



Citizens' Climate Lobby

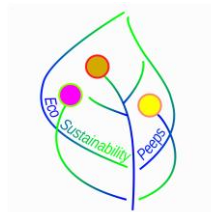


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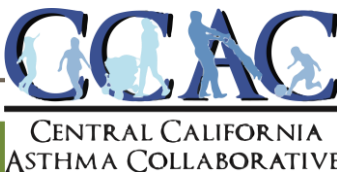
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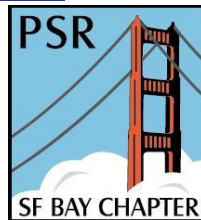


BEI Building Electrification Institute
CITIES DRIVING CHANGE



COMMUNITIES FOR A BETTER ENVIRONMENT
established 1978







June 2nd, 2022

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

RE: 73 Organizations Call for A Just and Ambitious 2022 Scoping Plan

Dear Honorable Governor Newsom and Board Chair Randolph,

We are writing to you on behalf of 73 organizations representing hundreds of thousands of members across California to request revisions to the 2022 Draft Scoping Plan. We strongly support Governor Gavin Newsom's call for California to "do everything possible to accelerate our climate targets and increase the pace of action to transition to a low-carbon future."¹ We are gravely concerned that the Draft Scoping Plan plainly fails to meet this call: It fails to accelerate our 2030 and 2045 climate targets, and it fails to increase the pace of California's actions beyond existing commitments. Because existing commitments alone are insufficient, the Draft Scoping Plan fails to reach even the statutory 2030 requirements set in 2016, and it fails to meet the 2045 carbon neutrality targets set in 2018. To make up for the shortfall in reaching these inadequate targets, the Draft Scoping Plan relies on record-breaking levels of unspecified mitigation from the cap-and-trade program in 2030 and entirely unrealistic levels of direct air capture in 2045. This is not a serious climate plan for California.

Instead, we need a plan that transitions us away from the extractive, fossil-fueled energy system at the pace and scale demanded by climate science and environmental justice. In practice, this transition requires two fundamental strategies. First, we must maximize near-term progress by accelerating deployment of proven, cost-effective, zero-emission solutions that alleviate the disproportionate harm caused by fossil fuels. Second, we must take an environmental justice approach to the final, hardest-to-decarbonize sectors that does not unnecessarily prolong our dependence on fossil fuel extraction and combustion.

Our organizations present the following policy solutions to address these issues. We view these changes as the bare minimum necessary for a stable, realistic, and just path to achieving urgent climate targets:

- 1) **Oil Extraction and Refining:** Phase out fossil fuel extraction by 2035 and refining by 2045 at the latest.
- 2) **Electric Power:** No new gas-fired generation starting today, and a greenhouse gas (GHG) target of 0 million metric tons (MMT) by 2035.
- 3) **Transportation:** Vehicle miles traveled (VMT) reduction of 30% by 2035, at least 75% zero-emission passenger vehicle sales by 2030, and 100% medium- and heavy-duty truck sales by 2035.
- 4) **Buildings:** Phase out sales of new gas appliances by 2030 and ensure a full decommissioning of the gas distribution system by 2045.

- 5) **Alternative Fuels:** Exclude reliance on alternative fuels that worsen pollution burdens and take an environmental justice approach when addressing hard-to-electrify sectors.
 - a) **No Role for Dairy Biomethane:** Regulate dairy emissions by 2024 and reduce methane emissions through a transition to agro-ecological alternatives.
 - b) **Role of Hydrogen:** Focus on 100% green electrolytic hydrogen only for hard-to-decarbonize, heavy-duty shipping, aviation, rail and industry.
 - c) **Role of CCS:** No Carbon Capture and Sequestration (CCS) for continued fossil fuel combustion, oil refining, or bioenergy.
 - d) **Remaining Role of CDR:** Carbon Dioxide Removal (CDR) should be limited to offset the final sliver of emissions that cannot be directly eliminated.

We underscore that CARB must maximize near-term climate action by accelerating proven solutions that alleviate the disproportionate harm of extraction and combustion. We detail these recommendations further below.

