June 24, 2022

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

Submitted electronically

RE: 2022 Draft Scoping Plan

Dear Chair Randolph and Members of the Board:

On behalf of Sierra Club California and Earthjustice, we appreciate the opportunity to comment on the California Air Resources Board's (CARB) 2022 Draft Scoping Plan.

INTRODUCTION

Earlier this month, Sierra Club California and Earthjustice joined more than 100 other organizations in submitting a letter that called for a more just and ambitious Scoping Plan.[1] As detailed in that letter, the Draft Scoping Plan is deeply flawed in numerous ways, and major changes are needed to ensure that it complies with applicable laws and policies and sets California on a path toward a just and equitable zero-emission future. A central shortcoming of the plan is its overreliance on engineered carbon removal—specifically direct air capture (DAC)—at the expense of direct emissions reductions that could benefit communities and the environment before 2045. These and other fundamental errors must be corrected.

In the aforementioned letter, our organizations detailed five specific changes that would improve the environmental integrity and public health benefits of the Scoping Plan and reduce the risks of overshooting climate thresholds.[2] Sierra Club California and Earthjustice stand by these key recommendations and urge CARB to adopt a Scoping Plan that incorporates each of them. In this letter, we expand upon these recommendations and raise additional concerns and recommendations. To comply

[1] *See* 108 Organizations Call for A Just and Ambitious 2022 Scoping Plan (June 20, 2022), https://www.arb.ca.gov/lists/com-attach/433-scopingplan2022-ADEBN1FoWVUDagJw.pdf.
[2] *See id*. The five recommendations include 1. Phase out fossil fuel extraction by 2035 and refining by 2045 2. No new gas-fired generation and set a GHG target of 0 MMT by 2035 3. Increase vehicle miles traveled reduction to 30% by 2035, achieve at least 75% sales of zero-emission passenger vehicles by 2030, and 100% medium- and heavy-duty trucks by 2035 4. Phase out new gas appliance sales by 2030 and fully decommission the gas distribution system by 2045 5. Exclude reliance on alternative fuels that worsen pollution burdens and take an environmental justice approach when addressing hard-to-electrify sectors.

with critical California laws and policies and achieve a just and equitable transition to a zero-emission future, CARB must make the following changes to the Draft Scoping Plan:

1. **Accelerate Direct Emission Reductions**: Prioritize direct emission reductions above unproven carbon capture and removal technologies.
2. **Acknowledge Engineered Carbon Removal Risks**: Provide additional analysis and discussion on limitations and risks associated with carbon capture and removal.
3. **Achieve a Zero-Carbon Electric Sector**: Plan for 0 MMT of GHGs by 2035 for the electric sector and exclude new gas build.
4. **Align Transportation Targets with the Mobile Source Strategy**: At a minimum, the Scoping Plan targets for zero-emission vehicles should match those needed to achieve health-based air standards as shown in the Mobile Source Strategy.
5. **Focus on Priority Applications for Green Hydrogen**: Limit inclusion of hydrogen to green electrolytic hydrogen produced with zero-emission. Electricity and reserves the use of this hydrogen for difficult-to-decarbonize sectors.
6. **Protect Carbon in Natural and Working Lands**: Emphasize retaining carbon on landscapes over tree removal.
7. **Reject Strategies that Extend Pollution**: Avoid polluting, false solutions such as biomethane and biofuels.
8. **Strengthen Strategies to Eliminate Gas in Buildings**: Accelerate building decarbonization targets to phase out new fossil-fueled appliances by 2030 and decommission the gas distribution system by 2045.

We provide a more detailed discussion of each of these points below.

DISCUSSION

1. The Draft Scoping Plan Fails to Prioritize Direct Emission Reductions and Instead Over-Relies on Unrealistic Levels of Unproven Carbon Removal Technologies.

Earthjustice and Sierra Club California are deeply dismayed that the Draft Scoping Plan fails to prioritize direct emissions reductions from stationary and mobile sources of pollution, consistent with Assembly Bill (AB) 197.[3] The Draft Plan leaves much of today's pollution (between a quarter to a third) in place, and it relies on both unspecified mitigation from cap-and-trade and unrealistic levels of carbon removal to make up for the shortfall in meeting our climate targets.

Relying on these wildly high levels of indirect reductions is even more confounding given that just two years ago, CARB's Carbon Neutrality Study presented CARB with a far more ambitious blueprint for directly reducing emissions to achieve carbon neutrality. That assessment examines a promising scenario that fully eliminates all fossil fuel emissions by 2045 and minimizes reliance on carbon dioxide removal (CDR) to 33 MMT of CO2 equivalent.[4] The study also presented a conservative book-end "High-CDR"

[3] AB 197 (E. Garcia, 2016).
[4] Mahone et al., Achieving Carbon Neutrality in California PATHWAYS Scenarios Developed for the California Air Resources Board (Oct. 2020), https://ww2.arb.ca.gov/sites/default/files/2020-10/e3_cn_final_report_oct2020_0.pdf.

scenario that aimed only for an 80% direct reduction of GHGs and left a need for 80 MMT of CO2 removal, as well as a "balanced" scenario that fell between the two.[5]

Incredibly, the Draft Scoping Plan is even less ambitious than this "High-CDR" scenario relying on a whopping 100 MMT of CO2 removal.[6] CARB's Carbon Neutrality Study described the High-CDR scenario as "highest risk, from a climate mitigation perspective, because it has the highest remaining direct GHG emissions, and relies on relatively untested CDR strategies which are not widely commercialized."[7] The Study went on to explain that the High CDR scenario "also has the highest remaining quantity of fuel combustion, which means the air quality impacts, though far improved relative to today, will likely be highest among the three carbon neutral scenarios evaluated" and that both the climate and implementation risks of relying so significantly on CDR are high.[8] Finally, the study points out that "[c]ontinuing to emit such a large share of gross emissions into the atmosphere through 2045 could result in an overshoot of emissions, with a risk of missing the state's climate goals if CDR options are not implemented early on."[9]

Despite these warnings, CARB's Draft Scoping Plan is riskier still. It exposes California to even greater climate risk, even greater technology adoption risk, and even greater air pollution. The path to carbon neutrality in the Draft Scoping Plan is highly dependent on mass deployment of carbon capture and removal technologies. These technologies are unproven and expensive, entrench carbon extraction, and fail to reduce other pollutants. For instance, DAC only captures GHGs and only does so after particulates (PM 2.5), oxides of nitrogen (NOx), and other pollutants have escaped into the atmosphere, damaging the heart and lungs of Californians. Relying on CCUS to reduce GHG emissions will result in increased air pollution for frontline communities. Simply replacing these resources with a diverse set of renewable resources could obviate the need for carbon capture use and storage (CCUS) altogether.

The consequences of accepting these higher risks will not fall evenly. The shameful legacy of environmental racism in California means that low-income communities of color will bear the brunt of air and water pollution from the emissions we fail to directly eliminate now. They will also likely bear the greatest safety risks of a massive buildout of new carbon handling and storage infrastructure, given high likelihood that these facilities will be cited nearby. Frontline communities will also face the worst effects of the fallout from the climate crisis if we do not meet our targets. California cannot afford to accept these risks, and CARB should not promote such an unjust outcome.

Instead of relying on risky and fantastical levels of indirect reductions, CARB should focus on direct emissions reductions through retiring fossil fuel power plants, transitioning away from polluting fuels, replacing internal combustion engines with ZEVs, and building out zero-emission energy resources and distributed energy resources that will reduce emissions immediately and permanently.

