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June 24, 2022

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

Re: Comments on Draft 2022 Scoping Plan Update

Dear Chair Randolph,

Calpine Corporation (Calpine) submits the following comments on the California Air Resources Board's (CARB's) Draft 2022 Scoping Plan Update (May 10, 2022) (the Draft Scoping Plan).

Calpine operates the largest fleet of natural gas combined-cycle (NGCC) and combined heat and power (CHP) facilities, both in California and the United States. Calpine is also the nation's largest producer of renewable geothermal electricity from its Geysers operations in Northern California. Together, its generation resources are capable of delivering approximately 26,000 megawatts (MW) of clean, reliable electricity to customers and communities in 19 U.S. states and Canada, with more than 75 power plants in operation or under construction. Calpine also operates and is developing battery storage projects, with 40 MW in operation and 1,500 MW in development. Consistent with its longstanding focus on sustainability, Calpine has made it a priority to study the technical and commercial feasibility of reducing emissions of carbon dioxide (CO_2) by equipping gas-fired power plants with carbon capture, utilization and storage (CCUS) technology.

Calpine has long supported federal and state efforts to address climate change and reduce greenhouse gas (GHG) emissions, including those from the power sector. Calpine supports CARB's effort to chart a technologically feasible, cost-effective, and equity-focused path to achieve the State's GHG reduction and carbon neutrality objectives. Calpine applauds CARB's leadership on climate change and submits these comments to urge CARB to provide stronger support for the role that CCUS can play in providing the clean, firm generation resources needed to support reliability of the electricity grid and reduce emissions from other sectors that have greater impacts on disadvantaged communities.

California has the opportunity to again lead the world on climate change by demonstrating how a clean, reliable and affordable electricity grid can serve as the foundation to decarbonize other sectors and achieve carbon neutrality. To accomplish that, CARB must consider the entire suite of technologies available to provide clean, dispatchable power including, where appropriate,

CCUS. Other states and nations are looking to California's example and CARB must therefore ensure that, when the story is ultimately told about how California achieved its ambitious goals, it is that they were attained without sacrificing reliability or affordability. CARB should therefore demonstrate leadership by making clear that the State intends to remove legal and regulatory obstacles to the permitting and deployment of CCUS projects in California and create the certainty that investors and developers of CCUS technology need to deploy that technology in the near term, both for the power sector and more broadly.

I. CCUS IS CRITICAL TO ACHIEVING CALIFORNIA'S DECARBONIZATION OBJECTIVES

The International Energy Agency (IEA) has unequivocally stated that "[t]he next decade will be critical to the prospects for CCUS and for putting the global energy system on a path to net-zero emissions," concluding that "[w]ithout a sharp acceleration in CCUS innovation and deployment over the next few years, meeting net-zero emissions targets will be all but impossible."[1] The IEA's own modeling projects that CCUS will be "increasingly called upon . . . to achieve the deep emissions cuts needed in the United States,"[2] envisioning a scenario where the initial focus is placed on retrofitting fossil-fuel-based plants and supporting low-carbon hydrogen production, followed by a shift to net removals of CO_2 through direct air capture (DAC) and as a source of climate-neutral CO_2 for synthetic aviation fuels.[3]

The IEA's conclusion regarding the criticality of CCUS is affirmed by a series of academic of studies from various institutions, including Stanford University and the Energy Futures Initiative (EFI)[4], Lawrence Livermore National Laboratory[5], and Princeton University.[6] One study from the Environmental Defense Fund (EDF) and Clean Air Task Force concerning California's decarbonization goals concludes that, if California were to rely upon solar, wind and storage alone, that "would require building the system up to nearly 500 gigawatts of power-generating capacity,"

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[1] IEA, SPECIAL REPORT ON CARBON CAPTURE UTILISATION AND STORAGE: CCUS IN CLEAN ENERGY TRANSITIONS, at 151 (Sept. 2020), https://iea.blob.core.windows.net/assets/181b48b4-323f-454d-96fb-0bb1889d96a9/CCUS_in_clean_energy_transitions.pdf.

[2] *Id.* at 130.

[3] *Id.* at 14, 129-30.

[4] Energy Futures Initiative and Stanford University. AN ACTION PLAN FOR CARBON CAPTURE AND STORAGE IN CALIFORNIA: OPPORTUNITIES, CHALLENGES, AND SOLUTIONS (October 2020), https://sccs.stanford.edu/sites/g/files/sbiybj17761/files/media/file/EFI-Stanford-CA-CCS-FULL-rev2-12.11.20_0.pdf.

