CENTER *for* BIOLOGICAL DIVERSITY

November 1, 2013

Via internet (http://www.arb.ca.gov/cc/scopingplan/2013comments.htm)

Mary Nichols, Chair
Members of the Board
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: 2013 Scoping Plan Update Discussion Draft

Dear Chair Nichols and Members of the Board:

The Center for Biological Diversity (the "Center") submits the following comments concerning the 2013 Scoping Plan Update Discussion Draft. The Center is a non-profit environmental organization dedicated to the protection of imperiled species, their habitats, and the environment through science, policy, and environmental law. The Center has more than 625,000 members and online activists throughout the United States, including more than 100,000 in California. The goal of the Center's Climate Law Institute is to reduce U.S. greenhouse gas emissions and other air pollution to protect biological diversity, the environment, and public health. Specific objectives include securing protections for species threatened by the impacts of global warming, ensuring compliance with applicable law in order to reduce greenhouse gas emissions and other air pollution, and educating and mobilizing the public on global warming and air quality issues.

The Center appreciates the Discussion Draft's emphasis on the latest climate science and its strong recommendation that California adopt mid-term and long-term targets consistent with climate stabilization. Board staff are correct to recognize that the science of climate change is becoming ever more certain and that the urgency of addressing the problem has never been more plain.

For these reasons, the Center urges to staff to address certain erroneous assumptions—primarily concerning the atmospheric consequences of biomass energy and biofuels—that could preclude attainment of both AB 32's mandatory 2020 emissions reduction goals and the far steeper emissions reductions needed in the future. Other assumptions regarding transportation planning and forest management may similarly undermine the Scoping Plan's mid- and long-term goals. These concerns, and suggestions for addressing them in the final version of the Scoping Plan Update, are discussed in detail below.

Kevin P. Bundy • Senior Attorney • 351 California St., Suite 600 • San Francisco, CA 94104
Phone: 415-436-9682 x313 • Fax: 415-436-9683 • kbundy@biologicaldiversity.org

I. Climate Science

Board staff are to be commended for the expanded discussion of the latest climate science in the Discussion Draft.[1] The Discussion Draft provides a much deeper background on the factors driving climate change—including short-lived pollutants—than the original Scoping Plan. The Discussion Draft also properly enumerates some of the consequences of climate disruption already being felt in California. Following are recommendations for making some important improvements to this discussion.

A. Scientific Basis for Emissions Reduction Goals

The Discussion Draft seems to adopt the goal of limiting global temperature increases to 2°C and atmospheric greenhouse gas concentrations to 450 ppm carbon dioxide equivalent ("CO_2e"). However, the document does not discuss the severe consequences of a 2°C rise in global temperatures. Board staff have pointed out in other contexts that such an increase "is very likely dangerous" and will increase the likelihood of "disastrous effects."[2] The California Climate Change Center predicts an increased risk of poor air quality, more extreme heat, dramatic reductions in snowpack, damage to agricultural and forest resources, and increases in sea level rise even under a "lower warming range" consistent with a 2°C temperature increase.[3] Nor does the Discussion Draft acknowledge that stabilizing atmospheric greenhouse gas concentrations at 450 ppm CO_2e will provide only about a 50-50 chance of meeting the 2°C goal.[4]

Leading scientists have demonstrated that a 450 ppm target is insufficient to protect against dangerous climate disruption.[5] United Nations negotiators have asked their scientific advisors to assess emissions reduction pathways that could preserve a likely chance of holding temperature increases below 1.5°C.[6] And one just-released study cautions that a single, temperature-based target—in the absence of other concrete,

---

[1] The Discussion Draft states that additional information from the Fifth Assessment Report of the Intergovernmental Panel on Climate Change will be incorporated into the November version of the Scoping Plan Update. Discussion Draft at 7. We trust that the Board will afford an opportunity to comment on this information before the Scoping Plan Update is finalized.

[2] California Air Resources Board, Preliminary Draft Staff Proposal: Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act (Oct. 24, 2008) (attached as Ex. 1).

[3] California Climate Change Center, Our Changing Climate: Assessing the Risks to California (July 2006) (attached as Ex. 2).

[4] See B. Hare & M. Meinshausen, *How Much Warming Are We Committed To and How Much Can Be Avoided?*, 75 Climatic Change 111 (2006) (attached as Ex. 3).

[5] See, e.g., J. Hansen, et al., *Target Atmospheric CO_2: Where Should Humanity Aim?*, 2 OPEN ATMOS. SCI. J. 217 (2008) (attached as Ex. 4).

[6] See United Nations Environment Programme, The Emissions Gap Report 2012 24-26 (attached as Ex. 5).

effect-based targets—is insufficient to protect against sea level rise, ocean acidification, and loss of net primary production on land (which could affect both food production and ecosystem services).[7]

In keeping with its expanded discussion of basic climate science, the Scoping Plan Update should both discuss the potential environmental consequences of adopting a 450 ppm CO_2e/2°C goal and thoroughly evaluate mid-term and long-term emissions reduction targets for consistency with pathways that preserve a likelihood of keeping temperature increases below 1.5°C.[8]

B. Short-Lived Pollutants

The Discussion Draft is correct to recognize the importance of short-lived climate pollutants in driving climate disruption as well as their role in facilitating or impeding attainment of California's climate goals. Certain aspects of the discussion, however, could benefit from clarification.

For example, the Discussion Draft asserts that a 20-year global warming potential ("GWP") value for methane "gives a better perspective on the speed at which [short-lived climate pollutant] controls will benefit the atmosphere relative to carbon dioxide emission controls." Discussion Draft at 11-12. The document also states that the AB 32 2020 target will be adjusted to reflect GWP values in the Fourth Assessment Report ("AR4") of the Intergovernmental Panel on Climate Change ("IPCC"). Id. at 18, 52. The document does not make clear, however, whether it is using the 20-year or 100-year GWP values from AR4 in revising the 2020 target, establishing a mid-range (2030) target, or making progress toward the state's 2050 target. Because different GWP values arguably could be relevant in each context, the Scoping Plan Update should clarify exactly what values it is using, and for what specific purposes.

