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<u>Submitted electronically via ww2.arb.ca.gov</u>

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

<u>RE: Comments on the August 12, 2024 CARB Low Carbon Fuel Standard 15-Day</u> <u>Changes</u>

Dear Chair Randolph and Members of the Board:

Carbon TerraVault Holdings, LLC ("CTV") appreciates the opportunity to comment on the California Air Resources Board's ("CARB" or "the Board") proposed amendments to the Low Carbon Fuel Standard ("LCFS"), released on August 12, 2024 (the "15-Day Changes").¹ CTV believes that the proposed modifications to LCFS credit generation for hydrogen projects is inconsistent with the requirements of California's Administrative Procedure Act ("APA") as well as CARB's December 2022 Scoping Plan (the "2022 Scoping Plan"). CARB must not finalize the 15-Day Changes or CARB risks suppressing California's nascent low-carbon hydrogen industry in a manner that will inevitably increase the risk of stranding existing assets and projects.

Restricting LCFS credits to non-fossil hydrogen after 2031:

- Does not align with CARB's 2022 Scoping Plan;
- Inhibits economic incentives that will constrict supply and the California hydrogen sector;
- Ignores the State's technology-neutral approach to carbon reduction; and
- Sends a message to investors that California's regulatory agencies may arbitrarily change rules that negatively impact the investment landscape without notice laid out by the state's own legislation.

Consistent with the 2022 Scoping Plan, California energy companies have planned for low carbon intensity ("CI") hydrogen projects that mitigate carbon emissions by employing carbon capture and storage ("CCS"),² with the understanding that these projects would receive LCFS credits. The 2022 Scoping Plan calls for a broad approach to defining low-CI hydrogen projects to support a projected massive increase in demand for hydrogen in the future. Developing a pipeline of low-CI hydrogen projects with CCS is essential to meet state climate targets, which compels CARB to provide long-term incentives in support of this emerging industry. The 15-Day Changes, as proposed, would eliminate these financial incentives by 2031, materially jeopardizing the long-

¹ California Air Resources Board, Proposed 15-Day Changes, <u>https://ww2.arb.ca.gov/rulemaking/2024/lcfs2024</u>.

² E.g., <u>Elk Hills Hydrogen Project Press Release</u>, California Resources Corporation (July 31, 2023).

term business justification for these projects and undercutting California's chance to be a leader in low-CI hydrogen production.

Moreover, finalizing such disruptive changes sends the wrong signal to investors with respect to support for low-CI hydrogen projects. The 15-Day Changes represent an unexpected and surprising proposal, exactly the kind that sends shocks through the investment and lending communities and ultimately risk provoking a sweeping retreat from investment in *any* type of low-carbon fuels because of fears of arbitrary and last-minute regulatory changes. CARB must abandon the 15-Day Changes and refocus its efforts on sending clear regulatory support for all types of low-CI hydrogen projects.

About Carbon TerraVault Holdings, LLC

Carbon TerraVault Holdings, LLC ("CTV"), a subsidiary of California Resources Corporation ("CRC"), provides services that include the capture, transport and storage of carbon dioxide for its customers. CTV is engaged in a series of CCS projects that inject CO₂ captured from industrial sources into depleted underground reservoirs and permanently store CO₂ deep underground. For more information about CTV, please visit <u>www.carbonterravault.com</u>.

About Carbon TerraVault Joint Venture

Carbon TerraVault Joint Venture ("CTV JV") is a carbon management partnership focused on carbon capture and sequestration development, and was formed between Carbon TerraVault, a subsidiary of CRC, and Brookfield Renewable. The CTV JV develops both infrastructure and storage assets required for CCS development in California. CRC owns 51% of the CTV JV with Brookfield Renewable owning the remaining 49% interest.

CTV JV is involved in several new clean energy initiatives. These include the Grannus Ammonia and Hydrogen Project, which expects to sequester 370,000 metric tons ("MT") of CO₂ annually and produce clean ammonia and hydrogen in Northern California. The project aims to be California's first clean ammonia and hydrogen facility producing an expected 150,000 MT per annum of clean ammonia and an expected 10,000 MT per annum of clean hydrogen. The Lone Cypress Hydrogen Project, in collaboration with Lone Cypress Energy Services, expects to sequester 205,000 MT of CO₂ per year from a new hydrogen plantand the production of an expected 65 tons per day of hydrogen.^{3,4} Lastly, the Yosemite Hydrogen Facility, in partnership with Yosemite Clean Energy, expects to sequester 40,000 MT of CO₂ per year from a new hydrogen, with plans for two additional facilities. These projects contribute to our sustainability goals to reduce carbon emissions and promote clean energy.

