acea

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ACEA position paper

Infrastructure requirements of urban buses, interurban buses and coaches

EXECUTIVE SUMMARY

With the 2030 CO2 reduction targets for heavy-duty vehicles, including buses and coaches, approaching swiftly, vehicle manufacturers' ability to meet them depends on the rapid deployment of suitable charging and refuelling infrastructure. It must focus on locations where these vehicles regularly operate, along major highways but most importantly also at depots, bus stations and hubs, and tourist destinations.

ACEA estimates that nearly 30,000 daily charging "opportunities" are needed by 2030 for interurban buses and coaches, with roughly 98% of them happening away from the main corridors.

To ensure that interurban buses and coaches can meet their CO2 targets, ACEA recommends the following:

- **Create targeted EU and national funding** specifically for interurban/coach -suitable charging infrastructure, improve visibility and access to existing schemes, and streamline permits and documentation, so projects move faster.
- **Work with the industry** and prioritise a long-term, market-led rollout in partnership with manufacturers and operators**.** ACEA's bus and coach manufacturers stand ready to cooperate closely with industry and value chain stakeholders, institutions and policymakers on all levels to ensure the ambitious CO2 reduction targets can be met.
- **Harmonise building and safety rules** across member states on fire-safety measures (eg partition walls, quarantine areas) and other civil-engineering constraints so these do not unnecessarily shrink usable charging space or slow deployment across countries.
- Even with an accelerating ZEV uptake in urban buses, there must be a **continued expansion of depot charging** to meet the 90% ZEV sales target by 2030. This must ensure urban bus fleets do not compete with interurban/ coach needs for limited infrastructure and grid capacity.
- **Update AFIR and related EU/ national rules** to include coach/interurban-specific site requirements. Additional provisions such as temporary accommodation of large passenger groups, toilets, and catering, safe alighting and pedestrian flows are crucial to ensure public and semi-public charging infrastructure are truly usable for passenger operations.
- **Consistent and periodic EU-wide monitoring** (bi-annual) of key enabling conditions (infrastructure rollout pace, grid readiness, permitting etc.) with the European Commission, Member States, and industry must be put in place. Feedback from these monitoring exercises must be used as a basis for reviewing CO2 targets to ensure they are aligned with the rollout of charging infrastructure and other key enabling conditions.

BACKGROUND

LEGISLATIVE BACKGROUND

Currently all urban buses, interurban buses, and coaches with a gross vehicle weight above 7.5 tonnes have been added to the scope of the CO2 emission performance standards for new heavy-duty vehicles (EU) 2019/1242. While urban buses are regulated through a sales share target for zero-emission vehicles (ZEV), coaches and interurban buses are regulated through a CO2 emission reduction target. This target refers to a common baseline for all manufacturers, which includes all vehicles sold by all manufacturers in the baseline year 2025. For interurban buses and coaches, reduction targets of 43% for 2030, 64% for 2035, and 90% for 2040 apply on this basis. While for urban buses a 90% ZEV share applies in 2030 and 100% in 2035.

CURRENT STATE OF THE ZERO-EMISSION BUS MARKET

In recent years, city buses have led the way in the introduction of ZEVs in the heavy commercial vehicle segment, paving the way for the adoption of these vehicles in other areas. City buses account for almost all of the zero-emission bus registrations; only a few zero-emission coaches are currently available on the market[1]. To accelerate the transition of the sector, the availability of suitable charging infrastructure is essential alongside other critical enabling factors. Such a charging infrastructure is currently not available to an extent that would allow the zero-emission vehicle sales figures required to meet the CO2 reduction targets in 2030.

Currently, the specific infrastructure requirements for interurban buses and coaches, meaning the number of charging opportunities and their configuration, are not considered in current EU legislation such as the Alternative Fuels Infrastructure Regulation (AFIR)[2]. National legislation, such as Germany's Charging Infrastructure Masterplan II[3], also only mention coaches in relation to public charging infrastructure at central bus stations/ hubs. In particular destination

[1] European Commission. (2025). COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the technological and market readiness of heavy-duty road transport vehicles

[2] Regulation (EU) 2023/1804 of the European Parliament and of the Council of 13 September 2023 on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU

[3] German Ministry of Transport: https://www.bmv.de/SharedDocs/EN/publications/charging-infrastructure-masterplan-ii.pdf?__blob=publicationFile

charging (i.e. charging at tourist attractions, amusement parks, museums, and other points of interest) has not yet been considered despite representing an important charging scenario for interurban buses and coaches. Another important charging scenario is en-route charging, which refers to charging while vehicles are on the road or on the motorway. The public charging infrastructure currently being built for electric trucks is on the one hand technically fully compatible. On the other hand, it does not meet the specific passenger transport requirements which are explained in the following paragraphs.

