

A review of the Alternative Fuels Infrastructure Regulation (AFIR) proposal

BACKGROUND AND REGULATORY CONTEXT

Decarbonizing road transport is a key lever to meet the European Union's (EU) Climate Law objective of carbon neutrality by 2050. Transitioning to zero-emission vehicles, namely battery-electric and fuel cell vehicles, is necessary to achieve these objectives. The technological feasibility and economic viability of these vehicles have already been established in previous ICCT assessments. However, building an extensive charging and hydrogen refueling network is a prerequisite to enable high adoption of these vehicles. The EU's Alternative Fuels Infrastructure Regulation (AFIR) was proposed in July 2021 to address this issue, as part of the "Fit for 55" package of the European Commission. The proposed regulation would set mandatory targets for deployment of infrastructure for charging and hydrogen refueling for both passenger cars and vans as well as trucks.

PASSENGER CARS AND VANS

Regarding passenger cars and vans, the AFIR proposal suggests 1 kilowatt (kW) of publicly accessible charging capacity for each battery electric vehicle (BEV) and 0.66 kW for each plug-in hybrid vehicle (PHV). As shown in Figure 1 below, **all EU Member States had already met the proposed targets as of the end of 2021**. This suggests that the regulation as proposed would not compel additional construction of charging infrastructure in most of the EU in the near future.

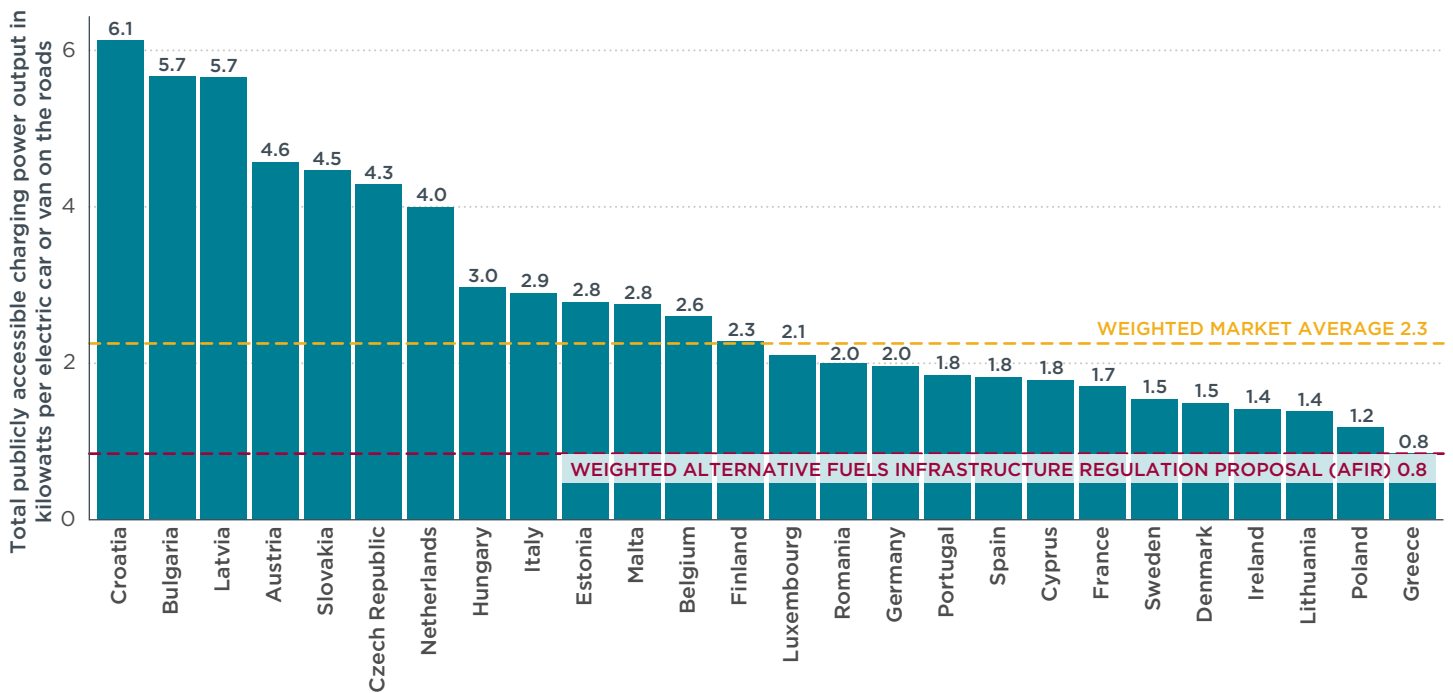


Figure 1. Total publicly accessible charging power output (in kW, data from Eco-Movement) per electric car and van on the roads at the end of 2021 for every European Union Member State (data not available for Slovenia).