1. **Oil: Phase out fossil fuel extraction by 2035 at the latest, and refining by 2045, without relying on CCS.**

Fundamentally, the Draft Scoping Plan fails to move California beyond oil and gas. This failure not only jeopardizes our climate goals, but also perpetuates environmental racism. The communities that are forced to live along the fossil fuel supply chain suffer from poisoned air, water, soil and ecosystems. These communities—predominantly low-income communities of color—have become sacrifice zones.

The Draft Scoping Plan delays the phase out of oil extraction to 2045. This timeline is unacceptable to meet our state’s climate and health goals. According to a recent study, the United States and other rich oil-producing nations must phase out oil production by 2034 to stay within the Paris Agreement’s carbon budget and allow adequate time for less-resourced oil producers to transition.² As the wealthiest State in the wealthiest nation, with one of the most well-diversified economies of any oil-producing jurisdiction, California has an obligation to, at a minimum, meet this phase-out goal.

There is also no plan to manage the decline of oil refineries, which leaves the fate of refinery communities and workers up to the fossil fuel industry. The Scoping Plan must initiate a plan to effectuate a coordinated phase out of oil refining by 2045. The plan should also include an immediate call for a robust safety net for fossil fuel communities and workers to ensure a just and equitable transition.

2. **Electric Power: No new gas-fired generation starting today, and a 0 MMT GHG target by 2035, without relying on CCS.**

The Draft Scoping Plan proposes to build 10 GW of new gas capacity,³ equivalent to at least 33 new large or 100 new peaker gas power plants.⁴ New gas-fired power plants are incompatible with our climate, public health and economic goals. Rather than building new fossil fuel infrastructure, the Scoping Plan should pursue additional demand response, renewable energy, and storage technologies.

In light of the climate emergency, the International Energy Agency (“IEA”) called for no new fossil fuel infrastructure starting last year, in 2021.⁵ Yet the Draft Scoping Plan pushes California in the opposite

direction, proposing significant new gas build by 2045. In addition to harming the climate, gas plants emit many harmful pollutants that unjustly and disproportionately burden disadvantaged communities.⁶ This pollution could increase under the Draft Scoping Plan if California builds additional gas capacity. Furthermore, building new renewable energy capacity is cheaper than running existing gas plants and expanding gas infrastructure.⁷ CARB must exclude new gas-fired power capacity for the Scoping Plan.

In addition to excluding new gas build, CARB must set a GHG target of 0 MMT by 2035 for the electric sector and plan to phase out fossil gas-fired generation, starting with power plants located in disadvantaged communities. The IEA has explained that all advanced economies must achieve a carbon-free electric sector by 2035.⁸ President Biden's Executive Order has also set a goal of 100% carbon-free electricity for the United States by 2035.⁹ Yet the Draft Scoping Plan proposes an astonishing 30 MMT by 2045. This is unacceptable because SB 100 requires California to achieve a zero-carbon electric system by 2045.¹⁰ Further, CARB's own analysis shows that a 15 MMT in 2045 scenario (i.e. *half* the 2045 emissions currently proposed in the Draft Scoping Plan) is more risky than the more ambitious scenarios and unlikely to achieve climate and air quality goals and requirements.¹¹ CARB should therefore revise the Draft Scoping Plan's misguided 30 MMT by 2045 GHG target and set a more ambitious target of 0 MMT by 2035.

3. Transportation: Reduce VMT 30% by 2035, achieve at least 75% passenger ZEV sales by 2030, and achieve 100% ZEV truck sales by 2035.

The Scoping Plan needs to do more to reduce transportation sector emissions, which is the largest source of greenhouse gas pollution statewide.

First, the Plan should incorporate higher reduction targets to VMT to reduce direct vehicle emissions. The Draft Scoping Plan proposes a mere 22% reduction in VMT by 2045 and should be updated to a 30% reduction in VMT by 2035. Strategies like mass transit investments are critical to decarbonizing the transportation sector and addressing access to opportunity. These changes can facilitate more emissions reductions at potentially lower cost than other policy measures, while also supporting affordable housing and livable communities. As the State works to achieve its goal of 100% ZEV car sales by 2035, it is important that we maximize near-term progress, by at a minimum achieving an interim target of 75% ZEVs for new car sales by 2030, in line with CARB's own Mobile Source Strategy.

