefly acknowledges that Alternative 1 is the scenario with the highest carbon stocks in 2045.[179] These results make clear that spending billions of dollars on increased forest cutting is detrimental to forest carbon storage and the climate, as well as the harms it causes to biodiversity and ecosystem services.

ii. CARB's Forest Modeling Incorrectly Concludes That Alternative 1 Will Result in the Highest Wildfire Carbon and PM 2.5 Emissions Based on Scientifically Unsound Modeling Assumptions, Which Must be Corrected.

CARB's forest modeling relies on scientifically unsubstantiated assumptions that result in overestimates of wildfire carbon and PM 2.5 emissions under Alternative 1, and result in underestimates of wildfire emissions under the Proposed Scenario. This leads to inaccurate conclusions regarding the public health impacts of the alternatives, which biases CARB's findings against Alternative 1. This must be corrected.

a. CARB Did Not Provide Adequate Time for the Public to Review the Technically Complex Appendix I Technical Support Document for NWL.

As an initial matter, Appendix I is a long, highly complex and often unclear 256-page document that serves as the technical support document for the NWL sector. CARB has not provided adequate time for the public to review this document. For the Forests, Shrublands, and Grasslands section, there are entire modeling analyses and results that were not included in the draft documents, for example, the modeling of "Biomass Residues and Potential Carbon Benefits" on pages 102-120 that is virtually incomprehensible. The modeling assumptions, limitations, inputs and outputs are often not provided, transparent, or understandable, constraining public review. Based on our experience with the notable limitations of the CALAND model, we have repeatedly urged CARB to provide the public with the documentation for the RHESys model, and the models used for other NWL types, early on in the Scoping Plan process, which CARB did not do.

b. CARB's Forest Modeling Includes Unsubstantiated Assumptions That Thinning Will Decrease Fire Severity and Therefore Decrease Wildfire Emissions.

CARB's forest modeling makes the unsubstantiated assumption that the heavier thinning and logging under Alternatives 2, 3, and 4 will decrease fire severity and therefore decrease wildfire emissions. Numerous studies, including a recent review of the science by forest carbon experts Beverly Law, William Moomaw, Tara Hudiburg, William Schlesinger, John Sterman, and George Woodwell concludes that thinning is not effective for reducing fire severity:

[178] Appendix I at Table 22.
[179] Scoping Plan at 55.

> As to the effectiveness and likelihood that thinning might have an impact on fire behavior, the area thinned at broad scales to reduce fuels has been found to have little relationship to area burned, which is mostly driven by wind, drought, and warming. A multi-year study of forest treatments such as thinning and prescribed fire across the western U.S. showed that about 1% of U.S. Forest Service treatments experience wildfire each year. The potential effectiveness of treatments lasts only 10–20 years, diminishing annually. Thus, the preemptive actions to reduce fire risk or severity across regions have been largely ineffective.[180]

Contrary to the assumptions in CARB's modeling, the researchers concluded that "[b]road-scale thinning to reduce fire severity results in more carbon emissions than would be released by fire, creating a multi-decade carbon deficit that conflicts with climate goals" and that "the amount of carbon removed by thinning is much larger than the amount that might be saved from being burned in a fire, and far more area is harvested than would actually burn."[181]

c. CARB's Forest Modeling Systematically Overestimates Wildfire Emissions.

As detailed in prior comments, the RHESys model being used for forest and shrublands substantially over-estimates wildfire emissions by using unrealistic biomass combustion factors and under-representing the biomass stored in standing dead trees after fire.[182] Specifically, the LANDFIRE model used by RHESys classifies post-forest-fire vegetation categories as having less carbon than they actually do. First, the model does not account for the large stores of post-fire carbon persisting in killed trees and other unburned fuels.[183] In practice, the model effectively assumes that when trees are killed, they are vaporized immediately and all the carbon goes into atmosphere, which is demonstrably incorrect. Second, the model makes broad assumptions about changes in vegetation categories based on LANDFIRE satellite imagery (which the Inventory acknowledges leads to substantial vegetation category classification inaccuracy[184]) and the mean carbon density in each vegetation category. Significant wildfire emissions overestimates can occur when a mature forest that has high-intensity fire is reclassified

