



June 22, 2022

Ms. Rajinder Sahota, Deputy Director  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

**Re: Comments on Draft 2022 Climate Change Scoping Plan**

Dear Ms. Sahota:

The Bioenergy Association of California (BAC) submits these comments on the *Draft 2022 Climate Change Scoping Plan*. BAC supports the new focus on carbon neutrality and Natural and Working Lands, but is concerned that these and other long-term strategies have largely supplanted measures that benefit the climate right away. The Draft Scoping Plan should place much more emphasis on Short-Lived Climate Pollutant (SLCP) reductions as the most urgent climate solution and one of very few measures that cool the climate in the next decade or two. In particular, BAC urges ARB to focus much more on near-term opportunities to reduce methane and anthropogenic black carbon emissions, including the emissions from diesel powered trucks, backup generators, and human caused fires. BAC also urges ARB to focus on the lifecycle emissions of different technologies, fuels, and strategies, rather than deeming specific technologies as carbon free or harmful to the climate when other technologies or fuels may be significantly higher or lower carbon on a lifecycle basis.

BAC's comments on the *Draft 2022 Climate Scoping Plan* focus on six main areas:

- BAC supports Alternate 3 as the Proposed Scenario, with some modifications, as it will provide the greatest benefits with the fewest downsides.
- The Proposed Scenario correctly includes bioenergy and renewable hydrogen, but should include specific recommendations to accelerate their use.
- The Proposed Scenario also correctly includes CCSU as an essential strategy to reduce emissions quickly and to reach carbon neutrality.
- The Scoping Plan should focus much more on SLCP reductions and other measures that benefit the climate in the near term.
- Analysis and recommendations should be based on lifecycle emissions rather than broad generalizations about different technologies, fuels, and strategies.
- The Scoping Plan should focus transportation and vehicle strategies on opportunities to reduce climate and air pollution in the near term.
- The Scoping Plan should provide a full and accurate assessment of technically available forest and agricultural waste biomass.

BAC represents almost 100 local governments, public agencies, private companies, and non-profits that are working to convert organic waste to energy. BAC's public sector members include environmental, air quality, waste and wastewater agencies, research institutions, publicly owned utilities, community and environmental groups. BAC's private sector members include energy and technology companies, developers, waste industry, agriculture and food processing, investor-owned utilities, investors, and others.

BAC's specific comments on the Draft Scoping Plan are below.

### **1. The Draft Scoping Plan Correctly Proposes Alternative 3 as the Proposed Scenario.**

The Draft Scoping Plan correctly proposes Alternative 3 as the Proposed Scenario since it provides the greatest benefits and is most likely to achieve the requirements of SB 1383 and SB 32. In particular, BAC supports Alternative 3 because it will “deploy a broad portfolio of existing and emerging fossil fuel alternatives and clean technologies.”<sup>1</sup> Given the complexity of decarbonizing while maintaining energy and transportation reliability, reducing air and water pollution, and maintaining our economy, will be complicated enough.

It is essential in managing such an unprecedented and complex transition to include a diverse portfolio of solutions to maintain reliability, be prepared for unforeseen events and consequences, and provide redundancy. The Draft Plan correctly notes that the “challenge before us requires us to keep all tools on the table.”<sup>2</sup>

BAC urges ARB to drop Alternative 1 as it excludes two of the most beneficial climate solutions and is based on technology choices that are unrelated to carbon emissions. In particular, BAC opposes the exclusion of dairy digesters that, by ARB's own analysis, are both the most effective and the most cost-effective of all the state's climate investments.<sup>3</sup> Alternative 1 would also exclude the use of landfill gas, even though landfills are one of the two largest sources of methane emissions and gas that is captured has to be flared if it is not used. Flaring that gas provides no energy value and has no pollution controls. It would be far better for the climate and air quality to use that gas instead to displace fossil fuels, especially diesel powered trucks and backup generators.

BAC also opposes Alternative 1 because it would exclude the use of biofuels<sup>4</sup> that can provide the greatest carbon reductions and carbon negative fuels. It makes no sense to ban the use of biofuels that can be lower carbon than electricity or hydrogen derived

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<sup>1</sup> *Draft 2022 Climate Change Scoping Plan Update*, released May 10, 2022, at page 41.

<sup>2</sup> *Id.* at page vii.

