ChargeUp EUROPE

LIFE IS A HIGHWAY: DRIVING THE ELECTRIFICATION OF HEAVY DUTY VEHICLES

At a glance

Availability of space to build charging sites (including fast permitting and planning procedures), access to sufficient power supply in a timely manner, the actual charging demand from a growing number of electric trucks and software standards are the critical enablers that can make or break electrification of HDVs.

Introduction

An increasing number of electric heavy-duty vehicles (eHDVs)[1] are expected on European roads in the coming decade. While there are variations in projections, **European climate ambitions could result in 270,000 to 520,000 eHDVs by 2030**[2] (further accelerated via the recently proposed CO2 standards for HDVs).

The commercial assumption is that electrification of the HDV segment will be phased. In the current initial stages of electrification, charging is primarily taking place around urban areas (also as a number of European cities have zero-emission mandates), or where there is a high density of delivery centers, or very predictable routes. Long-haul trucking

provides a significant opportunity for cost-effective decarbonisation (driving TCO[3] benefits due to high mileage and more cargo), but increases the requirements on on-the-go charging infrastructure. Purchase subsidies or other measures impacting the TCO could make this picture evolve.

The successful roll out of charging infrastructure for eHDVs depends on factors that should be addressed in parallel.

A sufficiently developed charging infrastructure for eHDV is especially relevant in the context of ongoing legislative discussions on CO2 standards for trucks, trailers, and buses, which raise the level of ambition compared to current standards for this segment, with a proposed 100% zero-emission target for city buses for 2030, and a 90% CO2 reduction target for trucks for 2040.[4]

ChargeUp Europe proposes a set of recommendations to be considered in EU legislation and at national level.

1. Availability of space to build charging sites

Public charging of eHDVs requires space (up to 5 hectares), and in particular space close to commercial trucking routes. The issue is particularly acute for public charging, but new, dedicated sites will also require substantial land for depots and safe and secure eHDV trucking sites. **Currently, the limited availability of dedicated eHDV charging locations,[5] the lack of existing parking spaces for trucks, and land concession requirements, all hinder installation of charging infrastructure for eHDVs**.

Recommendation 1
Member States should develop site allocation strategies and incentives to make more public land available (e.g. building on Germany's masterplan[6] as a best practice).

Recommendation 2
Land concession requirements that slow down the installation of charging infrastructure for on-the-go charging should be streamlined and simplified (e.g. administratively burdensome steps linked to the open competitive tendering process itself, lengthy obligations linked to soil decontamination...)

Recommendation 3
Where funding is already available, such as under the Alternative Fuels Infrastructure Facility (AFIF), "greenfield" site development which will include all the associated costs into a single project (i.e. EV charging hardware, grid elements, the civil works and cameras, fencing, "safe and secure" elements) should be permitted. The development of these sites should also be allowed further (up to 10 km) from the TEN-T roadways themselves.

Recommendation 4
Driving time rules should be clarified in the context of each step of the charging experience (i.e. plugging in, wait during the charge, stopping the charge) to avoid blocking a charging bay if the rest time only begins after the charge has been completed.

2. Access to sufficient power supply in a timely manner

Today's Combined Charging System (CCS) standard can charge a 40-tonne truck with enough energy to drive 400 km in 90 minutes. The Megawatt Charging System (MCS), to be commercially available soon, should reduce this to 30-45 minutes[7] (this fits well with obligations on driving time, whereby drivers must take a 45-minute break every 4,5 hours - charge while loading/unloading is an important use case). A high-capacity connection to the power grid is necessary to support these charging times.

The power grid at truck charging locations will typically need strengthening to deliver the required power capacity. This can be done directly via grid power or via other means. The grid may also need to be strengthened for private charging points at depots or distribution centres.[8]

Advanced planning (which will be facilitated by the logical placing of stations enabling charging during mandatory breaks[9]) and incentives to charge at night and deploy solutions that support grid balancing can help minimize the impact on the grid.

(NB: ChargeUp Europe has developed recommendations covering the adjacent issue of grid connection and permitting processes.)[10]

Recommendation 5
Member States should work with DSOs and TSOs to support proactive grid extension by adopting integrated grid reinforcement strategies factoring in the projected growth in public and private eHDV recharging capacity.

Recommendation 6
To encourage demand-side response, logistics companies should be incentivised to charge at night through dynamic electricity pricing and fitting power chargers with automatic control systems. More generally, demand-side response should be encouraged in the context of the reform of the Electricity Market Design (EMD).[11]

Recommendation 7
Incentives to support the deployment of stationary storage[12] (e.g. grants covering installation costs) should also be developed. A simple solution could be reforming the design of the AFIF, which currently does not allow energy storage, smart grid assets and other flexible solutions in eligible project financing.