Similarly, the Draft should advance the phase out of new combustion medium and heavy-duty truck sales to 2035, consistent with the Mobile Source Strategy.¹² By delaying the phase out until 2040, the Draft Scoping Plan would allow new, polluting trucks to stay on the roads well beyond 2050, undermining Governor Newsom's Executive Order that aims for all trucks on the road to be zero-emission everywhere feasible. Moving forward the phase out of new combustion sales is a low-cost, high impact mitigation strategy, especially given that CARB's own analyses indicate that zero-emission trucks will be cheaper to own in every category as early as 2030.¹³ The Scoping Plan should also ensure that 100% of all drayage trucks and transit buses on the road are zero-emission by 2030. Finally, the Plan should reflect that all polluting trucks are retired when they reach the end of their useful life. 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.¹⁴

4. Buildings: Phase out sales of new gas appliances by 2030 and ensure a full decommissioning of the gas distribution system by 2045.

The Draft Scoping Plan recommends that gas appliances in commercial and residential buildings are retired at the end of their useful life but does not allow for early retirements. From an economic perspective, this approach hampers the decommissioning of segments of the gas distribution system, as commercial and residential buildings will require gas until their appliances burn out. From a climate perspective, it entrenches methane leakage and gas combustion pollution, as gas appliances that were purchased before 2035 can operate for decades, potentially. From a justice perspective, this approach risks leaving the last customers on the gas system without heat if skyrocketing gas rates to retain the system are spread across fewer customers.

We ask CARB to include in its Scoping Plan strategic retrofits before end-of-life to protect customers from loss of service upon burnout, to better plan the transition away from gas to electric, and to support electrification efforts and their corresponding climate and public benefits. All gas end-uses should be retired by 2045. Given that all of CARB's scenarios eventually achieve 100% sales of electric appliances, the eventual retirement of the gas distribution system is implied in all scenarios by varying dates. The costs of early retirements for the progressive, strategic decommissioning of the gas system are likely substantially lower than the costs of safely maintaining an aging system that is fated to be shut down.

To minimize the scale of early retirements necessary, the Plan should accelerate the phase out of new fossil-fueled appliances. The Netherlands, a notably gas-dependent country, recently announced that by 2026, all new heating systems (both in new construction and replacements in existing buildings) will need to be at a minimum, hybrid heat pumps.¹⁵ Germany is planning to bring forward the phase out of new gas heating system sales from 2025 to 2024.¹⁶ California should aim to hit this milestone by no later than 2030. As in Europe, California's commitment must be supported by public investment to ensure low-income homes or renters are not expected to finance the shift.

5. Alternative Fuels: Exclude reliance on alternative fuels that worsen pollution burdens and take an environmental justice approach to addressing hard-to-electrify sectors.

A. No Role for Dairy Biomethane: Regulate dairy emissions starting in 2024, and further reduce methane emissions through increased agro-ecological alternatives.

CARB's current proposal 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. 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 invest in transitioning 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.

B. Role of Hydrogen: Limit to green electrolytic hydrogen only for the hardest-to-electrify sectors.

CARB's Scoping Plan departs from the most common understanding of green hydrogen (i.e. hydrogen produced from electrolysis powered by renewable electricity)¹⁷ by using it also to refer to hydrogen produced from steam methane reformation, gasification, or pyrolysis of biogas and biomass. These forms of hydrogen production are not zero-emission. Their production emits significant pollution, and there is no meaningful supply of sustainable bio-feedstocks to ensure they are low-carbon. CARB should align California's Scoping Plan with internationally accepted definitions of green hydrogen and reject industry greenwashing. Specifically, green hydrogen should be limited to electrolytic hydrogen produced by splitting hydrogen from water using zero-emissions renewable solar and wind energy, which is the only established way to produce hydrogen without emitting climate or air pollution.