[5] George Peridas, PERMITTING CARBON CAPTURE & STORAGE PROJECTS IN CALIFORNIA (February 2021), Lawrence Livermore National Laboratory, LLNL-TR-817425, https://gs.llnl.gov/sites/gs/files/CA_CCS_PermittingReport.pdf.

[6] E. Larson, C. Greig, J. Jenkins, E. Mayfield, A. Pascale, C. Zhang, J. Drossman, R. Williams, S. Pacala, R. Socolow, EJ Baik, R. Birdsey, R. Duke, R. Jones, B. Haley, E. Leslie, K. Paustian, and A. Swan, NET-ZERO AMERICA: POTENTIAL PATHWAYS, INFRASTRUCTURE, AND IMPACTS, INTERIM REPORT, Princeton University, (December 15, 2020), https://netzeroamerica.princeton.edu/the-report.

which "is roughly *half the capacity of the entire United States electricity generating system today*," just to serve California.[7]

According to the report, it "may simply not be possible to build renewable facilities at this scale" – "most of which [would] seldom [be] used" – in part because up to 6,250 square miles of land could be needed to bring the necessary renewable generation online. That commitment of land "may actually exceed the amount of land fit for utility-scale solar and not subject to restrictions (such as conservation easements or national park status)" in all of California.[8] Moreover, "[t]his excess capacity would be expensive," causing wholesale electricity rates in California to increase "by about 65% over today if renewable energy and currently available storage technologies alone were to be used to meet demand in 2045."[9] The report concludes that "[t]here is a better solution," whereby the State would support the development of "clean firm power," which includes gas-fired generation equipped with CCUS, alongside other technologies such as geothermal, hydrogen and other low-carbon fuels.[10]

A 2020 report by EFI and Stanford University similarly concludes that pairing CCS with NGCCs provides the opportunity "to create a 'clean firm' resource," which other studies (as described above) identify "as critical for maintaining grid reliability and managing energy system costs."[11] It also describes how deploying CCS on existing industrial and power generation sources through the development of regional hubs with shared pipelines could unlock potential for carbon removal technologies such as DAC.[12] In an article cited by the Draft Scoping Plan announcing this EFI and Stanford report, one of its authors, Jane Long, senior contributing scientist at EDF, is quoted as saying, "[t]he need for clean firm power is pretty overwhelming" and trying to keep the grid stable just with renewable power and batteries "is going to cost significantly more [than] to do it with clean firm power and it probably won't work."[13]

A more recent report from Stanford University similarly observes that allowing gas-fired generation with CCS to operate as a "clean firm resource" would reduce the total system capacity needs by more than half and avoid "the drastic overbuild of capacity" otherwise needed to

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[7] Long, Jane C.S., Ejeong Baik, Jesse D. Jenkins, Clea Kolster, Kiran Chawla, Arne Olson, Armond Cohen, Michael Colvin, Sally M. Benson, Robert B. Jackson, David G. Victor, and Steven P. Hamburg. CLEAN FIRM POWER IS THE KEY TO CALIFORNIA'S CARBON-FREE ENERGY FUTURE. *Issues in Science and Technology* (March 24, 2021), https://issues.org/california-decarbonizing-power-wind-solar-nuclear-gas/ (emphasis added).

[8] *Id*.

[9] *Id*.

[10] *Id*. at 3.

[11] *See supra* note 4 at S-1; *see also* S-6.

[12] *Id*. at S-7.

[13] Kara Glenwright, Precourt Institute for Energy, ROADMAP FOR CARBON CAPTURE AND STORAGE IN CALIFORNIA (Oct. 27, 2020), https://earth.stanford.edu/news/roadmap-carbon-capture-and-storage-california#gs.3z2jtz, cited by Draft Scoping Plan at 176.

decarbonize the electricity sector, and would also reduce both imports and exports of power to California and curtailment of renewables.[14]

Calpine recognizes that building out renewable generation and storage capacity will provide the foundation of the State's strategy to achieve the goals of SB 100. Calpine itself has developed and now operates a 40-MW battery storage facility in Santa Ana and has 1,500 MW of additional battery storage capacity in development. It also operates the largest source of baseload renewable generation in California, at its Geysers geothermal resource. But, as the body of research described above affirms, CCUS should also be considered as an available tool to provide the clean firm resources needed to backup renewable energy generation and storage and thereby ensure a reliable and affordable supply of electricity.

