

ELECTRIFYING LAST-MILE DELIVERY: BATTERY-ELECTRIC DELIVERY TRUCKS WILL SOON BE CHEAPER TO USE THAN DIESEL TRUCKS IN EUROPE

BACKGROUND:

Decarbonization of the heavy-duty vehicle segment in Europe is crucial to curb greenhouse gas and pollutant emissions from the transport sector. Last-mile delivery trucks are a promising application for electrification given their low daily mileages and the opportunity to recharge at depots when not in use. However, it is still unclear how battery-electric last-mile delivery trucks compare to their diesel counterparts from an economic perspective considering overall cost of usage. Moreover, the large-scale deployment of electric last-mile delivery trucks raises questions about how this additional charging demand can be integrated into local power grids and what it will cost.

A joint study from the International Council on Clean Transportation and the Regulatory Assistance Project (RAP) quantifies the total cost of ownership (TCO) of last-mile delivery battery-electric trucks in six European cities and compares it to existing diesel truck fleets. The analysis considers the cost of the trucks, purchase premiums, and a detailed breakdown of charging expenses, including power and network tariffs. The study also provides policy recommendations to overcome the cost difference between battery-electric trucks and their diesel counterparts.

FINDINGS:

- » With the currently available purchase premiums, last-mile delivery battery-electric trucks can achieve TCO parity with diesel trucks as early as 2022 in Paris, Berlin, Rome, and Amsterdam. Battery-electric trucks operating in London and Warsaw will reach TCO parity by 2025 and 2028, respectively, due to the low purchase premiums provided. Without the current purchase premiums, battery-electric trucks will achieve a positive business case relative to diesel trucks in most European cities by the end of the decade (Figure 1).
- » As the truck purchase price is a large component of the TCO of battery-electric trucks, proper battery sizing is essential to overcome the economic challenges of battery-electric last-mile delivery trucks. Reducing the battery size from 76 kWh to 35 kWh, which is enough to cover at least 85 km of driving range, would move up the time of TCO parity with a similar diesel truck to the second half of this decade for all cities studied.

» Despite current high electricity prices, electric trucks are a reliable choice for operators. The time in which battery-electric and diesel trucks reach TCO parity is more sensitive to variation in diesel fuel prices than electricity prices due to the higher energy efficiency of battery-electric powertrains. For example, in the case of Paris, TCO parity can be achieved in 2026 instead of 2028 considering March 2022 diesel and electricity prices¹ in comparison to 2021 prices.

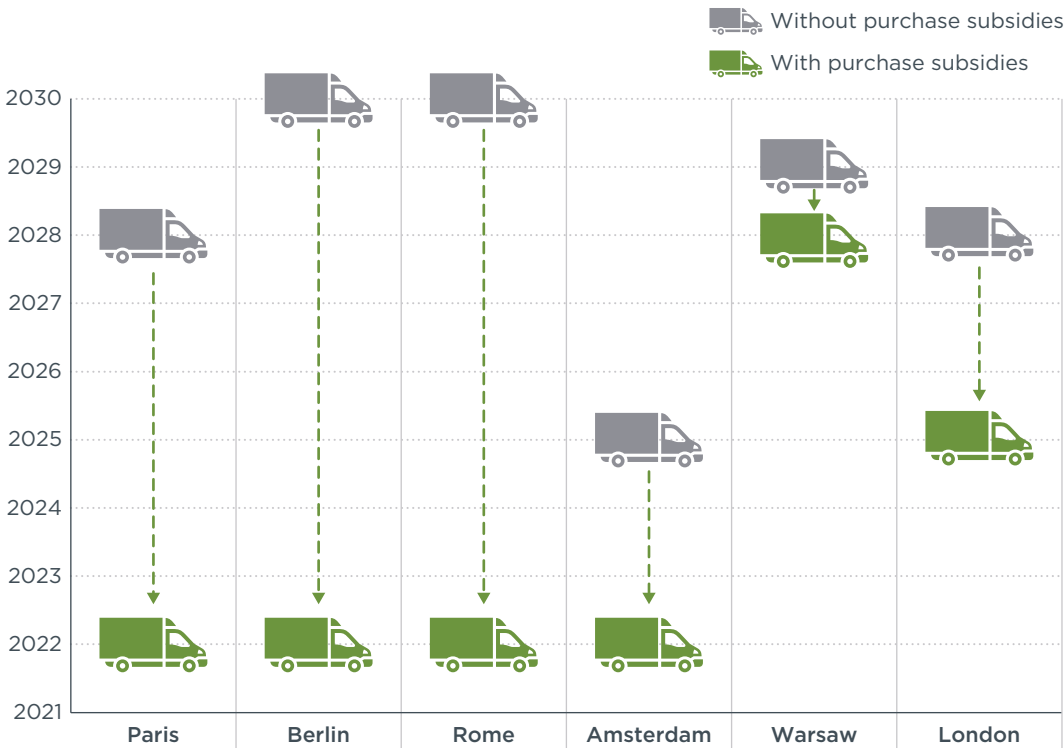


Figure 1. The year battery-electric trucks achieve total cost of ownership parity relative to diesel trucks with and without purchase subsidies.

RECOMMENDATIONS:

- » **Introduce a bonus-malus tax scheme to finance purchase incentives for battery-electric trucks.** Such a program would impose an additional tax on the registration of new diesel trucks based on the truck's CO₂ emissions to finance purchase incentives for battery-electric trucks. The bonus-malus tax scheme would ideally be budget-neutral and should be updated annually, taking into consideration the actual TCO gap between battery-electric and diesel trucks.
- » **Impose emissions charges on all diesel vehicles entering low- and zero-emission zones.** An emissions charge in the range of €2/day to €4/day for six days a week per diesel-powered heavy-duty vehicle can reduce the TCO gap, allowing battery-electric trucks to reach TCO parity before mid-decade.
- » **Encourage smart charging infrastructure deployment at urban logistics depots to help operators reduce charging costs.** Ongoing updates to current directives and regulations present an opportunity to promote smart charging infrastructure deployment. In the European Energy Performance of Buildings Directive currently under revision, policy makers should include requirements for equipping new and renovated depots with charging points for commercial vehicle charging. Requirements to set up smart charging infrastructure at commercial depots

¹ Diesel fuel prices in March 2022 are 50% to 70% higher relative to 2021 average price whereas electricity prices are double (100% increase).

with public access should also be included in the revision of the Alternative Fuel Infrastructure Regulation.

- » **Require energy regulators to set time-varying network tariffs that consider available grid capacity.** Network costs are a significant driver of charging costs for urban depots and are often caused by tariff design that doesn't reflect the actual state of the grid. Introducing time-varying network tariffs, that reflect available capacity on the grid, will help battery-electric truck fleet operators optimize their fleet charging strategies and minimize the related costs.

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