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[5] *Id*.
[6] Draft Scoping Plan, Figure 2-5, p. 73.
[7] Mahone et al., Achieving Carbon Neutrality in California PATHWAYS Scenarios Developed for the California Air Resources Board (Oct. 2020) at 4, https://ww2.arb.ca.gov/sites/default/files/2020-10/e3_cn_final_report_oct2020_0.pdf.
[8] *Id*.
[9] *Id*.

In addition to the guaranteed climate benefits of direct reductions, they also provide health benefits by replacing pollution-spewing generation and transportation with zero-emission technologies.

2. The Scoping Plan Must Provide Additional Discussion about the Risks and Limitations of Carbon Capture and Removal.

The Draft Scoping Plan must be revised to provide a more even-handed discussion of both carbon capture and carbon removal technologies. The current draft provides an imbalanced characterization that largely sidesteps severe and well-documented issues, including:

a. High rates of project failures;[10]
b. Chronic underperformance relative to promised capture rates;[11]
c. Enormous energy demand and associated emissions from capture, compression, transport, and storage;[12]
d. Potential impermanence in sequestration given the probability for leakage;[13]
e. Persistence of upstream emissions from the fossil fuel supply chain;[14] and
f. Potentially fatal safety hazards posed to communities and ecosystems by failures in carbon pipeline and storage infrastructure.[15]

Finally and most significantly, the Draft Scoping Plan does not include an adequate discussion of the environmental injustice of relying on carbon capture equipment to entrench and prolong fossil fuel refining and consumption and industrial facility and power plant pollution. The Draft Scoping Plan does suggest that the carbon capture strategies must be informed by significant stakeholder processes given the significant health, air quality and equity concerns raised by environmental justice advisors, the Council on Environmental Quality and academic researchers.[16] In an effort to assuage the very real concerns raised by these groups, the Draft Scoping Plan cites a Stanford report that application of carbon capture "could reduce emissions of criteria air pollutant emissions from certain facilities." However, the Draft Scoping Plan does not include the portion of the paper that also notes that "the local community benefits and impacts will vary by project and location" and that it "is possible that the installation of a [carbon capture

[10] Ahmed Abdulla et al., Explaining Successful and Failed Investments in U.S. Carbon Capture and Storage Using Empirical and Expert Assessments (Dec. 2020), https://iopscience.iop.org/article/10.1088/1748-9326/abd19e.
[11] Craig Bettenhausen, The Life Or Death Race to Improve Carbon Capture, Chemical & Engineering News (July 18, 2021), https://cen.acs.org/environment/greenhouse-gases/capture-fluegas-co2-emissions/99/i26.
[12] *Id*.
[13] Adriano Vinca et al., Bearing the Cost of Stored Carbon Leakage, Frontiers in Energy Research (May 15, 2018), https://www.frontiersin.org/articles/10.3389/fenrg.2018.00040/full.
[14] *See, e.g*., Diana Burns & Emily Grubert, Attribution of Production-Stage Methane Emissions to Assess Spatial Variability in the Climate Intensity of U.S. Natural Gas Consumption, Environmental Research Letters (Apr. 8, 2021), https://iopscience.iop.org/article/10.1088/1748-9326/abef33; Robert Howarth, Is Shale Gas a Major Driver of Recent Increase in Global Atmospheric Methane?, European Geosciences Union (Aug. 14, 2019), https://bg.copernicus.org/articles/16/3033/2019/bg-16-3033-2019-discussion.html.
[15] Dan Zegart, "The Gassing of Satartia" (Aug. 26, 2021), https://www.huffpost.com/entry/gassing-satartia-mississippi-co2-pipeline_n_60ddea9fe4b0ddef8b0ddc8f.
[16] Draft Scoping Plan, pp. 69-70.

and storage (CCS)] plant could lead to an increase in air pollutants other than CO2."[17] In fact, the report suggests that these increases in emission may be so significant that "a facility possessing a Title V operating permit for being a major source of air pollutants may have to undergo significant revisions of that permit."[18]

Because of the significant uncertainty associated with these carbon capture technologies, their inability to deliver air quality benefits and their apparent potential to *increase* air pollutants, the Scoping Plan should minimize reliance on engineered carbon removal (both CCUS and DAC) and elaborate on the risks inherent to each of these technologies. A more even-handed treatment of the risks in relying so heavily on an unprecedented and complication-free build-out of direct air capture must be incorporated.

3. The Scoping Plan Must Plan for 0 MMT of GHGs by 2035 for the Electric Sector and Eliminate New Gas Build.

Under the Draft Scoping Plan, the electric sector will emit 30 MMT of GHGs each year through 2045 in direct contravention of Senate Bill (SB) 100.[19] It will also include up to 10 GW of new gas capacity in 2045. [20] CARB must correct these grave errors.

a. Planning for electric sector emissions through 2045 is inconsistent with California law and climate policy requiring multiple pathways to achieving carbon neutrality by 2045 or earlier.

The Draft Scoping Plan projects electric sector emissions equivalent to 30 MMT in 2045,[21] despite multiple emphatic legal requirements and directives to accelerate carbon neutrality and reduce our reliance on fossil fuels. California's multiple climate laws and policy commitments require CARB to plan to achieve carbon neutrality by 2045 as well as investigating pathways to achieve carbon neutrality by 2035. For instance, SB 100 requires that "eligible renewable energy resources and zero-carbon resources supply 100 percent of all retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045."[22] SB 100 also repeatedly directs various state agencies to achieve "a zero-carbon electric system."[23]

CARB's interpretation that non-retail loads (such as wholesale or non-retail sales and losses from storage and transmission and distribution lines) are not subject to this law is inconsistent with the text and spirit of SB 100. A "zero-carbon electric system" cannot be realized with 6-8% of all generated electricity in the state originating from burning fossil fuels. Accordingly, the Scoping Plan should accommodate no emissions from the electric sector past 2045.

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[17] Benson, et al., An Action Plan for Carbon Capture and Storage in California: Opportunities, Challenges, and Solutions. CCS in CA at 107 (Oct. 2020), https://stacks.stanford.edu/file/druid:fy784bm4949/EFI-Stanford-CA-CCS-FULL-rev2-12.11.20.pdf.
[18] *Id.* at A-5.
[19] California Renewables Portfolio Standard Program: emissions of greenhouse gases (De León, 2017-2018).
[20] Draft Scoping Plan, Figure 4-5, p.162.
[21] Draft Scoping Plan, p.163.
[22] Pub. Util. Code Section 454.53 (a) (SB 100, De Leon).
[23] *Id*.

Furthermore, CARB is incorrect to exclude line losses from the requirements of SB 100. California and federal law intentionally include line losses as part of retail sales. Under the regulations implementing the federal Public Utility Regulatory Policies Act of 1978, payments include line losses because they are part of the costs a utility would have had to pay if they had not contracted for the energy from a Qualifying Facility.[24] The California Public Utilities Commission (CPUC) specifically analyzes the added line losses when considering Investor-Owned Utility rate cases.[25] California ratepayers—the retail purchasers to whom SB 100 applies—pay for line losses in their bills. Further, SB 100 requires California to plan for procurement of this renewable energy, and the energy procured always anticipates line losses.[26] Line losses are part of retail sales and cannot be excluded from the zero-carbon electric system in 2045.