II. CALPINE IS PIONEERING CCUS PROJECTS IN CALIFORNIA

As the largest generator of electricity from natural gas in the United States and California, Calpine is investing heavily in CCUS, with two demonstration projects underway and full-scale CCUS retrofits in development for a number of our sites in California.

At our Los Medanos Energy Center facility, in Pittsburg, California, we host two demonstration CCUS projects. With funding from the U.S. Department of Energy (DOE), ION Clean Energy has developed a proprietary solvent and process that captures more than 90% of CO_2 from power plant emissions at less than USD 50/ton.[15] This project will demonstrate the declining costs of post-combustion carbon capture and further advance the deployment of CCUS technology for low-CO_2 combustion emissions as are prevalent at gas-fired power plants.

Additionally, Calpine has partnered with Blue Planet to utilize its innovative technology, which mineralizes captured CO_2 to create light-weight building materials and other products.[16] For example, lightweight concrete was already successfully tested as part of constructing a parking facility in San Francisco. The pilot project is expected to begin producing around 5 tons/day within the next year. The use of Blue Planet's technology can be scaled-up after the pilot phase to capture and convert more CO_2, with the intent of reaching commercial scale.

Nearby, at our Delta Energy Center facility in Pittsburgh, CA, the company is currently conducting an engineering design study to capture 95% of site emissions. In October 2021, DOE awarded a

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[14] Ejeong Baik and Sally M. Benson, PATHWAYS TO CARBON NEUTRALITY IN CALIFORNIA: DECARBONIZING THE ELECTRICITY SECTOR, Stanford Center for Carbon Storage and Stanford Carbon Removal Initiative, March 2022, https://sccs.stanford.edu/sites/g/files/sbiybj17761/files/media/file/DecarbonizingTheElectricitySector_FullReport_0.pdf, at 34-35.

[15] THE ION SYSTEM SOLUTION, https://ioncleanenergy.com/our-technology/.

[16] BLUE PLANET SYSTEMS, The Science, https://www.blueplanetsystems.com/technology.

grant in the amount of $5,811,210 to fund this study and $4,791,966 to fund a similar study at Calpine's Deer Park Energy Center in Texas.[17]

These two engineering studies are among twelve projects funded by DOE pursuant to Funding Opportunity Announcement 2515, and the funding provided for them amounts to nearly one quarter of the $45MM awarded by DOE pursuant to Funding Opportunity Announcement 2515, which addresses natural gas power and industrial sources.[18] Upon announcing these awards, DOE Secretary Jennifer M. Granholm observed that, "to dramatically reduce carbon pollution in our fight against climate change, we must deploy all of the tools at our disposal, including the innovative technologies that capture CO_2 emission before they reach the atmosphere."[19]

Calpine is also working with other partners to develop a hub concept to enable efficient decarbonization of clustered emissions located near ideal geologic storage locations. Our projects for retrofitting gas-fired generation and CHP facilities with CCS could help de-risk investments in CCS technology for harder-to-abate sources and help realize the emission reduction opportunities among those sectors.

In sum, Calpine is advancing full-scale CCUS projects and retrofits that are necessary to achieving California's net-zero ambitions by 2045. In line with the weight of scientific research, Calpine's efforts will help ensure that clean, firm and reliable generation is available to support the electrification of end-uses throughout the economy and the deployment of intermittent renewable generation at scale.

III. THE SCOPING PLAN SHOULD EMBRACE CLEAN, FIRM GENERATION

A. CARB SHOULD ACKNOWLEDGE THE KEY ROLE CCUS CAN PLAY IN THE POWER SECTOR

The Draft Scoping Plan broadly states that carbon capture and sequestration (CCS) "will be a necessary tool to reduce GHG emissions and mitigate climate change while minimizing leakage"[20] and features "[s]ome reliance on carbon capture and sequestration" in each of its four modeled scenarios. However, the Draft Scoping Plan conceives a limited role for CCUS technology, with applications in heavy industry, but not the power sector.

