



# Reporting for Electric Forklifts

## Oregon Clean Fuels Program

May 30, 2023  
Virtual

# Agenda

- Background of electric forklifts
- Overview of the ARB estimation methodology and recent concerns
- Proposal of an Oregon estimation methodology
- Q&A and discussion

# History of Forklifts in the CFP

- DEQ first considered adding forklifts to the CFP in its 2018 rulemaking which became effective on January 1, 2019.
- Since then, credits generated from electric forklifts have increased dramatically to represent over a third of electricity credits in recent quarters.
- This appears to largely reflect more full reporting of the current population.
- Also, data from the Industrial Truck Association indicates that a clear majority of forklift production and sales are already electric in the US.

# Reporting for forklifts is not simple

- There are a lot of them! Currently, more than 3,500 electric forklifts are registered in CFP.
- There are multiple points where investments are being made – for an individual forklift, for a fleet, at a warehouse/facility, etc.
- Many are leased/rented so the operator and the owner are different parties.
- Many parties are represented by aggregators which adds another layer of communication to the process.

# Additional considerations

- CFP is required by statute to ensure that the generation of a credit means that a ton of GHG emissions has been reduced.
- There are a number of applications where electric forklifts are required due to meet worker safety and indoor air quality requirements and future adjustments to the energy economy ratio would need to reflect this.
- It is unclear if allowing electric forklifts to generate CFP credits is actually incentivizing more electrification or just rewarding past behavior.

# Overview of the regulation

In the 2022 rulemaking, the following changes were made:

- In the requirements for the generation of credits from electric forklifts in OAR 340-253-0330(5):

*For electricity used to power forklifts, the forklift owner may generate the credits. If the forklift is being operated by a person other than the owner, the owner may generate the credits if they have detailed data that enables them to accurately report the electricity used to operate the forklift as required by OAR 340-253-1000(2), otherwise the operator of the forklift may generate the credits.*

# Overview of the regulation

- In the requirements for reporting fuel quantities in OAR 340-253-1000(2):

*Registered parties must express fuel quantities in the unit for each fuel according to the temperature correction requirements in OAR 340-253-0640(4) for liquid fuels, or according to accurate metering for all other fuels when they are dispensed into the vehicle or other qualifying equipment. If the fuel cannot be accurately metered at the point of dispensation, DEQ may approve an alternative methodology and all registered parties reporting in that circumstance must use that methodology.*

# Prior use of ARB estimation methodology

- Prior to the 2023, the regulation did not speak directly to the use of an estimation methodology.
- DEQ staff had informally allowed for the use of California's estimation methodology for forklift charging.
- In starting to consider a formal estimation methodology for CFP, staff was made aware that the CARB estimation methodology likely results in a significant overestimation of the amount of charging that is actually occurring, leading to the generation of illegitimate credits.



# Overview of ARB estimation methodology

- ARB's estimation methodology is contained in their LCFS draft guidance document 17-02.
- The simple version of the equation is:  
Electricity per forklift = [80% of the battery capacity] x [adjustment factors] x [# of shifts per work day] x [# of work days]
- It uses several assumptions about a forklift's charging patterns and those assumptions have not been updated since 2017, nor is it clear that they are generally applicable.

# Concerns with the ARB estimation methodology

- 80% is likely an over-estimate, but there is very limited to zero actual data that DEQ can find in order to revise this estimate.
- The underlying data for the calculation is not required to be uploaded, so DEQ does not have a good record of how reporting entities are using it.
- The existence of the methodology means that there is no incentive to more accurately report on the electricity going to forklifts which is the end goal of DEQ.

# Current thoughts


- DEQ cannot adopt an estimation methodology that would result in illegitimate credits being generated.
- DEQ recognizes that it will take time to install meters and collect more accurate data from forklift charging.
- DEQ is proposing updates to the CARB estimation methodology that more accurately reflects the amount of electricity dispensed from electric forklifts.

# Proposed Oregon estimation methodology

- The proposal builds on the ARB estimation methodology, except that:
  - Only 20% (instead of 80%) of a forklift's battery can be assumed to be discharged per shift
  - Only two shifts (instead of 3 or more) can be assumed per forklift per work day
- In addition, for each facility reporting forklifts, a full calculation sheet must be provided.
- This is intended to be a transition measure. DEQ is proposing that this estimation methodology could be used for Q1 & Q2 2023 reporting. Starting with Q3 2023 reporting, this estimation methodology cannot be used.

# Estimation methodology spreadsheet

- Spreadsheet is provided to ease the calculations, and under the proposal would be required to be uploaded each quarter

 <b>Proposal for a Forklift Estimation Methodology</b> Discussion draft for the May 30, 2023 webinar Contact: OregonCleanFuels@deq.oregon.gov Version: May 24, 2023		<b>This spreadsheet is being produced for discussion purposes only. It is not an official estimation methodology that has been approved by Oregon for use in the Clean Fuels Program.</b>									
Quarter and year of reporting	FSEID	No. of Work Days	e-forklift Make	e-forklift Model	No. of Class I: pre-2016	No. of Class I: 2016 and later	No. of Class II: pre-2016	No. of Class II: 2016 and later	No. of Class III: pre-2016	No. of Class III: 2016 and later	Shifts per day
Charger_efficiency_rating (%)		Battery_capacity_rating (kWh)		Charge_return_factor (%)			Total No. of pre-2016 e-Forklifts	Total No. of post-2016 e-Forklifts	kWh per charge cycle	Pre-2016 kWh per FSE per quarter	Post-2016 kWh per FSE per quarter

# Clarifying Questions

- Please raise your hand and DEQ will call on you
- This portion of the meeting is for clarifying questions, DEQ will take comments and discussion on this topic after we answer clarifying questions.

# Comments & Discussion

- Please raise your hand and DEQ will call on you.

# Thank you!

- Please send written comments to [OregonCleanFuels@deq.Oregon.gov](mailto:OregonCleanFuels@deq.Oregon.gov) by COB June 6, 2023.



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# Appendix

The formulas to calculate kWh consumption of electric forklifts are as follows:

*kWh per forklift per charge cycle*  
*= Depth of discharge x Battery capacity rating x Charger efficiency rating x charge return factor*

*kWh per forklift per quarter*  
*= kWh per forklift per charge cycle x Shifts per day x number of work days per quarter*