European Copper Institute
Copper Alliance

Proposed Regulations on CO_2 emission standards for cars and vans & Alternative Fuels Infrastructure

Position paper of the European Copper Institute

ECI supports the EU's climate ambitions for 2030 and 2050 and welcomes the proposed regulations on CO2 emission standards for light-duty vehicles and Alternative Fuels Infrastructure (AFIR) as important steps forward in accelerating the transition to e-mobility.

Copper is one of the materials that makes this transition possible. Copper is a key material for electric vehicles and charging infrastructure, but also for numerous other applications that enable the clean energy transition. Copper delivers energy savings and CO_2 reductions across the electricity system, in buildings, transport and industry.

Reaching carbon neutrality by 2050 means that at least all light duty vehicles should become zero-emission from well to wheel by that time. To get there in time, it is of crucial importance that the proposed regulation on CO2 emission standards and AFIR set an ambitious EU framework. To this effect, we believe the following changes should be made:

To the proposed regulation on CO2 emission standards for cars and vans:

1. Introduce an intermediate target for the 2027-2029 period to ensure the successful phase out of non-Zero Emission Vehicles by 1 January 2035.

To the AFIR proposal:

2. Apply the Article 3(2) minimum requirements to deploy charging stations every 60 km with a power output of at least 300 kW and at least one power output of at least 150 kW to the whole comprehensive TEN-T network by the end of 2025.
3. Increase the required charging power output to be deployed by member states per every registered battery electric vehicle under article 3(1) to 2.3 kW.
4. Amend article 3(1) to mandate member states to ensure that a sufficient number of publicly accessible recharging stations for light-duty vehicles is deployed in locations where vehicles typically park for extended periods of time.

To both proposals:

5. Introduce a reference to the need to consider the Energy Efficiency First Principle in policy, planning and investment decisions in relation to transport, including as regards the well-to-wheel energy efficiency of different zero emission technologies.

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CO2 Emission Standards of Cars and Vans

Introduce an intermediate target to ensure successful phase out of non-Zero Emission Vehicles by 1 January 2035

ECI welcomes the increased ambition in accelerating the availability of zero-emission vehicles on the EU markets through the requirement that from 2035 all new passenger cars and vans should be zero emission vehicles (Article 1, point 5a). This is of crucial importance to ensure the decarbonisation of road transport at sufficient speed to allow the EU to meet its 2030 and 2050 targets.

We believe it is important to also introduce an intermediate target between now and 2035 to make sure that the CO2 reduction path is balanced and sufficient progress is made in the run up to 2030. Without the addition of an intermediate target, the CO2 emissions trajectory would be unbalanced with a reduction of only 15% in the six years from 2019 to 2024, followed by a massive reduction of 85% in only ten years (2025-2034). The CO2 reduction path, and its corresponding BEV uptake, is doubly important as it will determine the speed of deployment of the publicly accessible recharging infrastructure, according to the AFIR proposal.

ECI ask: Introduce an intermediate target equal to a 35% reduction of CO2 emissions for cars and 33% for vans for the period 2027-2029 under Article 1 of the proposed Regulation on CO2 emission standards for cars and vans.

Introduce a reference to the Energy Efficiency First Principle in road transport

The proposal to recast the Energy Efficiency Directive asks for including Energy Efficiency First as a principle also in non-energy sectors. Member States are mandated to ensure that energy efficiency solutions are taken into account in the planning, policy and major investment decisions related to non-energy sectors where those sectors have an impact on energy consumption and energy efficiency.[1]

Road transport accounts for 29% of EU final energy[2]. We therefore believe that the Energy Efficiency First principle should also be considered in the design of policies in this sector.

To this effect, we suggest that **a reference should be included in the proposed Regulation on CO2 emission standards for vehicles and to the proposed AFIR to the need to consider the Energy Efficiency First principle in policy, planning and investment decisions in relation to transport**, including as regards the well-to-wheel energy efficiency of different zero emission technologies.

In this regard, we note that battery electric vehicles are more energy efficient than other known zero emission technologies. For example, by 2030 a battery electric vehicle will be 2.8 times more energy efficient than a fuel cell one (see more details in Annex II). This should be considered when taking decisions.