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[17] FUNDING OPPORTUNITY ANNOUNCEMENT 2515, CARBON CAPTURE R&D FOR NATURAL GAS AND INDUSTRIAL POINT SOURCES, AND FRONT-END ENGINEERING DESIGN STUDIES FOR CARBON CAPTURE SYSTEMS AT INDUSTRIAL FACILITIES AND NATURAL GAS PLANTS, DOE Office of Fossil Energy and Carbon Management (Oct. 6, 2021), https://www.energy.gov/fecm/articles/funding-opportunity-announcement-2515-carbon-capture-rd-natural-gas-and-industrial.

[18] DOE INVESTS $45 MILLION TO DECARBONIZE THE NATURAL GAS POWER AND INDUSTRIAL SECTORS USING CARBON CAPTURE AND STORAGE (Oct. 6, 2021), https://www.energy.gov/articles/doe-invests-45-million-decarbonize-natural-gas-power-and-industrial-sectors-using-carbon.

[19] *Id*.

[20] CARB, DRAFT 2022 SCOPING PLAN UPDATE, at 66 (May 10, 2022) (Draft Scoping Plan), https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp.pdf.

For instance, in a section on carbon dioxide removal (CDR), CARB cites modeling results that "demonstrate the targeted need for CCS on large facilities such as refineries and cement," without mentioning the power sector.[21] In other instances, the Draft Scoping Plan bypasses consideration of CCUS for the power sector because, according to CARB, CCUS should "only be used to address sectors where non-combustion options are not technologically feasible or cost-effective."[22] Yet electricity generation *is* one such sector; studies show that it may be practically infeasible and significantly more costly to eliminate combustion from the power sector.[23]

Although the Draft Scoping Plan 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,"[24] and CCUS can "support clean dispatchable power for reliability needs,"[25] it provides no explicit support for deploying CCUS technology in the power sector. The absence of such support is particularly notable, given that the Draft Scoping Plan itself recognizes that California's geology provides "world-class CO_2 storage sites that would meet the highest standards, with storage capacities of at least 17 billion tons of CO_2."[26] EFI and Stanford University similarly conclude that California has the potential to store 60 million tons of CO_2 each year—the equivalent of total electricity sector emissions in 2017—for 1,000 years.[27] The EFI and Stanford study specifically notes that pairing CCS with NGCCs provides the opportunity "to create a 'clean firm' resource," which prior studies identify "as critical for maintaining grid reliability and managing energy system costs."[28]

Calpine appreciates the extent to which the Draft Scoping Plan's proposed scenario acknowledges the need for CCUS in achieving carbon neutrality. But, by failing to provide express support for deployment of CCUS in the power sector, CARB misses a significant opportunity to send the signal to investors and developers of CCUS technology that California is ready and willing to work with them to resolve the legal and regulatory hurdles that deployment of CCUS in California faces. Deploying the infrastructure needed to build carbon capture hubs will require a concerted effort across industry sectors. Including power generation in that effort would help de-risk investments

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[21] *Id*. at 175.

[22] *Id*.

[23] *See supra* at notes 7 and 13.

[24] *Id.* at 158.

[25] *Id*. at 68.

[26] *Id.* at 67.

[27] ENERGY FUTURES INITIATIVE, STANFORD PRECOURT INSTITUTE FOR ENERGY & STANFORD CENTER FOR CARBON STORAGE, AN ACTION PLAN FOR CARBON CAPTURE AND STORAGE IN CALIFORNIA: OPPORTUNITIES, CHALLENGES, AND SOLUTIONS, AT S-6 (OCT. 2020) ("ENERGY FUTURES INITIATIVE, CCS ACTION PLAN") HTTPS://STATIC1.SQUARESPACE.COM/STATIC/58EC123CB3DB2BD94E057628/T/5F91B40C83851C7382EFD1F0/1603384344275/EFI-STANFORD-CA-CCS-FULL-10.22.20.PDF.

[28] *Id*. at S-2; *see also* at S-6.

in that infrastructure, including for industries for which the Draft Scoping Plan already endorses the role of CCUS.