[180] Law, B.E. et al., Creating strategic reserves to protect forest carbon and reduce biodiversity losses in the United States, 11 Land 721 (2022), https://doi.org/10.3390/land11050721, at 7.
[181] *Id.* at 6; See also Bartowitz, K. et al., Forest carbon emission sources are not equal: putting fire, harvest, and fossil fuel emissions in context, 5 Frontiers in Forests and Global Change 867112 (2022).
[182] Stenzel, Jeffrey E. et al., Fixing a snag in carbon emissions estimates from wildfires, 25 Global Change Biology 3985 (2019), https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.14716.
[183] CARB, Technical Support Document for the Natural & Working Lands Inventory (Dec. 2018 Draft), https://ww3.arb.ca.gov/cc/inventory/pubs/nwl_inventory_technical.pdf, at 19 ("The fire-attributed stock changes account only for carbon contained in live and dead pools associated with the post-fire (e.g. 2012) vegetation type, and have no memory of the previous vegetation type, i.e. they do not account for potential post-fire carbon persisting in unburned fuels or in killed trees.")
[184] CARB, An Inventory of Ecosystem Carbon in California's Natural and Working Lands (2018 Edition), https://ww3.arb.ca.gov/cc/inventory/pubs/nwl_inventory.pdf, at 47-48.

as shrubland but still has large amounts of carbon stores in the snags and downed logs that are not counted.

CARB can correct for these flawed estimates by using empirical field data of forest carbon consumption based on actual wildfires.[185] Empirical research by Harmon et al. (2022) in California's Rim Fire and Creek Fire areas found that less than 2% of living tree biomass combusted.[186] Even in severe fire patches, the larger-size trees showed low combustion rates of less than 5% with most combustion coming from needles and small branches less than 2 centimeters in diameter. This study provides combustion rates for aboveground woody parts at multiple levels of organization (twigs, branches, trees, stands, and landscapes) and accounts for tree species, size, and fire severity in Ponderosa pine and mixed conifer-dominated forests of the Sierra Nevada. The review of forest carbon science by Law et al. (2022) similarly concluded that "[w]hile moderate to high severity fire can kill trees, most of the carbon remains in the forest as dead wood that will take decades to centuries to decompose."[187]

d. CARB's Modeled PM 2.5 Emissions for Alternative 1 are Overestimates That Improperly Penalize This Scenario.

CARB's PM 2.5 estimates are based on the annual biomass consumption estimates from RHESSys modeling.[188] However, the estimates of forest biomass consumed by wildfires is over-estimated for Alternative 1 as detailed above, making the associated PM 2.5 estimates for Alternative 1 inflated as well. As a result, CARB reports that Alternative 1 has the largest health costs based on its PM 2.5 emissions,[189] but this is a faulty conclusion based on faulty modeling assumptions.

e. CARB Massively Inflates the Economic Costs of Alternative 1 by Including Enormous Amounts of Urban Forestry Only in this Alternative; the Costs of Urban Forestry Must be Disaggregated From the Alternatives so as to Not Unfairly Bias the Results.

CARB reports that Alternative 1 is the most expensive, with a projected annual cost of $84 billion per year, which is "almost entirely due to the large cost of spending on urban forests, as NWL Alternative 1 targeted the theoretical maximum urban tree cover by 2045."[190] As reported in the Scoping Plan, "only NWL Alternative 1 provides more GHG reductions from lands but comes with a 25x increase in direct costs relative to NWL Alternative 3"[191] because of the inclusion of enormous levels of urban forestry. In contrast, the other alternatives have much

[185] Campbell, J., et al., Pyrogenic carbon emission from a large wildfire in Oregon, United States, 112 Journal of Geophysical Research Biogeosciences G04014 (2007).
[186] Harmon, M.E. et al., Combustion of Aboveground Wood from Live Trees in Mega-fires, CA, USA, 13 Forests 391 (2022), https://doi.org/10.3390/f13030391.
[187] Law, B.E. (2022) et al. at 7.
[188] Appendix I at 95.
[189] *Id.* at Figures 30, 31.
[190] Scoping Plan at 97-98.
[191] *Id.* at 55.