<sup>3</sup> California Air Resources Board, *California Climate Investments*, 2021 Report to the California Legislature, Table 2, pages 15-20.

<sup>4</sup> Draft scenarios presentation, slide 18.

from natural gas. The lowest carbon intensity fuels in the Low Carbon Fuel Standard program are biofuels derived from organic waste, in many cases several times lower carbon than grid electricity or fossil fuel-based hydrogen. Biofuels are also the only available alternative to diesel in heavy duty trucks, meaning they are the best option to reduce the use of diesel in the near term.

ARB should also eliminate Alternative 1 because it is too soon to ban combustion, which is necessary for many industrial processes, may continue to be necessary for energy reliability, and is used to prevent methane emissions from landfills and wastewater treatment facilities that are required to flare any methane that is not used. Banning combustion would also result in significant emissions leakage by banning certain industries altogether.<sup>5</sup> It makes no sense to ban cement, aviation, or other sectors when those emissions will just be moved to other states (not to mention the impact on California's economy of banning aviation).

For all these reasons, BAC supports the choice of Alternative 3 as the proposed scenario.

## **2. The Proposed Scenario Correctly Includes Bioenergy and Green Hydrogen, but Should Provide Additional Policy Recommendations to Accelerate Their Use.**

BAC agrees with the Draft Scoping Plan that both bioenergy and renewable hydrogen will be needed to decarbonize the energy and transportation sectors, as well as decarbonizing industrial and other hard to electrify end uses. As the Draft Plan notes, the "solution will have to include transitioning existing energy production and transmission infrastructure to produce zero-carbon electricity and hydrogen, and utilizing biogas resulting from wildfire management or landfill and dairy operations, among other substitutes."<sup>6</sup> Bioenergy and renewable hydrogen that are generated from organic waste can also provide significant carbon negative emissions that are essential to reach carbon neutrality.

The Draft Scoping Plan notes that biomethane, renewable hydrogen, and other low carbon fuels will be needed to decarbonize industrial processes that require high heat, as well as other hard to electrify end uses.<sup>7</sup> The Draft Scoping Plan also notes correctly that hydrogen can provide both generation and long-duration storage.<sup>8</sup> Biomethane and biogas (or bio-syngas) can also provide both generation and energy storage.

BAC agrees with the Draft Plan's recommendation to remove barriers to increased bioenergy and renewable hydrogen use,<sup>9</sup> but the Draft Plan does not recommend

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<sup>5</sup> Draft scenarios presentation, slide 11.

<sup>6</sup> Draft Scoping Plan at page vi.

<sup>7</sup> Id. at pages 166-167.

<sup>8</sup> Id. at page 163.

<sup>9</sup> Id. at page x.

enough specific strategies to do so. BAC supports the recommendations to remove cost barriers to biomethane use<sup>10</sup> and to implement the Renewable Gas Standard (biomethane procurement) program established pursuant to SB 1440.<sup>11</sup> BAC also supports the recommendation to accelerate development of new renewable electricity and associated transmission infrastructure.

BAC also supports the emphasis on green hydrogen in the Draft Scoping Plan, especially the comments that green hydrogen is not limited to electrolytic hydrogen. As the Draft Plan states, ‘green hydrogen’ is not limited to only electrolytic hydrogen.<sup>12</sup> “Hydrogen produced from renewable resources and renewable feedstocks can serve a dual role as a low-carbon fuel for existing combustion turbines, fuel cells, and linear generators, and as energy storage for later use.”<sup>13</sup>

The Draft Scoping Plan recommendations are not, however, sufficient to spur the pace and scale of bioenergy and renewable hydrogen production needed to meet the state’s climate goals, especially since the CPUC’s biomethane procurement program is focused on residential and small business customers, not industrial or hard to electrify end uses. BAC urges ARB, therefore, to add additional policy and funding recommendations to accelerate bioenergy and green hydrogen production and use, including:

- Prioritize climate and clean energy funding for bioenergy and renewable hydrogen sources that reduce SLCP emissions;
- Adopt an economy-wide Renewable Gas Standard and a requirement for existing natural gas power plants to use an increasing percentage of renewable gas;
- Accelerate and incentivize interconnection for bioenergy and hydrogen projects that reduce SLCP emissions and/or provide carbon negative emissions;
- Accelerate permitting for bioenergy and renewable hydrogen projects;
- Incentivize hydrogen fueling infrastructure;
- Adopt a statewide definition of “renewable” or “green” hydrogen that includes hydrogen from all SB 100 eligible resources.