In addition, recent direction from Governor Newsom makes clear the need to accelerate planned greenhouse gas emissions earlier than 2045. The Governor has directed both CARB and the CPUC to accelerate California's progress toward its nation-leading climate goals by investigating pathways to achieving carbon neutrality by 2035. Governor Newsom specifically asked CARB to "evaluate how to achieve carbon neutrality no later than 2035 as part of its 2022 Climate Change Scoping Plan."[27] The work should include analysis of how to "reduce or eliminate demand for fossil fuel in California and end oil extraction in our state."[28] By requiring an analysis to "eliminate demand for fossil fuel," this directive also includes evaluating how to eliminate fossil fuels from the electric sector. It is therefore inconsistent with this directive for Alternatives 2, 3, and 4 to fail to reach zero emissions by 2035, much less 2045.

b. Reducing electric sector emissions to 0 MMT by 2035 would dramatically decrease the need for expensive and unproven CCS technologies.

As noted above, the Draft Scoping Plan relies heavily on unproven and potentially cost-prohibitive CCS technologies to capture electric sector emissions, despite the fact that there is existing and, practicable electric generation technology that is renewable, avoids emissions altogether, and is considerably more cost-effective. Lowering the assumed electric sector emissions would reduce the massive reliance on DAC technologies used extensively in the selected portfolio to compensate for electric sector emissions.[29]

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[24] *See* 18 CFR 292.304(e)(2)(iv); CPUC Decision 09-05-030, p. 2 (citing 18 CFR 292.304(E)(4)).
[25] CEC Staff Paper, A Review of Transmission Losses in Planning Studies, (Sep. 2011), *available at* https://www.wecc.org/Administrative/TN%2062058%2009-1-11%20CEC%20Staff%20Report%20a%20Review%20of%20Transmission%20Losses%20in%20Planning%20Studies.pdf ("In general, the IOUs submit loss factors from each of several locations on the transmission and distribution grid in the rate cases. Utilities incur costs from transmission and distribution losses and expect to recover these costs.").
[26] SB 100 Senate Floor Analysis, p. 4 (Aug. 28, 2018).
[27] July 9, 2021 Letter from Governor Newsom to CARB Chair Randolph, https://www.gov.ca.gov/wp-content/uploads/2021/07/CARB-Letter_07.09.2021.pdf.
[28] *Id.*
[29] *See, e.g.*, Draft Scoping Plan, p. 68 ("CCS can support clean dispatchable power for reliability needs and hydrogen production until such time as there is sufficient renewable power for electrolysis."). *See also id.* at 69. ("If steam methane reformation is paired with CCS, the hydrogen produced could potentially be zero carbon.").

The Draft Scoping Plan envisions heavy reliance on CCS and carbon dioxide removal technologies, but fails to incorporate all of the projected costs and necessary resources to deploy this technology. The Draft Scoping Plan projects multiple parallel efforts to ramp up the deployment of CCS and DAC, including working groups, evaluating financing mechanisms and incentives, and supporting CCS infrastructure projects.[30] The selected portfolio would include 31 MMT CO2e emissions from the electric sector, and over 79 MMT of carbon dioxide removal.[31] However, the Draft Scoping Plan failed to include "any additional load to implement CO2 removal through CCS or direct air capture."[32] By failing to include the full costs associated with reliance on these resources, the Draft Scoping Plan fails to provide the Board with a reasonable understanding of the true costs associated with this selected portfolio.

Investment in CCS specifically steers investment away from renewable energy. CCS technologies are extremely expensive to build and operate and would require significant subsidies to be viable. Within the electric sector, there are multiple less costly, less polluting alternatives to CCS. For example, the cost of building and operating CCS technology at a power plant could cost more than five times as much as building additional wind or solar generating capacity. While these cost impacts may appear in the cost modeling planned for later stages of the Scoping Plan process, the cost considerations emphasize the need for added separation between Alternatives 2, 3, and 4 in order to provide clearer tradeoffs between sector emissions. In addition, there is a risk that CCS could result in increased dispatch for gas plants with the technology, leading to higher costs for customers.

Adding CCS technology could additionally extend the life of gas plants that would have otherwise faced economic pressure to retire by keeping uneconomic gas plants alive for longer. There are recent examples of other states that are specifically considering CCS in order to delay closures of uneconomic coal plants, such as in North Dakota and New Mexico.[33] California could face similar challenges with retiring uneconomic gas plants if CCS technology is added. The alternative pathway is to set a lower electric sector emissions assumption in order to build more renewable energy and reduce the projected need for CCS.

CCS technology can be extremely energy and water intensive. Solvent-based carbon capture technologies, in particular, can require a significant energy penalty to generate the solvent and compress the CO2 into the pipeline. This either reduces the efficiency of the host plant (similar to de-rating the plant) or alternatively requires a much larger power plant to achieve the same "net" power generation capacity that would have been available without CCS. CCS consumes large quantities of freshwater and requires substantial amounts of cooling water.

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[30] Draft Scoping Plan, pp. 177-78.
[31] CARB, AB 32 GHG Inventory Sectors Modeling Data Spreadsheet, *available at* https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp-PATHWAYS-data-E3.xlsx.
[32] Draft Scoping Plan, p. 161.
[33] *See*, *e.g.*, Dan Gearino, "A Lifeline for a Coal Plant Gives Hope to a North Dakota Town. Others See It as a Boondoggle," Inside Climate News (July 17, 2021), https://insideclimatenews.org/news/17072021/north-dakota-coal-energy-transition-jobs-carbon-capture/; *see also* Daniel J. Chacón, "Carbon-capture project generates support, skepticism among New Mexico lawmakers," Santa Fe New Mexican (July 13, 2021), https://www.santafenewmexican.com/news/local_news/carbon-capture-project-generates-support-skepticism-among-new-mexico-lawmakers/article_8dfcd960-e3ec-11eb-851d-ef8590cfc5c2.html.

It is also important to recognize that CCS technology could result in increased air pollution from power plants as well as other health risks. CCS technology would enable a power plant to avoid greenhouse gas emissions, but would have no impact on other air pollutants like fine particulates (PM2.5), NOx, or water pollution. CCS technology could allow emitting plants to operate more frequently and at higher levels, resulting in more pollution than they emit today. Carbon capture technologies that rely on solvents also risk solvent emissions slipping through the flue stack, resulting in new dangerous particulate and chemical emissions spewing into nearby communities and potentially contaminating surface water. Additionally, with the few CO2 transportation pipelines that exist today, there have already been signs of potential harm from accidents and pipeline ruptures.

Due to these impacts, reliance on CCS in the electric sector could worsen environmental injustices in California. Adding CCS to polluting power plants would not address the disproportionate environmental burdens of disadvantaged communities that border these facilities. The impacts of these decisions were partially illuminated in the UC Irvine air quality analysis, which also showed that Alternative 1 would have dramatically improved air pollution impacts in the Los Angeles, San Joaquin, and Central Valley air basins.[34] This distinction is critical to protecting public health and environmental justice. The air quality impacts analysis showed dramatic improvements in air pollution, but it is unclear how man buy y of these improvements might be attributed to various measures in different scenarios.

As multiple industries electrify, there is a risk that pollution impacts will be shifted from direct end uses to major electric sources, primarily gas plants. The electrification shift is beneficial in achieving our climate targets, but risks concentration pollution impacts towards communities that border gas plants.

c. The Draft Scoping Plan fails to justify additional gas build.

Zero-emitting resources can and should be deployed to meet future energy needs and can provide system reliability as well as or better than gas-fired resources. The California Energy Commission's (CEC) Mid-Term Reliability Analysis consisted of a loss-of-load-expectation analysis and provided new insight to the reliability benefits of battery storage. The analysis demonstrated that "relying on non-emitting resources like renewable generation and energy storage did not diminish reliability compared to portfolios that contained differing or additional amounts of thermal resources."[35] The analysis specifically shows that a system without new gas build can maintain reliability.