³ Lone Cypress CDMA Press Release, California Resources Corporation (Dec. 7, 2022).

⁴ CTV expects that the Lone Cypress Hydrogen Project will utilize a blended feedstock consisting of natural gas and RNG, subject to the availability of RNG.

Recommendations

As a California-based company committed to the energy transition, CTV supports CARB's overall goal of achieving carbon neutrality by 2045 and reducing greenhouse gas ("GHG") emissions by 2045 to a level that is 85% below 1990 levels. In its Statement of Reasons for the December 2023 proposed LCFS amendments, CARB stated that "[m]eeting this goal will require the deployment of greenhouse gas emission reduction strategies at an unprecedented scale and *pace*."⁵ However, we are concerned that many aspects of the 15-Day Changes unnecessarily restrict or prohibit established and proven strategies for reducing GHG emissions in connection with the production of low-CI hydrogen from generating LCFS credits. In particular, the 15-Day Changes as written would exclude low-CI hydrogen production using fossil gas with CCS from generating LCFS credits after 2030. By removing LCFS credit generation eligibility for hydrogen produced using fossil gas as a feedstock, the proposed amendments only support incentives for hydrogen produced using (1) electricity generated from renewable power sources and (2) renewable natural gas ("RNG") as a feedstock. Neither source can practically meet CARB's projected demand for low-carbon hydrogen production likely inhibiting the foundation of a meaningful low-carbon hydrogen industry in California. This proposal is inconsistent with the California APA and the CARB 2022 Scoping Plan and will ultimately frustrate the deployment of low carbon hydrogen projects in California.

As discussed in greater length below, the California APA compels that the 15-Day Changes actually be subject to a 45-day comment period. In any case, we respectfully request that prior to finalization of the 15-Day Changes, CARB must:

- **Reject the proposed Subsection 95482(h)**, which removes LCFS credit generation eligibility for hydrogen produced using fossil gas as a feedstock, effective January 1, 2031;
 - In the alternative, CARB should revise Subsection 95482(h) to (1) expressly allow for LCFS generation at hydrogen projects using fossil gas feedstocks *when paired with CCS*, and (2) permit existing LCFS credit generating facilities (*i.e.*, those generating credits before January 1, 2031) to be exempt.

These requests largely stem from regulatory inconsistencies and counterproductive consequences associated with the 15-Day Changes, including (1) potential deficiencies under California's APA, (2) misplaced assumptions regarding other feedstocks for hydrogen plants, (3) conflicts between the 15-Day Changes and CARB's 2022 Scoping Plan, (4) negative impacts to California's climate goals, and 5) harmful financial effects, including the risk of stranding assets.

California Resource Corporation's Concerns with the August 2024 15-Day Changes

1. CARB's 15-Day Changes Do Not Comply with California Administrative Law

The California APA requires that any substantial modification to a proposed rule must be available for public comment for a minimum of 45 days, unless the modification is "sufficiently

⁵ 2024 LCFS Amendments Staff Report: Initial Statement of Reasons at 4 (Dec. 2023) [hereinafter "Initial Statement of Reasons"] (emphasis added).

related" to the original proposal.⁶ Only if a modification is "sufficiently related" to the original proposed rule, such that a reasonable member of the directly affected public could have determined from the notice that these changes to the regulation could have resulted, can a California agency make the modification available for a 15-day public comment period.⁷ The 45-day public comment period—one of only a few ways the public can help shape rulemaking—is integral to allow the public sufficient time to consider and analyze new rules that could have drastic impacts on their business operations and efficiently convey this information to the agency.