### **3. The Proposed Scenario Correctly Includes CCSU to Reduce Emissions and Reach Carbon Neutrality.**

BAC agrees with the Draft Scoping Plan’s conclusion that carbon capture and sequestration or use (CCSU) will be essential to reach carbon neutrality.<sup>14</sup> Numerous studies have reached the same conclusion since carbon emissions cannot be eliminated entirely and we need to reduce the total amount of carbon in the

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<sup>10</sup> Id. at page 169.

<sup>11</sup> Id. at page 172.

<sup>12</sup> Id. at footnote 2.

<sup>13</sup> Id. at page 163.

<sup>14</sup> Id. at page 66.

atmosphere.<sup>15</sup> In addition to offsetting emissions from industrial and manufacturing processes, CCSU can help drive down the emissions from bioenergy and the combination of bioenergy with CCS (BECCS) can provide significant carbon negative emissions. According to Lawrence Livermore National Lab, BECCS can provide more than two-thirds of all the carbon negative emissions needed to reach carbon neutrality and it can do so at a very reasonable cost per ton of carbon reduction.<sup>16</sup>

BAC also agrees that CCS can help reduce emissions from steam methane reformation used to generate hydrogen. When generating hydrogen from organic waste, capturing and storing the carbon emitted during the conversion process means that the hydrogen will be carbon negative or extremely low carbon.<sup>17</sup> The use of CCS to generate carbon negative hydrogen from organic waste provides an immediate opportunity to reduce SLCP emissions from organic waste, to generate carbon negative emissions, and to produce a renewable form of hydrogen that can be used in place of diesel in heavy duty trucks and other end uses – in other words, providing a triple benefit for the climate and air quality. The Draft Scoping Plan also notes that hydrogen from organic waste and other sources that require steam methane reformation is available now, whereas electrolytic hydrogen is significantly more expensive and may not be widely available for many years given the quickly increasing need for renewable power in other sectors.<sup>18</sup>

#### **4. Long-term planning for carbon neutrality should not replace legal requirements to reduce SLCP and GHG emissions by 2030.**

The Draft Scoping Plan recognizes the importance of reducing SLCP emissions, which benefits the climate and public health right away, but the Draft Plan provides very few recommendations to do so and incorrectly ignores anthropogenic black carbon emissions from fire. BAC urges ARB to expand the recommended actions to reduce SLCP emissions and to include black carbon emissions from human caused fires in the Scoping Plan to meet the requirements of SB 1383, including the requirement to cut anthropogenic black carbon 50 percent by 2030. It will be impossible to meet that requirement without addressing anthropogenic black carbon from human caused fires.

The Draft Plan recognizes that “[g]iven the urgency of climate change . . . efforts to reduce short-lived climate pollutants are especially important”<sup>19</sup> and that “efforts to reduce short-lived climate pollutants emissions can provide outsized climate and health benefits.”<sup>20</sup> The Draft Scoping Plan also points out that SLCP emissions will cause as much warming in the next decade as carbon dioxide emissions.<sup>21</sup>

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<sup>15</sup> See, eg, Lawrence Livermore National Lab, *Getting to Neutral – Options for Negative Carbon Emissions in California*,” January 2020.

<sup>16</sup> Id.

<sup>17</sup> Id.

<sup>18</sup> Draft Scoping Plan at page 69.

<sup>19</sup> Id. at page 22.

<sup>20</sup> Id.

<sup>21</sup> Id. at page 178.