In addition, GridLab & Energy Innovations issued a report indicating that California's grid can remain reliable without new gas capacity, even during stress conditions with high electrification scenarios.[36]

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[34] CARB Appendix H: AB 32 GHG Inventory Sector Modeling, pp.76-78, *available at* https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp-appendix-h-ab-32-ghg-inventory-sector-modeling.pdf.

[35] CEC August 30 Analysis on Mid-Term Reliability Presentation, Slide 33 (Aug. 30, 2021), *available at* https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-ESR-01.

[36] Derek Stenclik, Michael Welch, and Priya Sreedharan, Reliably Reaching California's Clean Electricity Targets: Stress Testing Accelerated 2030 Clean Portfolios (May 2022), https://gridlab.org/wp-content/uploads/2022/05/GridLab_California-2030-Study-Technical-Report-5-9-22-Update1.pdf.

New clean energy development can produce a resilient, reliable electric grid and should be the default assumption for all Scoping Plan scenarios. New gas build is a perverse and unacceptable assumption for this Scoping Plan, and new gas infrastructure should be categorically excluded from every alternative to meet our climate, environmental justice, air quality and reliability needs.

d. New gas capacity is inconsistent with state climate law and policy.

The Draft Scoping Plan projects building 10 GW of new gas capacity by 2045 in the Proposed Scenario.[37] New gas infrastructure is wholly inconsistent with state climate law and would perpetuate environmental injustice, and accordingly, the Scoping Plan needs to be amended to include no new gas capacity.

New gas build is not consistent with numerous state mandates, policies, and agency rulings on climate, including SB 100, California's commitment to decarbonization, SB 32,[38] and SB 350,[39] and other agency decisions. Continued investment in gas is also conflicts with Governor Newsom's July 2021 statement on the "Electricity System of the Future," which emphasizes that: "[w]e must remove carbon emissions from our energy sources to support a sustainable future" and that "[a]lthough California has made great strides in eliminating coal power plants and increasing renewable energy resources, our current electricity system is still producing greenhouse gas emissions and contributing to unhealthy air quality in communities."[40] Governor Newsom has also said what everyone is thinking, following catastrophic wildfires: we are in a "climate damn emergency."[41] The direction from the Governor is clear: CARB must accelerate plans to end our reliance on fossil fuels as fast as possible. The Scoping Plan needs to remove all reference to new gas capacity in order to achieve this mandate.

e. New gas capacity would exacerbate environmental injustices by worsening air quality in disadvantaged and overburdened communities.

The new gas capacity described in the Draft Scoping Plan would undermine the state's work on environmental justice by worsening dangerous air pollution in overburdened frontline communities and increasing methane leakage. New gas build would have drastic additional impacts on air quality from increased capacity, even if the new build is more efficient and includes CCS technology. Even if carbon capture technology were deployed at these new gas plants, this technology does not decrease or alleviate other dangerous air pollutant emissions from gas plants.

Assuming that the new gas plants described in the Draft Scoping Plan will be used for flexible load, they are likely to be dispatched more often, resulting in more cycling and increased pollutant emissions. Gas plants emit significantly more air pollution while starting than during steady state operations. The cycling of gas plants produces significant amounts of pollution because emissions control systems are not as

[37] Draft Scoping Plan, Figure 4-5, p. 162.
[38] California Global Warming Solutions Act of 2006: emissions limit (Pavley, 2015-2016).
[39] Clean Energy and Pollution Reduction Act of 2015 (De León, 2015-2016).
[40] Governor Gavin Newsom, Electricity System of the Future (July 30, 2021), https://www.gov.ca.gov/wp-content/uploads/2021/07/Electricity-System-of-the-Future-7.30.21.pdf.
[41] Governor Newsom comments after viewing damage from the North Complex Fire, https://www.youtube.com/watch?v=tacIALNIf7k.

effective at capturing pollutants when plants are starting and stopping. In fact, pollution from a single start can be higher than if the plant operated the entire day.[42] For example, a single start of the Colusa Generating Station, a combined cycle gas plant, can emit as many NOx emissions as the facility would have emitted in 12 to 38 hours of steady-state operation.[43] These estimates are based on permitted values, but unfortunately operational monitoring data shows that plant emissions can be even higher. During a start in May 2020, the Colusa gas plant emitted over 900 pounds of NOx during its first three hours of operation, compared to around 10 pounds per hour of NOx after start-up.[44] This means that the Colusa facility emitted more than *90 times* its regular rate of NOx emissions during a single start. These startling pollution data demonstrate why the Board must reject any proposal that would increase the use and cycling of gas plants.

California's air pollution already exceeds national standards, and new gas capacity would only exacerbate this problem. While it is unclear from the Scoping Plan model results where new gas plants will be built, new gas resources would likely increase pollution in air basins that are already in serious, extreme, or severe nonattainment for one or more or more criteria pollutants.[45] Gas-fired power plants emit many harmful pollutants, and the majority of California's gas-fired power plants are located in or near the state's most disadvantaged communities.[46] This injustice results in compounding harms. For example, fine particulate matter emissions from gas combustion are closely connected to decreased lung function, more frequent emergency department visits, additional hospitalization and increased morbidity.[47]

f. New gas capacity could be dispatched to serve out-of-state loads, causing them to run more often than expected.

The new gas build described in the Draft Scoping Plan could result in increased gas plant dispatch to meet out-of-state loads. When gas resources come online, they can be called upon by other markets as exports, while increasing pollution in California. This increased reliance on gas resources for exports is already evident from market patterns in recent years, and it is likely to worsen if California continues to invest in gas plants rather than retiring them.

[42] *See* Birdsall et al., Senate Bill 350 Study Volume IX: Environmental Study (2016), Table 4.4-3, p. 100, https://www.caiso.com/Documents/SB350Study-Volume9EnvironmentalStudy.pdf.
[43] *Id.*
[44] *See* U.S. EPA Clean Air Markets Database, Colusa Power Plant, May 28, 2020 Data (according to the continuous emissions monitor data, the plant emitted 145, 393, and 404 pounds of NOx during its first three hours of operation. After those first three hours, the next 11 hours were between 8 and 10.5 pounds of NOx per hour).
[45] U.S. EPA, Green Book: Current Nonattainment Counties for All Criteria Pollutants (data current as of Dec. 31, 2020), *available at* https://www3.epa.gov/airquality/greenbook/ancl.html.
[46] Brightline Defense, Winding Up for Offshore Wind, p. 2, https://www.offshorewindnow.com/brightline-defense-report ("78% of gas-powered plants [in California] are located in frontline environmental justice communities").
[47] American Lung Association, Particle Pollution, https://www.lung.org/cleanair/outdoors/what-makes-air-unhealthy/particle-pollution.

g. The Draft Scoping Plan failed to consider the impacts that new gas capacity would have on methane leakage, creating additional intense GHG impacts.

Continued reliance on gas capacity also increases the risk of methane leakage. Methane has significantly more intense global warming potential over a short-term, posing intense climate damage, and methane leakage can cause severe health impacts, as witnessed by the community living near the Aliso Canyon gas storage facility. Between October 2015 and February 2016, the facility released at least 109,000 tons of methane, forcing the relocation of thousands of residents for several months. A UCLA study found that many community members living around Aliso Canyon experienced elevated indoor levels of air toxins and persistent health impacts following the leaks.[48] These residents exhibited headaches, nausea, stomach aches, dizziness, and trouble breathing following the leak, and a local physician found signs of bone marrow suppression, which can lead to anemia and leukemia.[49] In light of these health risks, then-Governor Jerry Brown directed the Public Utilities Commission to start identifying alternatives to Aliso. However, Aliso Canyon and other gas storage facilities cannot close if new gas-fired generation is dependent on it. Building new gas capacity risks another massive, dangerous, and climate-damaging leak again.

