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California Air Resources Board
1001 I Street
Sacramento, CA 95814

Rajinder Sahota
Deputy Executive Officer, Climate Change and Research

Matthew Botill
Division Chief, Industrial Strategies Division

Cheryl Laskowski
Branch Chief, Low Carbon Fuel Standard

**Re: LCFS 3rd Public Workshop – Comments on waste biomass, CCS in CATS model**

To Rajinder, Matthew and Cheryl,

Conservation Strategy Group (CSG) submits this comment letter in response to the Low Carbon Fuel Standard (LCFS) Public Workshop: Concepts and Tools for Compliance Target Modeling, held on November 9, 2022. We comment on the California Transportation Supply (CATS) model and the roles of waste biomass, including forest and agricultural residues, as well as carbon capture and storage (CCS).

Currently, the CATS model proposes *zero* fuels production from woody forest and agricultural residues. It also proposes *zero* waste biomass with carbon capture and storage (CCS) to provide carbon dioxide removal (CDR) necessary to achieve a net-zero emissions by 2045 target. This is not only misaligned with the Final Scoping Plan, but numerous other state policies at sister agencies as well as direction from Governor Newsom. Meanwhile, the model considers scenarios with a significant ongoing dependence on crop-based fuels, creating multiple challenges from an environmental protection perspective.

For these reasons, we recommend that CARB amend the model inputs to include a more substantive role for waste biomass feedstock supply and waste biomass-CCS (BECCS) feedstock-fuel pathways.

Overall, we view the upcoming LCFS rulemaking as perhaps the most consequential in program history. We encourage staff to seize the opportunity to enshrine new policies and incentives that promote sustainable biomass management and deep decarbonization. A net-zero by 2045 constraint means that staff must be proactive in setting policies to help speed the deployment of key technology options.

**CATS model misaligned with state policy on waste biomass and CDR**

The proposed Final Scoping Plan identifies the need for 75 Mt per year of CDR from BECCS and DACCS in order for California to achieve net-zero emissions by 2045. By projecting zero BECCS out to 2045, the CATS model is misaligned with the Scoping Plan. It is also misaligned with Governor Newsom's directive to CARB to achieve 20 Mt per year of CDR by 2030. Information on the abundance of California's waste

biomass feedstock supply and BECCS cost-curves could be derived from *Getting to Neutral*. Princeton University's *Net-Zero America* also provides a detailed techno-economic assessment of BECCS.[1]

The CATS model is also misaligned with CARB's mandate to ban agricultural field burning from 2025. *Getting to Neutral* estimates that there are about 10 million tons of woody agricultural residues produced annually in California. This is a significant amount, and it is currently unclear how producers will meet the mandate. CARB can support its own mandate by streamlining LCFS incentives for wood waste diversion to produce liquid and gaseous fuels. The avoided short-lived and criteria pollutant emissions that come from field burning and pile decay can also support CARB's air pollution goals.

Finally, the CATS model is misaligned with numerous state policies at sister agencies that seek to incentivize forest biofuels. Key state planning documents such as the Wildfire and Forest Resilience Action Plan highlight the role of biomass utilization. The Department of Conservation is administering a $50 million grant program for forest biofuels. CAL FIRE is administering a $25 million in support of forest bioenergy and other wood products. IBank is administering a $50 million Climate Catalyst Fund in support of forest bioenergy. OPR is administering a $5 million grant program to resolve challenges to forest biomass feedstock supply. The Joint Institute for Wood Products Innovation is administering a grant program for research related to forest products. Last year, the Joint Institute stood-up a 50-person, year-long working group to develop a *Collaborative Action on Forest Biofuels* report.

These are important initiatives, but as a number of stakeholders described in a previous letter submitted to this LCFS process, they are not enough. The scale of the problem is enormous, and the LCFS can fill a key policy gap by providing a recurring revenue stream to support project financing.

Overall, the CATS model can align with this suite of state policies – both within and outside of CARB – by more substantively including waste biomass feedstock supply and waste-BECCS feedstock-fuel paths. Exogenous subsidies (45Q, 45V) from the Inflation Reduction should be incorporated where applicable.

**LCFS program should prioritize waste biomass paths**

On the back of a historic Final Scoping Plan, $39 billion state budget and two game-changing climate packages, CARB staff have a unique opportunity to revise the LCFS program to maximize its climate and environmental benefits. Staff can be creative and bold in establishing program constraints and incentives that actively promote carbon-negative waste biomass paths for deep decarbonization and move the program away from relying on crop-based fuels. It is important to take action on this as soon as possible, given multi-year lead times to project development. While staff might ordinarily look to wait for further technology adoption, a net-zero emissions by 2045 target provides no such luxury.[2]

By taking such steps, CARB would also demonstrate significant global leadership. Biomass is a challenging climate topic, with valid concerns around land conversion and environmental impact. At the same time, practically every long-range climate-energy model show an important and specific role for

[1] For more information, see this submission from UC Berkeley, LLNL, Princeton and CSG researchers: https://www.arb.ca.gov/lists/com-attach/4118-scopingplan2022-Am5QOlU6AD8FXARb.pdf.

[2] Put another way, staff need to address the low-carbon fuels chicken-or-egg problem. A recent study considers this challenge in the context of CCS: https://pubs.rsc.org/en/content/articlelanding/2022/ee/d2ee01244h.

biofuels/BECCS in net-zero portfolios. It is therefore important that public trust can be maintained in biomass as a credible climate solution right through to 2050. CARB can enshrine a world-class framework that promotes sustainable biomass management in the upcoming rulemaking.

We emphasize that these actions would all serve the state's own climate goals as well. *Getting to Neutral* estimates that over 50 million dry tons of waste biomass is produced annually in California. Absent diversion into some form of product, this waste is an emissions time-bomb that could undercut the state's climate goals. Research shows that collecting and converting the residues into liquid and gaseous transportation fuels is one of the most commercially and technologically viable options.

**Conclusion**

The most challenging aspect of the climate problem is: time. In this context, CARB must achieve a 20% carbon intensity (CI) reduction by 2030, and then somehow compress another 70% of CI reductions in 15 years. Meanwhile, the technologies needed to achieve the latter are different and newer than the former. It is simply the case that all economies – not just California – must speed the adoption of technologies that offer deep decarbonization, including negative emissions, today. That way, by the time they are needed to sustain the rapid push towards net-zero, they are at a scale and readiness to do so.

CARB staff will need to consider modifications to the LCFS program to address this problem. A first step should include amending the CATS model to incorporate a more substantive role for woody waste biomass and BECCS. In the rulemaking, staff can then elicit feedback on ways to achieve the deployment goals. Streamlining the path to LCFS incentives by developing simplified calculators is likely one option.[3]

I hope these comments are useful to staff and am happy to discuss them further.

**Sam Uden**
Director, Climate and Energy Policy
Conservation Strategy Group, LLC
sam@csgcalifornia.com

[3] The *Collaborative Action on Forest Biofuels* report and Sanchez et al. (2020) provide other preliminary ideas.