The Discussion Draft also acknowledges the importance of reducing black carbon emissions. However, despite recognizing that black carbon is emitted during biomass combustion, Discussion Draft at 13, the document does not assess whether increased reliance on bioenergy generation will increase black carbon emissions, or whether such an increase would impede the state's short-term or long-term climate goals. As discussed in greater detail below, the Discussion Draft's heavy reliance on erroneous assumptions about the climate impact of bioenergy is perhaps the document's key weakness. Before proceeding further in reliance on expanded bioenergy generation, the Board must initiate a process for evaluating the net climate impact of different bioenergy feedstocks, pathways, and practices. Black carbon emissions must be included in that evaluation. A specific proposal for this evaluation is presented in Section II.A, below.

---

[7] Marco Steinacher, et al., Allowable Carbon Emissions Lowered by Multiple Climate Targets, 499 Nature 197 (2013) (attached as Ex. 13).
[8] See id. at 6, 23-29.

II. Progress Toward 2020 Target

By statute, the Board must update its plan "for achieving the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions from sources or categories of sources of greenhouse gases by 2020" every five years. Health & Saf. Code § 38561(a), (h). Although the Discussion Draft reviews several of the "sources or categories of sources" detailed in the 2008 Scoping Plan, it does little to quantify or otherwise measure progress toward AB 32's mandatory 2020 target. Moreover, several erroneous assumptions concerning emissions reductions from the energy, waste, and forest sectors call into question the plan's ability to achieve AB 32's target. In order to fulfill the Board's mandate under AB 32, the final version of the Scoping Plan Update must correct these erroneous assumptions and more thoroughly evaluate progress toward the state's 2020 goal.

A. Energy Sector

The Discussion Draft continues to rely on assumptions about the "carbon neutrality" of biomass energy that have been proven false in the relevant scientific literature. As the Center pointed out in our August 5, 2013 initial comments, hereby incorporated by reference, this incorrect assumption threatens to preclude attainment of AB 32's mandatory greenhouse gas reduction goal.

The energy sector is "tasked with achieving 25 MMT of greenhouse gas reductions by 2020." Discussion Draft at 26. According to a recent white paper prepared by Board staff, greenhouse gas emissions from only a portion of California's bioenergy facilities totaled 6.3 MMT CO2e in 2011, 6.2 MMT of which were considered "biogenic."[9] Yet all of these emissions—to the extent generated by facilities qualified under the Renewable Portfolio Standard ("RPS")—are not counted as emissions. Rather, to the extent RPS-eligible generation replaces fossil-fired generation, it is counted as achieving emission *reductions*. Discussion Draft at 28. Using emissions factors from the 2008 Scoping Plan, this means that each megawatt of biomass generation, which typically emits about 3,000 pounds of CO_2, is counted as a reduction of nearly 1,000 pounds of CO_2. 2008 Scoping Plan, App. I at I-23, I-29. There is thus a 4,000 lb/MWh difference between what the atmosphere actually sees and what the Scoping Plan counts. The potential for undermining AB 32's emissions reduction goals is clear.[10]

---

[9] California Air Resources Board, Biomass Conversion (Sept. 17, 2013), *available at* www.arb.ca.gov/cc/waste/biomassconversion.pdf (last visited Oct. 31, 2013) ("Biomass Conversion White Paper").

[10] As the Discussion Draft acknowledges, emissions "reductions" resulting from compliance with "direct regulation" like the RPS are credited to utilities under the cap-and-trade regulation, regardless of whether they result in real reductions. Discussion Draft at 38 ("Actions taken to comply with direct regulations are credited in the Cap-and-Trade regulation so, for example, increased deployment of renewable electricity sources reduces a utility's compliance obligation under the Cap-and-Trade regulation.").

Like the 2008 Scoping Plan, the Discussion Draft does not articulate a basis for treating all RPS-eligible bioenergy generation as if it automatically results in emission reductions. Renewable does not mean zero-carbon; nothing in the RPS statute or eligibility determinations ensures that all generation qualifying as "renewable" also reduces greenhouse gas emissions. Indeed, as pointed out in our August 5, 2013 comments, the assumption that all RPS-eligible generation results in emissions reduction is demonstrably false, at least where biomass energy is concerned.

There is no scientific or rational basis for the assumption that biomass combustion—particularly woody biomass combustion—is "carbon neutral." Measured at the smokestack, replacing fossil fuels with biomass actually *increases* CO_2 emissions.[11] Moreover, "biogenic" and fossil CO_2 have the same warming effect on the climate.[12] This warming effect can continue for decades or even centuries depending on the feedstock; multiple studies have shown that it can take a very long time for new biomass growth to recapture the carbon emitted by combustion, even where fossil fuel displacement is assumed, and even where "waste" materials like timber harvest residuals are used for fuel.[13] One study, using realistic assumptions about repeat bioenergy

---

Biomass emissions also are exempt from compliance obligations under the cap-and-trade regulation. 17 C.C.R. § 95852.2(a). Accordingly, biomass emissions are essentially unregulated under AB 32, despite their atmospheric impact.

[11] Typical CO_2 emission rates for facilities:

Gas combined cycle	883 lb CO_2/MWh
Gas steam turbine	1,218 lb CO_2/MWh
Coal steam turbine	2,086 lb/CO_2/MWh
Biomass steam turbine	3,029 lb CO_2/MWh

Sources: EIA, Electric Power Annual, 2009: Carbon Dioxide Uncontrolled Emission Factors. Efficiency values used to calculate emissions from fossil fuel facilities calculated using EIA heat rate data. (http://www.eia.gov/cneaf/electricity/epa/epat5p4.html); biopower efficiency value is 24%, a standard industry value.