[1] See recital 11 and Article 3(1)(b) of the proposal to recast the EED
[2] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_statistics_-_an_overview#Final_energy_consumption Figure 11 and numbers in https://ec.europa.eu/eurostat/databrowser/view/NRG_BAL_C__custom_510511/bookmark/table?lang=en&bookmarkId=079816c3-4e9e-47bc-bf54-59a988e639ae

ECI ask: In a recital, a reference should be included to the need to consider the Energy Efficiency First principle in policy, planning and investment decisions in relation to transport, including as regards the well-to-wheel energy efficiency of different zero emission technologies.

Alternative Fuels Infrastructure Regulation

ECI welcomes the Commission proposal as an important step forward in accelerating the deployment of recharging infrastructure for electric vehicles. The overall approach of a Regulation instead of Directive is helpful to ensure a faster, more homogeneous and coordinated deployment of recharging infrastructure across the EU.

Ambitious minimum requirements for public charging pools on the TEN-T network are essential to decarbonize transport at the speed required

We strongly welcome the proposed minimum requirements for publicly accessible recharging pools for light-duty vehicles on the TEN-T core network, i.e. deployment of charging stations in each direction of travel with a maximum distance of 60 km in-between them, with each charging pool offering a power output of at least 300 kW and including at least one charging station with an individual power output of at least 150 kW by 31 December 2025.

We nevertheless believe that these minimum requirements should apply to the comprehensive TEN-T network in the same timeframe as the core network. Current C-segment battery cars have a range of 400 km, more than enough to move around the place of residence, but not for long journeys. Power (related with the charging time) is as important as the even distribution of charging stations to reassure consumers that they will be able to use electric vehicles conveniently even to travel longer distances. Without this minimal infrastructure it will not be possible to convince consumers to switch to electric vehicles, and hence to decarbonise road transport at the required speed.

The comprehensive network includes the core network and, on average, is 2.3 times bigger than the core[3]. As a reference, in Poland, considering existing locations with access to both directions, it would be possible to cover the core network with 64 locations and an investment of €11.6 Million[4], while covering the rest of the comprehensive network would require a further 61 locations and an investment of €11 Million.

ECI ask: Apply the Article 3(2) minimum requirements to deploy charging stations every 60 km with a power output of at least 300 kW and at least one power output of at least 150 kW to the whole comprehensive TEN-T network by the end of 2025.

The proposal to deploy public charging stations in accordance with the uptake of EVs is welcome, but a much higher rate of power per every new EV is needed

[3] https://www.cedr.eu/download/Publications/2020/CEDR-Technical-Report-2020-01-TEN-T-2019-Performance-Report.pdf
[4] According to the Commission impact assessment on AFIR, the CapEx and installation costs of two 150 kW points would total €180,000.

The deployment of electric vehicles and of the recharging infrastructure must grow in parallel. The Commission has proposed a smart way to get around the 'chicken and egg' situation by mandating the deployment of publicly accessible charging stations for light-duty vehicles in a manner commensurate to the uptake of light-duty electric vehicles under Article 3(1). This approach relies on early adopters of electric vehicles, many of whom have access to off-street parking, to trigger the deployment of the required infrastructure for consumers requiring public recharging stations to enable charging of EVs parked overnight on the street.

While we support the Commission's approach to deploy recharging stations depending on the number of new EVs registered, we believe that a higher total power output of at least 2.3 kW per registered battery electric vehicle is needed, as opposed to 1 kW as proposed.

This is because our expectations differ from the Commission's assumptions in two respects: **First**, the Commission's proposed approach assumes that 50% of the energy provided by public infrastructure will be by normal charging points (up to 22 kW), however **we believe that a much higher proportion of 95% of normal charging points will be needed**. This is the approximate proportion of normal charging points today, as most electric vehicles are recharged through off-street facilities at home or at work. We also believe that in the future, energy service providers will manage the state of charge of the battery via artificial intelligence and forecasting which will lead to more reduced use of fast charging.

Secondly, **we expect that the average used power for normal charging points will be 3.7 kW, instead of 7.4 kW**. Considering the average performance of battery electric vehicles (15 kWh/100km) and the average daily driven distance (40 km), approximately two hours will be required to replenish the energy used during the day with a 3.7kW charging point. In most cases, we do not expect there to be a need to use an installed capacity of 7.4 kW to further limit charging time to one hour.

A detailed explanation of how we have calculated the power output/new BEV of 2.3kW is included in **Annex I.**

ECI ask: Increase the required charging power output to be deployed by member states per every registered battery electric vehicle under article 3(1) to 2.3 kW.

