Brussels, 5 March 2020

Joint call for the deployment of hydrogen fuel cell trucks
A needed shift towards a carbon-neutral society

The **European Green Deal** made it clear: carbon neutrality by 2050 is the goal to be achieved. As the transport sector accounts for a quarter of the EU's greenhouse gas (GHG) emissions and is a sector in which GHG emissions have been rising[1], drastic changes are required: **a 90% reduction in transport GHG emissions is needed by 2050 to achieve climate neutrality[2].**

In the road transport sector, which is responsible for two-thirds of all transport emissions[3], this shift cannot occur when the current technology is still used, and this will require a mix of different solutions to deliver decarbonised mobility. In Europe, industry players have invested heavily on technology, either to achieve the required norms or to develop alternative solutions that have led to the maturity of the sector. The **current CO_2 emissions regulation on heavy-duty vehicles[4]** foresees a CO_2 emission reduction of 15% by 2025 and 30% by 2030 for the most important categories of trucks[5]. **To meet the target, low- and zero-emission vehicles are needed, and this represents an essential opportunity to develop and roll out innovative solutions such as hydrogen fuel cell trucks**.

Fuel cell trucks powered by low carbon and renewable hydrogen as a key solution to decarbonise the truck sector

Hydrogen fuel cell trucks are electric trucks powered by electricity generated on board by a fuel cell that uses hydrogen as fuel (in gaseous or liquid form). We are convinced that this technology will play a key role in the transition to a carbon-neutral society for several reasons.

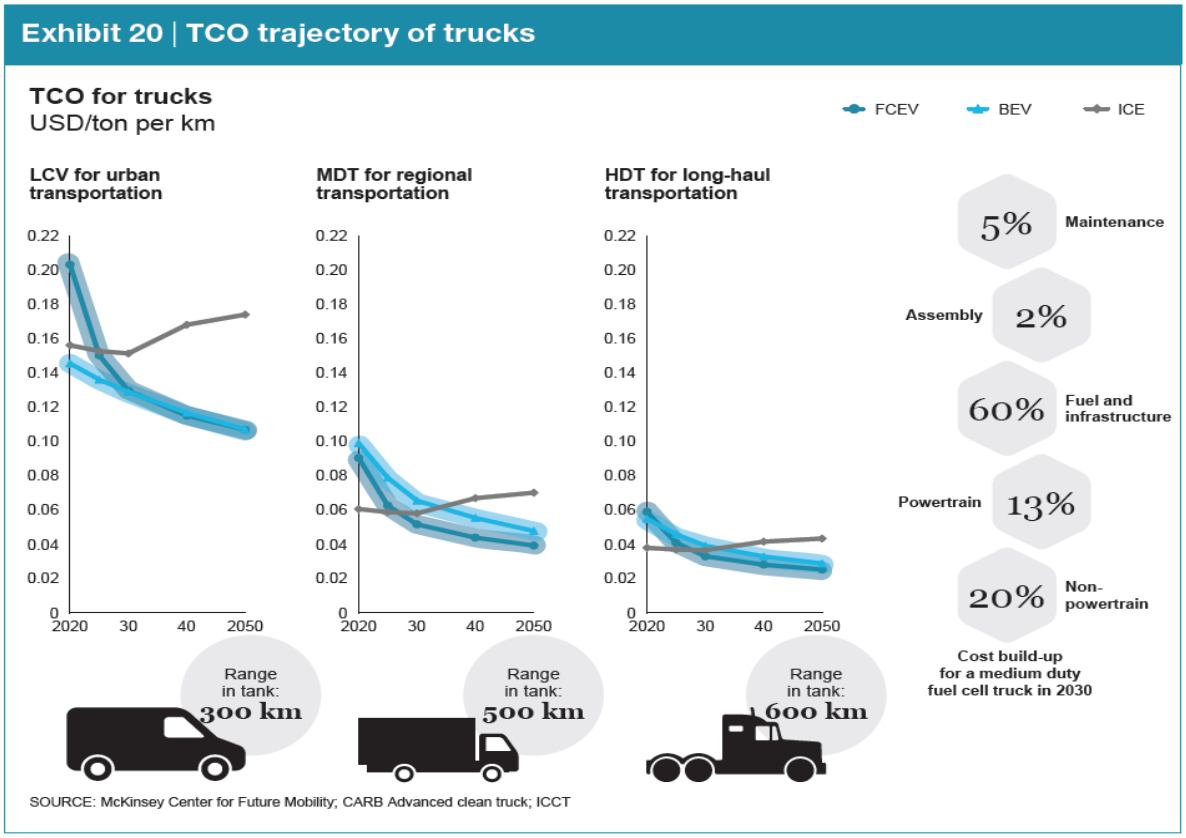
Hydrogen as an energy carrier is necessary to enable the massive shift to a renewable energy system: the use of hydrogen as a fuel is currently the only way to integrate and store growing amounts of renewables. Hydrogen can be generated sustainably and be available anytime, anywhere.