[12] Science Advisory Board Review of EPA's Accounting Framework for Biogenic CO_2 Emissions from Stationary Sources 7 (Sept. 28, 2012) (hereafter "SAB Panel Report") (attached as Ex. 6); *Center for Biological Diversity, et al. v. EPA*, 722 F.3d 401, 406 (D.C. Cir. 2013) ("In layman's terms, the atmosphere makes no distinction between carbon dioxide emitted by biogenic and fossil-fuel sources").

[13] See, e.g., Stephen R. Mitchell, et al., *Carbon debt and carbon sequestration parity in forest bioenergy production*, Global Change Biology Bioenergy (2012), doi: 10.1111/j.1757-1707.2012.01173.x (attached as Ex. 7); Ernst-Detlef Schulze, et al., *Large-scale bioenergy from additional harvest of forest biomass is neither sustainable nor greenhouse gas neutral*, Global Change Biology Bioenergy (2012), doi: 10.1111/j.1757-1707.2012.01169.x at 1-2 (attached as Ex. 8); Jon McKechnie, et al., *Forest Bioenergy or Forest Carbon? Assessing Trade-Offs in Greenhouse Gas Mitigation with Wood-Based Fuels*, 45 Environ. Sci. Technol. 789 (2011) (attached as Ex. 9); Anna Repo, et al., *Indirect Carbon Dioxide Emissions from Producing Bioenergy from Forest Harvest Residues*, Global Change Biology Bioenergy (2010), doi: 10.1111/j.1757-

harvests of woody biomass, concluded that the resulting atmospheric emissions increase may even be permanent.[14]

Policymakers thus cannot simply assume that "biogenic" CO_2 emissions have no effect on the climate. Rather, a full and scrupulously accurate life-cycle analysis is essential to understanding the greenhouse gas implications of burning biomass for energy.[15] The final version of the Scoping Plan Update must recognize this problem and establish a fast-track process for determining how to properly account for and regulate biomass CO_2 emissions under AB 32. Accordingly, the Scoping Plan Update should include the following text at the end of the "Renewable Energy" section on page 29:

> *RPS-eligible generation, however, does not necessarily result in greenhouse gas emissions reductions, even when it displaces fossil fuels. This is particularly true for energy generated from woody biomass, which although renewable, produces roughly three times as much CO_2 per megawatt-hour generated than natural gas. Numerous scientific articles and studies in recent years have called into question the long-standing assumption that this "biogenic" CO_2 has no effect on climate change. Rather, forest-derived biomass energy generation can result in significant increases in atmospheric CO_2 concentrations over a substantial period of time, even if the biomass used as fuel will eventually grow back or would have decayed anyway. In order to determine whether RPS-qualified biomass energy generation should be counted as reducing emissions (as in the current Scoping Plan), or whether associated emissions increases should instead be addressed either through direct regulation or the cap-and-trade program, the Air Resources Board will initiate a study of biomass lifecycle emissions to be completed by the end of 2014. The study at a minimum shall consider the current scientific literature on biomass carbon accounting frameworks, relevant biomass "carbon debt" periods depending on feedstock, proper selection of a baseline for evaluation, and*

1707.2010.01065.x (attached as Ex. 10); Manomet Center for Conservation Sciences, Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy Resources (2010), available at https://www.manomet.org/publications-tools/sustainable-economies/biomass-sustainability-and-carbon-policy-study-full-report (last visited Oct. 31, 2013).

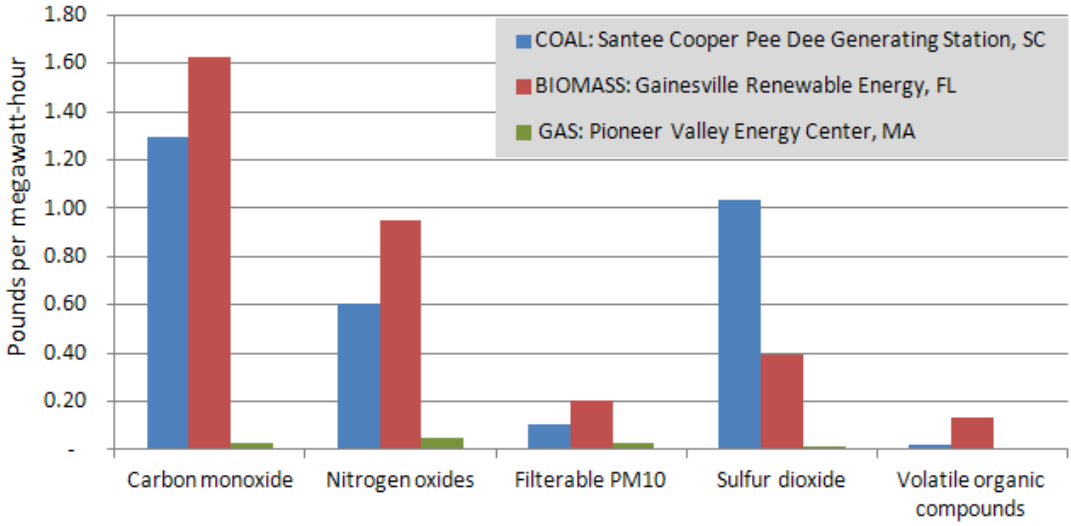
[14] Bjart Holtsmark, *The outcome is in the assumptions: analyzing the effects on atmospheric CO_2 levels of increased use of bioenergy from forest biomass*, Global Change Biology Bioenergy (2012), doi: 10.1111/gcbb.12015 (attached as Ex. 11).