The Draft Plan also highlights the climate and public health impacts of fires, but then utterly ignores black carbon emissions from human-caused fires, including large human-caused wildfires, controlled burns, and pile and burn of forest waste. These are significant sources of black carbon (and CO<sub>2</sub> and methane), yet the Draft Plan omits fire entirely from the discussion of anthropogenic black carbon. In fact, on page 37, the Draft Scoping Plan defines “anthropogenic” black carbon as excluding emissions from the forest sector, stating that the black carbon inventory “is reported in two categories: non-forestry (anthropogenic) sources and forestry sources.”<sup>22</sup> No rationale is given for excluding black carbon emission from the forest sector, despite the fact that most fires are human caused (intentionally or not) and therefore their black carbon emissions are “anthropogenic.” Similarly, the Draft Plan claims that “significant progress has been made since 2013 to reduce anthropogenic black carbon emissions, primarily from decreased combustion of distillate fuels in the agricultural sector, as well as improvements to provide cleaner, on-road combustion technologies.”<sup>23</sup>

The Draft Plan makes no mention of progress (or lack thereof) in reducing black carbon from human caused fires, which is the single largest source of anthropogenic black carbon emissions in California. According to CalFire, 90 percent of large wildfires in California are caused by human activities and human infrastructure, which clearly fall within the definition of anthropogenic. Prescribed fire (also known as controlled burns) in the forest and pile and burn of forest waste also contribute anthropogenic black carbon emissions, but those are not even mentioned in the section on anthropogenic black carbon.

BAC urges ARB to recommend additional strategies to reduce SLCP emissions, including anthropogenic black carbon from human caused fires, to bend the warming curve immediately. The latest IPCC report makes clear that we have much less than a decade to prevent catastrophic and irreversible climate change. It is critical, therefore, to increase the focus on actions that benefit the climate quickly. Climate experts around the state echoed this urgency in a recent paper that states that “decarbonization measures, while essential, will take two to three decades to have an impact on the steeply warming curve. The need for speed is great and it is a race against time.”<sup>24</sup> The climate experts call for “drastic” reductions in SLCP emissions, which can benefit the climate right away, including eliminating the use of diesel and reductions in methane and black carbon from organic waste.<sup>25</sup> They also call explicitly for accelerating the timeline for meeting the requirements of SB 1383, which currently calls for a 40 percent reduction in methane and a 50 percent reduction in anthropogenic black carbon by

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<sup>22</sup> Id. at page 37.

<sup>23</sup> Id. at page 194.

<sup>24</sup> Kammen, Ramanathan, Matlock, et al, “*Accelerating the Timeline for Climate Action in California*,” submitted to Environmental Research Letters, 2021. Available at: <https://arxiv.org/abs/2103.07801> [arxiv.org].

<sup>25</sup> Id. at page 4.

2030.<sup>26</sup> Climate science is clear that the only measures that reduce warming in the near term and can do so at large scale are the measures to reduce SLCP emissions.<sup>27</sup>

BAC urges ARB, therefore, to prioritize SLCP reductions in the 2022 Climate Change Scoping Plan and to include black carbon emissions from human caused fires in the section on anthropogenic black carbon. In particular, ARB should include additional strategies to reduce SLCP emissions, including or referencing the recommended actions in the *California Forest Carbon Plan* and the *Forest Biomass Utilization Plan* adopted by the Board of Forestry in November 2020. Additional policies are needed to provide a market for bioenergy and other wood products from forest waste, to incentivize and accelerate interconnection for bioenergy from forest waste, to incentivize new infrastructure development to process forest waste, streamlined permitting, R&D to continue to drive down emissions and maximize benefits of forest waste products, adoption of guidelines and carbon protocols for biochar use, and more.

### **5. The Scoping Plan must consider the lifecycle carbon emissions of each technology, fuel, and strategy in the Scoping Plan.**

The Draft Scoping Plan fails to focus on the lifecycle carbon intensity of different resources or opportunities for carbon negative emissions. To achieve a truly zero carbon electricity sector, it is essential to adopt a lifecycle carbon intensity focus, rather than focusing on specific technologies – ie, combustion – that are not directly related to carbon intensity.

Rather than pick technology winners or losers, the plan should focus instead on maximizing SLCP reductions and carbon reductions generally, including opportunities for negative carbon emissions. Focusing on specific technologies that are unrelated to lifecycle carbon emissions undermines the purpose of a climate change scoping plan.

To give an example, a facility that combusts biomethane or hydrogen generated from organic waste can provide significant negative carbon emissions despite the use of combustion. In fact, combustion of biomethane can provide many times greater carbon reductions than solar or wind power because wind and solar power are carbon positive when accounting for raw materials, manufacturing, land use changes, end of life disposal, etc.