3. Charging demand from a growing number of eHDVs

Charging infrastructure goes where demand is projected to be. Truck fleet operators are likely to first install charging infrastructure at or close to their depots, with upfront capex implications for them. eHDV should reach Total Cost of Ownership (TCO) parity vs diesel ICE by 2026/2027, but this can be further accelerated.[13]

Recommendation 8
Member States should improve the relative TCO of an electric versus diesel truck, e.g. by introducing purchase subsidies,[14] road toll exemptions, or differentiated taxation levels.

Some Member States (e.g. the Netherlands, Germany) have devised ways to encourage private charging (which will remain the predominant mode of charging for HDVs at first), via the implementation of REDII. They have enabled market players to claim credits for the charging of electric vehicles on private chargers as well as public chargers, incentivizing private actors to go electric and have EV charging on their premises.

Recommendation 9
Members States should make full use of the possibility to extend the credit mechanism under REDIII to private / depot charging, replicating positive national experience where it exists (e.g. in the Netherlands.)

Recommendation 10

As an important part of the charging infrastructure will be located on fleet site, Member States should also consider encouraging simple sharing processes of those services between different fleet owners. This will also help improve the business model behind eHDVs.

4. Seamless interoperability of hardware and software Standards

Harmonization of standards (both hardware and software) is critical to enable economies of scale, limit development costs, and ensure interoperability. Today there are several charging standards: CHAdeMO/ChaoJI mainly deployed in Asia, and CCS/MCS used in Europe and North America. Beyond standards focused on electro-technical issues (e.g. plugs, outlets), what is also required is standardisation of communication interfaces, development of data models to integrate the various actors along the value chain (logistics companies make important efforts to minimize fleet idle time and plan a journey with precision – data play a key role here) and support for cross-border interoperability.

Recommendation 11

The EU-US Trade and Technology Council should support the acceleration of the work on the MW standard, to help create deeper markets for eHDV charging.

Recommendation 12

The standards' streamlining process led by the CCS Alliance working on standardization of charging plug type should be accelerated to resolve incompatibility issues, and limit costs as well as range anxiety. It should be embedded in EU legislation and adopted as a harmonized standard as soon as possible.

Recommendation 13

The European Commission should work on rules that govern the flow of data from truck to infrastructure to freight operators' scheduling systems to grid. Creating these interfaces would allow optimized route planning taking into account key parameters such as state of charge, driving times, availability of chargers and grid load.

Endnotes:

1) Heavy-duty vehicle means a motor vehicle of categories M2, M3, N2 or N3 as defined in Annex II to Directive 2007/46/EC
2) EP study, Alternative fuel infrastructures for heavy-duty vehicles, November 2021
3) Total cost of owning and operating a vehicle, accounting for inputs such as purchase and fuel prices
4) Proposal amending Regulation (EU) 2019/1242 as regards strengthening the CO_2 emission performance standards for new heavy-duty vehicles and integrating reporting obligations, and repealing Regulation (EU) 2018/956,
5) There is an estimated shortfall of 100k HDT parking spaces especially for overnight charging stops along European highways – CEO alliance, HD truck Charging, Final Report, April 2021
6) Charging Infrastructure Master Plan II - Boosting the expansion of charging infrastructure, October 2022
7) Why battery-electric trucks? Milence, 25 January 2023
8) EP study, Alternative fuel infrastructures for heavy-duty vehicles, November 2021
9) See for example Acea study, "Electric trucks: new data maps out priority locations for charging points", May 24, 2022
10) Hook Us Up! Simplifying and Accelerating the Grid Connection and Permitting Process for EV Chargers, February 16, 2023
11) ChargeUp Europe has submitted a response to the public consultation on the EMD reform.
12) See an example of deployment here.
13) CEO Alliance, ibid.
14) These subsidies are already available in several jurisdictions, but the range of support varies widely. See Global Electric Vehicle Outlook 2022, Internal Energy Agency
15) CHARGING SOLUTIONS FOR BATTERY-ELECTRIC TRUCKS, WHITE PAPER, December 2022, International Council on Clean Transportation, Marie Rajon Bernard, Alexander Tankou, Hongyang Cui, and Pierre-Louis Ragon

Annex – Use type and associated charging needs[15]

Public / private	Location /type	Power output	Estimated upfront cost of charger	Use type
Private	Depot	50 kW DC	45.000,00 €	Fleet returning to same location every night Small-medium size batteries
		100-150 kW DC	92.000,00 €	Fleet returning to same location every night Small-medium size batteries
	Destination	350 kW DC	232.000,00 €	Fleet idling for at least 45 min-1hr when loading and/or unloading goods
Public	Overnight	100-150 kW DC	92.000,00 €	Fleet not returning to the same location every night
	En-route and destination fast	350 kW DC	232.000,00 €	High mileage/heavily loaded fleets not returning to the same location every night 3-4 hours rest during the day.
	En-route and destination ultra-fast	1 MW DC	Estimates for 1 MW chargers circa €615,000.	High mileage/heavily loaded fleets not returning to the same location every night Large batteries, needing a quick top-up during the day, 45 minutes rest
		3 MW DC		