Liane Randolph
Chair, California Air Resources Board
California Air Resources Board
1001 I St
Sacramento
CA 95814

June 24th, 2022

Re: Draft 2022 Scoping Plan Update (May 10, 2022)

Dear Chair Randolph,

The undersigned thank you for the opportunity to comment on the Draft 2022 Scoping Plan Update by the California Air Resources Board (CARB). We represent a diverse set of stakeholders from industrial, environmental, labor and research sectors. We are tracking this Scoping Plan update process with great interest, as it is the most ambitious and challenging one yet, in light of the state's mid-century climate goals. We offer the joint comments below on a limited number of topics that pertain to carbon capture, removal, and storage - an area where we have a common interest in catalyzing progress and deployment.

1. **California can *only* achieve its mid-century goals if it both intensifies existing efforts *and* expands its climate toolkit**

California's recent progress in decarbonizing its economy over the past two decades, combined with economic downturns and other circumstances beyond its control, has enabled the state to meet its climate goals to date. As we have laid out and substantiated in numerous comments during the 2022 update process,[1] the state can only achieve its mid-century goals if it both intensifies existing mitigation efforts *and* expands its climate toolkit to include carbon capture, removal, and storage technologies. These technologies are a complement - not a threat - to other mitigation approaches. The current Draft Scoping Plan under consideration has reached the same inescapable conclusion: all 4 scenarios rely on carbon capture and storage (CCS) and carbon dioxide removal (CDR) deployment to varying degrees - they just differ as to the exact level of reliance on these technologies.

This conclusion derived from CARB's latest modeling is supported by numerous other credible, in-depth analyses that apply to California, the nation and the globe.[2] We also reiterate that CCS technology is well

[1] See, for example: https://www.arb.ca.gov/lists/com-attach/16-sp22-kickoff-ws-UiFXMgFvVXYBbghm.pdf and https://www.arb.ca.gov/lists/com-attach/45-sp22-co2-removal-ws-UTRROQdhADoFbVQx.pdf
[2] Id.

established, tested, safe, and available today. This is firmly established following several decades' worth of practical demonstrations, research, documentation and peer-reviewed literature.[3,4,5,6]

We therefore strongly agree with CARB on the need to incorporate strategies in pursuit of CCS and CDR in California's climate portfolio, and are pleased to note that this Scoping Plan revision finally includes serious consideration of the technology and concrete steps to further its responsible deployment.

2. **Adoption of CCS and engineered CDR across multiple sectors and more appropriate timelines for implementation at scale**

CARB appropriately acknowledges the role of engineered CDR and point-source carbon capture and geological sequestration in meeting California's net-neutrality goals by 2045. Specifically, CARB's modeling points to natural and working lands as a net carbon source through 2035 and the subsequent need for engineered CDR to balance against not only these new sources but also the ongoing necessity of using CDR to "counterbalance hard-to-abate residual emissions…"[7]

CARB acknowledges that it had made an arbitrary decision within the Draft Scoping Plan modeling to limit the role of CCS to oil and gas refining and certain other industrial sources only.[8] This simplification limits the broad applicability of this family of technologies. In addition, CARB's projected timeframe for their wide scale implementation by 2030 is overly ambitious, showing about 13.5 million metric tons of CO_2 captured annually by that point.[9] This cannot be reasonably achieved in our view due to a mix of permitting, logistical, economic and perception constraints.

We therefore support the CARB's efforts to model the adoption of CCS and CDR more broadly across a wider swath of sectors and applications, including power generation, hydrogen and other fuel production from waste biomass and other feedstocks, oil and gas extraction, manufacturing processes including cement production, and other hard-to-decarbonize processes. We also urge CARB to amend its modeling to align with a more realistic rate of adoption of these technologies by 2030, given the constraints and challenges they face in the state, something that will necessitate wider adoption between 2030 and 2045.

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[3] IEA (2021), "About CCUS", IEA, Paris https://www.iea.org/reports/about-ccus
[4] IPCC, "Special Report on Carbon Dioxide Capture and Storage", Bert Metz, Ogunlade Davidson, Heleen de Coninck, Manuela Loos and Leo Meyer (Eds.). Cambridge University Press, 2005.
[5] "Safe Geologic Storage of Captured Carbon Dioxide – DOE's Carbon Storage R&D Program: Two Decades in Review" National Energy Technology Laboratory, Pittsburgh, April 13, 2020.
[6] Global CCS Institute, "Global Status of CCS 2021 - CCS Accelerating to Net Zero", 2021.
[7] IPCC, "Climate Change 2022: Mitigation of Climate Change", 2022.
[8] Draft2022 Scoping Plan Update, May 10, 2022; p.175.
[9] AB32 GHG Inventory Sectors Modeling Data Spreadsheet.