Furthermore, CARB's current proposal envisions the widespread use of hydrogen for road transportation and blending hydrogen into the gas distribution network. These are consistently ranked among the worst potential applications for green hydrogen's use.¹⁸ Several studies show hydrogen is unlikely to play a significant role in road transport—even long-haul trucking (although the vast majority of trucks travel less than 100 miles a day).¹⁹ More than 15 studies advise against the use of hydrogen for heating buildings.²⁰ The Scoping Plan should avoid wasting this scarce and costly resource in applications that delay the transition to a zero-emissions future, and direct it to sectors where its need is more certain, such as long-haul shipping and aviation and heavy-duty rail and industry.

C. Role of CCS: CCS should have no role for enhanced oil recovery, refineries, or power plants, and more promising mitigation should be prioritized for industrial decarbonization.

CARB's current proposal calls for large amounts of CCS infrastructure on refineries using unfounded assumptions. Capturing high percentages of carbon emissions via CCS in California's space-constrained refineries is extremely unlikely due to refinery systems complexity and the infeasibility of retrofitting controls onto hundreds of massive combustion units and thousands of fugitive sources. The few CCS demonstration projects on hydrogen units—which exist only in smaller, newer, incomparable refining facilities—show low rates of capture at an extremely high cost.²¹

CARB also alludes to a nonsensical role for CCS on power plants, despite the availability of zero-emission generation resources and peak-shaving measures. The process of capturing, compressing, transporting, and storing carbon is itself energy intensive, though the Scoping Plan does not model the incremental renewable energy needed to power it without additional emissions.²² Furthermore, CCS would not resolve potent methane leakage and local pollution problems.

Additionally, CARB proposes CCS on all stone, clay, glass, and cement operations by 2045. Before relying on polluting and inefficient CCS technologies, CARB should prioritize industrial decarbonization via energy efficiency, increased recycling, material substitution, electrolytic hydrogen, and investment in clean industrial technologies to reduce combustion and process emissions at stone, clay, glass, and cement

facilities. The Intergovernmental Panel on Climate Change (IPCC) estimates that CCS will play the smallest role—and at the highest cost—of any mitigation option evaluated for the industrial sector in 2030.²³ The Scoping Plan must be revised to incorporate additional industrial decarbonization strategies that the IPCC shows have far greater potential, including cementitious material substitution, enhanced recycling, and material efficiency. Each of these approaches has the significant advantage of reducing air pollution.²⁴

D. Remaining Role for CDR: Limit CDR to the maximum extent practicable.

The Scoping Plan relies on a whopping 100 MMT of CDR to address the emissions that remain in 2045. Such reliance is unreasonable because, to date, not even 1 MMT of CDR has not been successfully deployed globally. CARB’s own analysis in its 2020 Achieving Carbon Neutrality study shows that pathways that reduce emissions by 87-92% will require only 33-56 MMT of CO2 removal, far less than the draft plan’s 100 MMT proposition.²⁵ Further, the Draft Scoping Plan fails to analyze the energy demand necessary to power direct air capture, and therefore understates the complexity and cost of this technology.

While there is inherent uncertainty about the optimal way to eliminate all emissions by 2045, greater progress can and must be made now by using existing solutions to end our reliance on fossil fuels. Such an approach will minimize reliance on unproven and costly CDR technologies that could unnecessarily prolong harmful fossil fuel extraction and combustion. To reduce the risk of overshooting climate targets and unnecessarily exacerbating health harms, the Plan should limit CDR to the maximum extent practicable.

In conclusion, as stated above, these five asks constitute what our organizations view as the bare minimum necessary for a stable, realistic, and just path to achieving urgent climate targets. Many of our groups believe even faster progress can and must be achieved for certain sectors. Nevertheless, by applying the solutions enumerated above, we are confident that CARB could achieve far greater direct, and therefore more certain, reductions of greenhouse gasses than currently proposed in the Draft Scoping Plan.

Thank you for your consideration on these important changes for California communities and our climate.