Many countries in the eastern part of the EU (e.g., Bulgaria, Latvia, and Slovakia) are performing particularly well relative to the AFIR target, and have more public charging capacity per vehicle than countries in the western and northern parts of Europe (e.g., Sweden, Denmark, and France). However, these eastern countries have had lower electric vehicle uptake and have fewer charge points in absolute terms.

A detailed bottom-up analysis of charging infrastructure needs for passenger cars and vans in Europe was conducted by the ICCT. Its results suggest that, **while the AFIR- proposed targets are sufficient in the long term, higher targets that vary with the electric share of car and van stock are necessary in the short term.** Indeed, due to lower expected charge point utilization, higher charging targets are necessary for markets with less than 15% electric share of passenger car and van stock. This adjustment can be done using a stepwise approach, as illustrated in Figure 2 below.

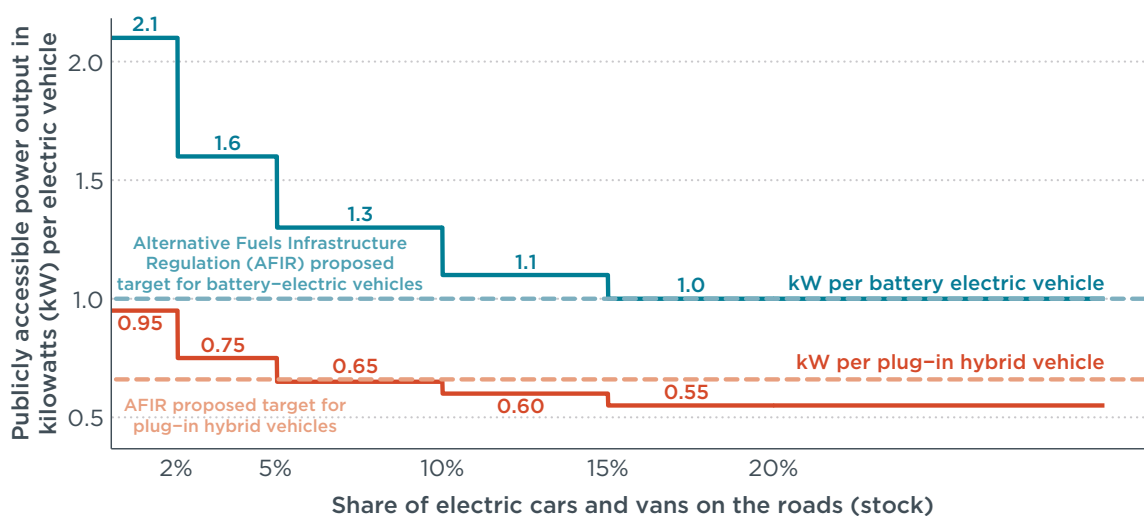


Figure 2. Recommended total public power output per BEV (blue) and per PHV (red) depending on Member States' electric share of car and van stock.

Markets with an electric car and van stock share below 5% will require public charging power output of at least 1.6 kW per BEV and 0.75 kW per PHV. This is currently the case for all EU Member States but Sweden. In the longer run—once 15% of a Member States’ car and van stock is electric—the required public charging capacity will be 1 kW per BEV and 0.55 kW per PHV, similar to the AFIR proposal. This level of electric vehicle uptake is expected for 2028 in the EU as a whole.

HEAVY-DUTY VEHICLES

The AFIR provisions regarding heavy-duty vehicles propose minimum requirements for the rollout of the charging and hydrogen refueling infrastructure across the core and comprehensive Trans-European Network for Transport (TEN-T). To assess the suitability of the targets proposed by the European Commission, the ICCT conducted a detailed bottom-up assessment of infrastructure needs for zero-emission trucks.