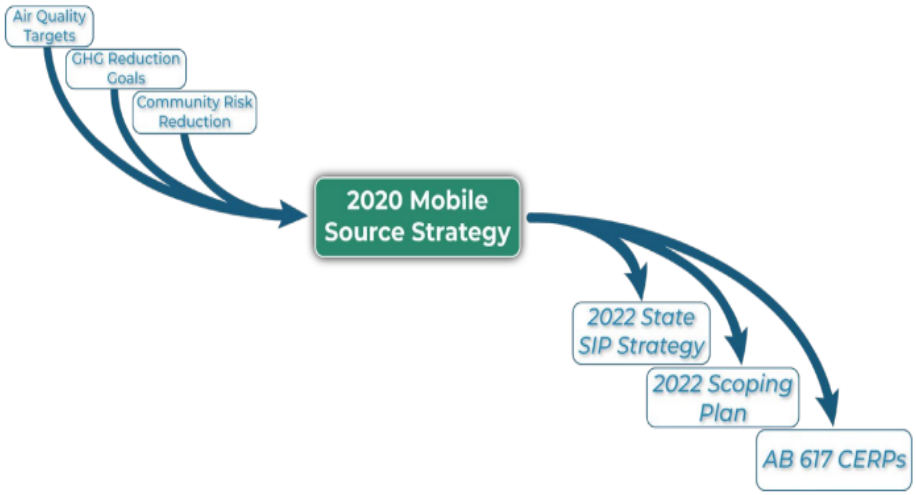
4. ZEV Targets Must at a Minimum Align with the Mobile Source Strategy.

The Draft Plan's ZEV sales targets for light, medium, and heavy-duty vehicles must be revised to, at a minimum, align with the scenarios articulated in CARB's Mobile Source Strategy. The Mobile Source Strategy identifies the level of ZEVs needed to meet air pollution and greenhouse gas reduction targets and is specifically intended to inform the transportation elements of the Scoping Plan. Indeed, the 2020 Mobile Source Strategy states that "[a] draft of the 2022 Scoping Plan Update will be published in Early 2022. This draft will include, at minimum, the overall framework and list of proposed actions to reduce VMT and meet the State's GHG reduction goals." But the Draft Scoping Plan does not include this bare minimum. The Mobile Source Strategy includes a comprehensive analysis of what California must do to meet its obligations under the federal Clean Air Act. As Figure 1 indicates, CARB has acknowledged that the Mobile Source Strategy is an input to the Scoping Plan. Yet the Draft Scoping Plan largely ignores the Mobile Source Strategy, making mention of it only once, in a footnote.

[48] Diane A. Garcia-Gonzales, et al., *Associations among particulate matter, hazardous air pollutants and methane emissions from the Aliso Canyon natural gas storage facility during the 2015 blowout* (Nov. 2019), https://www.sciencedirect.com/science/article/pii/S0160412018327314?via%3Dihub.

[49] Sharon McNary, *What Did Porter Ranch Residents Breathe During the Massive Gas Leak? Here's What One Doctor's Quest Revealed*, LAist (Nov. 5, 2019), https://laist.com/2019/11/05/aliso-canyon-porter-ranch-gas-leak-blowout-health-benzene-nordella.php.

Figure 1: Relationship Between Air and Climate Targets and CARB Planning Documents[50]



Improperly discounting the Mobile Source Strategy, the Draft Scoping Plan aligns more closely with CARB staff's current proposals for the Advanced Clean Cars II[51] and Advanced Clean Fleets[52] rules. As Sierra Club and Earthjustice have repeatedly emphasized, the targets in these rulemakings fall far short of the needs identified in the Mobile Source Strategy.[53] This shortfall is even more troubling given that the Mobile Source Strategy scenarios for light, medium, and heavy-duty vehicles do not deliver their "equal share" of reductions needed to meet the State's air quality and greenhouse gas reduction targets.

a. Interim light-duty vehicles sales targets should be accelerated.

In the light-duty sector, while the 2035 end point aligns with the Mobile Source Strategy, the ZEV sales in the years leading up to 2035 in the Advanced Clean Cars II rule and the Draft Scoping Plan are too low. Interim sales shares are arguably even more important than ultimately reaching 100% ZE sales in 2035, because to meet the 2031 ozone deadlines and the 2030 climate targets, California needs to see dramatic reductions of NOx and GHGs in *this* decade. To contribute toward these reductions, emissions from light-duty vehicles need to trend downward before 2030, meaning a majority of market share (e.g. over 50% of sales) should be zero-emissions as early in this decade as possible. The Draft Scoping Plan lags the Mobile Source Strategy by about 2 years and only clears 50% sales by 2029 – too late to be

[50] CARB, 2020 Mobile Source Strategy, p. 1, https://ww2.arb.ca.gov/sites/default/files/2021-12/2020_Mobile_Source_Strategy.pdf.
[51] Public Hearing to Consider the Proposed Advanced Clean Cars II Regulations, Staff Report: Initial Statement of Reasons, https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/accii/isor.pdf.
[52] Advanced Clean Fleets Regulation Proposed Draft Regulation Language 2040, 100 Percent ZEV Sales Requirement, https://ww2.arb.ca.gov/sites/default/files/2022-04/220502acfdraft100zevsales_ADA.pdf.
[53] *See, e.g.* Comments of the ACF Coalition to CARB (Sept. 27, 2021) available at https://www.arb.ca.gov/lists/com-attach/64-acf-comments-ws-AGNXPlI+AD4BYgBu.pdf.

helpful for 2030 targets.[54] To underscore: The Mobile Source Strategy itself is too weak to deliver the necessary reductions for our state and federal goals. As Staff admit in the 2020 Mobile Source Strategy, light duty vehicles (commonly understood to be among the easiest-to-decarbonize sectors across the economy) "cannot achieve its 'equal share' of reductions for NOx and GHG emissions in 2037 and 2045 respectively for this analysis."[55]

CARB must correct this incongruity. As the Draft Scoping Plan points out, "[m]yriad studies show cost parity for light-duty and heavy-duty ZEVs being achieved by mid-decade or shortly thereafter."[56] The draft goes on to cite a study by the Goldman School of Public Policy that highlights the feasibility and enormous health, climate, and economic benefits of 100% light-duty zev sales nationwide ($2.7 trillion through 2050 in consumer savings alone).[57] It is worth noting that this study assumed 100% light duty ZEV sales by 2030—five years ahead of California's target.

b. All medium- and heavy-duty truck sales must be zero-emission beginning in 2035.

The same problems are apparent in the Draft Plan's failure to adhere to the Mobile Source Strategy's scenario for ZEV sales in the medium- and heavy-duty segment. The Mobile Source Strategy makes clear that to have any chance of meeting health-based air quality standards in the San Joaquin and South Coast air basins, or to meet statewide greenhouse reduction targets, all medium and heavy-duty truck sales must be zero-emission beginning in 2035**.** Yet the Scoping Plan departs from the Mobile Source Strategy, delaying the phase-out of combustion truck sales until 2040. This is even more confounding given that in October 2021, CARB's input assumptions for Alternative 3 (now the Proposed Plan) initially matched the Mobile Source Strategy, but as indicated in Figure 2, by January 2022, these were eliminated, and the date was delayed to 2040—the same timeline being considered under the Advanced Clean Fleets rulemaking. This improper change creates the impression that CARB's rulemakings are governing the inputs for the Scoping Plan, rather than the other way around. No doubt, having the Scoping Plan aligned with the Mobile Source Strategy on the 2035 date would properly underscore the need for CARB to reconcile the stringency of its rulemakings with its own health- and climate-based modeling.