In order to achieve a zero-carbon electricity sector, it will be critical to have significant carbon negative emissions in the sector since most resources are not, in fact, truly carbon neutral. This includes solar and wind power, which have lifecycle carbon intensities between 4 and 40 grams of CO<sub>2</sub>e per kilowatt hour.<sup>28</sup> Batteries also have

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<sup>26</sup> Id. at page 4.

<sup>27</sup> Presentation of Dr. V. Ramanathan, UC San Diego and Scripps Institute, Presentation June 24, 2021 at MoveLA Symposium on Short-Lived Climate Pollutant Reductions.

<sup>28</sup> See, <https://www.nrel.gov/analysis/life-cycle-assessment.html>.

some carbon emissions on a lifecycle basis.<sup>29</sup> These are due to extraction of raw materials, manufacturing, installation, land use changes, and disposal or recycling of used batteries and other equipment (turbines, panels, etc.).<sup>30</sup> This wide range of emissions is much more than de minimis and should be included in any plan to achieve zero carbon electricity overall.

Bioenergy, by contrast, can be carbon negative – in some cases, extremely carbon negative – because it reduces SLCP and GHG emissions from organic waste as well as displacing fossil fuels. When carbon capture and storage or use is added, then most forms of bioenergy can be carbon negative.

Given the wide range of carbon intensities for RPS and LCFS eligible resources, it is critical to include lifecycle carbon intensities of different fuels and technologies to plan accurately for a zero carbon electricity grid and zero carbon transportation. The Scoping Plan should, therefore, focus on the lifecycle carbon emissions of different fuels and technologies, rather than making broad – and often incorrect – generalizations about different fuel and technology categories.

## **6. The Scoping Plan Should Maximize Near-Term Emissions Reductions in the Transportation Sector.**

BAC supports ARB's work to move to the cleanest possible vehicles to reduce climate and air pollution, and many BAC members are developing projects to convert organic waste to hydrogen and electricity to power ZEV's. At the same time, there is no commercially viable ZEV in the Class 7 and 8 truck markets and it is not at all clear when a Class 7 or 8 ZEV will be commercially available, not to mention reliable, affordable, and sufficient to meet the needs of long-haul trucks, waste haulers, and others. In addition, a new study by the U.S. Department of Energy highlights the need to increase the production of low carbon biofuels since the transition to electric vehicles will take several decades and we have to reduce transportation emissions more quickly than that.<sup>31</sup>

The Draft Scoping Plan highlights the need to eliminate diesel,<sup>32</sup> but fails to offer near-term solutions to get heavy-duty, long-haul diesel trucks off the road as soon as possible. By limiting the proposed strategies to ZEVs only, the Draft Scoping Plan is missing the single biggest opportunity to reduce black carbon, PM, NOx and other pollutants from diesel trucks, which are the biggest source of air pollution in the San

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<sup>29</sup> See, eg, <https://www.forbes.com/sites/rpapier/2020/02/16/estimating-the-carbon-footprint-of-utility-scale-battery-storage/?sh=519b1c827adb>.

<sup>30</sup> International Council on Clean Transportation, *Effects of Battery manufacturing on Electric Vehicle Life-Cycle Greenhouse Gas Emissions*, February 2018.

<sup>31</sup> U. S. Department of Energy, *"The Road Ahead – Toward a Net-Zero-Carbon Transportation Future,"* June 2022. DOE/EE-2539, available at: [energy.gov/fuel-engine-co-optimization](https://energy.gov/fuel-engine-co-optimization).

<sup>32</sup> Draft Scoping Plan at pages 147-148.



Joaquin Valley and South Coast Air Districts, the two most polluted air districts in the country.

The omission of near-term strategies to eliminate diesel-powered, heavy-duty trucks is especially concerning given the precipitous drop in LCFS credit prices. Together, these send a signal to biomethane and other renewable fuel producers that the state is walking away from low carbon and carbon negative fuels – including the lowest carbon fuels on the market – in favor of a long-term strategy to require 100 percent ZEVs. This would make sense if there were commercially viable ZEVs in all vehicle classes, but it does not make sense when biofuels are the only commercially available alternative to diesel powered, heavy-duty trucks.