Moreover, given the Draft Scoping Plan's acknowledgement of the continued role that gas-fired generation will need to play, as the electricity grid is increasingly relied upon to decarbonize other sectors and stressed by the impacts from climate change, CARB should embrace *all* strategies that could make the existing gas-fired generation fleet cleaner, including CCUS. The same solutions will not work for all power plants; for some where CCUS is not practically or economically feasible, the solution may be use of green hydrogen or carbon-negative fuels.[29] But for those units strategically located near prime sequestration reservoirs or in an area where a carbon capture hub is being developed to serve sources in other sectors, CCUS should be an available option. As the Draft Scoping Plan recognizes, "[i]f CCS is not deployed, those emissions would be released directly into the atmosphere and instead need to be addressed through CDR to achieve carbon neutrality."[30]

B. Environmental Justice Goals Are Compatible with CCUS Deployment for Gas-Fired Power Plants in California

The Draft Scoping Plan notes that the Environmental Justice Advisory Committee (EJAC) "raised several concerns related to the inclusion of CCS" in the Scoping Plan.[31] These "[c]oncerns range from potential negative health and air quality impacts, to safety concerns related to potential leaks, to viability of current technology."[32] As the Draft Scoping Plan explains in response to EJAC's draft recommendations, "[t]he merits of each CCS or CDR project must be evaluated on a case-by-case basis."[33] Calpine agrees and hopes that its demonstration projects will help address concerns regarding the viability and safety of CCUS technologies in California.

While some advocates have argued that eliminating all gas-fired generation by 2035 would deliver demonstrable health benefits to communities overburdened by pollution and disadvantaged communities, the California Public Utilities Commission (CPUC) has quantified these benefits and compared them to other emission-reduction strategies. According to the CPUC, the electrification of on-road transportation, off-road transportation, and natural gas combustion in

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[29] *See* Calpine Corporation, Comment on EPA's White Paper: Available and Emerging Technologies for Reducing Greenhouse Gas Emissions from Combustion Turbine Electric Generating Units (June 6, 2022), https://www.regulations.gov/comment/EPA-HQ-OAR-2022-0289-0016, at 10 (observing that, where no sequestration capacity is available nearby or where space constraints preclude construction of carbon capture equipment – hydrogen, biogas or synthetic fuels may be the best means of abating GHG emissions from gas-fired power plants).

[30] Draft Scoping Plan at 175.

[31] *Id*. at 69.

[32] *Id*.

[33] *Id*. at 175 (referencing EJAC Draft Recommendation F4.6).

buildings would achieve monetized human health benefits of about $44 billion per year in total.[34] In comparison, the elimination of emissions from all gas generators in California would achieve air quality benefits of only about $1 billion per year, "due to the significant emissions controls already required for gas generators, the cleaner profile of natural gas combustion relative to other fuels including petroleum fuels, and efforts to locate large gas generators outside of population centers."[35]

The CPUC's analysis therefore concludes that, due to these relative benefits, electrification of transportation and other end uses of fossil fuels is "likely to have an air quality benefit that is orders of magnitude greater than that of programs . . . that impact air quality solely by reducing emissions from gas generators."[36] In sum, the criteria pollutant emissions from retaining the gas-fired generation capacity needed to maintain reliability, as demand for electricity increases significantly to electrify transportation and other sectors, would be dwarfed by the reductions achieved by electrifying those other sectors, and those reductions will disproportionately inure to the benefit of disadvantaged communities.[37]

These conclusions align with a study conducted last year by the California Energy Commission (CEC), which finds that, even if gas-fired power plants were operated more to meet an increase in aggregate electricity demand of 20 percent, the corresponding increases in ambient concentrations of air pollutants "are on average significantly less than 1 percent," largely because plants located in California are subject to stringent emissions controls.[38] The CEC's study therefore concludes that "[s]ignificant further investments in cleaning up fossil electricity generation in California may not be the most effective strategy to improve air quality," but that, "[t]he transport sector, which is responsible for a significant share of the same pollutants and toxics may be worth studying more closely."[39]

It is for these reasons that Calpine has been a strong supporter of transportation-sector decarbonization and has sued and intervened in several cases across two presidential administrations to defend both California's and the U.S. Environmental Protection Agency's

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[34] Gabe Mantegna, et al., Energy and Environmental Economics, Inc. (E3), QUANTIFYING THE AIR QUALITY IMPACTS OF DECARBONIZATION AND DISTRIBUTED ENERGY PROGRAMS IN CALIFORNIA, 2021, https://www.ethree.com/wp-content/uploads/2022/01/CPUC-Air-Quality-Report-FINAL.pdf , at 7-8.

[35] *Id*. at 8.

[36] *Id*.

[37] *See id*. (projecting that 39% of the air quality benefits attributable to on-road transportation electrification occur in disadvantaged communities, which represent only 25% of the population.)