The proposed charging infrastructure rollout targets under the AFIR exceed the needs of the battery-electric truck fleet in 2025. Nonetheless, it is essential to maintain these targets because a rapid rollout of the infrastructure for zero-emission trucks is critical to provide confidence in electric trucks among manufacturers and fleet operators during the early market uptake phase. On the other hand, **the AFIR proposal largely underestimates the charging infrastructure needs for 2030 by more than 80%** (Figure 3).

The rollout of hydrogen refueling infrastructure resulting from the proposed targets overestimates the needs of the fleet and would not be needed until 2035. This is driven by the low expected market uptake for fuel cell trucks relative to battery-electric trucks. Based on a techno-economic analysis developed by the ICCT, fuel cell trucks would account for only 9% of the long-haul truck sales by 2050.

The infrastructure rollout must not be homogeneous across Member States but rather targeted based on traffic volumes along the different segments of the TEN-T network. This recommendation stems from our analysis of traffic flow data.

Total installed power of public charging infrastructure (Gigawatts)

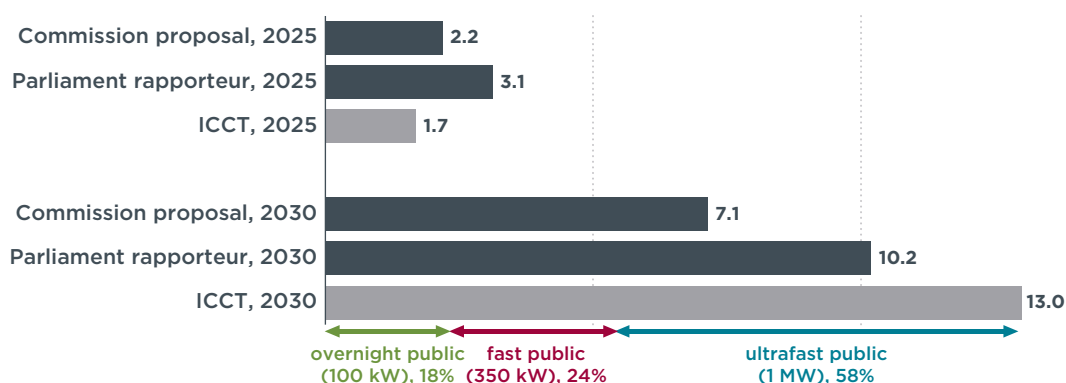


Figure 3. Total required installed power as calculated by the ICCT and compared to targets proposed by the European Commission and by the European Parliament’s rapporteur.

The AFIR targets for heavy-duty vehicles could be amended to align with the ICCT results regarding the total required charging power and hydrogen refueling stations’ capacity, while giving flexibility to adopt lower targets based on traffic volume across the different segments of the TEN-T network. By default, Member States should comply with the highest proposed targets. However, Member States can pursue lower targets on some roads of their domestic TEN-T network by applying to the European

Commission for a derogation complete with documentation of the low traffic volumes along these roads.

Several recommendations can be drawn from the analysis. These are summarized below and presented in Figure 4:

- » For the **2025** targets, increase the charging pool nominal power requirements across the core TEN-T network to **2,000 kW every 60 km**, while allowing the flexibility to adopt lower targets based on traffic volumes.
- » For the **2030** targets, align the charging pool nominal power requirements **for the core and comprehensive networks** and increase the nominal power to **9,000 kW every 60 km** while allowing the flexibility to adopt lower targets based on traffic volumes.
- » For **hydrogen refueling stations**, eliminate the simultaneous requirement for liquid and compressed hydrogen and increase the hydrogen refueling station nominal capacity requirement to **3 tonnes per day every 150 km** while allowing the flexibility to adopt lower targets based on traffic volumes. We also recommend **postponing the implementation of these targets until 2035**.