Deployment of public recharging stations in residential areas

Urban public recharging infrastructure is key to convince consumers without off-street parking to switch to electric vehicles. Depending on the Member State, this applies to between 19% and 66% of the national car fleet (France 19%[5], Germany 30%[6], UK 30%[7], Italy 52%[8], Spain 66%[9]).

Public recharging stations should as a priority be deployed in residential areas to allow convenient on-street charging. Equally, the priority should be to deploy more charging stations with a lower power output (7.4 kW), as opposed to fewer stations with higher output (22 kW) at commercial locations.

There are several reasons to prioritise the deployment of low power (approx. 7 kW) recharging stations in urban areas where vehicles park for extended periods of time, typically residential areas:

1. Simply plugging and charging the vehicle when arriving at home or to work is **the most convenient way to recharge for a large segment of consumers**, and therefore important for accelerating EV uptake.
2. **A 3.7 kW charger is enough to replenish the average energy used during the day in less than three hours** (7.4 kW for light commercial vehicles and heavy users). According to the AFIR impact assessment and assuming a 15-year operating life, the lifetime cost of a 7.4 kW charging point is 1,660€[10]. Assuming that the point will provide 6 kWh a day on average to replenish the energy used by one BEV a day, a surcharge of 5 c€/kWh will be enough to cover the costs of that charging point.
3. Prioritising urban low power charging infrastructure where vehicles park for extended periods of time is important to maximise the **potential of battery electric vehicles to provide energy services** to reduce renewable curtailments[11], grid congestion[12] and energy costs for consumers recharging at "off-peak" times. The ability to **integrate road transport with the electricity system** is an important benefit of EV deployment.

ECI ask: Amend article 3(1) to mandate member states to ensure that a sufficient number of low power publicly accessible recharging stations for light-duty vehicles is deployed in locations where vehicles typically park for extended periods of time.

Other considerations

- ECI welcomes the requirement under Article 5(8) for operators of charging points to ensure that all publicly accessible normal power charging points (22 kW or less)

[5] https://www.statistiques.developpement-durable.gouv.fr/sites/default/files/2018-11/La_mobilite_des_Francais_ENTD_2008_revue_cle7b7471.pdf
[6] https://www.vda.de/dam/vda/publications/2015/fat-schriftenreihe-271.pdf Table 2-1 with weighted average
[7] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/6748/2173483.pdf
[8] https://www.motus-e.org/wp-content/uploads/2020/10/Il-futuro-della-mobilit%C3%A0-elettrica-linfrastruttura-di-ricarica-in-Italia-2030-2.pdf
[9] https://translate.google.com/translate?sl=es&tl=en&u=https://www.idealista.com/news/inmobiliario/vivienda/2017/06/14/746871-solo-el-35-de-las-viviendas-en-venta-en-espana-tienen-plaza-de-garaje
[10] https://ec.europa.eu/info/sites/default/files/revision_of_the_directive_on_deployment_of_the_alternative_fuels_infrastructure_with_annex_0.pdf page 276 of the file
[11] https://www.bundesnetzagentur.de/SharedDocs/Downloads/EN/BNetzA/PressSection/ReportsPublications/2020/AnnualReport19.pdf?__blob=publicationFile&v=1 In 2018 in Germany 5,400 GWh were curtailed at a cost of 635 M€.
[12] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015285/electric-vehicle-smart-charging-government-response.pdf

operated by them are capable of **smart recharging** from 22 days after publication of the new regulation, not only the new ones. This is key to reduce grid and building installation congestion, renewable generation curtailments and energy prices for consumers.

- We believe that Member States' National Policy Frameworks (NPFs) should include **maximum lead times for the granting of new grid connections** of 8-12 weeks for AC charging infrastructure and 4-6 months for DC charging infrastructure from the request for a permit to the realisation of the connection to the grid.
- Annex III on the **reporting requirements** on deployment of electric vehicles and recharging infrastructure requires member states to report the number of stations not operational *on 50% of the available days in a given year*. We believe that 50% is too high and would suggest to revise this downwards to 5%. As an example, EVBOX claims for an uptime of 99.5%[13]

Copper makes a significant net contribution to the clean energy transition

Copper is one of the materials that makes the transition to e-mobility possible. On average, a battery electric vehicle requires three times more copper than a vehicle driven by a combustion engine.

But copper is also a key material for the clean energy transition in buildings and industry. Thanks to its excellent electrical and thermal conductivity, copper delivers energy savings and CO_2 reductions across the electricity system. Copper is used in applications such as windmills, power grids, electrical installations, solar panels, building automation, energy storage, solar thermal, wastewater heat recovery, heat pumps and batteries. Overall, copper-enabled decarbonising technologies can abate approximately 75% of the EU GHG emissions[14].