3. **CARB's strategies for achieving success in the carbon dioxide removal sector are sound, but can be further expanded**

We are closely aligned with CARB's proposed strategies for achieving success in the CCS and CDR sectors as outlined on pages 177-178 of the Draft Scoping Plan. Below, we elaborate on areas that we feel are critical elements to California achieving its tactical and long-term emissions goals.

More rapid CDR adoption is possible

The Proposed Scenario assumes 0 tons from CDR in 2035.[10] Such an assumption is inconsistent with California's decarbonization goals, and the state can and should be more aggressive. New and established direct air capture (DAC) companies, as well as other CDR developers including point source carbon capture, are proposing projects in the U.S. and elsewhere that can reach megaton scale in this decade. Additionally, the Department of Energy is poised to fund 4 CDR facilities of a least a megaton each in the U.S. in this decade under the federal Infrastructure Investment and Jobs Act (IIJA). Carbon removal technology can be readily deployed with a combination of private sector and government financial support, and other incentives.

There may be challenges regarding the necessary energy required to support DAC as a primary CDR solution, given competing uses for renewables on the state's grid. DAC project proponents are well aware of these energy challenges and we believe that CARB's incorporation of CDR in the Scoping Plan will help incentivize new or repowered renewable power projects. Opportunities also exist to explore the state's geothermal resources or oxy-fuel combustion with integrated carbon capture either via biomass or natural gas. California-based companies are developing and deploying technologies in this space. Also, there are renewable resources being built in areas with abundant sequestration resources that are having trouble being integrated with the grid given aging transmission lines, but which could supply power to projects with access to the state's abundant sequestration resources. While this nexus of energy demand is a challenge for the net-zero transition, it can be addressed with a variety of short-term and long-term solutions and innovation. There are opportunities for small-scale DAC and larger atmospheric removal using waste biomass today, and if permitting agencies can keep pace with project needs, such projects could be deployed in the state within the next five years and at a more aggressive pace than envisioned in the Draft Scoping Plan.

CARB CCS Protocol in Cap-and-Trade and facilitation of CCS in other, non-fuel sectors

We believe that an impactful step would be the incorporation of CARB's CCS Protocol into the Cap-and-Trade program as well. Such inclusion would incentivize near-term emissions abatement across key industrial processes (cement, CHP, and NGCC power) with significant current emissions not otherwise economically addressable. According to the 2020 report by the Energy Futures Initiative and Stanford University on CCS in California,[11] up to 45 million metric tons per year of CO_2 emissions (~11% of

[10] Draft Scoping Plan, p.52.

[11] https://sccs.stanford.edu/sites/g/files/sbiybj17761/files/media/file/EFI-Stanford-CA-CCS-FULL-rev2-12.11.20_0.pdf

California's total emissions) can be removed as a result of such inclusion. Also noted in the report, CARB adopted Resolution 10-42 in 2010, which committed to incorporating "a public process to establish a protocol for accounting for sequestration of CO_2 through geologic means and recommendations for how such sequestration should be addressed in the Cap-and-Trade program". Following through on this 2010 commitment would be a significant enabler to California meeting short and long-term emissions targets.

Updating the CARB's CCS Protocol

We agree with CARB that updating the existing Protocol to better align with national and global standards is an additional key opportunity.[12] Specific areas where this could apply include post-injection monitoring, injection limitations, buffer account contributions, and the handling of future penetrations through the storage complex. An improved protocol would better align with existing experience and science and provide more flexibility for projects without sacrificing environmental protection.