The proposed addition of Subsection 95482(h) in CARB's August 12, 2024 15-Day Changes to the proposed December 2023 LCFS amendments is not sufficiently related to those earlier proposed amendments and, as such, is deficient under the California APA. The inquiry into whether a modification is sufficiently related focuses on whether the change concerns "the same subject or issue" as the original proposed rule and whether the original proposed rule provided any "*specific indication*" of the changes that may be made.⁸ Here, commentors had no indication that CARB would propose to remove hydrogen produced using fossil gas from credit generation eligibility under the LCFS. This *drastic* change to Section 95482, completely removing an entire category of fuels from eligibility, is not sufficiently related to the previous proposal, which only proposed minor changes related to fossil jet fuel and biomass-based diesel fuel credits. The public could not have had any indication that a modification to hydrogen generation credits was under consideration, and thus, commentors are "hampered in effectively opposing those changes."⁹ To rectify this APA deficiency, we ask CARB to set aside these 15-Day Changes or reissue the proposed changes under a 45-day public comment period.

2. Other Hydrogen Feedstocks Are Insufficient to Meet Projected Fuel Demands

The LCFS program can play a critical support role in the development of California's lowcarbon hydrogen economy. For example, strong market signals from the LCFS have supported increased production and use of biodiesel and other low carbon fuels.¹⁰ Even regarding CCS, a recent May 2022 study from the Stanford Center for Carbon Storage found that "LCFS is the single largest financial incentive for eligible CCS projects in California."¹¹ But rather than send strong market signals or incentives in support of California's growing low-carbon hydrogen industry, the 15-Day Changes send the opposite signal, likely harming both the low carbon hydrogen and CCS industries. By picking winners and losers at such an early stage in the energy transition, CARB is abandoning the technology-neutral approach outlined in its own 2022 Scoping Plan where it stated

⁹ *Id.* at 246.

⁶ Ca. Gov. Code § 11346.8(c).

⁷ 1 Cal. Admin. Code § 42.

⁸ Wendz v. Ca. Dep't of Edu., 311 Cal. Rptr. 3d 213, 246 (Cal. App. 1 Dist. 2023) (quoting *Small Refiner Lead Phase-Down Task Force v. United States E.P.A.*, 705 F.2d 506, 548 (D.D.C. 1983)). In *Wendz*, a case not dissimilar to the rulemaking proceeding at issue here, the California Court of Appeal found that a proposed Superintendent of Public Instruction rule that placed a cap on the number of members on a Regional Migrant Parent Advisory Council, which was later modified to prohibit alternate members, was not sufficiently related because the public did not have adequate notice that the agency might prohibit the use of alternate members. In that case, the Court of Appeal found this portion of the rule invalid because a 45-day notice was required for the modified proposal. *Id.* at 247.

¹⁰ CARB 2022 Scoping Plan at 191.

¹¹ SCCS Study at 32.

that "[t]he challenge before us requires us to keep all tools on the table."¹² We believe that CARB should adopt this latter approach and reverse the restrictive course proposed in the 15-Day Changes. In particular, as part of this reversal, CARB needs to revise its proposal so that low-CI hydrogen projects—regardless of feedstock or technology—are eligible to receive LCFS credit generating opportunities.

The 15-Day Changes ignore the technical realities associated with the time to scale the deployment of hydrogen solely produced from RNG, renewable electricity, and other non-fossil sources. In this interim period, low-CI hydrogen produced with fossil gas and CCS is the only proven and scalable technology capable of meeting the demands of California's expanding lowcarbon economy.¹³ CARB itself acknowledged in its 2022 Scoping Plan, that "[t]here is a high degree of uncertainty around the availability of solar to support both electrification of existing sectors and the production of hydrogen through electrolysis."¹⁴ More recently, California's long reliance and proven history with fossil-based hydrogen production is referenced in the ARCHES White Paper which states that "California is home to the second-largest hydrogen economy in the United States, a predominately fossil-based system which has been in place for more than 60 years."¹⁵ The fastest way to decarbonize existing hydrogen production in California is to incentivize the installation of CCS at these facilities by allowing hydrogen production using fossil gas with CCS to generate LCFS credits. Providing this support avoids the risk of stranding the assets that have made California a leader in the hydrogen industry for the past 60 years by creating a bridge to low-CI hydrogen production. However, the 15-Day Changes would have the opposite effect, undercutting support for the best pathway to rapid reductions in carbon intensity of California's existing hydrogen industry.

The proposed amendment assumes that renewable electricity would be dedicated to hydrogen production versus used for other grid demands. This unnecessary competition over developing renewable electricity supplies can be avoided by revising the LCFS amendments to incentivize low-CI hydrogen with CCS as an alternate strategy while these other hydrogen generation technologies develop.