[15] See generally Timothy D. Searchinger, et al., *Fixing a Critical Climate Accounting Error*, 326 Science 527 (2009) (attached as Ex. 12); see also Mitchell 2012 at 9 (concluding that management of forests for maximum carbon sequestration provides straightforward and predictable benefits, while managing forests for bioenergy production requires careful consideration to avoid a net release of carbon to the atmosphere).

> *the effect, timing, and duration of increased CO_2 concentrations associated with biomass generation on achievement of both AB 32's 2020 target and California's 2050 emissions reduction goals. The study also shall address any potential climatic effect associated with black carbon emissions from bioenergy production.*

The Discussion Draft's erroneous assumptions about biomass carry over into its discussion of the purported "co-benefits" of renewable generation. For example, the Discussion Draft at page 59 claims that greenhouse gas reductions are "accompanied by criteria and toxic pollutant emission reductions at the State and local level" and will thus benefit environmental justice communities. However, in addition to producing large amounts of CO_2, biomass energy generation can result in significant emissions of criteria and other pollutants that harm human health. Indeed, as shown in the figure below, biomass emissions (except for sulfur dioxide) can exceed those of coal-fired power plants even after application of best available control technology:

Figure 1. Allowable pollutant emission rates (in pounds per megawatt-hour of electricity generated) from three recently issued air permits. [16]



[16] Figure courtesy of Mary Booth, Ph.D., Partnership for Policy Integrity. Permitted emissions rates based on the following permits: South Carolina Bureau of Air Quality. December 16, 2008. PSD, NSPS (40CFR60), NESHAP (40CFR63) Construction Permit for Santee Cooper Pee Dee Generating Station (1,320 MW, coal). Florida Department of Environmental Protection. December 28, 2010. Final air construction permit for Gainesville Renewable Energy Center (100 MW, biomass). Massachusetts Department of Environmental Protection. June, 2010. Conditional permit to construct issued to Pioneer Valley Energy Center (431 MW, gas).

The Discussion Draft points out that emissions of criteria pollutants, including NOx and PM, must be reduced by 90% by 2032 in many areas of California, and promises that "achieving both [climate and criteria pollutant reduction] objectives will align programs and investments to leverage limited resources for maximum benefit." Discussion Draft at 4. Yet the criteria pollutant emissions associated with expanded biomass generation could exacerbate, not remedy, air pollution problems in California. This is directly contrary to AB 32. See Health & Saf. Code § 38562(b)(4) (requiring Board to "[e]nsure that activities undertaken pursuant to the regulations complement, and do not interfere with, efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminant emissions.").

Furthermore, even if existing conventional pollutant emissions might conceivably be reduced in certain at-risk communities as a result of RPS implementation, construction of new biomass plants may well cause environmental justice problems in other communities. Once again, the Discussion Draft assumes without any factual basis that all RPS-qualified generation will achieve similar co-benefits, notwithstanding relevant differences among "renewable" technologies. Accordingly, we would propose the following language for inclusion on page 59, following the first paragraph under the heading "Potential Impacts and Benefits to Environmental Justice Communities":

> *ARB recognizes that implementation of certain Scoping Plan measures, particularly bioenergy generation and biofuels combustion, may increase rather than reduce criteria and toxic air pollutant emissions. ARB staff will undertake a study, to be completed by the end of 2014, of bioenergy and biofuel feedstocks and pathways either currently in use or reasonably anticipated to be in use within the next decade in California. The study shall identify all feedstocks and pathways that present a reasonable risk of increasing criteria and toxic air pollutant emissions in comparison to the fossil sources they are intended or assumed to replace, and shall make suggestions for further regulation to ensure that these feedstocks and pathways are not prioritized or supported as emissions reduction measures under the Scoping Plan.*

B. Waste Sector

Erroneous assumptions about the atmospheric effect of biogenic CO2 also undermine provisions in the waste management sector portion of the Discussion Draft. The Discussion Draft refers to a "Waste Management Sector Plan" and provides a link to a number of "white papers" on the Board's website. Discussion Draft at 41. One of those papers—the Biomass Conversion White Paper referenced above—contains a foundational error. The paper claims that "only the emissions from combustion of non-biogenic material (such fossil fuels) are counted as GHG emissions that contribute to climate change per protocols established by the Intergovernmental Panel on Climate Change (IPCC)." Biomass Conversion White Paper at 3-4. From this, the paper concludes that "California biomass conversion operations result in net negative GHG emissions." *Id.* at 4.

This erroneous interpretation of IPCC guidelines has been widely criticized by the scientific community,[17] abandoned by the federal EPA,[18] and explicitly disavowed by the IPCC.[19] Yet this plain error appears to be the sole basis identified in any Discussion Draft reference for the document's treatment of biomass energy as a "carbon neutral" source of emissions reductions. The Board's continued reliance on this error is arbitrary, capricious, and without any evidentiary foundation.

Again, biogenic emissions from only a subset of California biomass plants exceeded 6 MMT CO2e in 2011. Biomass Conversion White Paper at 3-4. If this sector grows in the future as anticipated, *see id.* at 3, 5-6, and its emissions are not counted, California may not be able to meet the 2020 target nor achieve steeper reductions thereafter. Furthermore, as previously discussed in the energy sector, incineration results in criteria and toxic pollutant emissions that harm human health and further burden environmental justice communities. California cannot avert dangerous climate change by burning more of its waste. Low-carbon waste management strategies—recycling, reuse, composting, and source reduction—must be made the highest priority. Incineration should be avoided to the fullest possible extent.

C. Forest Sector

The Discussion Draft properly recognizes the important role of California's forests in sequestering carbon and mitigating the effects of climate change. That said, there are some imprecise and/or inaccurate statements in the Discussion Draft that should be corrected in the final version of the Scoping Plan Update.