Predictable and time certain permitting of CCS Projects is critical to successful adoption

The California Air Resources Board 2022 Scoping Plan Update draft rightly identifies the challenging permitting environment currently present in California as numerous federal, state, regional, and local entities play different roles in approving a CCS or a CDR project. Further, the requirements of California's Environmental Quality Act (CEQA) and the associated environmental impact report (EIR) process can often derail a project through protracted litigation efforts, redundant agency review requirements, and excessively lengthy review timelines. While the CEQA review process is important to ensure that all relevant project impacts are being evaluated and all necessary mitigations are being implemented, this process should not be carried out in a way that precludes the practical deployment of the very projects that CARB has identified as critical to meeting the goals of this Scoping Plan. This applies to both point-source CCS projects as well as CDR projects. CARB should work with other state and local agencies to navigate the CEQA process efficiently, ensuring that projects' environmental impacts are fully considered and properly mitigated while projects are approved in a timely manner.

CCS Financing Mechanisms and incentives

California has been a proactive global leader in implementing measures that have been catalytic to emissions reductions and broader deployment of clean energy technologies, such as more efficient cars, buildings and appliances, solar power and wind power. Policy instruments such as Cap-and-Trade, the RPS, the LCFS and other standards have both set deployment targets and provided market drivers. However, no such treatment has ever been afforded to CCS or CDR technologies, which only very recently have become eligible for a federal tax credit (45Q) and for California LCFS credits for a very limited suite of applications. We strongly support CARB's stated intent to "[e]valuate and propose, as appropriate, financing mechanisms and incentives to address market barriers for CCS and CDR", and urge CARB to also include sectoral deployment targets for these technologies. The federal government has established funding and financing programs that provide a clear guidepost for California to emulate or build upon going forward. Science-based identification of viable current and future technologies followed by seed funding for R&D, pilots, demonstration projects, and ultimately commercial implementation are also areas where California can improve and accelerate its focus. Creating advanced buying commitments in the model of the Federal

[12] Draft Scoping Plan, p.177.

CDR Leadership Act and the Carbon Removal and Emissions Storage Technologies (CREST) Act are examples of mechanisms that may provide meaningful assistance.[13]

4. CCS can make small but important contributions to a carbon-free electricity system

The Draft Scoping Plan correctly acknowledges that decarbonizing the electricity sector needs to be a crucial pillar of the Scoping Plan.[14] However, even though CARB acknowledges that "in the near term, fossil gas generation will continue to play a critical role in grid reliability until other clean, dispatchable alternatives are available and can be deployed"[15], we believe that in the long term CARB has unduly limited the mix of resources on the grid, out of alignment with the goals of SB100. In particular, the small but important role that CCS could play is not adequately represented in the Draft Scoping Plan. This is of particular significance since, as CARB acknowledges, the Draft Scoping Plan does not model an increased electricity load due to deployment of CDR technologies, e.g. for DAC.

Electricity generation projects that produce electricity with net-zero carbon emissions through the use of CCS technology can facilitate decarbonization while maintaining grid reliability. A power grid supported by a diverse portfolio of zero-carbon, firm resources can achieve zero carbon emissions at a much lower cost than one that excludes available zero carbon resources,[16] while having a smaller land footprint, furthering grid reliability and accelerating the integration of intermittent renewable generation without excessive reliance on certain forms of storage. These firm resources can be relatively small, yet their benefits and resulting cost savings are disproportionately large.

Specifically, CCS can be used in the following ways to achieve zero-carbon electricity, or even carbon-negative electricity:

- Blending fossil natural gas with renewable natural gas at a conventional power plant and capturing (some of) the produced CO_2;
- Blending fossil natural gas at a conventional power plant with H_2 that has been produced with zero or even negative carbon emissions, and capturing (some of) the produced CO_2;
- Generating electricity using only a carbon-free fuel such as H_2 that has been produced as carbon neutral;
- Generating electricity using waste biomass that would have emitted its carbon due to decay or combustion (natural or prescribed) as a fuel, and capturing (some of) the produced CO_2; or
- Generating electricity and simultaneously providing the energy (heat and electricity) needs of a co-located DAC facility, while permanently sequestering the produced and captured CO_2.

[13] See: https://www.wri.org/update/federal-carbon-dioxide-removal-leadership-act and https://clearpathaction.org/legislation/carbon-removal-and-emissions-storage-technologies-act-of-2022
[14] Draft Scoping Plan, p.159.
[15] Draft Scoping Plan, p.158.
[16] See "Long-Run Resource Adequacy under Deep Decarbonization Pathways for California", Energy + Environmental Economics (E3), June, 2019, p.42.

