



August 8, 2022

From: Monarch Tractor  
203 Lawrence Drive  
Livermore, CA 94551

Cheryl Laskowski, Ph.D.  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

**Subject: CARB should incorporate electric tractors into the Low Carbon Fuel Standard and provide pathways for agricultural equipment to participate in the program.**

Dear Dr. Laskowski,

Monarch Tractor appreciates the opportunity to submit comments regarding potential changes to the Low Carbon Fuel Standard (LCFS), as presented at the July 7, 2022 workshop. We strongly support the LCFS, as well as the recent proposal to strengthen the program in line with the State's climate change and carbon neutrality goals. The LCFS has proven tremendously successful, and we support changes in the next rulemaking to ensure both on-road and off-road operators are able to participate to maximize program related emissions reductions and DAC/LIC benefits.

### **About Monarch Tractor**

Monarch Tractor is an innovative, mission-driven company, headquartered in Livermore, California developing and manufacturing fully electric driver-optional tractors. We are committed to enabling clean, efficient, and sustainable farming practices by making them economically viable. The Monarch Tractor brings together the benefits of electrification, automation, and insightful data to enable farmers to transition to more productive, precise, and sustainable farming practices. Providing a superior platform for farmers, Monarch Tractor is focused on delivering meaningful change for today's farmers and the generations of farmers to come.

Monarch's compact tractor is an attractive platform for significantly reducing criteria and greenhouse gas emissions in the agricultural sector. The compact tractor segment offers the opportunity for some of the most significant and cost-effective diesel emissions reductions due to its high volume, high utilization, and significant annual growth.

Monarch Tractor offers a zero-compromise solution, including equal or greater performance compared to even the most advanced diesel tractors. A swappable battery assembly allows for near continuous operation and allows operators to re-charge during non-peak rate hours and with low/zero CI energy. Autonomy adds the benefit of worker safety –preventing human exposure to hazards, such as high ambient temperatures hazardous air quality.

### **State Support for Targets That Align With the Scoping Plan and Carbon Neutrality Goals not Currently Inclusive of Agriculture**

Continued innovation in the off-road agriculture space is not well accounted for in CARB plans. Thanks to intentional state support in the early days of on-road electrification, California is on a trend to outpace its transportation electrification goals in the on-road space. Passenger vehicle EV sales are exceeding CARB's regulatory requirements, while the heavy-duty market is shifting to provide less diesel and more low-carbon intensity fuels – like renewable diesel and renewably generated electricity. By providing more support to zero-emission and other low-carbon intensity fuels in the off-road space through the LCFS, CARB and the State of California can encourage further decarbonization by incentivizing zero CI installations on farms that need to upgrade their electrical infrastructure to support the wave of off-road electric vehicles.

### **Add EER Value for Electric Tractors**

As CARB considers amendments to the program to ensure its ongoing success and alignment with the latest technology, market and policy developments, we encourage you to incorporate electric tractors into the program, in order to ensure the LCFS is providing benefits and market signals to decarbonize agricultural and other off-road sectors. Specifically, we offer our support to CARB in developing energy economy ratios (EER) for emerging technologies, including electric tractors.

### **Market Support for Driver-Optional, Electric Tractors Aligns With CARB Priorities**

Identifying EER values for electric tractors will allow this rapidly expanding electric vehicle market to participate in the LCFS fully and accurately and aligns with CARB priorities for decarbonizing heavy-duty transportation. In its 2020-2021 Long-Term Heavy-Duty Investment Strategy,<sup>1</sup> CARB specifically recognizes the efficiency and safety benefits associated with off-road vehicles operating autonomous mode:

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<sup>1</sup> [https://ww2.arb.ca.gov/sites/default/files/2020-11/appd\\_hd\\_invest\\_strat.pdf](https://ww2.arb.ca.gov/sites/default/files/2020-11/appd_hd_invest_strat.pdf)

“Generally, CARB considers connected vehicle technologies as having a ‘multiplier’ effect... their inclusion in projects paired with advanced cleanest combustion, hybrid, and zero-emission powertrains can extend the effectiveness of these systems and should be encouraged.” (pg. D-69)

The strategy further identifies ongoing barriers to adopting these promising technologies, including high incremental costs, rising diesel prices, and lack of understanding around the business case, while specifically stating that, “Off-road connected and automated work site demonstrations are ripe arenas for investment because of their ability to reduce emissions and increase productivity in otherwise hard to address sectors... Construction and agricultural are promising candidates.” (pg. D-71)

### **Inclusion of Agriculture Promotes Equity in the Low Carbon Fuel Standard**

A considerable amount of farming operations in California take place in the San Joaquin Valley which is almost entirely classified as Disadvantaged and Low-Income (DAC/LIC) according to CalEnviroScreen 4.0 and the California Climate Investments Priority Map. Most other rural and farming regions of the state tend to fall within DAC/LIC territory. Adoption of Zero-Emission and Low-Carbon fuels will directly reduce emissions and increase quality of life in these communities but can be slow to occur due to the high incremental cost for equipment conversion or replacement.

An ideal way to implement Low-Carbon intensity fuels in DAC/LIC areas is to provide increased incentive amounts encouraging deployments in these areas. Implementation could be as simple as a flat ‘plus-up’ or ‘enhancement’ mirroring what is offered by the CORE program.

Enabling driver-optional electric tractors to participate in the LCFS, with appropriate EER values, will add value to the market to help overcome these barriers and accelerate adoption of zero emission vehicles in high impact off-road and agricultural sectors, in line with CARB’s objectives.

Thank you again for the opportunity to comment on this workshop and provide input on potential changes to the LCFS. We look forward to next steps in this process and working with you to ensure the LCFS’s continued success – and making sure it reaches all transportation sectors, including off-road applications in the agricultural sector. Please let us know if you have any questions about these comments, our company or technology.



August 8, 2022

Thank you,

*Praveen Penmetsa*  
[Praveen Penmetsa \(Aug 8, 2022 16:22 PDT\)](#)

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