In other sectors and in general, the Draft Scoping Plan highlights the need to keep all options on the table to meet the state’s climate goals, but then contradicts that guidance in the transportation sector by focusing the proposed strategies entirely on ZEVs. This is surprising since the Draft Plan acknowledges that:

“In addition to building the production and distribution infrastructure for zero-carbon fuels, the state must continue to support low-carbon liquid fuels during this period of transition and for much harder sectors for ZEV technology such as aviation, locomotives, and marine applications. Biomethane currently displaces fossil fuels in transportation and will largely be needed for hard-to-decarbonize sectors but will likely continue to play a targeted role in some fleets while the transportation sector transitions to ZEVs.”<sup>33</sup>

Given the recognition that biomethane will continue to play a role in transportation and other hard-to-electrify sectors, BAC urges ARB to include recommended strategies to continue to increase the use of biomethane to replace fossil fuels in heavy duty trucks and other transportation sectors. Those recommendations should include:

- Maintaining a technology neutral, lifecycle carbon intensity based LCFS program;
- Increasing the carbon reductions required by the LCFS between now and 2030;
- Continuing to incentivize near-zero emission vehicles in vehicle classes where there is no commercially viable ZEV option;
- Developing a transition strategy for biomethane producers that maintains a viable market for biomethane and biogas from organic waste as vehicles transition to zero-emission technologies;
- Investing in hydrogen fueling stations with priority going to fueling stations that use low carbon and carbon negative hydrogen generated from organic waste to help meet the requirements of SB 1383.

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<sup>33</sup> Id. at page 152.

## **7. The Scoping Plan should provide a full and accurate assessment of technically available forest and agricultural waste biomass.**

BAC strongly supports the Draft Scoping Plan's inclusion of emissions and reduction strategies on Natural and Working Lands. BAC also supports the proposal to increase forest fuel removal to 2.3 million acres per year, which is about a ten-fold increase from the current rate. Unfortunately, the Draft Plan significantly underestimates the amount of technically available forest and agricultural waste biomass, which could result in increased open burning of biomass in contradiction to the state's climate and air quality goals.

### a) Forest Waste Biomass

The Draft Plan estimates that forest fuel removal on 2.3 million acres per year would only generate 5.6 million bone dry tons (BDT) of forest waste biomass. This is a small fraction of the estimates developed by UC Davis and Lawrence Livermore National Lab (LLNL) even though their estimates assumed a much smaller number of acres treated. UC Davis has calculated that California could generate 14.2 million BDT of forest waste annually.<sup>34</sup> LLNL estimates that California could generate 24 million BDT annually, including 14.5 million BDT from forest waste, 6.5 million BDT from sawmill residue, and 3.2 million BDT from shrub and chaparral removal.<sup>35</sup> These are orders of magnitude greater than the estimate contained in the Draft Scoping Plan.

BAC appreciates that much of the forest fuel removal will be done via controlled burns in the forest, but many locations require mechanical thinning because of the proximity to power lines, homes, highways, and other infrastructure. Mechanical thinning may also be required prior to controlled burns to reduce the risk of controlled burns getting out of control, as just happened with the catastrophic fires in New Mexico. In fact, the US Forest Service has temporarily halted all controlled burns on national forests because a controlled burn in New Mexico sparked the largest wildfire in the state's history.<sup>36</sup>

According to the *California Forest Carbon Plan*, adopted by CalEPA and the Natural Resources Agency, mechanical thinning and use for bioenergy production would cut emissions of black carbon, particulate matter, methane, and carbon monoxide 98 percent compared to controlled burns or wildfire.<sup>37</sup> According to CAPCOA and the Placer County Air Pollution Control District, bioenergy also cuts NOx emissions by 95

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<sup>34</sup> UC Davis' estimates of technically available organic waste, broken down by feedstock sector, are presented in the *2017 Integrated Energy Policy Report*, Table 20, on page 252.

<sup>35</sup> Lawrence Livermore National Lab, *Getting to Neutral – Options for Negative Carbon Emissions in California* at pages 29, 32, and 38.

<sup>36</sup> See, <https://www.reuters.com/world/us/us-stops-controlled-burns-nationwide-after-new-mexico-disaster-2022-05-21>

<sup>37</sup> *California Forest Carbon Plan* at page 130. Available at: <http://resources.ca.gov/wp-content/uploads/2018/05/California-Forest-Carbon-Plan-Final-Draft-for-Public-Release-May-2018.pdf>.

percent or more compared to controlled burns.<sup>38</sup> In addition, mechanical thinning combined with biomass utilization can provide jobs, economic development, low carbon energy, increased energy security, finished wood products, and other benefits that controlled burns do not provide.