For example, the Discussion Draft states that because "California needs a comprehensive strategy to protect, manage, and conserve [forest] lands in ways that maximize opportunities to achieve GHG reductions and carbon sequestration," a "Forest Carbon Plan" should be developed "to describe the actions necessary to ensure that California's forests are managed to optimize emission reduction and sequestration

---

[17] *See, e.g.*, Miguel Brandão , et al., *Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting*, 18 Int'l J. Life Cycle Assess. 230 (2013), doi:10.1007/s11367-012-0451-6 (attached as Ex. 14); Repo 2010; Searchinger 2009.

[18] U.S. EPA, Accounting Framework for Biogenic CO_2 Emissions from Stationary Sources 11-12 (Sept. 2011) (attached as Ex. 15) ("The IPCC . . . eschewed any statements indicating that its decision to account for biomass CO_2 emissions in the Land-Use Sector rather than the Energy Sector was intended to signal that bioenergy truly has no impact on atmospheric CO_2 concentrations."); see also Deferral for CO_2 Emissions from Bioenergy and Other Biogenic Sources Under the Prevention of Significant Deterioration (PSD) and Title V Programs, 76 Fed. Reg. 43,490, 43,498 (July 20, 2011); SAB Panel Report (Ex. 6) at 3.

[19] IPCC Task Force on National Greenhouse Gas Inventories, Frequently Asked Questions, at http://www.ipcc-nggip.iges.or.jp/faq/faq.html (last visited October 23, 2013) (Q1-4-5, Q2-10) (attached as Ex. 16).

opportunities." Discussion Draft at ES-6. The second statement here confuses the clear message of the first by implying that the state intends to prioritize emission reduction and sequestration opportunities above all other goals for California's forests. In fact, California's forests should be managed for a wide range of values and goals, including ecosystem integrity, wildlife habitat, and water quality, among many others, all of which can be achieved in ways that are consistent with the goals of emission reduction and carbon sequestration. The second sentence thus should be rewritten as: *A "Forest Carbon Plan" should be developed to describe the actions necessary to ensure that management of California's forests includes the goals of achieving emission reduction and carbon sequestration.*

The Discussion Draft also states that "[t]hrough conservation and management efforts, atmospheric removal of carbon through sequestration can be greater than the atmospheric emissions from processes such as fire, decomposition of wood, or harvest." *Id.* at 42. This statement is vague and somewhat confusing, but appears to mean that sequestration should be increased through improved forest management and conservation. This is an important point worth clarifying, and one that is not directly addressed in any of the discussion on Page 43, which refers primarily to approaches that focus solely on statewide GHG inventories. Approaches that look only at large geographic scales tend to overlook the carbon balance at the site level, which is the scale at which management occurs. This statement also seems to reflect a very weak goal—more explicitly stated in other parts of the document—of managing California's forests only to provide a bare net carbon sink, rather than to maximize both sequestration rates and landscape carbon storage over the long term.

Forest management does not necessarily lead to greater carbon sequestration, especially when the materials removed are combusted for energy production. Harvest of live trees from the forest not only reduces current standing carbon stocks, but also reduces the forest's future rate of carbon sequestration, and its future carbon storage capacity, by removing trees that otherwise would have continued to grow and remove CO_2 from the atmosphere.[20] Even if harvested biomass is substituted for fossil fuels, it can be decades or centuries before the harvested forest achieves the same CO_2 reductions that could be achieved by leaving the forest unharvested (depending on harvest intensity, frequency, and forest characteristics).[21] Any "Forest Carbon Plan" developed by the Board must evaluate whether leaving forests unharvested may present the best strategy

[20] See Holtsmark 2012 ("Taking into account that harvest usually takes place in stands that are still growing, the baseline scenario becomes important. . . . [T]he harvest scenario should be measured against a baseline scenario (with no harvest) in which the trees are still growing, thus capturing CO_2 from the atmosphere.").

[21] *See, e.g.*, Mitchell 2012; John L. Campbell, et al., *Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions?* Front. Ecol. Env't (2011), doi:10.1890/110057 (attached as Ex. 17); Tara Hudiburg, et al., *Regional carbon dioxide implications of forest bioenergy production*, Nature Climate Change (2011), doi: 10.1038/NCLIMATE1264 (attached as Ex. 18); Searchinger 2009.

for balancing wildlife habitat protection, ecosystem services, and maximum carbon sequestration.

The Discussion Draft should reassess the claims in the initial Scoping Plan that opportunities to "realize additional net carbon uptake by trees" include both "[e]stablishing forest areas where the preceding vegetation was not forest" and "[r]educing vegetative fuels that could feed wildfires and using this waste for biopower." *Id.* at 42-43. Neither claim has merit.

Afforestation is a form of ecotype conversion; it can damage existing ecosystems and result in unintended environmental consequences. Furthermore, afforestation does not necessarily sequester more carbon in the long term than existing vegetation and unsuitable sites may result in eventual failure of the planted trees. This is likely one of the reasons this options has not been pursued since the release of the initial Scoping Plan.

Also, the Discussion Draft should acknowledge that the reasoning behind the claim in the initial Scoping Plan that "reducing vegetative fuels that could feed wildfires" will produce "additional net carbon uptake" is flawed. Indeed, two recently published studies of forests in the Western United States suggest that emissions from removal and combustion of forest materials for bioenergy may exceed emissions from even high-intensity fires, at least for some period of time.

One study examined forest carbon responses to three different levels of fuel reduction treatments in 19 West Coast ecoregions containing 80 different forest types and different fire regimes.[22] In nearly all forest types, intensive harvest for bioenergy production resulted in net carbon emissions to the atmosphere, at least over the 20-year time frame of the study. Even lighter-touch fire prevention scenarios produced net carbon emissions in most ecoregions. The study shows that at present, across a wide range of ecosystems, thinning for fuels reduction and using the thinnings for bioenergy increases carbon dioxide concentrations, at least in the short term.