Given its size, the truck market is one of the largest enablers of the renewable hydrogen economy: with 6.5 million trucks in circulation across the EU and nearly 400,000 trucks registered[6] annually in Europe, economies of scale are expected to reduce the total cost of ownership (TCO) of hydrogen trucks, both in components and hydrogen supply. Hydrogen fuel cell trucks are expected to be on par with combustion engines by 2030 (TCO), as recently announced in the Hydrogen

[1] https://www.eea.europa.eu/airs/2018/resource-efficiency-and-low-carbon-economy/transport-ghg-emissions
[2] COM(2019) 640, "the European Green Deal"
[3] https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases/transport-emissions-of-greenhouse-gases-11
[4] Regulation (EU) 2019/1242
[5] Specifically 4x2 tractor, which are estimated to represent 54% of trucks CO_2 emissions according to the EC staff working document Impact Assessment SWD(2018) 185
[6] In 2018 – source ACEA pocket Guide 2019-2020 https://www.acea.be/uploads/publications/ACEA_Pocket_Guide_2019-2020.pdf

Hydrogen Europe Secretariat, Avenue de la Toison d'Or 56-60, B-1060 Brussels, Belgium
Tel: +32 2 540 87 75 l Email: secretariat@hydrogeneurope.eu l Website: www.hydrogeneurope.eu l Twitter : @H2Europe

Council's study[7]. In addition, trucks require large amounts of hydrogen: 10,000 fuel cell trucks will need around 100,000 t of hydrogen annually[8].



Fuel cell trucks offer similar operational requirements as conventional vehicles compared to other zero-emission technologies, with a longer range and shorter refuelling time, however the alternative drivetrain (battery modules, fuel cell and hydrogen tanks) could require some adjustments to the vehicle's architecture. Hydrogen fuel cell trucks have a heavy payload similar to that of combustion engines given the high energy density of hydrogen.

In addition, fuel cell trucks in driving operation have **zero tailpipe emissions**, which contributes to reducing local air pollution. There is a **potential for zero-emission well-to-wheel** depending on the pathway used to produce hydrogen. Fuel cell trucks consume less energy to travel the same distance as trucks powered by combustion engines, which will massively reduce the energy burden of transport. Moreover, trucks often operate in fleets, which makes the infrastructure profitable due to the high utilisation rate and will decrease the cost of the fuel. Trucks applications also benefit from technology transfer to/from other transport applications, such as the use of same fuel cells or tanks in maritime or railway sectors, resulting in increased volume and reduced cost of key components.

[7] https://hydrogencouncil.com/wp-content/uploads/2020/01/Path-to-Hydrogen-Competitiveness_Full-Study-1.pdf, p 37
[8] Assumption: long haul truck driving 120,000 kms/year; hydrogen consumption of app. 8kg hydrogen/100 km

Hydrogen is particularly suitable for long-haul trucks of over 16 t. For long-distance, hydrogen is expected to represent the most promising carbon-neutral solution. Hydrogen can also be a suitable solution for **regional distribution and other applications requiring high energy use** (e.g. refrigerated/garbage trucks).

We aim to make **large-scale deployments of fuel cell trucks a reality soon**, with pre-commercial series ready by 2025 and full commercialisation by 2030 and beyond: **with 5,000-10,000 vehicles, and with up to 95,000 vehicles by 2030[9], in all segments**. We estimate that we would need approx. **100 hydrogen refuelling stations by 2025 and 1,000 stations by 2030 to fill these trucks.**

We will strive to deliver low carbon, renewable hydrogen at a competitive cost at the nozzle. The fact that renewable electricity prices are going down is a sign in this direction. This is in line with the EU's ambition to work on developing a carbon-neutral society, in which not only the tank-to-wheel approach would be considered as is the case in current EU regulations.