KEY FACTS

~ 20.000 electric interurban buses and coaches expected to enter the market between 2025 and 2030, additionally to **~ 48.000** urban buses

~ 30.000 charging opportunities for interurban buses and coaches needed in 2030, additionally to **~ 48.000** new charging opportunities for urban buses

~ 98% of these charging opportunities needed at depots, public stations/hubs and tourist destinations (not in scope of EU-regulation and so far, hardly or not at all considered in national activities)

The **availability of suitable charging infrastructure** is particularly crucial, in addition to various other enabling factors, to meet the CO2 standards for 2030 (reduction targets of -43% for interurban/coach and 90% urban ZEV share in 2030)

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The infrastructure build-out for urban buses is progressing, but gets more challenging and needs continuous financial support and sufficient grid power. In contrast to that, there is **no infrastructure at all yet for interurban buses and coaches.**

SPECIFIC INFRASTRUCTURE REQUIREMENTS FOR INTERURBAN BUSES AND COACHES

The requirements for charging infrastructure for interurban buses and coaches differ in some areas from those of trucks. This distinction is important for a realistic assessment of the achievability of the CO2 reduction targets for interurban buses and coaches in view of the existing and expected enabling conditions.

In addition to en-route charging along the main transport routes (TEN-T corridors), it is also extremely important for interurban buses and coaches to have charging points at depots, central bus stations or hubs in cities and at their respective destinations.

INFLUENCE OF BUS AND COACH MISSION PROFILES ON CHARGING NEEDS

Depending on the vehicle category and its associated mission profile, the different charging scenarios are used with varying frequency:

Depot charging involves charging vehicle fleets at central, mostly private locations, typically during the vehicle downtime. This also applies to public charging at ***central bus stations or hubs***. A significant proportion of charging cycles for interurban buses are focussed on these two charging scenarios. For city buses these are considered as the relevant charging points.

Vehicles are also charged publicly or semi-publicly at their destinations (***destination charging***). The most common destinations are tourist attractions (POI: points of interest), like amusement parks or ski resorts. Destination charging is particularly relevant for coaches, as well as for interurban buses with a similar operational profile. The destinations are mainly located away from the main transport routes, which is why the development of charging infrastructure along the TEN-T corridors, as envisaged in the AFIR/ AFIF, is not sufficient for coaches in this scenario.

En-route charging refers to charging while vehicles are on the road or highway. This charging type/location is also particularly relevant for coaches. In contrast to the establishment of charging infrastructure at depots and destinations away from the main transport routes, en-route charging is within the scope of the AFIR/ AFIF, but the locations, which are mostly designed for electric trucks, are only suitable for coaches and their passengers to a limited extent (see “further requirements”).

TECHNICAL REQUIREMENTS

In terms of technical specifications, the requirements for coaches are equal to those of trucks. For fast intermediate charging en-route during mandatory rest periods, high-capacity charging stations of at least 350 kW – but with a focus on megawatt charging (MCS) of over 500kW – are required. For off-highway or overnight charging, lower charging capacities (100kW) can be used depending on the length of the stopover.

FURTHER REQUIREMENTS FOR INTERURBAN BUSES AND COACHES

In contrast to road freight transport, the needs of passengers must also be considered in passenger transport. This is also reflected in the requirements for the charging infrastructure. Locations primarily designed for electric trucks are only of limited suitability for coaches and their passengers. This restriction primarily relates to the suitability of the charging site to accommodate the corresponding passenger volume (approximately 50 per coach). During the charging period, passengers depend on the availability of amenities such as sanitary facilities

and catering options. At first glance, these factors may appear to be optional comforts, but they contribute significantly to the choice of buses over other (private) modes of transport. This, in turn, contributes significantly to reducing CO2 emissions from road traffic. Road/passenger safety is also of critical importance. Unlike with charging trucks, it is essential to ensure that passengers can exit the vehicle safely, without being endangered by maneuvering or passing vehicles.

EXPECTED DEMAND FOR CHARGING POINTS FOR INTERURBAN BUSES AND COACHES BY 2030

The methodology used to approximate infrastructure demand is based on estimates by ACEA and uses several assumptions to simplify calculations. The estimate is focussed on the year 2030 with values for previous years being interpolated. The assumption that all zero-emission vehicles are battery-powered electric vehicles is also an underlying principle. For this purpose, the buses and coaches are divided into four vehicle categories, that differ from their operation profiles and expected BEV (battery-electric vehicle) share. The overall BEV share is assumed to be exactly in line with the CO2 reduction targets for buses and coaches in 2030.