5. **The Draft Scoping Plan errs on emissions from California's Natural and Working Lands - this places even more importance on engineered carbon removal**

According to the IPCC, carbon removal is "unavoidable".[17] In order to halt dangerous changes to our climate, models have shown that removing CO_2 from the atmosphere to counterbalance residual emissions is required. Those models have estimated the needed global cumulative net-negative emissions at 380 gigatons of CO_2 from 2050 to 2100 to return to 1.5°C after a likely overshoot. Rapid emissions reductions could reduce the amount of carbon removal needed but never eliminate it.

These carbon removals should also include increasing the amount of carbon stored in natural sinks ("nature-based solutions"), particularly in the next several decades.

While there are ecological, landscape value, and other reasons beyond carbon for which California should pursue nature-based solutions on its natural and working lands, it appears that CARB has over-estimated the role of these solutions on California's natural and working lands. CARB acknowledges on p.72 of the Draft Scoping Plan that it expects net *emissions* of about 8 million tCO_2e per year from 2025 through 2045. The research and rationale behind this conclusion was clearly presented during the workshops in the run-up to the current Draft Scoping Plan. In contrast, the net sum of emissions and removals in Draft indicates a positive term, i.e. pointing to the natural and working lands sector as a net carbon *sink*. We urge CARB to investigate and rectify this discrepancy.

6. **CCS can significantly reduce non-CO_2 air pollutants**

The flue gas of many industrial plants includes sulfur dioxide (SO_2), oxides of nitrogen (including NO and NO_2), and particulate matter. These constituents contribute to unhealthy air pollution, such as ozone smog and fine particulates linked to asthma attacks, chronic bronchitis, hospital admissions, and premature mortality.

Carbon capture can dramatically reduce these non-CO_2 air pollutants as co-benefits of removing CO_2. Air pollutants such as SO_2, NO_2 and particulate matter are not only harmful to human health, but they also adversely impact the amine used to capture CO_2. For example, SO_2 and NO_2 form heat stable salts after reacting with the amine solution, while condensable particulate (particularly sulfuric acid and organic compounds) causes loss of solvent and increased solvent emissions. The capture system must be designed to remove these pollutants to protect the amine solvent and ensure its reliable and economical operation. Depending upon the application, removal steps might include wet ESPs to remove particulates, upgrading NOx controls, and direct contact cooling systems that remove acid gasses such as SO_2.

[17] IPCC, "Climate Change 2022: Mitigation of Climate Change", 2022.

The International CCS Knowledge Centre prepared an engineering study of the Lehigh cement plant in Edmonton, Alberta. They found that adding carbon capture to the cement plant resulted in significant reductions in air pollutants, as shown in the table below:[18]

Emission	Before Carbon Capture	After Carbon Capture	Percent Reduction
CO_2	3,604 tonnes/day	354 tonnes/day	90%
SO_2	7 tonnes/day	0 tonnes/day	100%
NOx	2.4 tonnes/day	1.05 tonnes/day	56%
PM_{10}	190 kg/day	15 kg/day	92%
$PM_{2.5}$	65 kg/day	7 Kg/day	70%

Operating the capture system consumes extra energy (steam for the amine system and electricity for CO_2 compression). The design of the capture system can address the CO_2 and air emissions associated with this energy increase by routing the emissions into the pretreatment and CO_2 capture equipment. CARB should establish a CCS goal that ensures that installing capture systems results in significant health benefits from non-CO_2 air pollutant reduction.

7. **Projections for future performance of CCS and CDR projects based on past performance must take into consideration the scale and extent of past technological deployment**

A technology's past performance is not always a useful or valid indication of future performance. All technologies that have not been widely deployed take time to mature, become more efficient, and reduce costs. It was true for solar and wind power a decade or two ago, and it is still true for CCS and CDR technologies today.

The CCS and CDR sectors have been growing at an unprecedented rate in recent years, and that growth is only accelerating. The increased dependence of global plans for net-zero on CCS means that the

[18] Summary for Decision Makers on Large-Scale CCS on Cement - Based on Lehigh Edmonton CCS Feasibility Study. International CCS Knowledge Centre. [November 2021]

economic performance of CCS is becoming increasingly important for governments, the private sector, and stakeholders alike.