At least one unintended consequence of CARB's proposal is that it could further delay decarbonizing the grid. Increased demand that will correspond with the electrification of the transportation sector and population growth will require maintaining adequate reliable baseload power generation such as natural gas-fired power plants even with the addition of new renewable generation capacity. These existing natural gas plants could be retrofitted to co-fire hydrogen, and incentivizing the production of low-CI hydrogen produced with fossil gas and CCS represents

¹² CARB 2022 Scoping Plan at 11.

¹³ Bracci, J., et al., *Fueling the California Mobility Market with Hydrogen from Natural Gas plus Carbon Capture and Storage, Stanford Natural Gas Initiative and Stanford Center for Carbon Storage*, May 2022, at 41 ("near-term techno-economic models still point to SMR-CCS being the cheaper hydrogen generation pathway to kickstart a clean hydrogen economy in California") [hereinafter "SCCS Study"].

¹⁴ California Air Resources Board, 2022 Scoping Plan for Achieving Carbon Neutrality, at 88 (Dec. 2022) [hereinafter "CARB 2022 Scoping Plan"].

¹⁵ White Paper Overview, Alliance for Renewable Clean Hydrogen Energy Systems, at 6 (2024).

would provide additional support for the overall decarbonization of the state's electric grid in an orderly and least-disruptive manner.

Moreover, CARB may be overestimating the availability of RNG for use in hydrogen production within California. Separate from the 15-Day Changes related to hydrogen, the previously proposed December 2023 LCFS amendments would also effectively end LCFS crediting for RNG projects after 2040. Given that the RNG pathway is widely used to support the development of RNG projects across the country, this change will remove the primary financial incentive for new RNG projects in California and for producers to send RNG to California. This is because LCFS credits are critical to making RNG projects competitive with fossil gas given the comparatively low value of environmental credits available under the federal Renewable Fuel Standard ("RFS") and other state low-carbon fuel programs. Removing RNG crediting from LCFS may also result in producers sending RNG to Oregon and Washington to capture more value under those state low-carbon fuel programs. On August 13, 2024, the American Biogas Council confirmed these concerns in its press release regarding these proposed 15-Day Changes, stating that the amendments "may deter the [biogas] industry from bringing new supplies to the [LCFS] program later in the decade."¹⁶ Such an immediate reaction by the main RNG trade group should come as a warning to CARB of the long-term impacts of these proposed changes.

Demand for RNG outside of California is only expected to grow over the next several years, with New Mexico recently enacting a low-carbon fuel standard¹⁷ and the U.S. Environmental Protection Agency's expected eventual finalization of rules allowing RNG used in electricity generation to generate credits under the RFS. This will inevitably increase demand for RNG for non-hydrogen uses outside of California and could accordingly result in RNG supply shortfalls within the state. CARB's assumption that sufficient RNG may be available as a feedstock for low-CI hydrogen production does not appear to consider this factor.

Electricity demand is expected to grow substantially in California over the coming decades – driven by the anticipated demands of electrifying the transportation and industrial sectors and supercharged by increased demand from data centers. This massive surge in electricity demand would have to be met, at least in part, by natural gas power plants ostensibly supplied with RNG. In the meantime, the amendments introduced by the 15-Day Changes would mean power generators and hydrogen producers compete for these limited RNG supplies when there are other proven methods available to deliver low-CI hydrogen. This overall approach, however, would result in compound inefficiencies from the energy losses associated with this two-step process: (1) producing hydrogen via RNG and (2) burning the hydrogen in power plants.¹⁸ A more efficient approach would entail sending RNG directly to power plants to produce electricity, while leaving hydrogen production open to multiple technologies such as low-CI fossil gas paired with CCS.

¹⁶ American Biogas Council, *Statement on Proposed Changes to California's Low Carbon Fuel Standard* (Aug. 13, 2024).

¹⁷ New Mexico House Bill 41, Clean Transportation Fuel Standards (Mar. 5, 2024).

¹⁸ See Krieger, Elena, et al., Green Hydrogen Proposals Across California, PSE Healthy Energy, at 93 (May 21, 2024).

3. CARB's 15-Day Changes are Inconsistent with the 2022 Scoping Plan

Assembly Bill ("AB") 32 requires CARB to develop a Scoping Plan which lays out California's strategy for meeting the state's climate goals and update the Scoping Plan every five years.¹⁹ The 2022 Scoping Plan provides a detailed pathway to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85% below 1990 levels no later than 2045.