lower amounts of urban forestry that result in their much lower costs compared to Alternative 1. CARB must disaggregate the effects, including the costs, of different levels of urban forestry across all alternatives, so as not to improperly bias the results against Alternative 1.

iii. CARB's Forest Modeling Makes Other Scientifically Unsubstantiated Assumptions That Bias the Results Against Alternative 1.

CARB's modeling over-estimates the carbon storage in harvested wood products over time for the Proposed Scenario. CARB acknowledges that its model "assumes that HWP carbon that enters the system stays in the system at least until 2045" and that "[f]uture developments of this assessment should incorporate some decay factor that captures the gradual loss from this pool."[192] CARB must use estimates of the loss of carbon storage in wood products over time from published research that corrects false assumptions and provides robust estimates such as Harmon (2019).[193] This is important because the forest modeling results report total biomass stock which includes both forest biomass (above and below-ground) and biomass in harvested wood products. Correcting for the over-estimations of carbon storage in harvested wood products would provide a more accurate, lower estimate of carbon storage over time for the Proposed Alternative and Alternatives 2, 3, and 4.

CARB's modeling also assumes that forests have been acting as a carbon source from 2000-2014, contrary to published research, and thus CARB relies on an inaccurate baseline. Contrary to CARB's modeling assumptions, Hudiburg et al. (2019) developed a transparent and transferable accounting method of all forest-derived carbon for California, Oregon and Washington, and concluded that California forests are acting as net carbon sinks because net forest carbon uptake resulting from biological processes exceed losses due to logging/thinning, wood product use, and wildfire combustion.[194] The California Forest Carbon Plan also concludes that California's forests have been acting as a net sink and sequestering carbon based on FIA Program data from 2006-2015.[195] When asked at the workshop about this discrepancy, staff replied that forest lands are acting as a carbon source because they are being converted to shrub or grassland following high-severity fire and these ecotypes hold less carbon. However, empirical studies in California that have investigated this issue have found that high-severity fire is not resulting in type conversion to non-forest nor conversion from pine forest to white-fir, Doug fir, and incense cedar forest. Instead, studies have documented substantial natural conifer regeneration following high-severity fire in mixed-conifer and yellow pine forests.[196] In addition,

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[192] Appendix I at 88.
[193] Harmon, Mark E., Have product substitution carbon benefits been overestimated? A sensitivity analysis of key assumptions, 14 Environmental Research Letters 065008 (2019), https://iopscience.iop.org/article/10.1088/1748-9326/ab1e95/pdf.
[194] Hudiburg, Tara W. et al., Meeting GHG reduction targets requires accounting for all forest sector emissions, 14 Environmental Research Letters 095005 (2019), https://iopscience.iop.org/article/10.1088/1748-9326/ab28bb.
[195] CARB, California Forest Carbon Plan (2018), *available at* https://ww2.arb.ca.gov/resources/documents/forest-carbon-plan at 103-104.
[196] Baker, William L., Transitioning western U.S. dry forests to limited committed warming with bet-hedging and natural disturbances, 9 Ecosphere e02288 (2018), https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.2288; Hanson, Chad T., Landscape heterogeneity

CARB's conclusion that forest lands are acting as a carbon source appears to be based largely on the Inventory of Ecosystem Carbon in California's Natural and Working Lands.[197] As described above, the Inventory's use of LANDFIRE results in faulty classifications of vegetation type post-fire and underestimates of carbon in post-fire ecosystems.

E. The Scoping Plan Must Analyze the Adverse Effects of Pesticides on Human Health, the Environment and the Climate.

The Scoping Plan must address pesticides' contribution to greenhouse gas emissions, pesticides' deleterious impact on soil's ability to sequester carbon, and analyze organic farming and pesticide reduction as a critical, nature-based climate solution.

i. Pesticides Harm the Environment and Farm Workers Bear the Burden of Pesticide Exposure and the Adverse Health Effects.