Broader technology development will be a significant driver of improved economics for CCS and CDR. Higher efficiency, reduced variable operating costs, capital cost reductions, and plant performance improvements, enabled by new technologies, are meeting the demand for improved CO_2 capture system performance, transport system costs, and CO_2 storage options.[19]

Government has always employed a variety of incentives to encourage the development of all domestic energy resources at the state and federal level. These incentives are varied, but include direct subsidies, tax breaks, market support, technology demonstration programs, research and development (R&D) programs, advance market commitments, information generation and dissemination, technology transfer, directed purchases, and government-funded regulations.

Government policies — including federal R&D funding (see expected funding in the figure below), public-private demonstration initiatives, and production tax incentives— all play a role in driving down costs for energy technologies. Support over time in concert with significant private sector investment can accelerate efforts to deploy CCS and CDR.

We urge CARB to take this into account in the Scoping Plan, both through projecting this improved performance of CCS and CDR from the current modest levels, but also through a deeper consideration of strategies to achieve wider deployment (see further comments on some suggested strategies above).

Infrastructure Investment and Jobs Act (H.R. 3684)

Carbon Management & Industrial Decarbonization Provisions

Carbon Management Provisions	**$12.1 Billion**
Large Scale Pilot Projects	$937 Million over four-year period
Demonstration Programs	$ 2.54 Billion over four-year period
Direct Air Capture Technologies Prize Competitions	a. Precommercial: $15 M for fiscal year 2022 b. Commercial: $100 M for fiscal year 2022
Carbon Utilization Program	$310 Million over five-year period
Carbon Capture Technology Program (Front-end engineering and design program)	$100 Million over five-year period
SCALE Act (financing for C02 transport and storage infrastructure)	$4.6 Billion over five-year period to carry out activities authorized by the SCALE Act
Direct Air Capture Hubs (creates 4 regional DAC hubs)	$3.5 Billion over five-year period
Total funding for carbon management	**$12.1 Billion over five-year period**

Included in the bill are transformative measures to scale deployment of carbon capture, removal, utilization and associated CO2 transport and storage infrastructure. This includes full funding of the authorizations for large-scale carbon capture pilot projects and demonstration programs.

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[19] Nouman Mirza, Ph.D , David Kearns, Ph.D, STATE OF THE ART: CCS TECHNOLOGIES, Technical Report, Global CCS Institute, 2022.

8. Fate of forest biomass and social cost calculation, alternatives

California is facing a growing forest and wildfire crisis. Decades of active fire suppression, coupled with the increasing impacts of climate change, have dramatically increased wildfires' size and intensity throughout the state.[20,21]

Low-carbon and carbon-negative fuels from non-merchantable/waste forest biomass can help California attain its greenhouse gas reduction targets and offer an opportunity to support sustainable forest restoration activities to reduce wildfire risk. Development and deployment of these innovative wood products can help the state of California increase the pace and scale of forest restoration efforts, strengthen regional capacity, support innovation, reduce vulnerability to wildfire, and promote carbon storage in long-lived products, including geologically sequestered CO_2. These fuels can also play a pivotal role in California's world-leading ambition to address climate change.

Several different fuel types could be produced using non-merchantable forest biomass in California, such as hydrogen, ethanol, drop-in synthetic fuels that could displace gasoline, diesel or aviation fuel, and renewable natural gas (RNG).

The 2021-22 state budget makes foundational investments in forest biofuels. This includes $50 million to the Department of Conservation for a forest biofuels pilot program including carbon capture and storage. The state has also set a goal to increase the pace and scale of forest treatments to 1 million acres per year by 2025, set in partnership with the United States Forest Service (USFS), which owns ~57% of forested lands in California.

Forest biomass is a byproduct of sustainable forest activities. Currently, this biomass is mostly open-burned or left in the forest to decompose. These approaches result in substantial greenhouse gas (but also other air) emissions, including climate pollutants such as methane and black carbon that do not persist for as long as CO_2 in the atmosphere but are much more potent greenhouse gases and also cause detrimental health effects. At the scale of treating one million acres per year, which is anticipated to generate hundreds of millions of new tons of biomass over the next one to two decades, such approaches could undermine the state's ambition to achieve net-zero GHG emissions by 2045 (Baker et al. 2019).[22] Adopting new policies that support the robust management and use of biomass waste are essential to align the state's forest health, climate, and air quality goals.

Low-carbon transportation fuels are high value, owing to incentives available under California's Low Carbon Fuel Standard and the federal government's Renewable Fuel Standard programs.