Conditions to enable hydrogen fuel cell trucks fast deployment

98.3% of all heavy and medium trucks on Europe's roads today run on combustion engines[10]. Market entry costs are still high for the supply of fuel cell vehicles and hydrogen fuel. This could deter end-users from choosing the hydrogen fuel cell truck options, while major European companies are already investing in this technology at their own risk. In terms of infrastructure, a comprehensive refuelling infrastructure will need to be deployed (€ billions annual investments expected), which cannot happen without strong political and financial support. Individual actions will not be enough to trigger a significant market change unless measures leverage these initiatives at national and European level. The different set of actions can be summarised as follows:

Reward mechanisms for early adopters and bridge to mass market adoption: innovative technology is not expected to have the same total cost of ownership as conventional technologies from day one. Mechanisms should be put in place to encourage the purchase of such vehicles and co-fund the operational costs (incl. additional fuel costs). In this regard, the newly established ETS innovation fund is a step in the right direction. We, therefore, call on the European institutions to set up and strengthen co-funding mechanism for end-users (e.g. fleets operators, hauliers) to state that they would be ready to accept a cost premium for innovative technology and/or a longer pay-back time.

We welcome the **upcoming revision of the Alternative Fuels Infrastructure Directive in 2021 (AFID[11])**: to ensure a level playing field with other fuels, the AFID needs to be revised and include hydrogen as a mandatory fuel, reflecting the maturity and the number of vehicle forecasts in the sector. This must be combined with the appropriate incentives in place at the national level, and with a certainty on the number of vehicles. In addition, the Directive should require the robust implementation of the National Policy Frameworks. Setting binding targets for the Member States will encourage strategic planning of hydrogen refuelling infrastructure in collaboration between

[9] See Strategic Research and Innovation Agenda: https://www.cleanhydrogenforeurope.eu/
[10] https://www.acea.be/uploads/publications/ACEA_Report_Vehicles_in_use-Europe_2019.pdf#page=16
[11] Directive (EU) 2014/94 on alternative fuels infrastructure

public and private stakeholders, leveraging also on the availability of existing assets (e.g. gas grid). In the heavy-duty sector, such a collaboration would arise from the need to install different types of hydrogen refuelling stations depending on the strategic location planning.

The **demand and supply of vehicles and infrastructure should be planned and coordinated** accordingly at European and national level, in discussion between the industry and public authorities. This will help identify the best refuelling locations, e.g. on motorways along the TEN-T corridors or depot-based stations. Both options should be supported at an early stage of deployment.

The already existing **co-funding and financing schemes should be further strengthened.** We welcome the CEF blending facility and the opportunity that it will leverage. However, we believe that the current funding of 20% for the additional costs on the vehicle side and 20% of the infrastructure should be re-evaluated and supported with higher rates. In addition, the co-funding should cover not only initial capital expenditures but also the additional operational costs of the trucks. Furthermore, the CEF mechanism must ensure that hydrogen refuelling infrastructure roll-out happens in both TEN-T Core and Comprehensive networks. The TEN-T guidelines[12] should also be amended to reflect the sustainability goals in their requirements. Regional funds should help to fill existing gaps in EU regions, as well as in remote areas, especially due to the large role regions play in the creation of a hydrogen ecosystem[13]. Other financial instruments – such as the European Investment Bank– should be also targeted to unlock innovative business cases and new solutions to infrastructure coverage.

We seek the **leverage of the European industrial competitiveness** in the hydrogen sector with dedicated schemes such as Important Projects of Common European Interest (IPCEI). Coordination amongst EU funding and financing opportunities must be strengthened: Just Transition Fund, EIB, CEF, IPCEI and The Clean Hydrogen for Europe Interinstitutional Public-Private Partnership (IPPP) currently under discussion will also be instrumental. In this IPPP, there should be a substantial increase in funding for hydrogen fuel cell trucks and their infrastructure compared to Horizon 2020. Trucks are a high priority for the hydrogen sector, as reflected in the draft Strategic Research and Innovation Agenda published in fall 2019.

Finally, this call remains conscious that **a European-wide hydrogen strategy**, including critical milestones and pathways to 2050, **must be created to ensure cross-sectoral and cross-border alignment to enable the EU to achieve carbon-neutrality while safekeeping key industrial sectors and jobs**.

[12] Regulation (EU) No 1315/2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU

[13] a Smart Specialisation Platform dedicated to hydrogen, "European Hydrogen Valleys Partnership" has been set up in 2019.

Hydrogen Europe

Signatories

Hydrogen Europe Secretariat, Avenue de la Toison d'Or 56-60, B-1060 Brussels, Belgium
Tel: +32 2 540 87 75 l Email: secretariat@hydrogeneurope.eu l Website: www.hydrogeneurope.eu l Twitter : @H2Europe