Hydrogen production plays a critical role in meeting these goals per the 2022 Scoping Plan. In order to achieve these ambitious climate targets, the 2022 Scoping Plan recognized that **1**,700 *times* the current hydrogen supply will be required by 2045.²⁰ AB 32 requires that any CARB scoping plan embrace "technologically feasible and cost-effective reductions in GHG emissions."²¹ Production of hydrogen using fossil gas with CCS is feasible, cost-effective, delivers verifiable GHG emission reductions and displaces traditional more carbon intensive uses of fossil gas, when properly incentivized. The 2022 Scoping Plan follows the statutory directive because it does not call to exclude hydrogen produced using fossil gas with CCS from the LCFS, but the December 2023 LCFS amendments and the recent August 2024 15-Day Changes do not.

The massive scaling of low carbon hydrogen projects necessary to meet the goals of the 2022 Scoping Plan requires an "all of the above" approach to low-carbon hydrogen production. The most efficient and logical way to do that is to ensure that sufficient supportive financial incentives are in place. LCFS credits represent a potentially critical financial incentive for low or zero carbon hydrogen projects. In light of the 1,700-fold expansion in the state's hydrogen supply called for by the 2022 Scoping Plan, CTV believes that CARB must be encouraging *all forms* of low-carbon hydrogen production as called for by the 2022 Scoping Plan. Any other approach would be arbitrary and capricious.

As highlighted above, the 2022 Scoping Plan calls for a flexible approach to supporting the development of low-carbon hydrogen.²² Specifically, the Plan makes the following key references to hydrogen and CCS:

"For the purposes of this Scoping Plan, 'renewable hydrogen' and 'green hydrogen' are interchangeable and are not limited to only electrolytic hydrogen produced from renewables." (page 26)

* * * *

"CCS can support hydrogen production until such time as there is sufficient renewable power for electrolysis and an abundant water source." (page 86)

* * * *

"If steam methane reformation is paired with CCS, the hydrogen produced could potentially be low carbon." (page 88)

¹⁹ Cal. Code Regs. Title 17, § 38561.(a)-(h) (2023).

²⁰ CARB 2022 Scoping Plan at 8.

²¹ AB 32 § 38561.(a) "[CARB] shall prepare and approve a scoping plan, as that term is understood by the state board, for achieving the **maximum technologically feasible and cost-effective reductions** in greenhouse gas emissions (emphasis added)."

²² CARB 2022 Scoping Plan at 6.

These references were included in the final adopted version of the 2022 Scoping Plan despite multiple commenters calling on CARB to explicitly exclude CCS from its definition of hydrogen production eligible to generate LCFS credits. Adhering to the 2022 Scoping Plan requirements outlined in AB 32, CARB refused to take such a narrow approach and built flexibility into the final 2022 Scoping Plan. The August 2024 15-Day Changes, with the newly proposed Subsection 95482(h), inexplicably and radically depart from CARB's prior actions and as called for by the 2022 Scoping Plan. This change in the Board's direction seems arbitrary and capricious in light of the rulemaking record.

This abrupt change in CARB's stance towards low-CI hydrogen with CCS is further evidenced when compared to the Board's responses to public comments on the draft 2022 Scoping Plan. When a public commenter called for CARB to only support electrolytic hydrogen generation via renewable electricity, the Board responded by stating that:

[t]he 2022 Scoping Plan does not prescribe the energy source to produce hydrogen, and therefore, steam methane reformation paired with CCS 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 and biomass-based hydrogen can meet the ongoing need.²³

CARB further acknowledged that because "the build-out [of renewable power generation] takes time and is additive to the growth in demand associated with electrification across the economy, the state needs to keep options open for other methods to produce zero carbon hydrogen at the scale needed to meet the projected demand."²⁴ The 15-Day Changes, however, without explanation or support, seemingly ignore CARB's prior express statements supporting broad approaches to identifying low-carbon methods of hydrogen production that will meet state climate goals and should therefore be incentivized. The 15-Day Changes directly conflict with the 2022 Scoping Plan and all other prior signals of regulatory intent from CARB without more than a cursory explanation.