Sincerely,

1. Barbara Rhine, Chair of Legislative Working Group, 1000 Grandmothers for Future Generations
2. Claire Broome, Leadership Team, 350 Bay Area
3. Jackie Garcia Mann, Leadership Team, 350 Contra Costa
4. Daniel Chandler, Steering Committee, 350 Humboldt
5. Annie Stuart, Steering committee member, 350Petaluma
6. Jan Dietrick, Policy Team Leader, 350 Ventura County Climate Hub
7. David Diaz MPH, Executive Director, Active San Gabriel Valley
8. Ameer Raval, Policy & Research Director, Asian Pacific Environmental Network
9. Cheryl Auger, President, Ban SUP (Single Use Plastic)

10. Kristel Rietesel, Admin, Bay Area Clean Air Coalition
11. Sven Thesen, Founder, BeniSol, LLC
12. Dan Johnson, Architect, Beyond Efficiency Inc
13. Jenna Tatum, Director, Building Electrification Institute
14. Igor Tregub, Chair, California Democratic Party Environmental Caucus
15. Ameen Khan, Regulatory Affairs Advocate, California Environmental Voters
16. Katie Bolin RN BSN MPH, Program Director, California Nurses for Environmental Health & Justice
17. Neena Mohan, Climate and Air Manager, CEJA
18. Dr. Shaye Wolf, Climate Science Director, Center for Biological Diversity
19. Marven Norman, Policy Specialist, Center for Community Action and Environmental Justice
20. Ana Gonzalez, Executive Director, Center for Community Action and Environmental Justice
21. Juan Flores, Community Organizer, Center on Race, Poverty and the Environment
22. Kevin Hamilton, Co-Director & Co-Founder, Central California Asthma Collaborative
23. Nayamin Martinez, Executive Director, Central California Environmental Justice Network
24. Sofia Magallon Policy, Advocate, Central Coast United for a Sustainable Economy (CAUSE)
25. Graham Emonson, Activist, Citizen's Climate Lobby - LA West Chapter
26. Jesus Alonso, Kern Community Organizer, Clean Water Action
27. Suzanne Hume, Educational Director and Founder, CleanEarth4Kids
28. Noah Harris, Policy Advocate, Climate Action Campaign
29. Shannon Simpson, Executive Director, Climate First: Replacing Oil & Gas
30. Ashley McClure, MD, Climate Health Now
31. Nailah Pope-Harden, Executive Director, ClimatePlan
32. Connie Cho, Associate Attorney, Communities for a Better Environment
33. Christy Zamani, Executive Director, Day One
34. Ann Edminster, Founder/Principal, Design AVenues LLC
35. Sasan Saadat, Senior Research and Policy Analyst, Earthjustice
36. Taylor Thomas, Co-Executive Director, East Yard Communities for Environmental Justice
37. James Wang, Founder/Director, Eco-Sustainability Peeps
38. Laura Deehan, State Director, Environment California Research and Policy Center
39. Jessica Craven, Steering Committee Co-Chair, Feminists in Action Los Angeles
40. Kimberly McCoy, Project Director, Fresno Building Healthy Communities
41. Rosalie Preston, President, Friends of the Air, Earth and Water
42. Elise Kalfayan, Steering Committee, Glendale Environmental Coalition
43. Amy Moas, Ph.D., Senior Climate Campaigner, Greenpeace USA
44. Steve Schmidt, Founder & CEO, Home Energy Analytics
45. Steve Mann, Owner, Home Energy Services
46. Indivisible Ventura, Director, Indivisible Ventura
47. Andrea L. Traber, Senior Principal, Integral Group Inc.
48. David Levitus, Ph.D., Executive Director, LA Forward
49. Shayda Azamian, Climate Policy Coordinator, Leadership Counsel for Justice and Accountability
50. Heidi Harmon, Senior Public Affairs Director, Let's Green CA!
51. Alicia Nichols-Gonzalez, California Organizing Manager, Mothers Out Front
52. Susan Butler-Graham, Volunteer Team Coordinator, Mothers Out Front Silicon Valley