[54]CARB, 2020 Mobile Source Strategy, Figure 14, p. 94, https://ww2.arb.ca.gov/sites/default/files/2021-12/2020_Mobile_Source_Strategy.pdf. This figure shows ZEV sales at around 40% in 2026 and 70% in 2030. The current Advanced Clean Cars II Proposal and Draft Scoping Plan are well below these targets.
[55] CARB, Proposed 2020 Mobile Source Strategy, p. 98 (Sept. 28, 2021), https://ww2.arb.ca.gov/sites/default/files/2021-09/Proposed_2020_Mobile_Source_Strategy.pdf.
[56] Draft Scoping Plan, p viii.
[57] UC Berkeley Goldman School of Public Policy, Plummeting Costs and Dramatic Improvements in Batteries Can Accelerate our Clean Transportation Future (Apr. 2021) http://www.2035report.com/transportation/wp-content/uploads/2020/05/2035Report2.0-1.pdf?hsCtaTracking=544e8e73-752a-40ee-b3a5-90e28d5f2e18%7C81c0077a-d01d-45b9-a338-fcaef78a20e7.

Figure 2: CARB's Scenario Input Assumptions – Redlined (January 2022)

CALIFORNIA AIR RESOURCES BOARD

Sector	Alternative 1 Carbon Neutral by 2035	Alternative 2 Carbon Neutral by 2035	Alternative 3 Carbon Neutral by 2045	Alternative 4 Carbon Neutral by 2045
Truck ZEVs	100% of MD/HDV sales are ZEV by 2030 Only ZEVs on road by 2035; no PHEVs on road by 2035	100% of MD/HDV sales are ZEV by ~~2030~~**2035**; Only ZEVs on road by 2045; no PHEVs on road by 2045	**AB 74 ITS Report: 100% of MD/HDV sales are ZEV by 2040**~~100% of MD/HDV sales are ZEV by 2035~~	~~AB 74 ITS Report:~~ 100% of MD/HDV sales are ZEV by ~~2040~~**2045**

We are deeply dismayed to see the Draft Scoping Plan depart from the health-based timeframes dictated by the Mobile Source Strategy. Delaying the phase-out of polluting trucks by 5 years and instead relying on carbon removal and continued combustion—even if they were to burn low-carbon fuels—to meet climate targets is another failure to prioritize feasible and beneficial direct emission reductions. As with the light-duty sector, this delay is even more concerning when one considers that even under the Mobile Source Strategy scenario, medium- and heavy-duty vehicles fail to provide an "equal share" of reductions needed to meet air and climate targets.

The good news is that CARB's own robust—though largely conservative—total cost of ownership study shows that by 2030, zero-emission trucks will cost less to own than the combustion counterpart in every single category evaluated.[58] Five years from that time, there is no reason why the life-saving, climate protecting alternative should not be the default for all sales. **The Final Plan should move the phase-out date to 2035, consistent with CARB's own analysis indicating both the need for and feasibility of faster truck electrification.**

Further, the Draft Scoping Plan does not assume any early retirement of medium- or heavy-duty combustion trucks. Not only would this fail to comply with the governor's executive order to transition 100% of medium- and heavy-duty vehicles to zero-emission vehicles by 2045,[59] it could also leave dirty, diesel trucks in California communities beyond 2050.

Because CARB is prohibited under SB 1 from forcing the retirement of any truck added to our roads for at least 13 years to 18 years,[60] it is crucial that combustion trucks be retired as soon as they reach their statutory "useful life" and that all new trucks be zero-emissions if we are going to meet our statewide

[58] CARB, Draft Advanced Clean Fleets Total Cost of Ownership Discussion Document (Sept. 9, 2021) at 5-6 https://ww2.arb.ca.gov/sites/default/files/2021-08/210909costdoc_ADA.pdf..
[59] Executive Order N-79-20 (Sept. 23, 2020), https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf..
[60] The Road Repair and Accountability Act of 2017 (2017, Beall).

clean air standards on time. CARB staff clearly agrees with this assessment as they proposed the Zero Emission Trucks Measure in the January Draft of the State Implementation Plan Strategy, which aims to retire fossil fuel trucks as soon as possible and replace them with zero-emission vehicles.[61]

5. The Scoping Plan Should Limit its Focus to Green Electrolytic Hydrogen and Avoid Wasting It in Buildings and Road Transportation.

a. The Scoping Plan should not endorse the use of pollution-intensive hydrogen production pathways.

As an initial matter, the Draft Scoping Plan should limit the discussion of hydrogen as a climate solution to green hydrogen, which is commonly defined as hydrogen produced from electrolysis powered by renewable electricity. Other forms of hydrogen production discussed (including gasification, reformation, or pyrolysis of biomass) have not been commercially demonstrated, produce health-harming emissions, and cannot be scaled given the miniscule supply of sustainable biomass.

It is especially concerning that the Draft Scoping Plan treats conventional hydrogen produced from steam methane reformation of fossil gas paired with carbon capture (also known as "blue hydrogen") as a process that could be "considered in the near term to ensure a rapid transition to hydrogen and increase hydrogen availability until such time as electrolysis with renewables can meet the ongoing need."[62] The Plan also provides no basis for the highly controversial assumption that blue hydrogen "could potentially be zero carbon" or that it is likely to be available more readily than green hydrogen. Such a theoretical outcome would require zero upstream leakage and 100% capture rates, something even the vice president of Norwegian oil company Equinor (which aims to be a leader in blue hydrogen production) acknowledged is not physically possible for steam methane reforming.[63]

Peer-reviewed studies on blue hydrogen make clear that its lifecycle emissions, even under a "best-case scenario" where 85% of carbon is captured, are only 9 to 12 percent less than for gray (conventional) hydrogen–itself an extremely carbon intensive resource.[64] As the California Energy Commission's Integrated Energy Policy Report ("IEPR") points out, the study "generously assumes that captured CO2 can indeed be stored at the commercial scale indefinitely and for decades or centuries, yet there is no history to support that assumption…Further, the study did not consider the energy cost and associated GHG emissions from transporting and storing the captured CO2."[65] CARB should join the CEC and a host of other advocates, industry experts, and academics in dismissing the idea that blue hydrogen is a

[61] Draft 2022 State Strategy for the State Implementation Plan (Jan. 31, 2022), p. 42, https://ww2.arb.ca.gov/sites/default/files/2022-01/Draft_2022_State_SIP_Strategy.pdf.
[62] Draft Scoping Plan, p. 69.
[63] Leigh Collins, Upstream emissions risk 'killing the concept of blue hydrogen', says Equinor vice-president, Recharge (July 15, 2021), https://www.rechargenews.com/energy-transition/ upstream-emissions-risk-killing-the-concept-of-bluehydrogen-says-equinor-vice-president/2-1-1040583.
[64] Howarth, Robert W. and Mark Z. Jacobson (Aug 12, 2021), "How Green Is Blue Hydrogen?" Energy Science & Engineering, published by Society of Chemical Industry and John Wiley & Sons Ltd. https://doi.org/10.1002/ese3.956.
[65] CEC IEPR Volume III at 69.

plausible zero- or even low-carbon fuel, and focusing on scaling renewable, electrolytic hydrogen.

b. The Scoping Plan should avoid wasting green hydrogen on buildings and road transport.

The Draft Scoping Plan also departs from the recommendations of most climate and energy experts by devoting large quantities of hydrogen to end uses that are more efficiently and economically decarbonized through direct electrification—namely, buildings and road transportation.