It is unrealistic to expect hydrogen produced from renewable energy will scale sufficiently by the end of the decade to develop the market size California seeks. Developers seek to maximize their investment, thus build financial models based on the ability to operate an electrolyzer as much as possible. As such, electrolyzers that use renewable energy to produce hydrogen need to be paired with energy storage capabilities to ensure maximum use of the equipment. Goldman Sachs, an investment bank that has conducted extensive market research in the hydrogen sector, notes that power prices need to be below US\$30/MWh to compete with hydrogen produced from natural gas combined with carbon capture and storage²⁵ (see chart below labeled "Exhibit 74": the bank refers to this production method as "blue" hydrogen). Current PG&E industrial consumer retail prices in Q1 2024 were ~US\$200/MWh. Lazard, an investment bank with extensive industry research, notes in June 2024 research (see chart below²⁶) that to ensure firm reliability when

²³ CARB 2022 Scoping Plan Response to Comments, Appendix B at 57.

²⁴ Id.

²⁵ Goldman Sachs. "The Clean Hydrogen Revolution," February 2022.

²⁶ Lazard. "Levelized Cost of Electricity," June 2024.

renewables are intermittent, the levelized cost of wind and solar in the California Independent System Operator (CAISO) region is between US\$123-177/MWh.

These price signals do not incentivize developers to build renewable generation, required storage and hydrogen electrolyzer equipment – and it is unlikely that these pricing dynamics will change sufficiently by 2031.

Exhibit 74: Overall, we estimate that for an electrolyzer of an efficiency of 64% and operating for 5,000 full load hours, an LCOE that is lower than c.US\$30/MWh is required to be at cost parity with 'blue' hydrogen, and lower than c.US\$20/MWh to be at cost parity with 'grey' hydrogen Levelized cost of green, blue and grey hydrogen under different electrolyzer capex assumptions



Source: Goldman Sachs Global Investment Research

Levelized Cost of Energy Comparison—Cost of Firming Intermittency The incremental cost to firm⁽¹⁾ intermittent resources varies regionally—as such is defined by the relevant reliability organizations using the current



4. CARB's 15-Day Changes Negatively Impact California's Climate Goals

The California Climate Crisis Act (AB 1279) sets an ambitious goal, requiring the state to achieve net zero GHG emissions as soon as possible, but no later than 2045, and thereafter achieve and maintain net negative GHG emissions. CCS is critical to this endeavor; it is, importantly, a *viable* option to reduce emissions from sectors that are key contributors to California's total emissions.²⁷ It is also a "critical enabler" of various carbon dioxide removal pathways and a "strong complement" to other decarbonization strategies.²⁸ In California specifically, CCS has the potential to play "a key role" in the removal of unabated carbon emissions, with potential geologic sequestration capacity in the state estimated to be between 35 to 425 gigatons of CO₂e in saline aquifers and five gigatons of CO₂e in the largest oil and gas basins.²⁹ This could provide storage capacity for up to 1,000 years.³⁰

CARB itself has acknowledged the essential role that CCS must play in achieving California's ambitious climate goals. In fact, CARB has stated that "there is no path to carbon neutrality without carbon removal and sequestration," as indicated not just by the 2022 Scoping Plan Update but also by the IPCC's Climate Change 2022: Mitigation of Climate Change report.³¹ The 2022 Scoping Plan is the main regulatory document governing how CARB will approach progress toward, and the meeting of, the state's ambitious climate aims. Integral to such progress is the development of, and support of, CCS projects—without this tool, carbon neutrality will remain an illusory hope. CARB's LCFS 15-Day Changes, then, are entirely inconsistent with the state's 2022 Scoping Plan, completely disregarding prior acknowledgement of the absolute necessity of CCS, because of how they would disincentivize a proven method of low-carbon hydrogen production by prohibiting LCFS credits for hydrogen produced with fossil gas and CCS after 2030. CARB must return to embracing CCS as an integral part of its strategy to achieve the state's targets.

CCS represents a both foundational building block for meeting California's climate goals and as a bridge to support low-carbon hydrogen production until sufficient renewable power generation capacity exists to allow for large-scale hydrogen production using only renewable electricity. Even if, as CARB has recognized, the transportation sector is headed toward electrification, hydrogen produced with fossil gas and CCS will be a key component in any strategy to decarbonize hard-to-abate industries, such as heavy manufacturing (*e.g.*, steel and cement).³² Restricting economic support in the transportation sector will likely limit the ability for hydrogen producers to develop projects that will supply these other industries – and thus inhibit market development broadly. This role serves as a necessary bridge to 100% renewable-derived hydrogen, but it will be thwarted without the right long-term support under the LCFS.

