



JOHN DEERE

Deere & Company
One John Deere Place
Moline, IL 61265

August 8th, 2022

California Air Resources Board
1001 I Street
Sacramento, CA 95814

Julian Sanchez
Director, Emerging Technology
SanchezJulian@JohnDeere.com

Richard Corey
Executive Officer

Liane Randolph
Chair

Rajinder Sahota
Deputy Executive Officer, Climate Change and Research

Cheryl Laskowski
Branch Chief, Transportation Fuels

Subject: Comments relating to July 7, 2022 Public Workshop on Potential Changes to the Low Carbon Fuel Standard by Deere & Company

To the Low Carbon Fuel Standard team,

We thank the California Air Resources Board (CARB) staff for the opportunity to comment on the LCFS during this Pre-Rulemaking period. In a recent letter, we outlined three modes of action cited by CARB as important for John Deere's customers: (1) on-farm electrification; (2) healthy working lands; and (3) low-carbon fuels. For each of these modes, we can contribute substantive climate impact for California, especially with additional support and consideration from CARB. We see each of these modes of action as complementary and additive towards larger climate goals.

John Deere supports the recognition in the CARB Draft 2030 Scoping Plan of how vital our forests and soils are to climate mitigation, resiliency, and adaptation. Through our innovative products and solutions, we and our customers are actively contributing to this vision as part of our day-to-day operations.

Below we offer comments on specific topics of interest requested by CARB staff in their July 7, 2022 workshop on Potential Changes to the LCFS. Across these comments one common theme emerges: that working lands, fueled by technical innovation, can provide sustainable, low-carbon feedstocks at sufficient scale to contribute to California's transportation decarbonization goals.

Improving alignment between LCFS and incentives needed for infrastructure and fueling in rural communities

In 2022, John Deere announced our Leap Ambitions, which included goals to reduce our CO_{2e} emissions by 50% for Scope 1 and 2, and 30% for Scope 3. To contribute to these goals and our decarbonization efforts, John Deere is exploring advancements in our internal

combustion engines, renewable fuels, hybrid electric vehicles, and battery electric vehicles. Deere believes that the LCFS can play an important role decarbonizing California's off-road equipment sector.

For customers where battery electric vehicles make sense, John Deere is committed to the following:

- Deliver an autonomous battery powered electric small ag tractor (below 150HP)
- Offer an electric option in each Turf and Compact Utility Tractor product family
- Deliver 20+ electric and hybrid-electric models across Deere's product lines

To deliver our electrification and decarbonization goals, upgrades in electrical infrastructure and support for incentives will be key to drive customer adoption and value. Investments in ZEV electric infrastructure in rural areas, including charging ("refueling") stations and grid integrity, will be essential. LCFS improvements should include making ZEV refueling infrastructure credits available in rural areas of the state. More specifically, successfully delivering electrification in rural areas while reducing CO₂e and the risk of blackouts in California will require:

- Electrical infrastructure upgrades to carry energy to and from the farm
- Charger subsidies to increase the rate of conversion from diesel to electric
- Targeted and balanced electricity rates to support electrification charging, grid health, and reduced blackouts through Vehicle to Grid Two Way Charging (V2G)
- Free market trading of green energy inside California's grid with controlled oversight

The graphic below (Figure 1) depicts John Deere's vision of key elements of the infrastructure value chain for rural agriculture electrification.

Support Needed To Transition California Ag To Sustainable Solutions (Battery Electric)

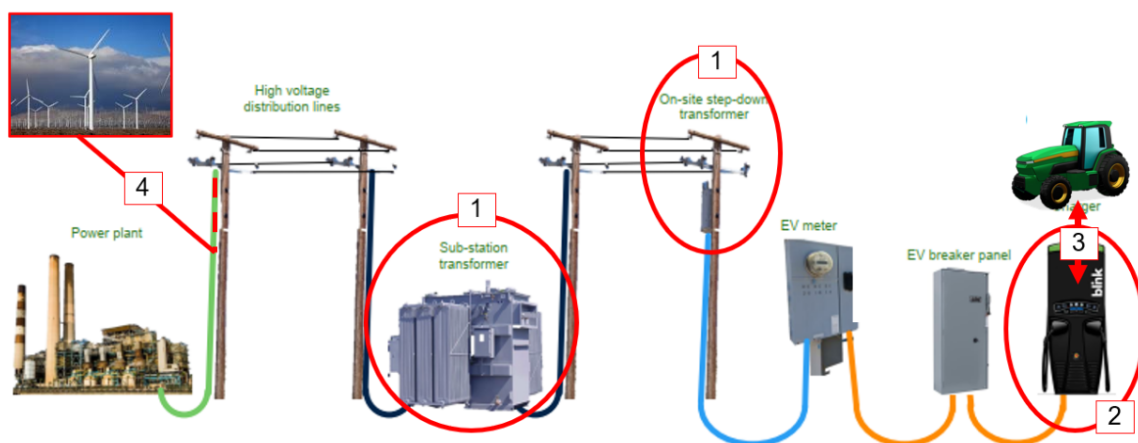


Figure 1: Infrastructure value chain for rural agriculture electrification in order of priority. 1) Electrical infrastructure (transformers) both on site and at mid voltage sub-stations. 2) High charge rate chargers driven by the need to keep farms running at peak efficiency. 3) Energy pricing to both support the economic transition from diesel to electric but also to support Vehicle to Grid (V2G) in order to push power onto the grid in periods of grid stress (e.g., Blackouts). 4) The ability of farms to select which energy source (e.g., Green) their site power originates from in order to support "sustainable farming" requirements and marketing opportunities for higher revenue of low-income farms.



