Driving the adoption of Battery Electric Heavy-Duty Vehicles:

General policy recommendations for the deployment of sustainable infrastructure

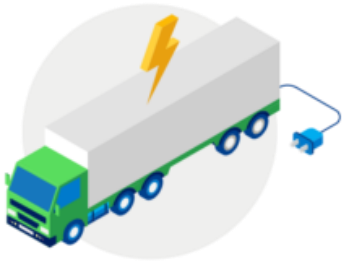
November 2023

- The members of the Platform for electromobility recognise the importance of driving uptake of the required infrastructures for Battery Electric Trucks and buses (BEHDVs). They also recognise the need for policy recommendations that complement the Alternative Fuels Infrastructure Regulation (AFIR) and Energy Performance of Buildings Directive (EPBD).

- The challenges in this area span multiple sectors, from energy, through land management and on to data security. We therefore emphasise the importance of cooperation between all sectors of the electric road transport system, resulting in this paper, which outlines the key elements that legislators should keep in mind when addressing this topic.

- In this position paper, we identify three areas that require attention and provide policy recommendations to ensure the successful roll out of infrastructures for BEHDVs: the grid, the data framework and the land.

- Beyond infrastructure (which this paper is dedicated to), we stress the importance of ambitious, clear and timely revision of both the CO2 Standards for trucks and buses Regulation and the Weights and Dimensions Directive. We have discussed both of these in previous publications (respectively here and here).



More about the Platform for electromobility

The Platform for electromobility is a unique alliance of over 48 Europe-based producers, infrastructure managers, operators, transport users, cities and environmental civil society organisations from across industries and transport modes. Our overarching goal is to reach a sustainable, multimodal transport system in which people and goods are moved across land, inland waterways, sea and air in Europe using exclusively fossil-free electricity. To reach its vision, the Platform unites all sectors constituting the electromobility ecosystem to pragmatically ensure the conditions for the full electrification of new light-duty vehicles by 2035 and build a sustainable European zero-emission transport system by collectively sharing their expertise, challenges and solutions.

For more information about the platform and its members, please visit:

https://www.platformelectromobility.eu/

1. The grid[1]

a) Assessments: per country and per usage

While strong CO2 Standards would prove useful for anticipating actual and future demand, a situation where a grid connection may not be available can potentially undermine the trajectory defined by those new CO2 Standards. It therefore becomes urgent to immediately and proactively assess whether there is sufficient potential grid-capacity to allow for sufficient connection for the charging infrastructure needed for BEHDVs. Assessment becomes all the more pressing when considering the lengthy lead times, the need for grid reinforcement, the likely demand for BEHDVs and the number of actors involved.

Grid infrastructure varies between countries. Some may need important investments in order to prepare for the integration of BEHDVs, with the development of megafast chargers where required. In the Netherlands – a European Member State at the forefront of road transport electrification (along with other such as Germany and, to a lesser extent, Belgium) - it appears to be extremely difficult for transport operators to obtain the needed capacity for BEHDVs, both at their depots and on the road, due to a lack of effective planning. Even where capacity increases are possible, long delays for connection and procedural constraints present barriers to the swift adoption of BEHDVs.

Grid infrastructure varies between usages. While large charging hubs for BEHDVs along motorways will be the exception and the depot/destination charging overnight the rule, the need for very high-level connection capacity along the motorway should be tackled. Medium- and high-voltage connections to the power grid will be necessary to support the fast charging times in the event of opportunity charging. To deliver the necessary power capacity, grid strengthening may be required at both public locations and - for different reasons – at private charging depots/distribution centres.

BEHDVs-suitable charging locations can be mapped and the power needs for those locations assessed. Recent existing mapping[2] - based on the GPS records of large numbers of trucks routes during one year throughout Europe - can provide a good starting point. Truck stakeholders can subsequently confirm or propose new locations for the recharging infrastructure and the power required. Distribution System Operators (DSOs) and Transmission System Operators (TSOs) should confirm whether there is sufficient capacity and, where necessary, propose alternatives.

We would welcome support for undertaking a similar mapping exercise for coaches and interurban buses. Such analysis would also support the task forces (see below) in deciding the pre-equipment needed for depots and distribution centres, as well for existing service stations. This would ensure that delays in installing charging stations for BEHDVs do not exceed reasonable timescales.

Mapping analysis shows some 10% of locations will account for half the opportunity charging stops.[3] Pre-identifying these would help accelerate the coordinated development of charging infrastructure for BEHDVs and facilitate discussion within the dedicated task forces.

---

[1] The Platform for electromobility further elaborates on the needs and solutions for gird upgrade in a dedicated paper here.