53. Michael Stocker, Director, Ocean Conservation Research
54. Matt Leonard, Director, Oil and Gas Action Network
55. Teresa Bui, State Climate Policy Director, Pacific Environment
56. Antonio Díaz, Organizational Director, People Organizing to Demand Environmental & Economic Rights (PODER)
57. Matthew Baker, Policy Director, Planning and Conservation League
58. Kathleen Kramer, MD, Co-Founder, Project Green Home
59. Sean Armstrong, Partner, Redwood Energy
60. Ari Eisenstadt, Campaign Manager, Regenerate California
61. Robert M. Gould, MD, President, San Francisco Bay Physicians for Social Responsibility
62. Ben Eichenberg, Staff Attorney, San Francisco Baykeeper
63. Peter Warren, Spokesperson, San Pedro & Peninsula Homeowners Coalition
64. Anne Sheridan, Public Policy Team Co-chair, SanDiego350
65. Rachel Altman, Administrator, Santa Barbara Standing Rock Coalition
66. Pauline Seales, Organizer, Santa Cruz Climate Action Network
67. Martha Camacho Rodríguez, Educator/Director, SEE(Social Eco Education)
68. Monica Embrey, Senior Associate Director, Sierra Club
69. Carolyn Chaney, Chair, Social Justice Ministry, LOUUC
70. Shoshana Wechsler, Coordinator, Sunflower Alliance
71. Jennifer Thompson, Executive Director, Sustainable Silicon Valley
72. Roshi Sirjani, Triple Justice Coordinator, Triple Justice Organization
73. Joanna Gubman, Executive Director, Urban Environmentalists

¹ Governor Gavin Newsom, Letter to Liane Randolph (July 9, 2021), https://www.gov.ca.gov/wp-content/uploads/2021/07/CARB-Letter_07.09.2021.pdf.

² Dan Calverly et al., Phaseout Pathways for Fossil Fuel Production Within Paris-Compliant Carbon Budgets, (Mar. 2022), [https://www.research.manchester.ac.uk/portal/en/publications/phaseout-pathwaysfor-fossil-fuel-production-within-pariscompliant-carbon-budgets\(c7235a8e-e3b1-4f44-99dec27958c03758\).html](https://www.research.manchester.ac.uk/portal/en/publications/phaseout-pathwaysfor-fossil-fuel-production-within-pariscompliant-carbon-budgets(c7235a8e-e3b1-4f44-99dec27958c03758).html).

³ Draft Scoping Plan, Figure 4-5, p. 162 (indicating new gas in graphic of “Projected electricity resources needed by 2045 in the Proposed Scenario”); see also Mahone, et al., *CARB Draft Scoping Plan: AB32 Source Emissions Initial Modeling Results*, March 15, 2022 Workshop Presentation at Slide 26, <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.”).

⁴ One of the most recently proposed gas plants rejected by the California Energy Commission was the Puente Power Plant, which would have been 262 megawatts.

⁵ IEA, Net-Zero by 2050 (May 2021), <https://www.iea.org/reports/net-zero-by-2050>.

⁶ 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.”).

⁷ Rocky Mountain Institute, *Headwinds for US Gas Power: 20021 Update on the Growing Market for Clean Energy Portfolios Summary* (Dec. 2021), available at <https://rmi.org/insight/the-economic-health-and-jobs-impacts-of-ceps-compared-with-every-proposed-us-gas-plant-in-2021/>.