Reducing pesticides not only mitigates climate change, but also addresses serious environmental justice concerns affecting predominantly Latinx rural and farm-working communities throughout California.[198] Health impacts from pesticide exposure includes nausea, headaches, shortness of breath, and seizures, as well as the longer-term risks including chronic illness, cancer, and neurological disorder.[199] The mission of CARB is to promote and protect public health, welfare, and ecological resources through the effective and efficient reduction of air pollutants, and the regulation of pesticides is crucial to fulfill this mission.[200]

ii. Fumigants' Contribution to Greenhouse Gas Emissions.

Pesticide use in California plays a significant, yet overlooked, factor for greenhouse gas emissions. CARB must address emissions associated with pesticides. Specifically, CARB should address the contribution of commonly used fumigants' to greenhouse gas nitrous oxide (N_2O) emissions. Soil fumigants can cause increased emissions of N_2O and represent roughly one-fifth of the pesticides used in California.[201] For example, application of the commonly used fumigant chloropicrin can significantly increase N_2O production.[202] Similar classes of fumigants can yield

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[199] Greenfield 2021.

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[202] *Id.*

similar increases in emissions.[203] Additionally, methyl isothiocyanate producing fumigants—metam sodium and dazomet—also increase nitrous oxide production significantly.[204] Tens of million pounds of these three fumigants are used every year in California fields.[205]

CARB must also address pesticides' contribution of volatile organic compounds (VOCs), an ozone precursor.[206] Tropospheric ozone (O_3) is one of the most important greenhouse gases contributing to climate change.[207] VOC emissions related to pesticides include the fumigants methyl bromide, 1,3-dichloropropene, chloropicrin, metam sodium, metam potassium and dazomet.[208] In California's San Joaquin Valley, an ozone and VOC non-attainment area, 65% of VOC emissions are from high VOC formulations of non-fumigant pesticides including abamectin, chlorpyrifos, gibberellins and oxyfluorfen.[209] The contribution of these pesticides must also be measured.

CARB must also take steps to curb sulfuryl fluoride. Sulfuryl fluoride is a toxic air contaminant and an extremely potent short-lived climate pollutant.[210] It is a commonly used fumigant in California,[211] but CARB has not taken adequate steps to reduce its use despite recognizing it as a greenhouse gas of concern. To contextualize sulfuryl fluoride's climate impact, its use in California each year is equal to the carbon dioxide emitted from about one million vehicles.[212]

iii. Pesticides Negatively Impact Soil's Natural Ability to Sequester Carbon.

CARB must also address pesticides' negative impact on soil carbon sequestration. Synthetic pesticides, through their deleterious effect on microorganisms, decrease the soil's capacity to sequester carbon, reduce soil organic matter and the many associated benefits including cycling and provision of nutrients, suppress of phytopathogens, and build resistance to both biotic and

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[203] *Id.*
[204] Spokas K., Wang D., Venterea. R., Greenhouse gas production and emission from a forest nursery soil following fumigation with chloropicrin and methyl isothiocyanate, 37 Soil Biology & Biochemistry 475 (2005), https://doi.org/10.1016/j.soilbio.2004.08.010.
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[207] IPCC, *Chapter 4: Atmospheric Chemistry and Greenhouse Gases*, *in* TAR Climate Change 2001: The Scientific Basis (2001), https://www.ipcc.ch/site/assets/uploads/2018/03/TAR-04.pdf.
[208] Cal. Department of Pesticide Regulation, *Reducing VOC Emissions from Field Fumigants*, https://www.cdpr.ca.gov/docs/emon/vocs/vocproj/reg_fumigant.htm (last visited June 10, 2022).
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abiotic stressors.[213] A recent review of almost 400 studies showed pesticide use was associated with damage to soil invertebrates in more than 70% of the studies.[214] Pesticide impacts include inhibition of nitrogen-fixing bacteria, decreased populations of mycorrhizal fungi, detrimental shifts in nematode populations, and decimation of earthworm populations.[215] CARB should analyze the impacts of and provide solution pathways to reduce the impacts of pesticides on soil carbon sequestration.

iv. Organic Farming Reduces Greenhouse Gas Emissions from Pesticides.