In this context, it should be noted that this publication focuses on battery-electric vehicles (BEVs) and does not consider hydrogen-powered vehicles. Nevertheless, the importance of an appropriate hydrogen refuelling infrastructure for these vehicles should not be overlooked.

		Vehicle Numbers			Depot Charging			Public Charging (hubs, rural areas)			Destination Charging (e.g. touristic points)			En-route charging			Total	
		vehicles entering the European market 2025-2030	ZEV share 2025...2030 required to fulfill the CO2 targets	resulting BEV vehicle number	Share *	Factor **	Charging Oppor-tunities	Share *	Factor **	Charging Oppor-tunities	Share *	Factor **	Charging Oppor-tunities	Share *	Factor **	Charging Oppor-tunities	Charging Oppor-tunities	Overall factor
MZE	**Urban Low Floor** 31-LF/ -L1/ -DD, 33-LF/ -L1/ -DD, 35-FE, 39-FE	**68.400**	0,5...0,9	**47.880**	1,0	1	47.880	0	1	0	0	1	0	0	1	0	**47.800**	1,00
MCO2	**Interurban Low Entry** 31-L2, 33-L2	**24.000**	0...0,55	**6.600**	0,95	1	6.270	0,35	1	2.310	0,05	1	330	0	1	0	**8.910**	1,35
MCO2	**Interurban High Floor** 32-C2, 34-C2	**30.600**	0...0,45	**6.885**	0,75	1	5.164	0,60	1	4.131	0,30	1	2.066	0,10	4,5	153	**11.514**	1,67
MCO2	**Coaches** 32-C3, 32-DD, 34-C3, 34-DD	**37.200**	0...0,35	**6.510**	0,55	1	3.581	0,35	1	2.279	0,50	1	3.225	0,50	7	465	**9.580**	1,47
	MZE	68.400		**47.880**			**47.880**			**0**			**0**			**0**	**47.880**	**1,0**
	MCO2	91.800		**19.995**			**15.015**			**8.720**			**5.651**			**618**	**30.004**	**1,5**
	Total	160.200		67.875			62.895			8.720			5.651			618	77.884	

*Charging share: share of vehicles charging at this location
**Charging opportunity factor: vehicles that use one charging opportunity per day

Charging opportunity number = BEV number * charging share / charging factor

An estimate is made regarding the share of vehicles in the respective vehicle categories that will use the respective charging scenarios. These shares are then used to determine the corresponding vehicle numbers, which are subsequently multiplied by a utility factor[2] to obtain the number of charging opportunities required. Finally, the number of charging opportunities required in earlier years (up to 2030) is accumulated, as charging demand is defined not only by new registrations in 2030, but also by vehicles already on the market by that time. This is based on a linear increase from a starting point of a 0% BEV share in 2025 (interurban buses and coaches).

These ACEA projections indicate that around 30,000 charging opportunities will be required for interurban buses and coaches every day by 2030. This figure does not account for the local distribution of charging opportunities. In areas with high demand, additional charging opportunities may be necessary to enable the simultaneous charging of vehicles. Therefore, the final number required could exceed 30,000.

The analysis also shows that around 98% of the required charging needs in 2030 will be off the main transport routes (TEN-T corridors) and are therefore currently barely or not at all taken into account by EU or Member State level legislation or initiatives. Even if the charging needs in (mostly) private depots are disregarded, around 45% of the charging needs are currently not taken into account. This raises serious questions about the development of suitable charging infrastructure, which is needed to allow the zero-emission interurban and coach sales figures required to meet the CO2 reduction targets in 2030.

Specific challenges for urban buses

Attention needs to be given to the continued expansion of charging depots for city buses. Although the ZEV share in this segment is already relatively high, considerable progress is still required to achieve the 90% sales target by 2030.

After a first strong growth period for e-mobility for urban buses, the second period 2025-2030 needs to require large public transport authorities (PTAs) to complete the conversion of their urban located depots, while many small communities have not even started or budgeted this conversion.

Depot transformation in terms of building permits delays in dense urban cities and potential grid strengthening is seen as a bottleneck for infrastructure deployment in time to meet CO2 regulation targets.