The Draft Scoping Plan commits to blending 20% hydrogen by volume into the gas distribution grid along with both fossil and biogenic methane to incrementally reduce greenhouse gas emissions from combustion in building appliances. Over 15 studies have already scrutinized the role of hydrogen in home heating and their conclusions are clear that residential heating is either the or among the lowest priority, lowest efficiency applications for green hydrogen.[66] Given that hydrogen blending hits a dead-end far short of complete decarbonization, and would not alter the fundamental need to fully retire the gas system as 100% of appliance sales become all-electric, such a strategy would waste costly, resource-intensive green hydrogen for meager benefits.

Similarly, the Draft Scoping Plan envisions large amounts of hydrogen being used for transportation fuel– with apparently more than half of all heavy-duty trucks assumed to be hydrogen fuel cell vehicles. The Plan's enormous reliance on hydrogen for trucking is unsupported. Academics,[67] truck manufacturers,[68] and multiple independent analysts[69] have concluded that battery electric technology is best positioned to decarbonize the vast majority of heavy-duty trucking, including long-haul. Daimler's new battery-electric long-haul truck, for example, will reach customers before the end of this year, with series production expected by 2024. Between its 500 kilometer range and charging times that add an entire charge within the span of mandated driver breaks, battery-electric trucks like the Daimler's eActros are poised to cover the vast majority of long-haul heavy-duty truck demands far more efficiently and affordably than hydrogen fuel cell vehicles.[70] It is possible hydrogen could play a niche role in certain heavy-duty long haul applications where the need for sub-20 minute refueling times outweighs their higher cost and

[66] Leigh Collins, "Revealed | What 18 independent studies all concluded about the use of hydrogen for heating" (June 2022), https://www.rechargenews.com/energy-transition/revealed-what-18-independent-studies-all-concluded-about-the-use-of-hydrogen-for-heating/2-1-1240962.

[67] Patrick Plotz, Hydrogen Technology is Unlikely to Play a Major Role in Sustainable Road Transport Nature Electronics (Jan. 31, 2022), https://www.nature.com/articles/s41928-021-00706-6.

[68] TRATON, "Why the future of trucks is electric," (Apr. 13, 2021), https://traton.com/en/newsroom/current-topics/furture-transport-electric-truck.html.

[69] *See, e.g.*, Amol Phadke et al., Why Regional and Long-Haul Trucks are Primed for Electrification Now (Mar. 2021), https://eta-publications.lbl.gov/sites/default/files/updated_5_final_ehdv_report_033121.pdf; Transport & Environment, Why the Future of Long-Haul Trucking is Battery Electric (Feb. 2022) transportenvironment.

[70] "Mercedes-Benz Trucks to unveil the eActros LongHaul electric truck for long-distance transport in September." (June 20, 2022), https://www.automotiveworld.com/news-releases/mercedes-benz-trucks-to-unveil-the-eactros-longhaul-electric-truck-for-long-distance-transport-in-september/.

inefficiency relative to battery electric long haul trucks.[71] This would comprise a far smaller share of the heavy-duty fleet than the Draft Plan currently assumes will rely on hydrogen. Correcting this assumption will significantly lower the quantity of hydrogen needed for road transport, and ideally increase the availability for greater fossil fuel displacement from sectors like shipping and aviation where it is more likely to be needed.

6. The Final Scoping Plan Should Emphasize Retaining Carbon on Landscapes Over Tree Removal.

The proposed role of Natural and Working Lands (NWL) in the Draft Scoping Plan relies heavily on "increasing the pace and scale" of actions on NWL to ensure they are resilient and reduce the risk of wildfire.[72] The state's "action" of choice in the forest and chaparral ecosystems has been thinning. Carefully planned non-commercial thinning may reduce wildfire severity and decrease associated emissions, but large-scale forest thinning has been shown to increase carbon emissions associated with removals of mature stands, snags and downed wood while simultaneously reducing carbon stocks that serve to sequester and store carbon in forests. Furthermore, forests subjected to large-scale thinning projects have been still been shown to burn with relatively high severity.[73]

The Draft Scoping Plan relies on LIDAR and/or model-based findings rather than on empirical data. These methods could exaggerate the amount of forest carbon burned during a fire. For example, many models assume that ~80% of trees would be incinerated during a wildfire, but field-based scientific research shows conducted in two large California wildfires shows the amount of vegetation combusted was up to 3.2% at the stand level and up to 1.8% at the landscape level.[74]

The Draft also overestimates the ability of thinning projects to reduce wildfire risk. Current studies show that "increasing harvest of mature trees to save them from fire increases emissions rather than preventing them."[75] Despite this, the Draft proposes to treat 2-2.5 million acres annually to avoid carbon emissions, possibly reduce wildfire risk, and increase resilience.

Similar to carbon removal technologies, NWL interventions that involve removing carbon stocks (trees) offer uncertain emission reductions and sequestration. The Draft Scoping Plan states, "Climate smart management can help make forests more resilient to climate change and less prone to catastrophic wildfire" but acknowledges, "Climate-smart management in shrublands and chaparral face additional

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[71] Transport & Environment, Comparison of Hydrogen and Battery Electric Trucks (June 2020), https://www.transportenvironment.org/wpcontent/uploads/2021/07/2020_06_TE_comparison_hydrogen_battery_electric_trucks_methodology.pdf.

[72] Draft Scoping Plan, p. 205.

[73] Human ignitions on private lands drive USFS cross-boundary wildfire transmission and community impacts in the western United States, https://www.nature.com/articles/s41598-022-06002-3.

[74] Combustion of Aboveground Wood from Live Trees in Megafires, CA, USA. https://www.mdpi.com/1999-4907/13/3/391

[75] Forest Carbon Emission Sources Are Not Equal: Putting Fire, Harvest, and Fossil Fuel Emissions in Context. https://www.frontiersin.org/articles/10.3389/ffgc.2022.867112/full

challenges and uncertainty, but can still provide protection for threatened communities and natural resources."[76]

Some trees removed in fuel reduction operations may have otherwise been burned in a wildfire, but this is extremely unlikely for trees removed from a distinct area in forests that spans millions of acres[77]. The most likely scenario is that if left in place, the trees would continue growing and sequestering carbon; the soil, undisturbed by heavy equipment, would also continue to sequester millions of years of carbon. Alternatively, when the trees are removed, they are often either pile burned or combusted in a bioenergy facility (both of which release carbon dioxide and criteria emissions).

The Draft Scoping Plan laudably suggests avoided land conversion as a key NWL sequestration strategy but is likely to inadvertently cause land conversion through the removals. This suggests that CARB recognizes the importance of keeping trees and other vegetation in place. However, the Draft Scoping Plan hardly mentions logging or harvesting trees, and when it does, it mentions it as a "treatment" implying that it could benefit the climate.

The state should encourage sequestration on forest lands by curtailing logging operations, particularly salvage logging, clearcutting and other forms of even-aged management, that remove large amounts of carbon from the landscape without guaranteeing regrowth or sequestration. Trees removed from the forest are partially turned into wood products, but much of the bark, branches, and limbs are pile-burned or incinerated in a biomass facility which emits carbon and criteria pollutants. Even if trees are replanted there is no guarantee of regrowth – particularly given the changing climate and increased occurrences of wildfire. Intensive logging can be a "land conversion" activity and the state must implement protections to avoid this outcome.

