August 4th, 2022

Dr. Cheryl Laskowski
Chief, Low Carbon Fuel Standard
California Air Resources Board
1001 I Street, Sacramento, CA 95814
Submitted electronically via helpline@arb.ca.gov

RE: Comments regarding the July 7, 2020 Public Workshop: Potential Changes to the Low Carbon Fuel Standard

Dear Dr. Laskowski,

Smart Charging Technologies (SCT) is a high-tech firm focused on developing innovative IoT energy management and monitoring products and services for the motive industry. As one of the largest aggregators of energy credits for industrial transportation equipment, SCT offers energy credit management services, including managing the LCFS program administered by the California Air Resources Board (CARB) and the CFP program administered by the Oregon Department of Environmental Quality (ODEQ). In addition, the SCT team and its partners have extensive experience in battery charging and monitoring products and solutions for electric forklift trucks having developed and deployed more than 50,000 smart and IoT battery chargers and monitors throughout the US and Canada.

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.

Our comments are related to the proposed phase-out of credits for electric forklifts. CARB noted that forklift trucks were added to the program in 2015 and based its recommendation to phase out forklifts on three premises, namely:

1. The "cost of ownership of forklifts is lower than other ZE application even without LCFS benefits",
2. "The forklift fleet population is mostly electric", and
3. "Credits issued to electric forklifts have grown substantially."

We strongly oppose the proposed phase-out of credits for electric forklifts and we would like to present the following comments to counter CARB's assertions.

THE NEED FOR CLEAR CRITERIA TO PHASE OUT PARTICPATING FULES

While SCT understands technology maturity and the need to support new technologies, we urge CARB to publish a clear criterion that applies to all fuels participating in the program, and not to single out electricity track / the forklift trucks pathway. Also, if the number of credits generated by a pathway is a deciding factor, there should be a clear limit that applies across all pathways. For

example, fuels like Biodiesel, may have also reached maturity and may no longer need to rely on LCFS credits, and could/should face potential phaseout. CARB need to consider an overall methodology that is clear, consistent, and in line with the program's long-term goals.

THE ASSERTION THAT ELECTRIC FOLKLIFTS WILL CONTINUE TO GROW WITHOUT LCFS SUPPORT

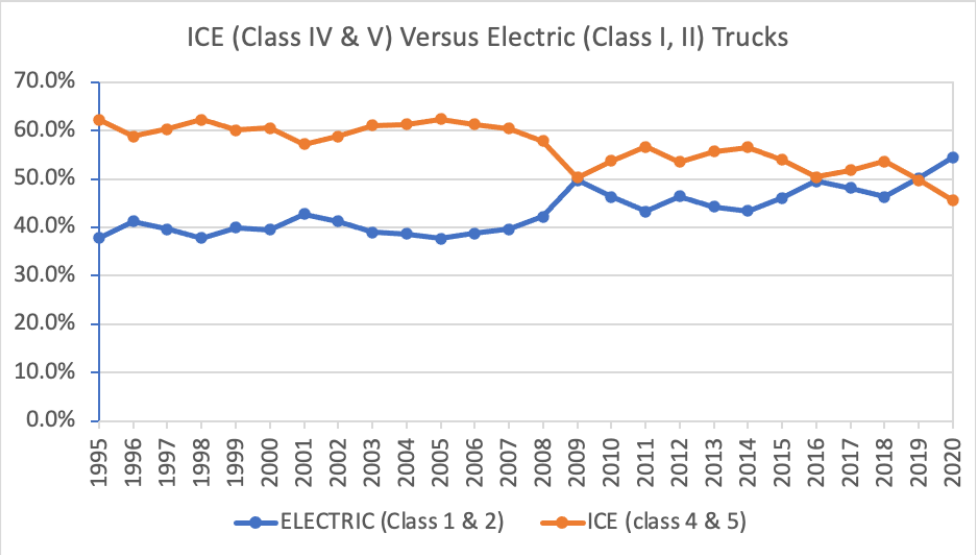
First, CARB's assertion that electric forklifts, particularly those for heavy-duty applications, are mature technology and will continue to grow without LCFS support is not accurate. Being the largest aggregator of LCFS credits for electric forklifts, we have seen many of our client companies investing into newer and more efficient forklifts as well as newer and more efficient battery chargers and charging infrastructure. The cost of electric forklifts is not limited to the forklifts themselves. Companies must purchase battery chargers and upgrade their electrical infrastructure to support charging of their forklift fleets. Unlike on-road EVs, the electrical infrastructure in warehousing and manufacturing facilities is primarily 480VAC, three phase power resulting in much higher electrical infrastructure upgrade investments.