[2] https://www.acea.auto/press-release/electric-trucks-new-data-maps-out-priority-locations-for-charging-points/

[3] https://www.isi.fraunhofer.de/content/dam/isi/dokumente/cce/2021/ACEA_truckstop_report_update.pdf

b) Task Forces

The task forces - constituted as follows - should be established and moderated by transport ministries or designated government agencies. National task forces: DSOs or their representations; TSOs; manufacturers of BEHDVs, BEHDVs operators and national associations[4]; representations of energy aggregators operators; fleet managers; road and urban planners; national Charging Point Operator (CPOs) associations.

Such task forces would be well suited for **indicating the investments required to extend and reinforce charging infrastructure and to determine suitable charging locations and power requirements**. This will enable DSOs and TSOs to plan the necessary grid extensions and reinforcements. This is extremely important for those areas that are not being developed by project developers due to high investment costs and long lead times for grid connections. The bottom line for achieving a comprehensive approach to planning involves early engagement with fleet managers, road operators, local municipalities, CPOs and grid utilities. Such an approach helps in proactively addressing public acceptance, potential land use challenges and in establishing a workable and timely power delivery schedule.

c) National deployment plans

In order to forge a **stronger link between the AFIR implementation and the deployment of charging infrastructure for BEHDVs**, we propose that Member States base their own **national deployment plans** on the AFIR targets, reflecting the anticipated demand at each location.

These plans should align with the anticipated demand for BEHDV charging, while also considering such factors as traffic density and projected growth in BEHDV usage and stops. By adopting such an approach, Member States can provide network operators and other stakeholders with longer lead times for planning future infrastructure uptake and anticipated connection requests, particularly post-2030.

d) Public & private investments

A high-capacity grid does not come without costs. Ultrafast charging stations are expected to require large MVA network connections, which usually occur directly at high voltage level but can also occur at MV level, depending on Member State specificities.

Well-designed European financing programmes can attract private investments for BEHDV infrastructure development. To facilitate implementation, and considering the high CapEx involved, **public funding should be made available**: The Connecting European Facility (CEF) is a vast programme, one that is primarily focused on passenger cars rather than on BEHDVs. This limits its alignment with the needs of the heavy-duty vehicle sector. Typically, the **Alternative Fuels Infrastructure Facility** (AFIF) Call of the CEF Programme supports BEHDVs infrastructure between 150kW and 350kW while for 800kW and higher, power the financial solutions provided by European Commission are too limited. The annex should be adapted to better take account of the needs of BEHDVs.

[4] Shippers and carriers such as TLN in the Netherlands or RHA in the United Kingdom.

2. The Data Framework

a) Align grid codes, regulations to ultrahigh-power charging standards under development

The introduction of ultrahigh power charging standards necessitates global and European recognition. When being designed, standards should take into account factors such as space and interoperability as well as the futureproofing of those ultrahigh power charging standards currently under development. Any existing regulations that did not anticipate BEHDVs and their charging infrastructure must be updated to in order to accommodate this new paradigm. Definitions of technical aspects and use cases must be integrated into existing technical codes and regulations. Temporary exceptions will likely be required in areas such as standardised and certified energy metering concepts, which are currently lacking for megawatt charging. Member States should implement standards for BEHDV infrastructures for both public and private applications. Last, it is not possible to apply to EU funding for deployment of standards that have yet to be adopted.

b) Harness the flexibility potential of BEHDVs

Smart and bidirectional charging can be key in increasing the uptake of renewable energy and in offering flexibility potential to the grid. While initially this may seem challenging to implement, given the fast-charging requirements dictated by the road transport business model based on opportunity charging. Yet, the potential to harness the flexibility of the BEHDVs is actually significant, particularly considering their battery sizes, the high predictability of their routes and time schedules and the predominance of depot/overnight charging.

Smart energy management systems can therefore be deployed, specifically through the implementation of balancing mechanisms between connectors. This will synchronise with renewable energy production and provide a fast-frequency response to keep the grid stable. This would further require signals to use the flexibility from batteries, such as incentives for aggregators and dynamic tariffs, etc. Beyond advanced planning, tariffication incentives and financial incentives in the grid services markets are other crucial elements for minimising grid impact and allowing potential grid balancing.

Bidirectional and smart charging can be particularly suitable for certain business models, notably buses and trucks that are not operated on a 24/7 basis (short-haul and regional transport). Their large batteries can offer key services to the grid. Smart meters should be considered as one of the solutions for smart charging in depots and distribution centres. However, regulatory frameworks will need to be adapted in order to enable bidirectional charging and provide economic incentives.

Finally, the sector is currently exploring the potential of flexible storage positions within local energy systems, such as incorporating stationary batteries into charging stations or exploring battery swapping solutions. Such approaches can help reduce the strain on the grid, offering advantages to both charging operators and system operators by enhancing flexibility. In addition, configurations integrating renewable energy sources on site should be examined for smart charging, as they have the potential to mitigate expected peak loads.

c) Data sharing for smooth logistic operations

A proper regulatory framework would also enable data and information exchange along with digitalisation for cross-sector integration:

Smooth reservation and non-discriminatory access to, and reliable operation of, public recharging infrastructure can accelerate the transition to BEHDVs. Standardised data sharing and interoperability between value chain players are a prerequisite for third-party operators of smart charging services and for the proper functioning of smart charging technologies.