The other study similarly found that thinning forests to avoid high-severity fire could actually increase overall carbon emissions.[23] Because the probability of a fire on any given acre of forest is relatively low, forest managers must treat many more acres than will actually burn in order to get much of a benefit—removing more carbon during "thinning" than would be released in a fire. The study also found that over a succession of disturbance cycles, models predicting forest growth, mortality, decomposition and combustion showed more carbon storage in a low-frequency, high-intensity fire regime than in a high-frequency, low-intensity fire regime.

The Scoping Plan Update presents an important opportunity to correct the initial Scoping Plan's erroneous assumptions about forest carbon dynamics and their relation to wildfire. The Update should reassess and correct the above-referenced actions proposed

[22] Hudiburg 2011.
[23] Campbell 2011.

in bullet points on pages 42-43 ("Establishing forest areas where the preceding vegetation was not forest" and "Reducing vegetative fuels that could feed wildfires and using this waste for biopower"). These ideas from the initial Scoping Plan lack evidentiary support and should be removed from the Scoping Plan Update.

Finally, the Discussion Draft's assertions regarding the purported "co-benefits" of recent legislation establishing a fee on certain wood products, *id.* at 43 (citing AB 1492, Statutes of 2012), are highly speculative. It is not yet clear that requiring consumers and taxpayers to pay for the regulatory oversight of commercial timber harvest plans will even result in different forest management, much less additional emissions reductions from "prevention of forest biomass loss through wildfire disturbance." This paragraph of the Discussion Draft is unsupported and unnecessary, and should be deleted from the final version.

D. Agriculture Sector

The Discussion Draft states that research is underway regarding the relative benefits and costs of biofuel feedstock crops, including "off-farm environmental consequences." Discussion Draft at 47. The Board also is working with the California Department of Food and Agriculture to "expand use of biomass-based transportation fuels as a regulatory pathway under the Low Carbon Fuel Standard." *Id.* The document fails to mention, however, important scientific issues related to biofuel greenhouse gas emissions, including calculation of relevant "carbon debt" periods and emissions associated with land use change.[24] Nor does the document address potential non-climate-related consequences, including displacement of food production.[25] The Scoping Plan Update should clarify that these issues will be examined in the course of the research and additional pathway development mentioned in this portion of the Discussion Draft.

III. Progress Beyond 2020

The Discussion Draft rightly emphasizes the importance of looking beyond 2020 to ensure that future emissions reductions are consistent with what climate science demands. The development of a mid-term target, constrained by its consistency with long-term emissions reduction trajectories, is an appropriate and important goal for the Scoping Plan Update. That said, the Discussion Draft lacks quantitative detail as to how such a target would be established or achieved. Moreover, several questionable

---

[24] See, e.g., Timothy Searchinger, *Biofuels and the Need for Additional Carbon*, 5 Envtl. Research Letters (2010), doi:10.1088/1748-9326/5/2/024007 (attached as Ex. 19); M. O'Hare, et al, *Proper Accounting for Time Increases Crop-Based Biofuels' Greenhouse Gas Deficit Versus Petroleum*, Envtl. Res. Lett. (2009), doi:10.1088/1748-9326/4/2/024001 (attached as Ex. 20); Joseph Fargione, et al., *Land Clearing and the Biofuel Carbon Debt*, 319 Science 1235 (2008) (attached as Ex. 21).

[25] Marshall Wise, et al., *Implications of Limiting CO_2 Concentrations for Land Use and Energy*, 324 Science 1183 (2009) (attached as Ex. 22).

assumptions undermine the document's analysis of various sectors. These deficiencies should be corrected in the final Scoping Plan Update.

A. Mid-Term Targets

Acknowledging that both climate science and Governor Schwarzenegger's Executive Order S-3-05 demand dramatic emissions reductions by 2050, the Discussion Draft appropriately seeks a mid-term "target that reflects the scientifically-based level of emission reductions the state needs to achieve by 2030" to "help guide ongoing and future policy decisions and provide a clear market signal for continued investment in low-carbon technologies." Discussion Draft at ES-3. Yet the document also states that 2050 is "too distant to form the basis for a credible policy regime for ongoing emission reductions." *Id.* at 77. There is, however, necessarily a very close relationship between mid-term and long-term emissions reduction targets. Unless peak emissions are achieved in the very near term and steep reductions accomplished shortly thereafter, the emissions reduction curve will have to be that much steeper in the years leading up to 2050 if long-term targets are to be achieved. The steeper the reductions needed after 2020, the more difficult and costly they will be.[26] Accordingly, mid-term targets must be established and evaluated in terms of their consistency with feasible trajectories toward long-term goals.

B. Bioenergy and Biofuels

The Discussion Draft repeats many of the erroneous assumptions about the climate impacts of bioenergy and biofuels in the portions of the document pertaining to long-term targets. For example, the Discussion Draft recognizes that achieving long-term climate goals will require a "near-zero carbon electricity supply", "low carbon liquid fuels," and "better use of natural carbon sinks." Discussion Draft at 75. Once again, however, the document seems simply to assume that RPS compliance will be a major driver of "de-carbonization" and that "carbon-neutral biofuels" will be readily available. *Id.* at 78, 79. As previously discussed, bioenergy generation can be very carbon-intensive regardless of RPS eligibility, and the carbon neutrality (or lack thereof) of biofuels pathways must be evaluated in light of several factors, including carbon debt periods, additional carbon, and indirect land use change, not otherwise acknowledged in the document. Merely stating that there is a need for "sustainable bioenergy systems," *id.* at 83, does nothing to ensure that those systems will not exacerbate rather than ameliorate climate and conventional air pollution. Rather, any "overarching energy plan" developed for California, *id.* at 84, must be informed by a framework for accurate carbon accounting for both bioenergy and biofuels. The studies proposed in Section II.A., above, should be used to develop this framework.

