

May 9, 2024

California Air Resources Board Low Carbon Fuel Standard Program

RE: LCFS eForklifts EER 50% drop proposed amendment

SCT, and on behalf of it client companies, respectfully submits the following comments to California Air Resources Board (CARB) Staff with the hope of advancing the LCFS program in a way that makes it easy and practical for concerned stakeholders to participate. Consistent with our role, Smart Charging Technologies submits this letter to **express our concern and offer solutions to the proposed amendment dropping eForklift EER from 3.8 to 1.9**.

First, the concerns:

1. Recent implementation of eForklifts metering requirements in <u>Oregon</u> resulted in over 90% drop in credits 4Q22 to 4Q23.

Looking at the **DEQ 4Q23** Credits report we notice:

- The 1st impact of metering started showing on 1Q23 when DEQ allowed only 30% Depth of Discharge. This resulted in a drop of 78% between 4Q22 and 1Q23.
- The 2nd impact of metering, a drop of 75%, showed on 4Q23 when using credit estimation was discontinued.
- Thus, the total impact of metering is a drop of over 90% between 4Q22 and 4Q23

DEQ State of Oregon Department of															
Environmental Quality	2020				2021				2022				2023		
creates	Q3	Q4	Q1	Q2	03	Q4	Q1	Q2	Q3	Q4	Q1	92	03	Q4	
Iternative Jet Fuel	-	•			•	•			•	•	•	•	•		
20 Diesel			5 .						1	11					
/5 Diesel	7	H0 6	07 1,63	9 1,630	1,642	1,468	2,302	1,967	3,620	3,427	5,948	6,200	7,802	12,810	
No-CNG	3,0	97 3,	312 3,47	1 4,521	9,662	11,595	11,716	8,342	4,093	9,021	21,991	36,271	41,778	41,393	
/iodiesel	126,2	34 126,0	47 102,15	5 141,521	145,411	132,217	117,168	171,953	118,041	158,293	106,866	117,603	128,222	125,897	
sio-LNG	3	0	12 .												
Jiesel	1,5	53 2,3	54 26	2 313	109	25	67	84	99	2	657	1	256	380	
E10 Gasoline	1,8	91 1,5	09 4,71	4 5,704	6,051	5,410	10,570	11,134	12,915	11,721	15.607	15,884	11,218	11,849	
Electricity - Offroad:	4,2	21 4,3	60 15,32	3 20,430	23,188	24,736	27,027	28,745	32,077	31,817	7,009	11,099	11,071	2,724	

2. Using the LCFS Credit/Deficit formula shows that reducing the eForklift EER by 50% reduces credits by 66%.

$$Credits = \left(CI_{standard}^{diesel} - \frac{CI_{electricity}}{EER}\right) \times E_{displaced}^{diesel} \times 10^{-6}$$

 $E_{displaced}^{diesel} = Energy \times EER$ for forklifts newer than 2010 model year

- The 50% drop in EER is impacting the number of Credits twice
 - 1. EER is used in the CI difference as a denominator
 - 2. EER is used as a multiplier reducing the CI difference by 50%
 - The net impact is a 66% drop in the number of credits

Select Year	Select the Heavy- Duty/Off-Road Applications (Fuels used as Diesel replacement)	Electricity used (kWh)	Electricity Source	2023 Diesel CI (gCO2e/MJ)	2023 California Avg Grid Electricity CI (gCO2e/MJ)	Energy Density for Electricity (MJ/KWh)	Electricity Forklifts (post-2010) Energy Economy Ratio (EER)	C (MT/gCO2e)	Credits / Deficits (MT)	\frown	
<mark>2023</mark>	Electricity Forklifts (post-2010)	1,000	Cal Grid	89.15	81.49	3.0	5 3.8	0.000001	0.9262080	Delta	
2023	Electricity Forklifts (post-2010)	1,000	Cal Grid	89.15	81.49	3.	5 1.9	0.00	0.316422	-66%	

3. Combining the impact of Metering and EER drop causes severe eForklift Feasibility Impact.

- Reducing the eForklift EER by 50% reduces credits by (66%)
- > New Metering requirements reduce credits by (90%)
- > 3rd-Party Verification(Electricity) increases costs by \$5k \$10k.
- > The above proposed requirements lead to a very narrow margin, if not negative. This is a major disincentive to customers to go with eForklift.