7. The Scoping Plan Cannot Rely on Polluting Biofuels and Biomethane.

In the Draft Scoping Plan's Table 2-2: "Actions for the Proposed Scenario: AB 32 GHG Inventory sectors," biofuels and so-called "renewable natural gas (RNG)" are listed as strategies that will "Reduce demand for petroleum fuel and GHGs, and improve air quality" and achieve the goals of AB 197 to prioritize "direct emissions reductions for sources covered by the AB 32 Inventory."[78]

It is unclear how biofuels and biomethane will improve air quality as these fuels emit the same criteria pollutants as their fossil fuel counterparts. In fact, investing in RNG and biofuels will likely delay electrification in the transportation and building sectors, thus increasing emissions. For example, any truck fleet that decides to invest millions of dollars into new, methane-combusting trucks and the infrastructure necessary to fuel them will not readily transition to ZEVs even as the technology becomes more mature in the coming years. Fugitive methane emissions from a leaky distribution system and from

[76] Draft Scoping Plan, p. 203.
[77] A 2017 review by fire scientist Tania Schoennagel and eleven co-authors found that roughly 1% of United States Forest Service forest treatments experience wildfire each year, on average. See https://www.pnas.org/doi/pdf/10.1073/pnas.1617464114 at page 4586.
[78] Draft Scoping Plan, p. 62.

leaky end-use gas appliances are also locked in for decades if methane combustion is relied upon to heat buildings and homes.

Any claimed GHG emission reductions associated with RNG and biofuels are highly dependent upon a large number of complex variables. In the case of woody-biomass-derived biofuels – which the Draft Scoping Plan supports – the state is either looking at trees removed from complex forest or chaparral ecosystems that are nearly impossible to predict or trees removed from large-scale agricultural operations.

As outlined above, the alternative fate of forest biomass is nearly impossible to predict. A tree that is removed from the forest, transported to a biofuel facility, made into biofuel, and then combusted for its end use could just have easily remained in the forest sequestering carbon for years to come. Further, this scenario is farfetched given the massive scale of forested area in California and the fact that forest operations will result in many, relatively small piles of trees scattered throughout the state. The transportation costs associated with collecting all these trees would be enormous and, unless ZEVs are used, the emissions would be equally massive.

In the case of woody agricultural waste, the priority should be carbon sequestration rather than the production of biofuels that the state will not need to meet its transportation goals. This sequestration can be accomplished through whole orchard reincorporation, mulching, or other activities that encourage farmers to sequester carbon rather than burn it.

The Draft Scoping Plan also mistakenly relies on increasing dairy digester capacity in an attempt to capture dairy manure methane emissions. This proposal will only continue to exacerbate the air, water, soil quality, and health impacts borne by communities exposed to large herd sizes and factory farming practices. These communities are often the most vulnerable, economically and environmentally, and a buildout of biomethane incentivizes the consolidation of dairies, exacerbating and amplifying negative quality of life and health impacts associated with living near dairies. CARB must model and recommend the direct regulation of dairy methane emissions starting in 2024 and phase out incentives for dairy methane reduction via dairy digesters, which are hazardous and ineffective. In the interim, to further reduce enteric methane emissions, CARB should plan to transition large-scale farming systems to diversified, agroecological systems which have more sustainable herd sizes and rely less on emissions-generating practices while increasing natural carbon sequestration capacity.

The reality is that biomethane is too expensive and not available in large enough quantities to replace conventional gas. Maintaining the gas system for the promise of biomethane requires either maintaining large, leaking, expensive infrastructure to supply a fraction of the current end use of conventional gas or continuing to use large quantities of conventional gas, both of which are unacceptable outcomes for California's ratepayers. By a gas industry estimate, biomethane costs on average more than four times the cost of fossil gas.[79] The figure is likely much higher as other analyses show $/MMTBtu biomethane prices that are 10-15 times the price of fossil gas.[80] The cost of biomethane is likely to remain high, as the

[79] The Four Fatal Flaws of Renewable Natural Gas, *The Sightline Institute* (Mar. 9, 2021), https://www.sightline.org/2021/03/09/the-four-fatal-flaws-of-renewable-natural-gas/.
[80] Sierra Club and Earthjustice, "RHETORIC VS. REALITY: The Myth of 'Renewable

technology is already mature and the most cost-effective sites have already been built out.[81] Biomethane is also currently not available at anywhere close to the quantities required to replace conventional gas, and incentivizing the production of biomethane to increase that availability would have devastating impacts on communities close to dairies and landfills.

On the other hand, electric heating, cooking, and drying appliances and ZEVs *are* emerging technologies that are becoming more affordable each year. As they reach economies of scale, installation costs and the costs of appliances themselves will decrease. These alternatives to biomethane promise to be low-cost in the near future, especially if state policy signals and facilitates rapid electrification, and they don't require the maintenance of a gas system that leaks methane into the atmosphere, leaks gas into people's homes, and is only getting more expensive, even as gas demand reduces. Electric appliances and ZEVs also offer major load-shifting benefits to the grid, as they can charge during off-peak hours, lowering system costs overall and reducing the need for expensive, polluting ramping capacity.

8. The Scoping Plan Must Accelerate Building Decarbonization Targets for Existing Buildings.

We appreciate that the Draft Plan makes clear the importance and benefits of reducing fossil gas reliance in buildings. We further appreciate that the Plan includes action to ensure new residential buildings will be all-electric beginning in 2026. However, we are concerned that the plan unnecessarily delays the phase-out of new polluting gas appliances until 2035 for residential buildings and until 2045 for commercial buildings. Sales of new combustion appliances will lock in more than a decade of additional gas dependence and increase the scale of potential early retirements necessary, adding unnecessary extra costs to decarbonization when we could instead transition to available electric technology. We therefore urge the Final Plan to phase-out new polluting gas appliance sales by 2030 for both the residential and commercial sectors.

In this year alone, there has been tremendous momentum from other climate-leading nations to phase-out the sale of new gas appliances, including in the Netherlands (by 2026), Germany (by 2025), and Austria (by 2025). These new policies apply to all new sales in both new and existing buildings. California should join them by no later than 2030. And as with these countries, California should couple phase-out policies with public investment, tenant protections, and protected or reduced electricity rates for low-income households.

Additionally, the Scoping Plan should include an expanded discussion of opportunities for, and benefits of, strategic decommissioning of the gas system to fully retire the distribution system by 2045, at the latest. A managed contraction of the vast gas network feeding California's buildings and homes would avoid continued health-harming indoor air pollution, continued methane leakage from pipelines and appliances, and continued maintenance costs that would otherwise be spread across fewer and fewer

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Natural Gas' for Building Decarbonization," (Jul. 14, 2020), p.13, https://earthjustice.org/sites/default/files/feature/2020/report-decarb/Report_Building-Decarbonization-2020.pdf. (citing sources).

[81] The False Promise of "Renewable Natural Gas," *Vox* (Feb. 20, 2020), https://www.vox.com/energy-and-environment/2020/2/14/21131109/california-natural-gas-renewable-socalgas

ratepayers. The Scoping Plan can protect vulnerable gas customers from shouldering the burden of stranded assets not only in 2045 but also in prior decades by endorsing decommissioning. Without a target date, planning for the reduction in size and scope of the gas system is unlikely to occur and we risk being left with an overstretched and polluting gas system serving a scattered array of customers. Statewide electrification should be a priority, and as emphasized above, low-income customers should be prioritized in the transition away from gas in homes, so that they can not only benefit from the energy transition but also are not left stranded on a diminishing gas system. We believe the ongoing benefits of strategic decommissioning can far outweigh the upfront costs of select early retirements.

CONCLUSION

California must take meaningful action to combat the climate crisis while also driving down pollution in frontline communities. The Draft Scoping Plan does not adequately accomplish either of these endeavors and violates California's critical climate, air quality, and environmental justice laws and policies. We therefore urge CARB to thoroughly revise the Draft Scoping Plan to include the changes described above.

Sincerely,

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