Currently, however, data sharing and interoperability are often limited, which can lead to inefficiencies and reliability challenges. For example, charging point operators may not have access to real-time data on the location and battery state of charge of heavy-duty trucks. This in turn can make it challenging to plan optimal power needs and manage the charging process. Likewise, logistics operators may not have access to real-time data on the availability of charging infrastructure, which can lead to delays in delivering goods. There are multiple data types for multiple use cases that require a minimum of data sharing across the industry to enable efficient logistics and reliable charging.

Agreeing minimum specific list of data points for BEHDVs, interoperability standards and developing a robust, open and non-discriminatory data sharing framework will allow logistics operators, truck manufacturers, grid and charging point operators to put solutions in place for improving the reliability and efficiency of logistics operations and recharging infrastructure.[5] The European Commission should support the parties involved, with the aim of establishing an open data-sharing framework built around a set of industry-agreed data types, made accessible to the market and public authorities. Ultimately, it should strive to establish a reliable European legal framework for smooth data exchange for electric HDV recharging operations throughout the EU.

d) Understand the charging patterns

Last, further research is required to understand the charging patterns and to demonstrate the cost opportunities for transport operators and Mobility Service Providers (MSPs) of participating in the flexibility services market. TSOs - in collaboration with fleet operators - can play a crucial role, for example by introducing pilot projects and regulatory sandboxes to gather experience on grid impacts and reactions to time-varying tariffs, and to eventually assess the real flexibility potential.

[5] Smart charging, BET eRoaming, Plug and Charge, Value Added Services (i.e., Preconditioning), flexibility provision services in relation to battery degradation patterns etc.

3. The Land

a) Quantity: Sufficient space for trucks and buses public and private charging

According to the European Commission[6], there is a shortage of around 100,000 suitable parking spaces for HDVs, of which only around 54,000 offer a reasonable standard of safety. We can therefore no longer ignore the shortage of parking space for truck drivers. This current lack of parking leads to improperly parked trucks, leading to both environmental and safety issues for truck drivers and other road users and places a considerable burden on truck drivers. Even existing parking areas frequently lack adequate facilities or are in a state of disrepair.

The need for additional charging infrastructure created by the advent of electrification makes these issues even more acute. Consequently, the availability of ample parking space - now in parallel with charging facilities – represents more than a mere convenience; rather, it is an indispensable prerequisite for driving the transition to a decarbonised transport system.

b) Quality: Safe and Secure Truck Parking Areas (SSTPAs) suited to charging

Private investment in constructing increasingly costly infrastructure such as large-scale parking facilities, warrants reinforcement through European and national public funding initiatives. Such incentives include grants, tax benefits and subsidies geared to attracting private investment in the construction of parking areas with integrated charging stations for BEHDVs. Such moves can help offset initial infrastructure costs and incentivise the expansion of such facilities. While establishing more ambitious - yet attainable - targets for each Member State at an EU level emerges as a sensible strategy, the reality of achieving these minimum standards is frequently faced with lack of available land, particularly in densely populated areas. To overcome this challenge, the EU should support Member States in pursuing following options:

- Earmarking publicly owned land for investors to develop new parking and charging spaces. Alternatively, streamlining the permitting process and alleviating bureaucratic complexities to incentivise private investments in additional parking capacity.
- Enhancing the synergy between private landowners and operators of parking and charging spaces through improved matchmaking mechanisms and by leveraging digital platforms.
- Tendering (greenfield) locations where investors are hesitant via a 'concession model', eventually combined with incentivised deployment on certain locations. In a concession model, governments can accelerate permitting and realisation of grid connections.
- Cooperating with system operators to secure grid capacity on shared (or tendered) locations.

c) Must-have for market models

Other market models (land sale, rental, long lease) are viable alternatives, but lead to more commitment in implementation (profitable business case, cooperation, multiple operators on one site). All market models should consider monopoly on 'premium' sites, market forces in designated locations, differences between HDV and LDV infrastructure markets and maximising market forces.

[6] https://www.iru.org/system/files/Final-Report-SSTPA-27022019.pdf

d) The role of concession holder

In essence, the role of concession holder can play an ever-more prominent role in accelerating the market by:

- Taking the lead in all restrictive conditions (such as grid connection, land ownership)
- Securing grid capacity before locations are offered for tender. Participate with system operators to secure grid capacity on multisite (multiple operators using a single grid connection). Facilitate consortia to own and initiate a shared site with multiple operators of zero emission infrastructure.
- Acting as a bridge function in sharing construction and basic infrastructure costs when multiple operators settle on a site (such as direction on site layout, site paving).
- Promoting a location for charging infrastructure operators by attracting other services (retail, hospitality, etc).