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[20] Erin J Hanan *et al* 2021 *Environ. Res. Lett.* **16** 024051.

[21] James Temple, "Suppressing fires has failed. Here's what California needs to do instead", MIT Technology Review, September 17, 2020.

[22] Baker, S. E. et al. (2019). "Getting to neutral: options for negative carbon emissions in California (No. LLNL-TR-796100). Lawrence Livermore National Lab.(LLNL), Livermore, CA.

In the long term, biofuels from forest biomass offer the potential to achieve near-zero, or even below-zero emissions in a diversity of hard-to-electrify applications, including aviation, shipping, some long-haul transport and some industrial processes, thereby supporting California's transition to net-zero GHG emissions.[23] We urge CARB to both acknowledge this potential in the Scoping Plan and include it in the modeling. The Draft Scoping Plan suggests that it is preferable to open burn or leave to decay in the forest a significant portion of biomass residues resulting from wildfire prevention treatments.[24]

9. CCS and CDR can have significant benefits for California communities and workforce

CCS and CDR projects can provide significant environmental benefits by lowering the overall carbon intensity of transportation fuels, energy production and other industrial processes, and significant positive economic impacts through job creation and associated tax revenues. Predictable permitting processes and local land use oversight will ensure business plans can be executed with certainty and adequate land use compatibility and project mitigation is implemented.

In many under-served California communities, unemployment, poverty, and educational attainment are all worse than the national averages. Strong economic opportunities will benefit these disadvantaged communities if the state develops a suite of CCS and CDR projects. Direct project benefits include regional and local job creation and retention, and the associated positive social impacts of high-road jobs (public safety, public schools and higher community standard of living). In addition, the direct positive impact of low- to zero-net carbon intensity energy production is a benefit to the region, and state and national climate goals. Current and future CCS job opportunities will include design/permitting/construction and operations/maintenance and long-term monitoring for capture/compression plants, pipelines and storage complexes.[25]

Key local dependencies to ensure a positive result include:

- Creation of a strong job suite that delivers a pathway to middle-class living standards;
- Balanced decarbonization solutions that ensure all communities equal access to affordable and reliable energy during the transition;
- Mitigation of local air pollution and climate impacts; and
- Economic investment in local economies via capital development and ongoing operations.

While there have been numerous studies on the overall implications of CCS and CDR deployment on carbon cycles, global temperature rise, and the required expansion of clean energy capacities, there has not been enough research dedicated to exploring the local impacts of carbon management projects on both built and natural environments where these projects are deployed. Also, there should be project

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[23] Joint Institute For Wood Products Innovation, "Advancing Collaborative Action on Forest Biofuels in California", Dr. Daniel Sanchez, Dr. Haris Gilani, University of California, Berkeley, February 22, 2022.

[24] See: Sam Uden, "Missed opportunity: Draft Scoping Plan fails to address biomass pile burning and decay", June 9, 2022.

[25] John Larsen, Whitney Herndon, Galen Hiltbrand, Ben King, *The Economic Benefits of Industrial Carbon Capture: Investment and Employment opportunities for Eastern and Western States*, (Rhodium Group, 2021) https://rhg.com/wp-content/uploads/2021/01/The-Economic-Benefits-of-Carbon-Capture-State-Investment-and-Employment-Estimates_Phase-II.pdf

specific and appropriate communication and community engagement around siting of CCS and DAC facilities.

As we work on developing and scaling carbon management projects, it is essential to make sure that these projects are tailored to meet the environmental, social, and economic needs of the local communities where they will be located. We are convinced that, under the right safeguards, CCS and CDR projects can benefit California's communities and workforce in multiple ways. Judging these projects' potential impact - positive or negative - based on a narrow subset of fossil fuel infrastructure projects is neither relevant nor applicable. CCS and CDR projects merit a closer look that is tailored to their individualities and characteristics. CARB should include in its strategies for success in CCS and CDR requirements for project developers to demonstrate and ensure local benefits when they apply for permits or funding opportunities.

Conclusion

We thank CARB once again for the opportunity to comment and engage in this Scoping Plan Update process. We commend staff for appropriately recognizing the important role of CCS and CDR technologies in this Update at length, and for proposing strategies to achieve success and deployment in this sector. We urge CARB to expand the scope of its modeling and the breadth of strategies for success.

Respectfully submitted,

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