Secondly, we also believe that CARB's analysis doesn't seem to include the industry's transition to Li-Ion battery technology. Over the past few years, the motive power industry has been adopting newer and more efficient battery technologies for forklift truck applications[1]. While the industry has been dominated by lead acid technology, more recently, Li-Ion batteries are making their headway into forklift truck applications. While Li-Ion batteries are more efficient than lead acid batteries and allow the utilization of forklift trucks in cold storage and freezer applications, the cost of a typical Li-Ion battery is two to three times that of lead acid batteries. Not only that, Li-Ion batteries are primarily fast charged and thus require higher power battery chargers (two to three folds compared to lead-acid batteries). As such, there is a significant added costs associated with adopting Li-Ion battery technology and the LCFS program is critical in reducing the cost of such technologies. Many of our client companies have factored in the LCFS energy credits to justify the business case for purchasing Li-Ion for their fleet.

ONLY HALF OF THE HEAVY DUTY FORKLIFTS IS ELECTRIC

CARB's assertion that "the forklift fleet population is mostly electric", is not accurate. According to the Industrial Truck Association (ITA), electric forklift trucks make up ~64% of the North American lift truck market[2]. Note, however, that this ratio includes class III trucks, namely, the motorized hand trucks (pallet jacks), which are already electric and do not contribute significantly to electricity consumption in forklift truck fleets. If one compares US shipments of electric class II and class III forklifts versus ICE class IV and class V trucks over the last 15 years, the resulting ratio of electric is lower, namely 54% as of 2020 and has only increased by 4% since 2015[3] (see the figure below). Since the trend in CA follows the national trend, we believe that there is a long way to go before asserting that the forklift fleet is mostly electric.

[1] https://www.mmh.com/article/lithium_ion_technology_the_next_generation_of_forklift_efficiency
[2] https://www.indtrk.org/wp-content/uploads/2019/09/ITA.pdf
[3] https://www.indtrk.org/wp-content/uploads/2021/03/Factory-Shipments-Table-2021-Directory.pdf



US Electric (Class I & II) vs ICE (Class IV & V) Forklift Truck Shipments (source: ITA)

According to the ITA, new improvements in electric forklift technology that allow users to get up to two full shifts of runtime on a single battery charge when employing new Li-Ion battery technology require significantly higher capital and infrastructure investments. As such, we strongly believe that phasing out LCFS credits for forklifts will turn the tide on more conversions to electric forklifts and adoption of more efficient forklift and battery technologies.

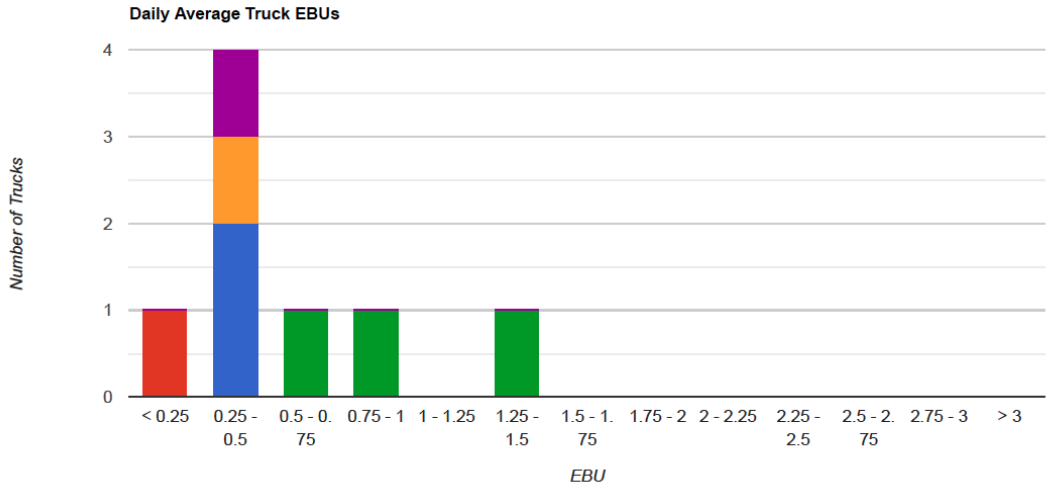
CREDITS ISSUED TO ELECTRIC FORKLIFTS HAVE GROWN SUBSTANTIALLY SINCE THE METHODOLOGY USED TO ASSIGN CREDITS OVERESTIMATES ELECTRICTY DISPENSED