²⁷ See Energy Future Initiatives, Standard Precourt Institute for Energy & Stanford Earth, An Action Plan for Carbon Capture and Storage in California: Opportunities, Challenges, and Solutions, at S-1 (Oct. 2020) [hereinafter "Action Plan"].

²⁸ *Id.* at S-2.

²⁹ See California Air Resources Board, Achieving Carbon Neutrality in California, at 65 (Oct. 2020).

³⁰ See Action Plan at S-6.

³¹ California Air Resources Board, *Carbon Sequestration: Carbon Capture, Removal, Utilization, and Storage - About Webpage* (last visited May 5, 2024), <u>http://tinyurl.com/r46r5ucf</u>.

³² See CARB 2022 Scoping Plan, Table 2-1, at 72-79.

5. CARB's 15-Day Changes Stymie Investor and Developer Confidence

For California to be a leader in the low-CI hydrogen industry and, moreover, to meet state climate targets, CARB must use the LCFS to incentivize low-carbon hydrogen production using all known proven methods, including hydrogen produced from fossil gas and CCS. LCFS credits are critical here.³³ To mitigate against the expenses of production, low-carbon hydrogen developers have come to rely on stacking multiple incentives, particularly following the passing of the Inflation Reduction Act in August 2022.³⁴ For CCS projects, the stacking of incentives relies not only on tax credits but also the LCFS credit.³⁵ Long-term support for these incentivizes is essential. However, by adopting the restrictive approach proposed in the 15-Day Changes, California-based CCS projects face undue capital and economic uncertainty, stymying development and, ultimately, the achievement of state decarbonization targets. Moreover, this unnecessary barrier to market and develop CCS projects will likely result in stranded assets, the very idea of which CARB has strongly rejected in the 2022 Scoping Plan³⁶ and acknowledged it must avoid in its Statement of Reasons provided with other recent LCFS amendments.³⁷ Finalizing the 15-Day Changes is inconsistent with and arbitrarily departs from CARB's prior expressly stated broad views on supporting hydrogen produced using CCS.

³³ See supra n.19 and n.20.

³⁴ See Hedreen, Siri, Stacked Tax Credits Make Green Hydrogen Economic for First Time in US, S&P Global Market Intelligence Webpage (last visited May 5, 2024), <u>http://tinyurl.com/ycxf5se3</u>.

³⁵ See Littlefield, Anna, et al., *Decarbonization of Ethanol: Pathways to Monetization Series Part One: Stacking 45Q with Voluntary Carbon Markets*, Colorado School of Mines: Payne Institute for Public Policy (Dec. 2023); *see also* SCCS Study at 2 ("These [federal] tax credits, combined with Low Carbon Fuel Standard incentives, offer a strong— and urgent—business case for commercial scale blue hydrogen projects in California."); SCCS Study at 42 ("Existing federal and state policies—the 45Q and LCFS—are key in making blue hydrogen more cost-competitive[.]").

³⁶ *Id.* at 9 "We must avoid making choices that will lead to stranded assets and incorporate new technologies that emerge over time."

³⁷ With respect to RNG, CARB acknowledges that, for the fuel to transition to more sectors in the long term, "the existing market signals will need to transition accordingly to avoid stranded assets and the closure of methane capture projects." Initial Statement of Reasons at 30 (Dec. 2023). The same idea is applicable to CCS projects if projects are forced to cease mid-development due to the lack of financial incentives, support and access to capital.

Conclusion

As more fully explained above, CARB must revisit various provisions of its proposed 15-Day Changes to the LCFS regulations that exclude projects producing hydrogen from fossil gas and CCS from LCFS credit generation after 2030. Revisions to the 15-Day Changes are necessary to ensure consistency with the 2022 Scoping Plan and, importantly, to recognize the importance of low-CI hydrogen in meeting the state's ambitious climate goals. To that end, we respectfully ask CARB to reconsider the inclusion of the proposed Subsection 95482(h) in light of the concerns detailed above. Failure to do so would not meet CARB's obligations under the California APA.

CTV appreciates the opportunity to comment on the August 12, 2024 LCFS 15-Day Changes. We thank CARB for its consideration and look forward to continued dialogue and public workshops on this matter.

Respectfully submitted,

Chris Gould

Chris Gould Managing Director