BAC urges ARB to re-evaluate the amount of forest waste that is likely to be generated from 2.3 million acres of forest fuel treatments annually. If the assumption is that most of that fuel removal will be done with controlled burns, then the emissions from those burns must be included in the state's GHG and anthropogenic black carbon inventories and ARB must consider the enormous public health impacts of burning on such a large portion of the state.

Accurately assessing the amount of forest waste biomass is also important because it can provide the single largest source of carbon negative emissions. According to UC Davis and Lawrence Livermore National Lab, forest waste constitutes half or more of all the technically available organic waste in California and, when converted to bioenergy with carbon capture and storage (BECCS), will be a major source of carbon negative emissions needed to reach carbon neutrality.

For all these reasons, BAC urges ARB to more accurately assess the amount of forest waste biomass that will be available 1) pursuant to existing policies, including SB 901 and the Forest Stewardship Agreement, and 2) if California can achieve forest fuel removal on 2.3 million acres annually as proposed in the Draft Scoping Plan.

#### b) Agricultural Waste Biomass

The Draft Scoping Plan also underestimates the amount of agricultural waste biomass that California generates at only 4.3 million BDT annually.<sup>39</sup> This is based on two studies, one by UC Davis from 2016 and the US Department of Energy's Billion Ton Report. Both of these are several years old and the US DOE report was a nationwide estimate. Lawrence Livermore National Lab has conducted a California specific analysis, and much more recently, that estimates that California generates 12.7 million BDT annually of usable agricultural waste.<sup>40</sup>

The Draft Scoping Plan also errs by limiting the estimate to what is economic today. That is very misleading since what is economically viable today may change dramatically depending on policy drivers, state or federal incentives, changes in energy markets or demand for biochar, and air quality or climate needs. This happened in an earlier UC Davis study of the potential for biomethane from organic waste in California by Amy Myers Jaffe, et al, that only considered what was economically viable at the

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<sup>38</sup> "CAPCOA Policy Statement on Biomass Power Plants" adopted December 2016, at page 1, available at: [http://www.capcoa.org/wp-content/uploads/2016/12/CAPCOA\\_Biomass\\_Policy\\_Dec\\_2016.pdf](http://www.capcoa.org/wp-content/uploads/2016/12/CAPCOA_Biomass_Policy_Dec_2016.pdf).

<sup>39</sup> Appendix H, page 57, Table 31.

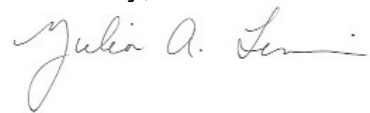
<sup>40</sup> Lawrence Livermore National Lab, *Getting to Neutral – Options for Negative Carbon Emissions in California* at pages 29, 32, and 38.

time.<sup>41</sup> As a result, the study estimated that only 100 dairy digesters would be developed in California based on what was economic in 2015. Since then, California enacted SB 1383, the CPUC has provided hundreds of millions of dollars for pipeline interconnection for dairy biogas, ARB adopted the SLCP Reduction Strategy, LCFS credit prices increased dramatically (at least for several years), and the international scientific community has reached consensus on the urgency of reducing methane emissions. As a result, California has almost 250 dairy digesters in operation or active development – 2.5 times the number that UC Davis estimated just seven years ago.

BAC urges ARB, therefore, to base its estimate of available agricultural waste on the most recent analysis – Lawrence Livermore National Lab’s – and not to limit it to what is economically viable in 2022. Based on the experience in the dairy sector, the economics of bioenergy can change dramatically and quickly. In addition, by underestimating the amount of agricultural waste biomass, ARB is essentially consigning the remaining two-thirds (8.4 million BDT) to open burning, which is unacceptable for the climate and air quality and would violate ARB’s own order to cease open burning of agricultural waste by 2025.

Thank you for your consideration of these comments.

Sincerely,



Julia A. Levin  
Executive Director

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<sup>41</sup> Myers-Jaffe, et al, *The Feasibility of Renewable Natural Gas as a Large-Scale, Low Carbon Substitute*, UCD-ITS-RR-20-16.