[38] Maximilian Auffhammer, University of California Berkeley, FINAL PROJECT REPORT DISTRIBUTIONAL IMPACTS OF CLIMATE CHANGE FROM CALIFORNIA'S ELECTRICITY SECTOR (July 2021), CEC-500-2021-038, https://www.energy.ca.gov/sites/default/files/2021-07/CEC-500-2021-038.pdf, at 4.

[39] *Id*.

(EPA) authority to set ambitious greenhouse gas tailpipe emissions standards that support electrification of the on-road vehicle fleet.[40]

Given the significant air quality benefits to be gained from transportation electrification and the negligible benefits that could be obtained by eliminating all gas-fired generation, Calpine refutes the claims by advocates that the continued role for gas-fired generation projected by the Draft Scoping Plan will negatively impact disadvantaged communities. Moreover, Calpine believes that equipping existing gas-fired power plants with CCUS provides the most cost-effective pathway to reduce residual power-sector CO_2 emissions, as the power sector is increasingly relied upon to decarbonize other sectors that have much greater emissions impacts on disadvantaged communities. Retrofitting existing plants with CCUS also provides significant opportunities to further reduce criteria pollutant emission rates.

C. CARB SHOULD EXPAND ITS EFFORTS TO DEPLOY CCUS

Despite CARB's under-emphasis of CCUS' role in the power sector, the Draft Scoping Plan does offer some promising proposals for CCUS deployment more broadly, which Calpine supports.

For example, CARB suggests convening a multi-agency CCS group across state and federal governments to work with experts, communities, and environmental justice advocates to guarantee safe and effective CCS deployment.[41] It also suggests clarifying pore space ownership and unitization rules for geologic carbon sequestration, streamlining permitting barriers, studying local air quality benefits from CCS, and exploring "permitting options to allow for scaling the number of sources at carbon sequestration hubs."[42] Calpine supports all of these efforts as necessary for the State to demonstrate its leadership in CCS and carbon reduction. While the Draft Scoping Plan acknowledges the need to reevaluate CARB's existing CCS Protocol "if CCS were to be more broadly applied across sectors beyond transportation fuel production,"[43] Calpine encourages CARB to anticipate broader application of CCS and move forward with development of a protocol that can be used to quantify the emissions reductions achieved through CCUS for purposes of the Cap-and-Trade Program. Creating the right signal for investment in CCUS technology demands that investors know that the reductions achieved through application of CCUS will be recognized by CARB and that the standards for permanence are legally and practicably attainable.

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[40] *Union of Concerned Scientists v. NHTSA, et al*., D.C. Cir. No. 19-1230 (challenging EPA's withdrawal of California's waiver to enforce its own GHG and zero-emission vehicle standards for light-duty vehicles and NHTSA's declaration of such standards as preempted by its authority to set fuel economy standards); *Competitive Enterprise Institute, et al. v. NHTSA*, *et al*., D.C. Cir. No. 20-1145 (challenging EPA's weakening of GHG standards for light-duty vehicles); *Texas v. EPA*, D.C. Cir. No. 22-1031 (intervening in support of EPA's restoration of strong GHG standards for light-duty vehicles for model years 2023-2026); *Ohio v. EPA,* D.C. Cir. No. 22-1081 (intervening in support of EPA's restoration of California's waiver to enforce its own GHG and zero-emission vehicle standards, against claims that the waiver is unconstitutional).

[41] Draft Scoping Plan at 69.

[42] *Id*. at 178.

[43] *Id*. at 177.

Calpine applauds CARB's leadership role in seeking to resolve critical obstacles to the deployment of CCUS within California and hopes that CARB will bring this same level of thought and engagement to power sector applications of CCUS. As the IEA has warned, "[w]ithout a sharp acceleration in CCUS innovation and deployment over the next few years, meeting net-zero emissions targets will be all but impossible."[44] To achieve this sharp acceleration, CARB should work closely with other agencies at the state, local and federal level, along with those investing millions of dollars in the deployment of CCUS in California today, including Calpine, to create a stable and supportive regulatory environment for the wide-spread deployment of CCUS technology.

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Please contact us at kassandra.gough@calpine.com and emily.turkel@calpine.com with any questions regarding these comments.

Sincerely,

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[44] *See supra* note 1, at 14, 129-30.