Failure to account for these factors results in the Discussion Draft simply promoting additional research and development for bioenergy and biofuels. *Id.* at 85, 88. Again, specific feedstocks and pathways must be closely evaluated, and their climate

[26] See, e.g., UNEP 2012 at 28-29.

consequences detailed, before any commitment is made toward further development and deployment of these technologies.

Finally, the Discussion Draft's statement of support for "development of large-scale renewable and low carbon fuel production facilities," *id.* at 90, is ambiguous. The statement should be revised to make clear that support should flow only to facilities that are both renewable and low-carbon, and not to facilities that may technically be "renewable" but still cause an increase in atmospheric CO_2 concentrations, as follows:

> Support development of large-scale renewable ~~and low-carbon~~ fuel production facilities only to the extent those facilities use feedstocks and production techniques that reduce greenhouse gas emissions over both short- and long-term timeframes in comparison to the fossil fuels they displace. Evaluation of short- and long-term emissions reductions shall consider full lifecycle emissions associated with production, harvesting, and processing of feedstocks, production and combustion of fuel, and both direct and indirect land use change.

C. Transportation and Land Use

Both the 2008 Scoping Plan and the Discussion Draft rely heavily on sustainable communities strategies ("SCS") under SB 375 in achieving emissions reductions from transportation and land use. Discussion Draft at 23-24, 79-80. As demonstrated by the 2050 Regional Transportation Plan/SCS adopted by the San Diego Association of Governments, however, an SCS may meet SB 375's 2020 and 2035 targets, and yet still permit long-range increases in total and per capita greenhouse gas emissions and vehicle miles traveled. Put simply, SANDAG's plan demonstrates that SB 375 compliance does not necessarily result in lasting emissions reductions from these sectors. Although the Discussion Draft optimistically states that the "next generation" of SB 375 plans "will result in climate benefits well beyond the 2035 time horizon," *id.* at 80, the document does not state why Board staff believe this to be the case. The Scoping Plan Update should propose specific changes that will ensure needed reductions from the transportation and land use sectors. Aspirational assurances that regional governments will get it right next time are not sufficient to show progress toward a long-term target.

D. Waste

Among the Discussion Draft's long-term recommendations for the waste sector are development of "more accurate GHG emission factors for various materials, processes, and landfill emissions." Discussion Draft at 99. This is appropriate, but it should explicitly include rejection of the assumption that all biomass combustion is "carbon neutral" and near-term development of accurate accounting frameworks for bioenergy and biofuels. Further pursuit of "bioenergy processes," *id.*, must be informed by an accurate accounting regime, not simply assumed to be beneficial.

E. Forests

The Discussion Draft's proposals for long-term emission reductions from the forest sector are hampered by some of the same erroneous assumptions underlying its treatment of the 2020 target.

For example, the document states that "actions taken to address forest health concerns or to reduce wildfire risks may result in temporary reductions in carbon sequestration, but are necessary to maintain healthy forests that are more efficient at GHG sequestration and more resilient to future climate conditions and reduce the capacity of natural and working lands to sequester carbon." Discussion Draft at 100. As a threshold matter, the latter part of the sentence seems to contradict its overall meaning. More critically, the document does not explain the basis for its assumption that "temporary" reductions will lead to greater sequestration later. As previously discussed, harvests for wildlife threat reduction may significantly diminish carbon stores and increase atmospheric CO_2 concentrations for substantial amounts of time. Nor does the Discussion Draft address how long those "temporary" reductions will last, whether "sequestration" is measured in terms of rate of flux or landscape storage or both, or how management based on such "actions" will affect carbon balance over relevant timescales as compared to other management alternatives. Again, the document should not simply assume that particular management strategies will produce desired outcomes. Rather, it should set up a process for determining, based on sound science and comprehensive carbon accounting, exactly which management strategies best contribute to emissions reduction goals.

The Discussion Draft also establishes a very weak goal—ensuring that forests provide "net carbon storage" or operate as a "net carbon sink"—for the forest sector. *Id.* at 100-103. In particular, the document recommends that CAL FIRE and the Board of Forestry establish a "Forest Carbon Plan" in which they "investigate and make recommendations on actions to ensure that the State's forests are operating as a net carbon sink and establishing realistic quantitative carbon sequestration goals for the Forest Sector." *Id.* at 101. This description of the Forest Carbon Plan does not seem consistent with the description on Page ES-6, which states: "California needs a comprehensive strategy to protect, manage, and conserve these lands in ways that maximize opportunities to achieve GHG reductions and carbon sequestration." Merely maintaining a net carbon sink at the state level is an extremely low standard that would most likely allow vast amounts of emissions from forests that could and should be sequestering carbon under conservation and responsible management.

This could be clarified and strengthened as: "*CAL FIRE and the Board of Forestry and Fire Protection (BoF) should investigate and make recommendations on actions to ensure that the State's forests* ~~*are operating as a net carbon sink*~~ <u>are being protected, managed, and conserved in ways that maximize GHG reductions and carbon sequestration while protecting forest ecosystems and other values;</u> *and establishing realistic quantitative carbon sequestration goals for the Forest Sector (the "Forest Carbon Plan").*

Furthermore, it is critical that the emissions and carbon impacts associated with silvicultural treatments—which largely means timber harvest, understory removal, or commercial forest site preparation—are considered in comparison to all other options for forest management and conservation. The state's recommendations and goals should be based on objectives for the best management of the state's forests overall, and not artificially constrained by the industry's current business-as-usual operations.