The additional copper demand generated by the energy transition is compatible with the move towards a circular economy. Copper can be recycled endlessly without loss of properties and already today, around 50% of copper produced in the EU is obtained through recycling. Copper also contributes to resource efficiency as a carrier metal and by-products of copper production include other metals needed for the energy transition like zinc, molybdenum and nickel.

The copper industry makes up approximately 0.4% of the EU's GHG emissions. The industry has significantly decreased the per-unit energy consumption of copper through improvements such as flash smelting, use of oxygen, energy management and excess heat recovery. Copper producers are working to further reduce their carbon footprint for instance through increasing electrification and the use of renewable energy. As an industry we are putting together a decarbonisation roadmap to 2050, while in parallel individual copper producers are working hard to define and realise their specific decarbonisation pathways.

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[13] https://evbox.com/us-en/partners/car-manufacturers

[14] Copper estimate based on the EU 2050 "High-RES" scenario of the EU 2050 energy roadmap, plus additional assumptions about the uptake of emerging technologies.
https://ec.europa.eu/energy/sites/ener/files/documents/2012_energy_roadmap_2050_en_0.pdf

GHG estimate based on DecarbEurope. https://decarbeurope.org/

About the European Copper Institute

The European Copper Institute (ECI) is the leading advocate for the copper industry in Europe and the European arm of the International Copper Association (ICA). Our members mine, smelt, refine and recycle copper for use across the economy, in the electricity system, buildings, transport and industry.

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ANNEX I

Calculation behind ECI request to increase the charging power output per every new electric vehicle to 2.3kW

Assumptions	**Impact Assess.**	**ECI**
number BEVs by 2030	34.322.000	
km/year	13.141	
kWh/km	0,148	
Average normal nominal power (kW)	7,7	
Average normal delivered power (kW	7,7	3,7
Average fast nominal power (kW)	130	
Average fast delivered power (kW)	104	
Normal utilization rate (h/day)	1,80	2,00
Fast utilization rate (h/day)	3,00	
Rate energy delivered public normal	20%	38%
Rate energy delivered public fast	20%	2%
Calculations		
Total energy fleet / year (kWh)	66.751.759.496	
number normal chargers	2.638.983	9.391.214
number fast chargers	117.232	11.723
kW/BEV	1,04	2,15
		2,3

Notes:

- 2.3, instead of 2.15, considering the new definition of publicly available including semi-public ones (end-user requirements or opening hours).
- ECI column only includes the figures which are different than the ones considered in the impact assessment.
- According to current average driving patterns in EU, 3.7 kW is enough to replenish in less than three hours the energy used during the day. ECI recommends to install 7.4 kW considering heavy users and to also provide flexibility to the system.
- 40% of the energy supplied by public charging points seems to be aligned with the share of passenger cars which are parked overnight on the street (France 19%, Germany 30%, UK 30%, Italy 52%, Spain 66%).

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ANNEX II

Well to wheel energy efficiency of a BEV and a FCEV with green energy[15]

WIND	**WTT (MJ_{fuel}/MJ)**	
Electricity (WDEL)	1,07	
H2 (WDEL average)	1,91	
Passenger cars	**TTW (MJ/100km)**	
BEV400 2025+	44,71	
FCEV 2025+	69,74	
Heavy Duty	**TTW (MJ/tkm)**	
Group 4 (rigid)		
BEV 2025+	1,225	
FCEV 2025+	1,755	
Group 5 (long haul)		
BEV 2025+	0,3279	
FCEV 2025+	0,4795	
Passenger cars	**WTW (MJ_{fuel}/100km)**	**Ratio**
BEV400 2025+	47,84	**2,8**
FCEV 2025+	133,2	
Heavy Duty	**WTW (MJ_{fuel}/tkm)**	
Group 4 (rigid)		
BEV 2025+	1,311	**2,6**
FCEV 2025+	3,352	
Group 5 (long haul)		
BEV 2025+	0,3509	**2,6**
FCEV 2025+	0,9158	

Acronyms
WTT: well to tank
TTW: tank to wheel
WTW: well to wheel
BEV: battery electric vehicle
FCEV: fuel cell electric vehicle

[15] https://ec.europa.eu/jrc/en/jec/publications/reports-version-5-2020