The above impacts are illustrated in the following waterfall chart for a company having 2000 credits, sold at a \$100 each, almost double the current market price, resulting in \$1,800 net income:



4. Such impact leads to:

- Enrolled fleet operators opting out.
- Missing an opportunity to reduce CI from fossil forklift continued presence (40% of the market).

5. EER represents a scientific tool to compare the fuel efficiency of eForklift vs. fossil fuel forklift. Not a tool to arbitrary reflect policies or commercial reality.

"Energy Economy Ratio (EER)" means the dimensionless value that represents the efficiency of a fuel as used in a powertrain as compared to a reference fuel used in the same powertrain. EERs are often a comparison of miles per gasoline gallon equivalent (mpge) between two fuels."

Second, the potential solutions:

1. A more gradual approach is warranted to avoid negative reactions.

According to CARB's rational document, "This proposed amendment (EER 50% drop) is necessary to ensure that forklift crediting more accurately reflect the fuels displaced by electricity and hydrogen forklift fueling."

- The above goal can be easily attained by the metering requirement as shown from the numbers in Oregon (90% drop in eFL credits 4Q22 to 4Q23).
- Re-asses the above CARB rational after studying the effect of implementing metering on the number of credits.

2. Class III Forklifts

According to CARB's rational document, class III represents ~20% of the forklifts and not really contributing to the fossil fuel displacement.

- Removing Class III forklifts from the baseline may contribute to solve the baseline problem.
- Trying to delineate energy consumption amongst above and below 12,000lb lift capacities will be difficult for most fleets.

The cost of metering implementation was not feasible for Class III fleet operators in Oregon, hence they opted out.

3. Fixing the inaccurate baseline problem

If an inaccurate baseline continues to be a problem, then a more scientific approach, e.g. Fractional Displacement¹, may be considered for future rulemaking². In the paper, Dr. Murphy makes the following recommendation regarding e-forklifts:

"Based on the assumption of a 40% incumbent fraction, immediate application of FD crediting would result in a precipitous drop in LCFS credit generation from this category, compared to the current method. While this would more accurately reflect anticipated emissions benefits, it could have a disruptive effect on the progress of this sector toward carbon neutrality. To mitigate this, a gradual catch-up approach that limited the maximum rate of change for the FD term to no more than 10% per year was adopted. This guaranteed a phase-down period for credits from fuel displacement of no less than 10 years (Figure 4)."

4. A methodology for phasing out mature technologies is vital to keep LCFS a technology-neutral program.

- ARB should establish clear criteria for what warrants a specific technology or fuel being phased out of the program.
- It is unclear whether an EER adjustment is only a mechanism for electricity-based crediting, as such a change has not been suggested for renewable diesel which is currently 40% of the diesel pool in California. ARB should clarify if it intends to apply a similar restructuring of credits from renewable diesel if renewable diesel grows to represent 50% or more of the diesel pool in California. Any proposal to phase out specific fuels or technologies should be applied equally to all fuels in the program, not just to electric vehicles.
- We also request that CARB establish clear rules on "how" technologies will be phased out. The LCFS should provide an off-ramp or other provision geared at a smooth and predictable transition out of the program. These provisions ensure market certainty for ZEV manufacturers and market participants.
- CARB will also need to assess any broader impacts to the program if specific credit-generating technologies or fuels are phased out of the program but the deficit-generating fuels that these technologies replace continue to be regulated in the program.

In conclusion, we again caution dropping the EER by 50% has far-reaching implications, and its implementation, if at all, should only take place after careful collaboration and dialogue with the aggregators. We appreciate your time and consideration, and look forward to finding a solution that will be acceptable to all stakeholders while continuing to advance the goals of CARB.

Sincerely,

Ma'n Altaher

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¹ Dr. Colin Murphy, "Improving Credit Quantification Under the LCFS: The Case for a Fractional Displacement Approach," (December 21, 2022), at https://escholarship.org/uc/item/0px4m8hz, at p. 16.

² See comments by CleanFuture March 15, 2023