The Discussion Draft further recommends that the Natural Resources Agency and Cal/EPA convene a "climate investment working group" to fund "actions to ensure that California's forests provide net carbon storage." Discussion Draft at 102. Among these actions would be "market-based mechanisms applicable to large forest land owners for the purpose of ensuring that California's forests provide net carbon storage." *Id.* Again, "net carbon storage" is an incredibly weak goal, and one that by definition need not actually contribute to reductions in either emissions or atmospheric CO_2 concentrations. Moreover, it is not clear why only large forest land owners would be singled out for financial assistance, nor why they need additional "market-based mechanisms" to ensure that they do not deplete forest carbon stores on their lands. Large timberland operators are already required by the Forest Practice Act to ensure that harvest does not exceed growth over a 100-year time frame. They are also required to mitigate significant impacts of their operations under the California Environmental Quality Act. Additional market-based mechanisms are not necessary to ensure that the timber industry does the bare minimum it is already required to do under the law, especially if they will require diverting cap-and-trade revenues from other projects that actually could reduce emissions.

Accordingly, the first bullet point on Discussion Draft page 103 should be revised as follows: "Evaluate and make recommendations on actions to ensure that the State's forests ~~are operating as a net carbon sink~~ <u>are being protected, managed, and conserved in ways that maximize GHG reductions and carbon sequestration while protecting forest ecosystem values</u> and establishing realistic quantitative carbon sequestration goals for California forests." The first bullet point under "Funding" should be deleted. And finally, a bullet point should be added under "Planning and Actions" as follows: "Initiate a comprehensive review of published scientific literature on forest carbon dynamics, taking into account emissions from all forest carbon pools associated with removals of forest material for wood products and bioenergy production, and develop a forest carbon accounting method that permits identification of forest management alternatives that can maximize both CO_2 sequestration and landscape storage while preserving other forest ecosystem services such as water quality, wildlife habitat, and recreation."

IV. Conclusion

Board staff are to be congratulated on preparing a Discussion Draft that foregrounds the latest climate science and highlights the urgency of ambitious action over both the near and long term. As discussed above, however, the Discussion Draft maintains erroneous assumptions, particularly concerning CO_2 emissions from bioenergy, that threaten to impede attainment of both AB 32's mandatory 2020 target and the state's

longer-term emission reduction goals. The Scoping Plan Update presents a critical opportunity to correct these errors. We stand ready to work with the Board and staff on addressing these concerns before the Scoping Plan Update is finalized. Thank you for your consideration of these comments.

Sincerely,

Kevin P. Bundy
Senior Attorney

Encl. (exhibits submitted in PDF format)

List of Exhibits
(Submitted via internet upload in PDF format)

Exhibit	Title
1	California Air Resources Board, Preliminary Draft Staff Proposal: Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act (Oct. 24, 2008).
2	California Climate Change Center, Our Changing Climate: Assessing the Risks to California (July 2006).
3	B. Hare & M. Meinshausen, *How Much Warming Are We Committed To and How Much Can Be Avoided?*, 75 Climatic Change 111 (2006).
4	J. Hansen, et al., *Target Atmospheric CO_2: Where Should Humanity Aim?*, 2 OPEN ATMOS. SCI. J. 217 (2008).
5	United Nations Environment Programme, The Emissions Gap Report 2012.
6	Science Advisory Board Review of EPA's Accounting Framework for Biogenic CO_2 Emissions from Stationary Sources (Sept. 28, 2012).
7	Stephen R. Mitchell, et al., *Carbon debt and carbon sequestration parity in forest bioenergy production*, Global Change Biology Bioenergy (2012), doi: 10.1111/j.1757-1707.2012.01173.x.
8	Ernst-Detlef Schulze, et al., *Large-scale bioenergy from additional harvest of forest biomass is neither sustainable nor greenhouse gas neutral*, Global Change Biology Bioenergy (2012), doi: 10.1111/j.1757-1707.2012.01169.x.
9	Jon McKechnie, et al., *Forest Bioenergy or Forest Carbon? Assessing Trade-Offs in Greenhouse Gas Mitigation with Wood-Based Fuels*, 45 Environ. Sci. Technol. 789 (2011).
10	Anna Repo, et al., *Indirect Carbon Dioxide Emissions from Producing Bioenergy from Forest Harvest Residues*, Global Change Biology Bioenergy (2010), doi: 10.1111/j.1757-1707.2010.01065.x.
11	Bjart Holtsmark, *The outcome is in the assumptions: analyzing the effects on atmospheric CO_2 levels of increased use of bioenergy from forest biomass*, Global Change Biology Bioenergy (2012), doi: 10.1111/gcbb.12015.
12	Timothy D. Searchinger, et al., *Fixing a Critical Climate Accounting Error*, 326 Science 527 (2009).
13	Marco Steinacher, et al., Allowable Carbon Emissions Lowered by Multiple Climate Targets, 499 Nature 197 (2013).
14	Miguel Brandão , et al., *Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting*, 18 Int'l J. Life Cycle Assess. 230 (2013), doi:10.1007/s11367-012-0451-6.
15	U.S. EPA, Accounting Framework for Biogenic CO_2 Emissions from Stationary Sources (Sept. 2011).
16	IPCC Task Force on National Greenhouse Gas Inventories, Frequently Asked Questions.

17	John L. Campbell, et al., *Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions?* Front. Ecol. Env't (2011), doi:10.1890/110057.
18	Tara Hudiburg, et al., *Regional carbon dioxide implications of forest bioenergy production*, Nature Climate Change (2011), doi: 10.1038/NCLIMATE1264.
19	Timothy Searchinger, *Biofuels and the Need for Additional Carbon*, 5 Envtl. Research Letters (2010), doi:10.1088/1748-9326/5/2/024007.
20	M. O'Hare, et al, *Proper Accounting for Time Increases Crop-Based Biofuels' Greenhouse Gas Deficit Versus Petroleum*, Envtl. Res. Lett. (2009), doi:10.1088/1748-9326/4/2/024001.
21	Joseph Fargione, et al., *Land Clearing and the Biofuel Carbon Debt*, 319 Science 1235 (2008).
22	Marshall Wise, et al., *Implications of Limiting CO_2 Concentrations for Land Use and Energy*, 324 Science 1183 (2009).