An important tool to reduce pesticides' contributions to greenhouse gas emissions is increased organic agricultural production, which results in the reduction of pesticide use. A long-term research project on agricultural systems, conducted by University of California, Davis, found that after ten years, organic systems dramatically increased the rate of carbon sequestration.[216] That trend continues over longer periods.[217] This proven strategy should be analyzed by CARB and implemented in the upcoming scoping plan.

VI. THE DRAFT ENVIRONMENTAL ASSESSMENT ("EA") FAILS TO COMPLY WITH THE CALIFORNIA ENVIRONMENTAL QUALITY ACT.

Public agencies may not approve or carry out any project that may have a significant effect on the environment without first complying with the California Environmental Quality Act (CEQA).[218] A "project" is any discretionary action that may cause a direct or a reasonably foreseeable indirect physical change in the environment.[219] As CARB correctly recognizes, the Proposed Scoping Plan is a "project" as defined by CEQA.[220] And as a functionally equivalent document, the EA must comply with the goals and requirements of CEQA that the document provide meaningful information on impacts, alternatives, and mitigation measures, and not approve a project as proposed if there are feasible alternatives or mitigation measures.[221]

Here, the draft EA fails to comply with CEQA, among other reasons, because it uses unreasonable assumptions to analyze and mitigate impacts, and it provides a confusing and incomplete analysis of alternatives.

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[213] Gunstone et al., *Pesticides and Soil Invertebrates: A Hazard Assessment*, 9 Frontiers in Environmental Science 122 (2021), https://www.frontiersin.org/article/10.3389/fenvs.2021.643847.
[214] *Id.*
[215] *Id*.
[216] Kong, A. Y. et al., The relationship between carbon input, aggregation, and soil organic carbon stabilization in sustainable cropping systems, 69 Soil Sci Soc Am J. 1078 (2005).
[217] Wolf, K., et al., Long-term agricultural experiments inform the development of climate-smart agricultural practices, 71 California Agriculture 120 (2017).
[218] Pub. Res. Code §§ 21001, 21002.1, 21081.
[219] See Pub. Res. Code § 21065.
[220] Appendix B: Draft Environmental Analysis at 6.
[221] Pub. Res. Code § 21080.5(d); 17 Cal. Code Regs. §§ 60005(b); 60006.

A. The Draft Environmental Analysis Fails to Disclose, Evaluate, or Propose Mitigation for Potentially Significant Impacts.

An EIR must be prepared with a sufficient degree of analysis to provide decision-makers with the information needed to make an intelligent judgment concerning a project's environmental impacts.[222] Among many other defects, the flaws in modeling assumptions and analyses described above apply to the draft EA as well as to the draft Scoping Plan itself, and they are incorporated here by reference. As but one example, just as the Scoping Plan itself fails to incorporate cap-and-trade fully into the project and analysis—and does not even provide an accurate description of the amount of GHG reductions that will need to be achieved with the cap-and-trade program—so does the draft EA. Even though, as explained above (Section III.D.), cap-and-trade will account for a significant number of emissions reductions needed through the Scoping Plan, there is simply *no* discussion or analysis of its potential environmental impacts in the draft EA.

B. The Alternatives Analysis Fails Its Informational Purpose.

One of the fundamental purposes of environmental review is to inform decisionmakers and the public about the potential, significant impacts of a project.[223] It is also intended to prevent such impacts "through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible."[224] Additionally, the environmental review document must "include sufficient information about each alternative to allow *meaningful* evaluation, analysis, and comparison with the proposed project."[225] The alternatives analysis provided in the draft EA violates CEQA as it is utterly confusing and devoid of critical information to allow a comparison to the proposed scenario in the draft Scoping Plan.