Building guidelines for fire propagation prevention creates park space reduction and other civil engineering constraints such as partition walls and quarantine areas. Harmonization of member state safety guidelines at European level is strongly recommended. Capacity building and operational skills are missing for such fast transformation of depots

[2] vehicles that can use one charging point per day

CONCLUSIONS AND POLICY RECOMMENDATIONS

Against this background, ACEA recommends the following policy actions:

ENCOURAGE INVESTMENT IN INFRASTRUCTURE ROLL-OUT SUITABLE FOR INTERURBAN BUSES AND COACHES

- In addition to regulatory measures, the long-term market-driven development of the necessary infrastructure should be prioritized. To support this, an appropriate, targeted funding framework for interurban buses and coaches should be established at the EU and Member-State-level. However, the creation of new funding opportunities should not be the only consideration here. The visibility of existing funding programs and financing schemes should also be improved. To meet the need of 30,000 charging opportunities by 2030, an average of 6,000 additional possibilities for charging interurban buses and coaches should be established annually across Europe and be supported by effective incentives.
- Initiatives need to make sure that also further 48,000 urban bus charging opportunities will be added until 2030 which means ca. 9,600 per year.
- ACEA strongly recommends a long-term market-driven approach. As a manufacturers' association, we are currently developing various initiatives to contribute to this effort and are open to working with industry stakeholders, policymakers and all relevant institutions.
- To promote the development of suitable charging infrastructure for interurban buses and coaches, the necessary approval processes should be streamlined. Wherever possible, delays caused by unnecessary bureaucracy and requests for extensive documentation should be avoided.
- Building guidelines for fire propagation prevention and other civil engineering constraints, such as partition walls and quarantine areas, can reduce charging space in different EU countries. It is strongly recommended that e.g. member state safety guidelines are harmonized at a European level.

CONSIDER INCLUDING SPECIAL REQUIREMENTS OF INTERURBAN BUSES AND COACHES IN THE REGULATORY FRAMEWORK

- Charging infrastructure is a key enabler for the market introduction of ZEV coaches and interurban buses. Without it, market adoption of zero-emission vehicles will continue to be severely constrained and remain far from what is needed to meet the 2030 CO2 reduction targets for interurban buses and coaches.

- Current EU legislation, such as the Alternative Fuels Infrastructure Regulation (AFIR), does not address the specific infrastructure requirements for interurban buses and coaches. Ideally, specific requirements for charging sites should be included, such as the ability to temporarily accommodate large numbers of passengers and provide amenities like sanitary facilities and catering options. Additionally, requirements relating to road and passenger safety should be taken into account.When reviewing AFIR and other relevant regulations on the European (e.g. EPBD and others) and national level, consideration should be given to this. ACEA is ready to support all relevant institutions in further developing the necessary policy framework

URGENTLY MONITOR THE AVAILABILITY OF SUITABLE INFRASTRUCTURE AND TAKE IT INTO ACCOUNT WHEN REVIEWING EU LEGISLATION

- The above-mentioned actions are of great importance for a long-term ramp-up of the charging infrastructure suitable for coaches. Despite efforts by many ecosystem partners, the rollout of dedicated charging infrastructure remains slow and significantly limits ZEV adoption. Considering the current level of infrastructure deployment, it becomes clear that this does not provide sufficient support for meeting the current CO2 reduction targets for interurban buses and coaches in the upcoming years.

To address the situation, ACEA requests the urgent setup of a regular (6-monthly) monitoring of a comprehensive set of enabling conditions relevant for buses. This should involve the European Commission, all Member States and key industry stakeholders. The outcome of the first monitoring report should be taken into account when reviewing corresponding EU legislation.

ABOUT THE EU AUTOMOBILE INDUSTRY

- 13.6 million Europeans work in the auto industry (directly and indirectly), accounting for 6.9% of all EU jobs
- 8.1% of EU manufacturing jobs – some 2.5 million – are in the automotive sector
- Motor vehicles are responsible for €414.7 billion of tax revenue for governments across key European markets
- The automobile industry generates a trade surplus of €93.9 billion for the European Union
- The turnover generated by the auto industry represents over 8% of the EU's GDP
- Investing €84.6 billion in R&D per year, automotive is Europe's largest private contributor to innovation, accounting for 34% of the EU total

ACEA REPRESENTS EUROPE'S 16 MAJOR CAR, VAN, TRUCK, AND BUS MANUFACTURERS

ACEA
European Automobile
Manufacturers' Association
+32 2 732 55 50
info@acea.auto
www.acea.auto

x.com/ACEA_auto

linkedin.com/company/acea

youtube.com/c/ACEAauto