JOHN DEERE

Carbon intensity standards

CARB asked for specific input on three potential 2030 standards, as well as post-2030 standards. John Deere supports strengthening the compliance curve, coupled with including opportunities for farmers to participate by recognizing site-specific feedstock Carbon Intensity (CI) values. We encourage CARB to adopt the most up-to-date scientific consensus on the impact of indirect land use change included in the most recent iteration of GREET modeling from Argonne National Labs. We see a huge opportunity for these changes to drive innovation in farming and biofuel production.

Our support for more stringent CI targets is in line with conversations we are having with farmers about the emergence of policy support for low-carbon crop production. We emphasize that including farmers should be a core part of any process to adjust CI standards. Farmers hold detailed knowledge about the technologies they use and low-carbon fuels they produce. In this regard, we recommend CARB commit to regular updates with opportunities for public comment on CI standards under the LCFS.

Oil crops

CARB asked for specific input on whether it should cap lipid-based feedstock volumes under the LCFS. We emphasize that not all lipids-based biofuels carry the same risks, and that CARB should take a science-based approach that weighs the benefits and costs of each feedstock appropriately in a market-based system. For example, new emerging trends of dual cropping with winter oilseeds (e.g. pennycress and winter camelina), could produce lipid-based feedstocks with significant net environmental benefits, and inedible oil crops such as jatropha may increase lipid-supply without impacting food supply. Within soy- and canola-based biofuels, increases in productivity both at the farm level and in crushing facilities will continue to provide increased volumes of low carbon feedstocks without negatively impacting either food supply or land use. John Deere's precision farming equipment is supporting this outcome by enabling farmers to produce more feedstock with fewer inputs on the same land area.

Quantification of on-farm practices for fuels production

In addition to improvements contemplated in the Public Workshop, we recommend future improvements to the LCFS in one key area: inclusion in future LCFS policy of farm-level GHG accounting for biofuel feedstocks, whether produced in or out of the state of California. Emissions generated as part of growing feedstock for biofuel production are as engrained in the fuel carbon footprint as the processing of the feedstock, which is already included in LCFS calculations regardless of where the processing occurs. Growing feedstock is an important part of the overall carbon footprint of producing biofuels. The carbon footprint associated with feedstock production can vary significantly between producers based on their on-farm practices, primarily through variability in synthetic nutrient use. John Deere equipment, such as variable rate and split fertilizer applicators, is proven to provide growers with the tools to reliably monitor and reduce these inputs while still maintaining best-in-class yields. At the same time, clean fuel policies can support uptake of climate-smart practices such as no-till, and cover cropping by incorporating on-farm practices into dynamic CI calculations. Existing clean fuels policies, including the CARB LCFS and Oregon's Clean Fuels Program, do not currently recognize or compensate farmers for climate-smart farming practices. Instead, these programs assign average values for biofuel feedstocks. Not driving innovation in farm-level practices is a missed opportunity for climate leadership.



JOHN DEERE

To practically implement these recommendations, we recommend that CARB review the recently released Great Plains Institute “Framework for Including Farm-Level Greenhouse Gas Emissions in Clean Fuels Policies.”¹ As other low-carbon fuels policies like those contemplated in the Midwest begin to recognize farm-level GHG accounting, California will be able to verify that biofuels sold into its markets are derived from feedstocks produced through climate-smart practices. John Deere is committed to enabling growers to robustly measure the field-level carbon intensity of the feedstocks they produce through high quality data recorded directly by machines. We recently submitted multiple applications to the USDA Climate Smart Commodity RFP specifically to demonstrate pathways for robust and transparent measurement and verification methodologies in this space.

Availability of farm-specific data

John Deere is uniquely positioned to enable producers interested in participating in climate smart commodity programs to voluntarily measure and document their operational activities through the John Deere Operations Center data platform. The Operations Center is additionally interoperable with machinery outside of the John Deere family, thereby promoting data empowerment broadly among producers.

High-integrity operational data tracking (e.g. agrochemical application, tillage depth, seeding rate, grain moisture content, etc.) allows growers to move beyond the use of imprecise emissions factors for tracking on-farm GHG impacts. These direct measurements could easily be paired with water, soil health, and carbon sequestration monitoring for growers that elect to distinguish themselves in markets where climate-smart crops are valued with a premium. These capabilities could enable producers to rigorously and reliably monitor, report, and verify emissions reductions and avoidance as part of the LCFS program. With support from CARB under the LCFS, we could empower growers to participate in voluntary carbon markets and incentives programs for inseting and climate-smart agricultural practices. CARB policies can further the goal of empowering producers to adopt climate-smart practices by: communicating widely to producers the benefits of leveraging their data; and by providing frameworks that enable producers to participate in markets that pay a premium for low carbon commodities, such as low carbon fuel markets.

Conclusion

John Deere looks forward to being an active participant in upcoming rulemakings around both the LCFS, as well as medium and heavy-duty off-road electrification. We would value the opportunity to work collaboratively with CARB on ways to include farmers as part of the solution to California’s climate goals, including sharing learnings and results from our ongoing field-level carbon intensity quantification demonstration projects.

Respectfully submitted,

Julian Sanchez
Director, Emerging Technology
Deere & Company