Second, although the Scoping Plan itself and the EA both evaluate alternatives, the EA's alternatives do not align with the alternatives delineated in the draft Scoping Plan. In fact, CARB spent the previous year modeling the impacts of what essentially became the Scoping Plan alternatives. The EA, however, analyzes the impacts of an entirely new set of alternatives, which it then compares to the Scoping Plan's "Proposed Scenario" (chosen scenario/alternative). This unnecessary confusion makes it impossible for the public and policymakers to understand, compare, and evaluate the impacts of the alternatives in either the Scoping Plan or the EA.

The draft Scoping Plan itself considered four scenarios, or alternatives, "for the AB 32 GHG Inventory and NWL and helped to inform the Proposed Scenario. . . . All the scenarios are set against what is called the Reference Scenario—that is, what the GHG emissions would look like

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[222] CEQA Guidelines § 15151.
[223] *Id.* § 15002(a)(1).
[224] *Id.* § 15002(a)(3), (4).
[225] *Id.* § 15126.6(d) (emph. added). *See also Laurel Heights Improvement Ass'n v. Regents of Univ. of Cal.* (1988) 47 Cal.3d 376, 406.

if we did nothing at all beyond the existing policies that are required and already in place to achieve the 2030 target or expected with no new actions in the NWL sector."[226]

Meanwhile, the EA considered four different alternatives: a No Project Alternative and Alternatives A, B, and C. The EA provides a convoluted explanation of how these alternatives differ from those analyzed in the Scoping Plan:

Draft EA Alternative A is most similar to Alternative 1 for AB 32 GHG Inventory Sectors in the 2022 Scoping Plan with measures implemented as outlined in that scenario but with a 2045 carbon neutrality target. Draft EA Alternative B aligns with Alternative 4 for AB 32 GHG Inventory Sectors in the 2022 Scoping Plan. The natural and working lands actions in both Draft EA Alternatives A and B are the same as the Proposed Scenario in the 2022 Scoping Plan. Draft EA Alternative C is aligned with Alternative 2 for natural and working lands in the 2022 Scoping Plan and the AB 32 GHG Inventory Sectors actions in Draft EA Alternative C are the same as the Proposed Scenario in the 2022 Scoping Plan.[227]

Once a reader has parsed this out, potentially using a logic grid, it becomes clear that these differences are not minor. For instance, the Scoping Plan's Alternative 1 sets out a carbon neutrality target of 2035, whereas the EA's Alternative A's target is 2045—a decade of difference in terms of emissions and effects on climate change.

Additionally, nowhere does the Draft EA describe many of the important assumptions and targets comprising the various alternatives. (For that matter, nowhere does the draft Scoping Plan describe all of the assumptions underlying its alternatives. For that, a reader must search CARB's website for the materials from previous modeling workshops that took place in 2021.) Again using Alternative A as an example, the description simply states that it "requires early retirement of vehicles, appliance, and industrial equipment to eliminate combustion, with aggressive deployment and adoption of non-combustion technologies. . . ."[228] By when will this "early retirement" take place? Assuming it is "most similar" to Alternative 1, a reader could guess that means, for instance, requiring 100% zero emission vehicle sales by 2030—but the EA does not actually provide that information. Additionally, the impacts analysis of the alternative comprises less than one page of conclusory statements, and it completely ignores impacts related to natural and working lands actions. The analyses of the other alternatives similarly fail to provide the necessary information for a meaningful comparison to the Proposed Scenario.

Thus, the convoluted, conclusory, cursory discussion of alternatives in the EA flouts the basic goal of CEQA and the role of environmental analysis to provide information to the public and decisionmakers to allow for informed decision making.

[226] Draft Scoping Plan at 39.
[227] Appendix B: Draft Environmental Analysis at 256.
[228] Draft EA at 260.

VII. CONCLUSION

Thank you for the opportunity to submit comments on the Draft 2022 Scoping Plan. For the reasons set forth above, the draft plan is adequate to meet California's and the world's climate goals, and should be revised to increase ambition to target near zero by 2035.

Please do not hesitate to contact the Center with any questions at the number or email listed below.

Sincerely,

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