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- ⁸ IEA, *Pathway to critical and formidable goal of net-zero emissions by 2050 is narrow but brings huge benefits* (May 18, 2021), <https://www.iea.org/news/pathway-to-critical-and-formidable-goal-of-net-zero-emissions-by-2050-is-narrow-but-brings-huge-benefits>.
- ⁹ U.S. Whitehouse, President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target (April 22, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>.
- ¹⁰ SB 100 (De León, 2018); Public Util. Code Section 454.53(a), (d)(2).
- ¹¹ See CARB Carbon Neutrality Report, pp. 4-6 (Oct. 2020), https://ww2.arb.ca.gov/sites/default/files/2020-10/e3_cn_final_report_oct2020_0.pdf (explaining that the 15 MMT by 2045 scenario “represents the highest risk scenario, from a climate mitigation perspective, because it has the highest remaining direct GHG emissions, and relies on relatively untested [carbon dioxide removal] strategies which are not widely commercialized. The 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. Both the climate risks and the technology adoption and implementation risks of relying so significantly on [carbon dioxide removal] are high.”).
- ¹² CARB, Mobile Source Strategy (Oct. 28, 2021), p. 68, https://ww2.arb.ca.gov/sites/default/files/2021-12/2020_Mobile_Source_Strategy.pdf.
- ¹³ CARB, Draft Advanced Clean Fleets Total Cost of Ownership Discussion Document (Sept. 2021), https://ww2.arb.ca.gov/sites/default/files/2021-08/210909costdoc_ADA.pdf.
- ¹⁴ 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.
- ¹⁵ Cagan Koc, “Dutch Homes Will Have to Install Hybrid Heat Pumps from 2026” (May 18, 2022), <https://www.bloomberg.com/news/articles/2022-05-18/netherlands-to-make-hybrid-heat-pumps-mandatory-from-2026>.
- ¹⁶ Nikolaus J. Mayer, “Germany’s ‘Summer Package’ to Focus on Heating Sector Revamp” (May 9, 2022), <https://www.euractiv.com/section/energy-environment/news/germanys-summer-package-to-focus-on-heating-sector-revamp/>.
- ¹⁷ The IEA defines green hydrogen as hydrogen produced “using electricity generated from renewable energy sources,” as does the International Renewable Energy Agency, the European Bank for Reconstruction and Development (“made by using clean electricity from renewable energy technologies to electrolyse water”), international energy companies like Iberdrola (“electrolysis from renewable sources”) and energy consultancies like Wood Mackenzie (“produced from water by renewables-powered electrolysis”).
- ¹⁸ See, e.g., Sasan Saadat and Sara Gersen, *Reclaiming Hydrogen for a Renewable Future* (Aug. 2021), https://earthjustice.org/sites/default/files/files/hydrogen_earthjustice_2021.pdf.
- ¹⁹ Patrick Plotz, Hydrogen Technology is Unlikely to Play a Major Role in Sustainable Road Transport, *Nat Electron* (2022), <https://doi.org/10.1038/s41928-021-00706-6>.
- ²⁰ See, e.g., Jan Rosenow, “17 Independent Studies on the Role of Hydrogen for Heating Buildings” (Updated May, 2022), https://www.linkedin.com/posts/janrosenow_hydrogen-heating-studies-activity-6930099391642935296-LvOu?utm_source=linkedin_share&utm_medium=member_desktop_web.
- ²¹ See Communities for a Better Environment, April 4, 2022 comment letter submitted to CARB portal on CARB Draft Scoping Plan: AB32 Source Emissions Initial Modeling Results, available at <https://www.arb.ca.gov/lispub/comm2/bccommlog.php?listname=sp22-modelresults-ws>; Wara et al., Stanford, April 4, 2022, Comment letter submitted to CARB portal on Initial Modeling Results, available at <https://www.arb.ca.gov/lispub/comm2/bccommlog.php?listname=sp22-modelresults-ws>; Wara et al, Stanford, May 3, 2022, Comment letter submitted to CARB portal on Initial Air Quality & Health Impacts and Economic Analyses Results, <https://www.arb.ca.gov/lists/com-attach/62-sp22-econ-health-ws-VDVSIgNgVloBdAVm.pdf>.
- ²² Capture can consume 30-50% of the plant’s energy output. See 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-flue-gas-co2-emissions/99/i26>.
- ²³ IPCC, Climate Change 2022 - Mitigation of Climate Change (April 4, 2022) at SPM-50, https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf.
- ²⁴ *Id.*
- ²⁵ E3, Achieving Carbon Neutrality (Oct. 2020), pp. 5-6, 69, https://ww2.arb.ca.gov/sites/default/files/2020-10/e3_cn_final_report_oct2020_0.pdf.