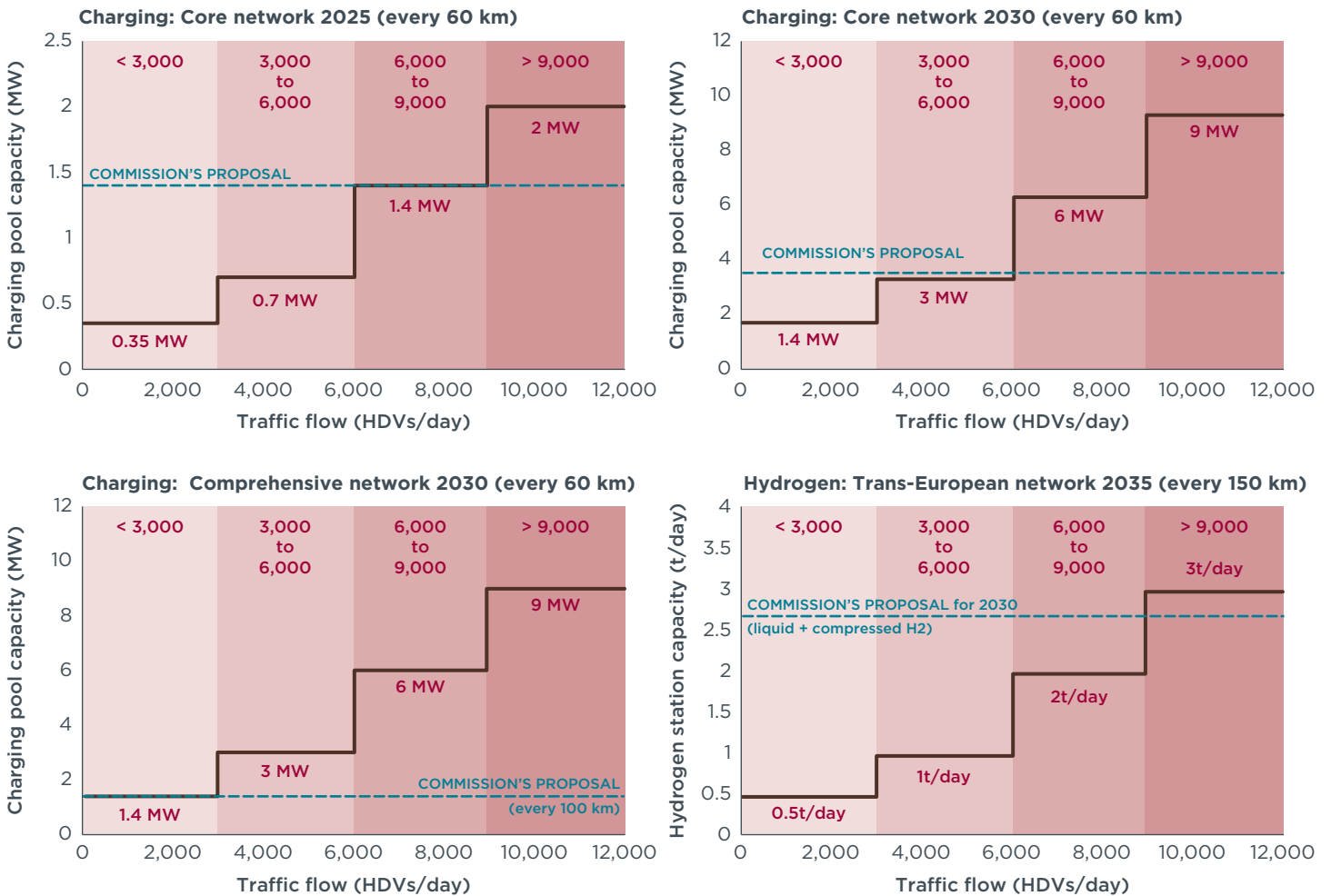


Figure 4. ICCT's proposal for traffic-based targets for the rollout of charging and hydrogen refueling infrastructure along the Trans-European Network for Transport – core and comprehensive.

PUBLICATION DETAILS

Title: A review of the AFIR proposal: How much power output is needed for public charging infrastructure in the European Union?

Authors: Marie Rajon Bernard, Michael Nicholas, Sandra Wappelhorst, and Dale Hall

Download: <https://theicct.org/publication/europe-ldv-review-of-afir-proposal-how-much-power-output-needed-for-public-charging-infrastructure-in-the-eu-mar22>

Contact: mrajonbernard@theicct.org

Title: A review of the AFIR proposal: Public infrastructure needs to support the transition to a zero-emission truck fleet in the European Union.

Authors: Pierre-Louis Ragon, Eamonn Mulholland, Hussein Basma, and Felipe Rodríguez

Download: <https://theicct.org/publication/europe-hdv-review-of-afir-proposal-public-infrastructure-needs-to-support-transition-to-zero-emission-truck-fleet-in-eu-mar22>

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