As to CARB's third assertion that "credits issued to electric forklifts have grown substantially," and while we do agree with that, we strongly believe that the methodology that CARB recommends in calculating LCFS credit for forklift trucks over-estimates the actual electricity dispensed for charging forklift truck fleets. In fact, in our comments letter that we sent to CARB on 11/4/2020, we proposed using forklift monitoring technology to monitor forklift truck actual kWhr usage. In fact, SCT has developed the **IoTAh** product platform[4], an innovative, cloud-based forklift truck monitoring and data logging device. The **IoTAh** device automatically tracks and logs true Amp-Hour and KWHr usage of electric forklift trucks thus providing an audit trail of actual forklift truck usage at client facilities. By measuring and reporting the kWHr usage of a forklift truck, the charging kWhrs can be easily calculated by applying a charging return factor (1.1) and an efficiency factor (1.11 assuming 90% charger efficiency), or a combined 1.22 multiplier. The new IoTAh product is intended to support the LCFS program reporting and comply with new proposed CARB amendments. Each IoTAh unit is equipped with wireless communication for remote monitoring and

[4] https://smartchargetech.com/service/iotah-forklift-truck-monitor-new/

configuration, where data is automatically uploaded to SCT's cloud-based servers. The IoTAh unit can also track where the forklift trucks are thus accurately tracking forklift truck movement.

We believe that with metering, the number of credits for forklifts will be reduced by anywhere between 30% and 50%. In fact, we have deployed several IoTAh devices at various sites to compare calculated versus measured data. The measured data consistently confirmed that actual trucks usage is quite lower than the theoretical calculated values. For example, the theoretical calculations assume that each forklift fully utilizes 80% of the battery capacity over the course of one shift, which corresponds to one equivalent battery unit (EBU) or 1.0 EBU. Over a two shift, the forklift would thus use 2.0 EBUs. However, measured data of sample forklift truck fleets clearly show that the actual usage is quite less than 2.0 EBUs over two shifts (16 hours). The figure below shows EBU usage over a 90-day period of 9 pieces of equipment and it is evident that most equipment use less than 1 EBU per day. As such, the calculation method would more than double the number of credits generated if the trucks are metered.



Actual Sample Forklift Fleet EBU Usage (9 forklifts) Over a 90 Day Period

Most clients have opted to use the calculated method per CARB's recommendation as they had no incentive to install equipment, such as IoTAh due to the following reasons:

a. ***Hardware and installation costs as well as recurring reporting expenses.*** Acquiring the hardware as well as installing the monitoring devices will lead to additional costs incurred by operators of forklift truck fleets. In addition, and since the data reporting will be automated through a cloud app (requires one cell service per site), monthly recurring connection costs will be incurred.

b. ***Reduced LCFS credits.*** Since LCFS credits will be accurately logged and reported, the number of LCFS credits earned by forklift truck operators will be reduced. This is due to the fact that the present calculation method assumes that forklift trucks are operated consistently based on the audited operation profile. While SCT typically subtracts downtimes associated with breaks throughout a shift, actual operation logs will lead to lower reported forklift truck usage and thus

lower LCFS credits. This may disincentivize forklift truck operators from installing these devices as it will lead to lower earned LCFS credits.

As such, we do recommend changes to the way electric forklift truck reporting and LCFS credits generation are reported by requiring the installation of forklift truck monitoring devices, such as IoTAh. We also strongly recommend that CARB incentivizes operators of forklift trucks to install forklift truck tracking devices by creating a special category for metered forklift trucks employing tracking devices to receive additional credits to cover some of the added costs and reduced LCFS credit earning potential. Note that the added credits due to such incentive will still yield quite lower overall LCFS credits since actual usage will be quite lower than the calculation methods.

For all the above, we strongly oppose the proposed phase-out of credits for electric forklifts and hope that CARB considers our comments and proposed changes, which would bring the program into alignment with the goals of CARB.

Thank you for taking our comments into consideration. We look forward to continued participation and discussion.

Respectfully.

Nasser Kutkut, PhD, DBA
CEO
Smart Charging Technologies LLC